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ABSTRACTS OF INDIVIDUAL PRESENTATIONS

Abbott, David (Arizona State University)
[194] What We Know and What We Wished We Knew about Hohokam Platform Mounds

In January 1888, Frank Hamilton Cushing rode his horse atop the Hohokam platform mound at Los Hornos in the lower Salt River valley, and took note of numerous other mounds that dotted the valley's landscape. The monuments' spacing led Cushing to conceive of the valley-wide settlement as an integrated network for communication and irrigation management, and archaeologists have been trying to figure out the settlement structure and organization ever since. Today, the evidence from platform mounds fuels vigorous discussion of their significance from multiple perspectives. When synthesized, the mound data steer us towards refined insights about Hohokam communities.

Abel, Alanna [383] see Lorenz, Samantha

Abel, Timothy (SUNY Canton), Jessica Vavrasek (PhD Candidate, University at Albany, SUNY) and John Hart (New York State Museum)
[73] Radiocarbon Dating the Iroquoian Occupation of Northern New York

Fifty new, high-precision AMS radiocarbon dates have been obtained on maize, faunal remains and ceramic residues from 18 pre-contact Iroquoian village sites in northern New York. These dates add significant new information to the chronology of the Iroquoian occupation of the region. Once thought to span AD 1350-1500, these new dates suggest an AD 1450-1520 period of occupation. The evidence now points to their arrival in the region in the late pre-contact period from as many as four different origins. In roughly 70 years, they occupied 40-50 village sites. Village space among some of the village sequences tripled during this period, marked by increasingly larger and more fortified villages- some as large as 3 ha. During their time in northern New York, they were integral to social networks between ancestral Haudenosaunee, Wendat and other St. Lawrence Iroquoian groups. The new chronology points to population pressure and local warfare as being major contributors to their dispersal from the region by 1520.

Abo, Stephanie (Brigham Young University)
[397] Chemical and Standardization Analysis Results on Fremont Snake Valley Black-on-gray Pottery

Archaeologists widely argue that Fremont potters from the Parowan Valley, in southwestern Utah, manufactured Snake Valley pottery. For my research, I examined various properties of Snake Valley Black-on-gray (SVBG) ceramics using metric data, statistical methods, and newly obtained neutron activation analysis data. I compared my data results on SVBG sherds from archaeological sites within the Parowan Valley to my results on SVBG sherds recovered from archaeological sites over 200 kilometers to the north. My research expands on the limited knowledge of the painted variety of Snake Valley pottery; as well as provides insight into the overall understanding of pottery distribution among different geographical regions within the Fremont culture.

Acabado, Stephen [408] see Koller, Jared

Acabado, Stephen (UCLA) and Marlon Martin (Save the Ifugao Terraces Movement)
[421] Indigeneity and Empowerment: The Politics of Ethnic Labeling in the Philippines

The 300+ years of Spanish, and later, American colonial administration in the Philippines provided the backdrop to regionalism and distinct ethnolinguistic boundaries that borders into prejudice. This is highlighted by the acrimonious relationship between upland and lowland Filipinos, where the idea of being colonized/uncolonized became the foundation of their identities. As an example, this presentation provides a case study that argues that Philippine ethnolinguistic identities were crafted in the last 150 years. Of particular interest is the identity of the Ifugao, whose cultural identity is centered on their rice terracing tradition and the dominant historical narrative of being 'uncolonized'. Recent archaeological findings contest these descriptions as the shift to wet-rice cultivation and drastic landscape modification occurred soon after contact with the Spanish in the late 1500s. This presentation argues that current Philippine historical narratives perpetuate the colonial-era ideas that people outside the *bajo de campana* and/or the *reducción* system were uncivilized.

Acero, Erick E. [315] see Rojas-Pelayo, Lisseth

Acevedo Peralta, Benjamin [412] see Torreggiani, Irene

Achimo, Mussa [338] see Raja, Mussa

Ackerly, Neal (Dos Rios Consultants, Inc.)

[264] *Carlisle, NM: The Short Life of an Early Gold-Mine*

The Carlisle claim was located January 1881. The mine and town operated as the Cochise Company until 1883 when it was acquired by N. K. Fairbanks, the lard king of Chicago. Within a year, Fairbanks sold the mine and nascent town to a London consortium operating as the Carlisle Gold Mining and Milling Company, Ltd of London. With a 40-stamp mill, hotel, restaurants, and mercantile stores, all supplied with mule-drawn wagons, it was a booming operation. By 1885, the territorial census shows the mine and associated town having 198 people, exceeded only by Silver City's estimated population of 975 people. CGMMC continued to operate the mine through much of 1888, finally selling all assets to yet another British company, Gold Leaf, Ltd. late in the year. Despite misplaced optimism, mining at Carlisle had ceased by 1890, although sporadic efforts to resurrect the mine continued through 1942. This paper combines documentary studies, vintage photographs, and archeological research to present a comprehensive overview of the history of Carlisle and its inhabitants as it related to broader patterns of the rise and fall of mine development across the American West.

Acosta-Ochoa, Guillermo (Instituto de Investigaciones Antropológicas), Emily McClung de Tapia (Instituto de Investigaciones Antropológicas, UNAM), Laura Beramendi-Orosco (Instituto de geología, UNAM), Diana Martínez-Yrizar (Instituto de Investigaciones Antropológicas, UNAM) and Galia González-Hernández (Instituto de geofísica, UNAM)

[38] *Prehispanic Chinampas at El Japón, Xochimilco: Structure and Chronology*

El Japón in San Gregorio Atlapulco, Xochimilco (Mexico City) was a Postclassic-Early Colonial chinampa community, previously reported and partially surveyed by Lechuga (1977), Parsons et al. (1982, 1985), Ávila López (1995) and González (1996). In 2013, investigators from the Instituto de Investigaciones Antropológicas, UNAM initiated a geoarchaeological, paleoethnobotanical and chronological study of the site which is severely threatened by encroaching urbanization and changes in land-use. The postclassic habitational platform is partially destroyed and a broad area of chinampas has been lost. Evidence from recent excavations of these chinampas indicate their initial occupation towards the end of the fifteenth century AD and abandonment after approximately two centuries. Geoarchaeological analyses and AMS dating suggest that chinampa construction in this area was more complex than anticipated, including the reutilization of mid-Holocene sediments from the documented preceramic occupation of the site in addition to the use of layers of diatomaceous sediments, the function of which is yet to be confirmed.

Acuna, Julian (California State University, San Bernardino)

[394] *Exchange, Crafting, and Subsistence at Early Formative Period La Consentida*

The Early Formative (2000–1000 B.C.) period in Oaxaca is generally regarded as a transitional period from the Archaic (7000–2000 B.C.). The early formative is characterized by a change in subsistence, social organization, and sedentism. This period included the emergence of La Consentida, the earliest known settled village in coastal Oaxaca. This paper presents an analysis of the chipped stone assemblage of La Consentida focusing on obsidian, the material most used at the site. I present technological considerations regarding manufacturing techniques and subsequent issues regarding technique implementation, in addition to the within-site distribution of lithics, and other artifact classes, at the site and relate this to manufacturing techniques and inferences towards social organization. Results indicate that obsidian was a favored material for lithic manufacture used in expedient lithic reduction. Additionally, the way in which lithics, and more importantly obsidian lithics, are distributed at the site indicates a purposeful designation for manufacture and use in specific locations. Therefore, ascertaining how the lithic artifacts were distributed throughout the site will help expand current understandings of Early Formative period exchange, crafting, and subsistence practices.

Adaev, Vladimir [154] see Piezonka, Henny

Adair, Mary (University of Kansas)

[80] *Context and Age of Early Maize (*Zea mays*) in the Central Plains*

Maize, or corn, was one of the dominate crops to many North American Plains tribes, contributing beyond subsistence to origin beliefs, rituals, ceremonies, and trade. Given this, archaeologists seek to recreate the evolutionary processes by which maize became an important element in the economy of Plains populations. Central to this understanding is documenting the arrival of this cultigen. Using microbotanical identifications from absorbed and visible cooking residues and tooth calculus, coupled with AMS dates, this paper summarizes what we currently know about the distribution of this crop in central Plains contexts dating from ca. 1900BP to 1500BP. These data add to a growing body of information on the northern and eastern dispersal of maize with incidences of maize starch and phytoliths occurring 700-800 years earlier than the direct dated macrobotanical remains. A suggested use of maize recovered from microbotanical analysis is offered.

Adam, Manda, Zachary Stanyard (University of Texas at Austin) and Fred Valdez (University of Texas at Austin)

[120] Detection of Water Management Systems Using LiDAR at Las Abejas, Belize

In 2016, the PfBAP (Programme for Belize Archeological Project) employed airborne LiDAR (light detection and ranging) remote sensing technology to map the project area in northwestern Belize. The PfBAP has used LiDAR data to detect and analyze anthropogenic modifications created by the ancient Maya. With this data in hand, we have generated a map with which to locate and ground-truth such anthropogenic modifications. Using this map as a guide, we have identified potential areas for excavation, and have begun to enrich our understanding of how ancient peoples molded and modified their environments. This poster explores the detection of water management features on the landscape that have been identified using LiDAR data. Here the ancient Maya site of Las Abejas serves as a case study to develop and demonstrate methods of detecting water management systems.

Adam, Manda [30] see Trein, Debora

Adams, Alisha (University of Otago), Sian Halcrow (University of Otago), Kate Domett (James Cook University) and Marc Oxenham (Australian National University)

[379] From the Mouths of Babes: Weaning, Diet, and Stress in Neolithic Northern Vietnam

The Neolithic agricultural transition has been found to have a negative effect on human health in many parts of the world. However, numerous bioarchaeological studies in Southeast Asia have shown a different pattern of health changes. Changing weaning practices have been argued to have major effects on population health and fertility around this transition. However, the relationship between weaning and stress has been unable to be compared directly. The Neolithic site of Man Bac in Northern Vietnam is ideal to assess the relationship between weaning and stress at the agricultural transition, due to its large sample of excellently preserved infants and children, and previous research that has shown high levels of systemic stress. To see if there is a relationship between weaning, diet and stress, this research compares the timing of systemic linear enamel hypoplasias, identified through new microscopic topographic methods, and incremental isotopic weaning profiles of dentine, determining differences observed within the demographics of the site. Preliminary results investigating systemic stress during development of permanent and deciduous teeth are presented, arguing for inclusion of deciduous teeth as potential representations of gestational stress, and how the timing and prevalence of LEH correlates with age at death in the population.

Adams, Christopher (Gila National Forest)

[413] Prehistoric Copper Artifacts Found in the White Sands Missile Range

Recent Office of Contract Archeology, University of New Mexico fieldwork on the White Sands Missile Range has resulted in the discovery of rare prehistoric copper artifacts. This preliminary investigation involved looking at several El Paso phase sites consisting of Jornada Mogollon adobe melt roomblock complexes using the latest metal detector technology available. This is the first formal metal detector investigation on El Paso phase Jornada Mogollon sites adding to the so far sporadic evidence that the Jornada Mogollon were exploiting copper artifacts in the southern Tularosa Basin. This paper will bring to light that the Jornada Mogollon culture was utilizing copper artifacts during the period of A.D. 1250 to A.D. 1450.

Adams, E. Charles [415] see Rowe, Matthew

Adams, Karen [86] see Smith, Susan

Adams, Karen (Crow Canyon Archaeological Center) and Anna Graham (University of North Carolina, Chapel Hill)

[302] Domestication and Management of Indigenous Plants in the U.S. Southwest: Case Studies of Little Barley (*Hordeum pusillum* Nutt.) and a Wild Potato (*Solanum jamesii*)

Although the histories of major New World plant domestications of beans, corn, squash, gourd, and tobacco are well-known, histories of regional plant domestications from local wild plants are not. In the pre-Hispanic U.S. Southwest, a wild late winter/early spring-ripening annual grass known as Little Barley (*Hordeum pusillum* Nutt.) became a crop of interest. One notable mutation, likely occurring regularly in nature but not normally perpetuated, resulted in unprotected hull-less grains that were easy to harvest and therefore appealing to humans. This crop was particularly important in the Hohokam Pre-Classic period. A case for pre-Hispanic management of a wild potato (*Solanum jamesii*) is based on the association of modern populations with archaeological sites, range extensions, and supportive plausibility arguments such as long dormancy, nutritional value, and broad use by historic groups. Case studies could also be developed for other wild plants (*Descurainia*, *Astragalus*, *Plantago*, *Salvia*) that researchers consider may have been domesticated or managed in the past. Such regional plant histories suggest that domestication/management may have been an easier/more common occurrence than previously realized.

Addison, Jason [248] see Misarti, Nicole

Adler, Daniel [388] see Gill, Jayson

Adler, Michael [409] see Levin, Samuel

Adler, Rachel (Architectural Conservator, Vanishing Treasures Program, NPS) and Laura Martin (Archeologist, Southeast Utah Group, NPS)

[85] *Don't Leave Your Mark: Graffiti Mitigation Strategies at Arches National Park*

Over the past five years, there have been several high profile incidents of vandalism on public lands, including in multiple National Parks across the West. This presentation deals with one such incident that took place at Arches National Park in the spring of 2016. Visitors carved names deeply into the face of Frame Arch, a popular resting spot for visitors on their way to Delicate Arch, one of the most popular trails in the park. In October 2017, Vanishing Treasures conservator Rachel Adler tested a number of infill mixtures to disguise the carved graffiti. She completed the treatment in June 2018. The treatment was successful in minimizing the visual impact of the graffiti at the site, but was time and labor intensive, costing the park unanticipated funds. In addition, the compliance process brought to the forefront the enormous challenges parks face when deciding how and when to properly and legally treat graffiti. With incidents increasing every year, parks must develop a streamlined compliance process that is both sensitive to the resources and agreed upon by affiliated tribal communities. Arches has begun that process and hopes to implement these compliance procedures in the coming years.

Adler, Yonatan (Ariel University)

[384] *Between Archaeology and Texts: Early Jewish Ritual Law as a Test Case*

The late Hellenistic and Roman periods were formative for the development of halakhah—Jewish ritual law. Whereas texts have traditionally served as the primary basis for tracing the evolution of early halakhah, archaeology provides evidence on aspects of this history which are entirely unobtainable from the textual record. Through archaeology, we can trace how halakhah developed in the actual practices of ordinary Jews over time and across geographies. Together with the potential prospects, a slew of methodological pitfalls lie in the path of any attempt to correlate archaeological finds and halakhic praxis. We must be careful, for example, never to be too quick in finding intersections between archaeology and halakhic textual evidence; archaeological finds should never be forced into the straightjacket of the texts. Another salient and ever-present danger is anachronism – whenever earlier material finds are interpreted through the lens of later practices. Ritual purity and tefillin (phylacteries) provide two case studies for evaluating how archaeology may be both used and misused in the reconstruction of early halakhic development. A sober consideration of the benefits and hazards allows us to chart the path forward toward developing a useful “archaeology of halakhah” within the framework of a broader “archaeology of ritual”.

Adovasio, J. M. (Senator John Heinz History Center)

[222] *Perishable Technology and the Successful Peopling of South America*

Recent research demonstrates that perishable industries—specifically including the manufacture of textiles, basketry, cordage, and netting—were a well-established, integral component of the Upper Paleolithic milieu in many parts of the Old World. Moreover, extant data suggests that not only were these synergistic technologies part and parcel of the armamentarium of the first migrants to the New World, but, also, that these technologies played critical, and hitherto, largely unappreciated roles in the ecological success of Late Pleistocene populations, notably including the first South Americans. This paper examines the evidence for, and varied roles, of early plant fiber technology in highland and lowland South America and examines the adaptive qualities, potential impacts on social organization, and alteration of food procurement strategies implicit in this fundamentally crucial series of interrelated industries.

[135] *Chair*

Adovasio, J. M. [222] see Pohl, Mary

ae Anda, Guillermo [360] see Zhu, Kimberly

Afrin, Lopa [262] see Maki, David

Agarwal, Sabrina (UC Berkeley)

[317] *Discussant*

[317] *Chair*

Agostini, Mark**[96] When Is Healing?: An Archaeological Case Study of the Chacoan and Post-Chacoan American Southwest**

For the Ancestral Puebloans, Chaco Canyon (ca. AD 800-1180), in what is now northern New Mexico, brought disparate communities together under a common cultural system by adjoining religious ceremonies, pilgrimages, and exotic goods with astronomical events, striking topographical features, and other socionatural phenomena. While the presence of artefactual fossils and other exotic lithified material deposited at Chaco is well documented, the relational and semiotic meanings of these objects in the context of an ancient Chacoan cosmology remains largely under explored. We consider here how practices of healing, being fundamentally rooted in the optic, haptic, and auditory senses of the body, are bundled together with assemblages of material culture evoking a prototypic Pueblo cosmology at Chaco. Pairing museum collections and survey and excavation work with oral traditions, place lore, geomyths, and creation narratives from Pueblo and Navajo cultures, we present evidence for healing at Chaco Canyon and Post-Chacoan migrant sites through the pragmatic hypothetical identification of "medicine stones" by a broad consideration of morphological features and within a contextual relationship connecting these artifacts to subterranean structures known as kivas.

[96] Chair**Aguilar, Felisa (Centro INAH Coahuila), Joaquín Arroyo-Cabral (SLAA-INAH) and Eduardo Corona-Martínez (Centro INAH Morelos)****[88] INAH's Paleontological Council and Its Role in Preserving the Mexican Heritage**

The National Institute of Anthropology and History (INAH by its Spanish initials) is the federal institution dealing with the research, preservation, and protection of the historical, archaeological, and paleontological heritage from México. Although historical and archaeological heritage has already been under care for more than 40 years, it was not until March 2017 when it was decided to undertake the functions of the Paleontological Council (ConPal by its Spanish initials). Currently the ConPal is constituted by members from 10 academic institutions from all over the country, bringing together high knowledge and capability within the distinct topics of the paleontological field. Among the several functions that the ConPal members are pursuing, there is the development of the regulations under which the forthcoming projects in regard to the paleontological heritage will be reviewed. Furthermore, the necessity for writing guidelines and manuals for conservation and preservation of this heritage, coping with the present economic and social conditions of the country, is another goal for the members. Based on those considerations, we call for the archaeologist searching at deposits where fossil bones are to be found to comply with regulations set for by ConPal and help to save the Mexican Paleontological Heritage.

Aguilar, Fernando (POSGRADO EN ARQUEOLOGÍA/ENAH)**[307] Archaeological Survey in Delimited Units: The Altépetl of Ixmiquilpan in the Sixteenth Century**

Archaeological surveys at a regional scale have faced the dilemma of concordance between the archaeological sampling units, normally defined by physiographic elements of the landscape, and the use of significant components of the studied societies, for example, political units or symbolic landscapes. Research undertaken in the Valle del Mezquital has used the Macro and Semi-micro units, as were developed by Kent Flannery in the Valley of Oaxaca and by David Clark in Analytical Archaeology. Research has progressed in defining a Meso level for the sampling systems that we have developed from the ethnocategory of Altépetl, which integrates symbolic landscape and human occupation in a bounded geographic space. In this paper, we will present the accumulated knowledge for the Altépetl of Ixmiquilpan derived from archaeological surveys, excavation, documentary research in archives and ethnographic studies of the hñahñu population of the region.

Aguilar, Joseph (University of Pennsylvania)**[294] Partnership Building: Moving Beyond the Collaborative Model**

In North America, American Indian communities are engaging with archaeology in two distinct, and sometimes intersecting, ways: one is by working with governmental agencies in complying with local, state and federal laws meant to protect and preserve their cultural heritage, the other involves engaging with their cultural heritage through meaningful research, which often involves collaborating with academic professional and academic archaeologists. This paper will examine how Pueblo Indian communities in the North American Southwest are navigating their engagement with archaeology through compliance and/or research, and how both forms of engagement are providing means to assert tribal sovereignty and achieve social justice in their communities. Social justice in American Indian communities is often achieved by pushing the limits of colonial governments and their laws, and by changing the ideas and perceptions colonial governments have about native peoples. This paper will explore how this is happening among the Pueblo Peoples in the Southwest through strategic and meaningful engagement with archaeology and cultural heritage on all fronts.

[62] Discussant

Aguilar, Juan [412] see Torreggiani, Irene

Aguilar-Arellano, Felisa J. [56] see Arroyo-Cabral, Joaquín

Aguilera, Elizabeth and Emily Umberger**[304] Coyolxauhqui's Serpents**

This study focuses on questions about serpents and gender associations in Aztec art--questions raised by a ceramic fragment located in storage in the Brooklyn Museum. On it Coyolxauhqui, the enemy of the Aztecs' supernatural patron, Huitzilopochtli, is depicted with two different types of imaginary serpents, a serpent belt like those worn by fertility goddesses, but double-headed (maquixcoatl), and a fire serpent (xiuhcoatl) solar dart, piercing her torso, having been launched by her male rival. The juxtaposition of the two snakes in this image brings up questions about gender associations. In addition to examining serpents on different female images, e.g. the single-headed serpents on amacalli goddesses and the blood serpents on Coatlicue, we will look at others in sculpture—rattlesnakes, water snakes, feathered serpents, etc.

Aguinaga, Xochitl [89] see Hernandez, Stevy

Aguirre, Alejandra (Proyecto Templo Mayor/UNAM) and Diego Matadamas Gomora (Tulane University/Proyecto Templo Mayor)**[255] The Miniaturization of Lithic Artifacts within the Offerings at the Great Temple of Tenochtitlan**

The offerings at the Great Temple of Tenochtitlan contain several lithic artifacts that were miniature versions of ornaments, weapons and attire, which were used to produce religious images. For the Mexicas, the act of placing small objects in offerings as gifts was loaded with symbolism. These miniaturized artifacts were deposited to create a microcosm within the reduced space that was the offering. Miniature objects would have held the same symbolic qualities as the normal-size objects they represented. In the present paper, we will study miniaturized lithic artifacts from offerings around the sculpture of the earth goddess Tlaltecuhtli, located in front of the Great Temple of Tenochtitlan. We propose that these miniaturized artifacts were models used by the Mexicas to represent deities, as well as dead-warriors traveling through the underworld.

Aguirre, Alejandra [304] see López Luján, Leonardo

Aguirre, Ana [110] see Soler, Manuel

Ahern, Kaitlin (University at Buffalo)**[407] Recipe and Quality of Lime Plaster Samples from Plaza One, Teotihuacan**

In 1959, the Teotihuacan Mapping Project, led by Rene Millon, excavated at the site of Plaza One in Teotihuacan and acquired a myriad of artifacts, including lime plaster samples. This presentation focuses on the examination of these plaster samples via Optical Microscopy and SEM-EDS, which are used to evaluate the similarities and differences in the building techniques and raw materials employed in the construction of plaster. Specifically, emphasis is placed on the comparison of the Plaza One samples with previous plaster studies that examined samples from structures located along the Avenue of the Dead. This analysis provides insight and later interpretation into the different methods of plaster production by comparing the recipe and quality of the plaster between different locales at Teotihuacan.

Ahlman, Todd (Texas State University)**[172] Chair**

Ahlman, Todd [172] see McKeown, Ashley

Ahrlrichs, Robert (UW-Milwaukee)**[204] Archaic Copper Economy and Exchange in the Western Great Lakes: A Comparative Study from Two Wisconsin Localities**

This research presents the results of an analysis of a large privately curated collection of Archaic period (Old Copper Complex) copper from the Western Great Lakes. Results from metric, LA-ICP-MS chemical characterization, and radiometric dating analyses will be presented. The data set is drawn from a collection of over 2000 formal copper tools recovered by a single individual at two localities in Wisconsin, one in northern Wisconsin near the primary source of copper and one several hundred kilometers to the south. Results of these analyses will be compared between the localities with an emphasis on discerning the degree to which the two localities are connected within the Old Copper Complex.

Ahlstrom, Richard (HRA, Inc. Conservation Archaeology) and Heidi Roberts (HRA, Inc. Conservation Archaeology)**[86] The Jackson Flat Reservoir Project: Investigating a Basketmaker-Pueblo I Community in Kanab, Utah**

Data recovery for the Jackson Flat Reservoir, Kanab, Utah included the excavation of 60 habitations at six sites. Thirty-eight structures were radiocarbon dated, mostly with samples of maize from hearth and floor contexts, to the Early Agricultural and Basketmaker II through Pueblo I periods. We interpret the sites' Basketmaker III temporal components through the lens of events and episodes in this longer history, including an intrusion of San Pedro culture farmers around 1300 B.C., construction in late Basketmaker II of an oversized pithouse associated with the beginnings of a (small) multi-household community, that community's persistence through Basketmaker III, construction of attached-antechamber pithouses in late Basketmaker II–early Basketmaker III, a second, presumed central Pueblo intrusion marked by construction of classic Basketmaker III-style detached-antechamber pithouses in terminal Basketmaker III–early Pueblo I, and the continuing presence of a multi-household community through Pueblo I. We examine these developments in the context of relations and contacts between the bearers of the region's "Virgin Branch" archaeological culture and those of the Kayenta and other Ancestral Pueblo branches located to the east.

Ahmad, Mansoor [186] see Janulis, Klint

Ainis, Amira [48] see Ceniceros-Rodríguez, Santos

Ainis, Amira (University of Oregon), Jon Erlandson (Museum of Natural and Cultural History, University) and Rene Vellanoweth (California State University, Los Angeles)

[240] *Resilience and Stable Shifts: Historical Ecology at Bay Point, San Miguel Island, California*

Faunal remains from two multi-component archaeological rockshelter sites on northeastern San Miguel Island are used to reconstruct aspects of nearshore ecosystems and investigate patterns in marine resource use through time. More than 90 14C dates demonstrate that Daisy Cave (CA-SMI-261) and Cave of the Chimneys (CA-SMI-603) were occupied for most of the Holocene from ~11,700 to 1,000 cal BP. Stable isotope analysis of >100 archaeological mussel shells was used to reconstruct nearshore sea surface temperature (SST) for Bay Point, revealing environmental shifts during the Holocene. Analysis of fish bones identified >20 taxa that people used hook and line, nets, and other technologies to catch—with a consistent suite of nearshore and kelp bed taxa through time. Analysis of shellfish remains identified >50 taxa revealing a similar pattern with oscillations in sizes and relative abundances of major prey species through time. Faunal densities and relative abundances oscillate between components, but the fish and shellfish assemblages indicate relatively stable and resilient nearshore habitats throughout the past 10,000 years. These data contribute to our understanding of how islanders utilized and shaped marine ecosystems in the past and inform on the potential resiliency of marine fisheries.

Ainsworth, Caitlin (University of New Mexico)

[419] *Paquimé in Perspective: A Meta-Analysis of Turkey Remains from the US Southwest and Northern Mexico*

Excavations at the site of Paquimé in Northern Mexico, uncovered the interred remains of hundreds of common turkeys. Given both the size and unusual nature of this assemblage, studies of the Paquimé turkeys seem well suited to furthering our understanding of domestication, management, and use of the common turkeys in North America. Yet, while interest in zooarchaeological studies of turkeys has never been higher, the Paquimé avifauna remain little discussed outside the context of studies of the Casas Grandes system. This paper evaluates what is currently known about the turkeys of Paquimé, highlighting similarities and differences between this assemblage and ones recovered from sites in the US Southwest, and suggests ways in which data from this site might contribute to broader narrative regarding turkey husbandry and domestication in North America.

Ainsworth, Caitlin [25] see Kirk, Scott

Aitchison, Kenneth (Landward Research Ltd)

[65] *Intelligence and Predictive Analytics*

Labor market intelligence can tell us about the size, shape and dynamics of professional archaeology, as it is today and as it has been in the past. This valuable information helps individual archaeologists to see where they are in their careers, helps employers to recognize their place in the market and helps educators see where the students they have trained have made a difference. Predictive modeling takes the data gathered by labor market intelligence and creates a tool that employers can use to plan the development of their workforces, educators can use to plan future courses and individual archaeologists to plan their careers. Building on the authors' global experience of gathering labor market intelligence, this paper will look at how data can be used to support predictive analytics which go beyond describing the current and past state of affairs, and how this can create actionable, forward-facing predictions on how archaeology will change in the future.

[65] *Chair*

Aiuvalasit, Michael (Southern Methodist University) and Ian Jorgeson (Southern Methodist University)

[127] *Modeling Regional-Scale Vulnerabilities to Drought through Least Cost Analyses: An Archaeological Case Study from the Jemez Mountains, New Mexico*

We present a new approach for identifying archaeological proxies for community vulnerabilities to climate change: least cost analyses of water acquisition costs from archaeological sites to water. By automating the least cost

analysis through a custom Python script in ArcGIS Pro, we modeled the 1-way cost for water acquisition pairwise between 136 water sources and 5,480 archaeological sites across the Jemez and Pajarito Plateaus of the Jemez Mountains, New Mexico. We then compared travel times from water sources with different drought sensitivities to archaeological sites. This allowed us to explore diachronic regional-scale vulnerabilities in Ancestral Pueblo settlement patterns to hydrological droughts. Our research found that while hydrological droughts would not have made water acquisition costs prohibitive, they significantly increased costs. This problem was exacerbated on the Pajarito Plateau due to greater sensitivities in the geohydrological system to reduced surface water during droughts, and the decline of the dual residence pattern among Ancestral Pueblo communities. Therefore, hydrological droughts in concert with the socio-economic consequences of village aggregation in the 15th century cannot be ruled out as factors in the depopulation of Pajarito Plateau.

[166] Moderator

Aiuvalasit, Michael [419] see Burger, Rachel

Ajú, Gloria [303] see Arroyo, Barbara

Akoshima, Kaoru (Tohoku University)

[416] Foreseeable Tools: Lithic Use-Wear and Technological Organizations in Evolutionary Perspectives

The paper explores some problems concerning the relationship between aspects of lithic technology and the cultural evolutionary theory. There are three fundamental realms in stone tool analysis, namely, typology, technology, and functional studies. These research phases are integrated into the study of "technological organizations" in the sense of Binford (1979). It is important to understand thus described variabilities in lithic industries from evolutionary viewpoints. In other words, why and how selection pressures have been in operation on such diversities in lithic technology needs to be pursued. The present study focuses on the Upper Paleolithic period in East Asia. Case studies in the northeastern Japanese archipelago and the middle Korean peninsula are evaluated on adaptive advantages of such industries as blank blades, backed knives, tanged points, and microblades. The results of detailed functional reconstruction based on microscopic use-wear analysis are combined with technology and morphology. Concrete data from microwear analysis of both high-power and low-power methods shed light on some modern human behaviors such as planning depth, hafting, and composite tool usage for foreseeable future activities by new arrivals of population to the most peripheral region of Asia.

Alaica, Aleksa (University of Toronto)

[356] Quilcapampa and Points of Convergence in Middle Horizon Arequipa: Faunal Evidence for Extensive Interregional Interaction

Quilcapampa was an important point of convergence for communities from around the southern Andean region with these people and/or their material culture suggesting extensive interregional interaction. The zooarchaeological work conducted on the vertebrate remains from Quilcapampa will be presented in this paper. The presence of camelids (llamas and alpacas) dominate the proportion of species identified. The skeletal elements used in the various parts of the site along with the age of camelid remains will be discussed in detail. There are multiple examples of pathologies along the toes of these animals that indicate habitual, long-distance movement was part of the life histories of these animal groups. The few bird remains that were identified suggest both coastal and local opportunistic hunting, which supports additional evidence from mollusk analysis demonstrating coastal materials were extracted and were brought to Quilcapampa. The zooarchaeological work conducted on this project is another important line of evidence to clarify the role and occupational history of Quilcapampa at the time of growing Wari influence in the region.

Aland, Amanda (Southern Methodist University), R. Alan Covey (UT-Austin), Robert Selden (Stephen F. Austin State University) and Astrid Runggaldier (UT-Austin)

[200] Revising Empire: Chimú and Inka Ceramic Morphology at Santa Rita B (Chao Valley, Peru)

Populations in the Chao Valley of coastal Peru experienced successive waves of imperial expansion from about AD 1350 to the mid-sixteenth century. In relatively short order, the Chimú, Inka, and Spanish empires each established varying degrees of control over the valley. The site of Santa Rita B offers perspectives of how the annexation of the valley by the Chimú state established an imperial foundation that was strategically revised during the decades of Inka imperial rule. In this paper we discuss the evidence from Santa Rita B, which suggests that the Chimú conquest of the Chao Valley brought about a profound transformation of local identities and daily life as imperial subjects. We also investigate the distribution of the "Chimú-Inka" aesthetic in excavated administrative, ceremonial, and mortuary contexts at Santa Rita B. Given the uneven distribution of Inka-affiliated material culture at the site, we discuss the hybrid nature of Chimú-Inka pottery using preliminary results of a 3D scanning project to examine the impact of Inka conquest on local ceramic production practices and the social use of ceramics at Santa Rita B.

Alaniz, Guillermo Gerardo De (Instituto Nacional de Antropología e Historia [INAH]) and Karla Ortega (Proyecto Gran Acuífero Maya)

[360] The Reemergence of Balamku as a First Order Sacred Landmark at Chichen Itza

During the 2018 season, the Gran Aquífero Maya project began exploration of the cave of Balamku, located some 2.4 km east of Chichen Itza's site center. The cave is noteworthy in containing incensarios, manos and metates, and

other artifacts identical to those in the back passage of Balankanche, only in greater numbers. The similarity does not end there. Balamku, like Balankanche, was elaborated by a substantial amount of surface architecture and both were connected to the site core through sacbeob. When one considers the Osario complex, the many cenotes, and the huge number of sascaberas converted into caves, it is clear that the site is integrated into the subterranean to an extent heretofore unappreciated.

Alarcón Tinajero, Edgar (University of Georgia), Christopher Morehart (School of Human Evolution & Social Change, Arizona) and Angela Huster (School of Human Evolution & Social Change, Arizona)

[374] *Approaching the Iconography of Epiclassic Censer Ornaments, a Typology from Los Mogotes, Estado de México*

Censers are a subset of Mesoamerican ceramics interpreted as ritual vessels used to burn incense. In ancient central Mexico, censers tend to feature mold made or handmade clay ornaments that were possibly part of iconographically composite vessels. A challenge in their interpretation, however, is that these complex vessels are often found in isolated fragments. At Los Mogotes, an Epiclassic period (ca. 600-900 CE) hilltop settlement in the northern Basin of Mexico, body sherds of censers and appliquéd ornaments are part of the ceramic assemblage. This poster offers a preliminary classification and interpretation of motif classes – such as chilies, maize, and thunder – based on an analysis of ornaments from Los Mogotes. The spatial distribution of ornament types recovered across functional contexts is described: including public, domestic, and ritual spaces. Understanding the spatial distribution of ornament fragments can help ascertain the association of ornament types with once-complete composite censers. This is important because complete examples are rarely recovered. This analysis elucidates the classification of censers by approaching the repertoire of ornament symbols and their possible place in the ritual life of an Epiclassic settlement.

Alcantara, Keitlyn (Vanderbilt University Department of Anthropology)

[192] *Ingredients for Resistance: Foodways in Prehispanic and Colonial Tlaxcallan*

Known as the “traitors to Mexico” for their fateful alliance with the Spanish, the Tlaxcalteca are often denigrated in Aztec-influenced versions of Mexican history. In these accounts, Tlaxcallan’s alliance with the Spanish was assumed to be a sign of the population’s political and economic weakness; an escape plan from impending Aztec conquest. An examination of the state’s chronology points to a far more intentional resistance: settled in AD 1380, in less than 200 years, the Tlaxcalteca faced both Aztec (AD 1460-1519) and Spanish (AD 1519) colonial pressures, maintaining a measure of sovereignty not seen in other populations faced with the same fate. I argue that when confronted by Aztec and Spanish colonialism, the Tlaxcalteca maintained a sense of autonomy through political, economic and social structures that interacted to create a fiercely patriotic state, strengthened by internal cohesion. In this presentation, I support this hypothesis through the bioarchaeological analysis of food practices (dietary isotopes and phytoliths) from human burials at Tepeticpac, the urban core of Tlaxcala. The comparison between these bioarchaeological results and modern local food practices will demonstrate that food continues to play a central role in maintaining a sense of local cohesion and unique cultural identity in Tlaxcala.

[59] *Moderator*

Alconini, Sonia (University of Texas At San Antonio)

[355] *Inka Provincialism and the Empire: Commensalism and Social Agency*

As a multiethnic empire, the Inkas maintained varying forms of relations with the provinces and outlying frontier regions. To maintain control, state power was often materialized in state architecture, prestige materials and standardized ceramic styles disseminating the imperial ideology. Despite this situation, recent research has revealed the rise of a variety of provincial styles as the product of wider processes of transculturation, hybridization and emulation. By comparing the variability, spatial distribution and temporal shifts in a set of imperial centers of the Collasuyu quarter, the goal of this presentation is to discuss the different ways in which indigenous populations were integrated into the state, and the role that imperial emissaries had in implementing a set of imperial institutions and practices. Among others, those centers include Oroncota (Yampara province), Kaata Pata (Kallawaya province) and Samaipata. By using ethnohistoric and archaeologic information, the results will reveal the complexity of these relations, the different orientation and nature of commensalism celebrated in these state installations, and the varying ways in which competing royal families and Inkas-by- privilege implemented and interpreted the imperial agenda.

[355] *Chair*

Alcover, Omar [100] see Rodas, Ricardo

Aldana, Gerardo (University of California Santa Barbara)

[383] *Notions of Value and Ahegemonic Archaeological Interpretation*

This paper takes up a theoretical exploration of the concept of “value” as it is articulated explicitly and implicitly within archaeological investigation. Recognizing that the issue is related to social science inquiry broadly, this paper looks to Bourdieu’s “Forms of Capital” to develop a framework for interpretation that does not rely on hegemonic considerations of value. The presentation draws on examples of proposed relationships between astronomy and ideology within Mesoamerican cultures to seed the more general and theoretical development of ahegemonic interpretive tools that variously may or may not be compatible with hegemonic approaches. Accordingly, the intent is to make intellectual space for articulation with approaches to archaeological data arising from Indigenous Studies,

Ethnic Studies and Feminist Studies.

[383] *Chair*

Alday, Camila

[76] *Fabrics of the South American Desert Coast: The Study of the Marine Hunter-Gatherer's Plant Fiber Technology in the Atacama Desert*

This research aims to study the earliest fabric artifacts made by marine hunter-gatherers who inhabited the Peru-Chile desert coast. Thanks to the aridity of this area, I use a remarkable amount of well-preserved plant-fiber materials, most belonging to the world's oldest Chinchorro mummies buried more than 7,000 years ago. Fibers in these pre-ceramic materials are often identified based on mostly macroscopic methods, which often fail to accurately identify the plants used. To address this significant gap in knowledge, this study investigates the microscopic characteristics of fibers in order to reveal the range of plants employed in this technology. A high-resolution portable microscope is also used to observe artifacts' technical aspects related to epidermis extraction (cortication), splicing or spinning techniques, and other techno-textile attributes. Through the understanding of the manufacture of nets, ropes, and other plant-fiber items, I will interpret the social organisation of the coastal population around this technology. I hypothesize that such processes and all related activities gave shape to a techno-social choreography on the coast. By this, I mean that the artisans' movements were guided by the rhythm of technical tasks and the seasonality of taskscape.

Aldenderfer, Mark (University of California)

[181] *Hearths and the Early Ritual Architecture at Middle Archaic Asana*

Around 7000 years ago, the inhabitants of Asana created what appears to be a kind of ritual structure. Larger and shaped differently when compared to the residential structures nestled around it, the construction contained a hearth wholly unlike those found in its neighbors. Those hearths lit the interiors of these houses, provided warmth, and were used as impromptu dumps for bone scrap and small lithic waste. In every sense, these hearths look wholly quotidian. In contrast, the hearth inside the larger structure lay largely on the surface, did not show signs of intensive burning, and was composed instead of large, fire cracked rocks or cobbles showing evidence of fire spalling. This hearth is hardly quotidian. No lithic or bone waste was found within it or anywhere else on the floor. But as many as five small clay "boxes" are embedded on the floor, and some contain small quantities of very fine wood ash.

If this structure serves a ritual purpose, what role did the hearth play? And what of the boxes? In this paper, I seek to reconstruct what may have taken place within this special structure.

Aldenderfer, Mark [183] see Eng, Jacqueline

Ale, Liz

[88] *Addressing Objects in Limbo: Using Digital Resources to Increase Access to Native American Material Culture*

Despite the passage of the Native American Graves Protection and Repatriation Act in 1990, a large amount of contested Native American material culture remains in archaeological collections across the country. Universities, museums, and government agencies may retain such objects due to issues with cultural identification, competing claims from multiple groups, or a lack of legal obligation. Although institutions might not be holding these items with malicious intent, their inability to grant access nevertheless serves to uphold colonialist ideals of ownership that deny Native groups control over their own narratives. This poster will examine how digital resources can increase the accessibility of these items stuck in limbo. To achieve this, the poster will provide analyses of multiple digital repatriation methods, including institutionally managed web pages, indigenous-centered online databases (such as the Mukurtu Collections Management System), and 3D-digitization technology. These analyses will place particular emphasis on the spiritual and political issues surrounding the digitization of Native American objects. After discussing the potential merits and limitations of each method, the poster will summarize the essential considerations researchers must make when implementing digital repatriation projects.

Alexander, Katharine [312] see Crothers, George

Alexander, Michelle [310] see Pluskowski, Aleks

Alexander, Rani [198] see Hernandez, Hector

Alexander, Rani (New Mexico State University)

[198] *Discussant*

[198] *Chair*

Alexianu, Marius [242] see Tencariu, Felix

Alfonso Durruty, Marta [176] see Giles, Bretton

Alix, Claire (CNRS UMR8096 / Univ. Paris 1 Pantheon Sorbonne)

[138] *Discussant*

Allaby, Robin [253] see Smith, Oliver

Allaby, Robin, Roselyn Ware (University of Warwick) and Logan Kistler (Smithsonian Institute)

[302] *Domestication through the Bottleneck: Archaeogenomic Evidence of a Landscape Scale Process*

Domesticated crops show a reduced level of diversity that is commonly attributed to the 'domestication bottleneck'; a drastic reduction in the population size associated with sub-sampling the wild progenitor species and the imposition of selection pressures associated with the domestication syndrome. A prediction of the domestication bottleneck is a sharp decline in genetic diversity early in the domestication process. Surprisingly, archaeological genomes of three major annual crops do not indicate that such a drop in diversity occurred early in the domestication process. In light of this observation, we revisit the general assumption of the domestication bottleneck concept in our current understanding of the evolutionary process of domestication, and consider the implications of localized versus landscape scale models of agricultural origins.

Allard, Amélie (Royal Ontario Museum)

[414] *"The South Traders Carry All Before them": Colonialism, Waterways and Relationships in Ontario's Fur Trade*

The so-called "fur trade era" of northern North America was founded on a willful exchange between Indigenous peoples and European or métis-descended merchants. Waterways provided the main means of travel, permitting traders to spread their posts and influence across the landscape of the interior. Yet in its early years the London-based Hudson's Bay Company (HBC) operating in Rupert's Land made use of water in very different ways from its most direct competitor, the Montreal-based North West Company. In this essay, I examine the ways in which two existing collections from Ontario, one from HBC's Fort Albany and the other recovered from the French and Winnipeg rivers, inform our understanding of fur-trade era colonial relationships and the diversity of local responses to merchant capitalism. Using a comparative framework, I assess the differences between the two assemblages, in so doing highlighting how the two types of sites provide different glimpses in the ambivalent nature of intercultural relationships as evidenced by the different colonial approaches. I further argue that a perspective that takes into account non-human forces, such as water flows, provide unique opportunities to bring to the fore different facets of human interactions and how they are themselves entangled with non-human things.

Allard, Francis (Indiana University of Pennsylvania), Wengcheong Lam (Chinese University of Hong Kong) and Nam Kim (University of Wisconsin - Madison)

[300] *A Metallurgical Study of Early Bronzes from Northern Vietnam: Some Thoughts on Methodology, Local Practices and Inter-regional Interaction*

This paper presents the results of the metallurgical analysis of 43 fragments of bronze artifacts recovered from Bronze Age sites in northern Vietnam. It represents the largest systematic study undertaken so far of early north Vietnamese bronzes using a range of archeo-metallurgical techniques. The artifacts, which are associated with the Dong Dau, Go Mun and Dong Son archaeological cultures, were studied using various techniques, including pXRF, SEM-EDS, and metallography. Although the sample size remains small, the compositional data on the copper, tin, lead and arsenic contents of different types of bronzes, combined with evidence of metalworking processes (e.g., hammering and heat-treatment), so far points to clear changes in metallurgical practice over the 1st millennium BCE, as well as differences with early metallurgical traditions in adjacent regions such as southeast and southwest China. The paper also reviews the uses and limitations of the different techniques used in this study of north Vietnamese bronzes.

Allaun D'Lopez, Sarah (University of Wyoming) and Ismael Sánchez-Morales (The University of Arizona)

[221] *Spatial Analysis of Surface Locality 5 at Fin del Mundo, Sonora, Mexico*

The Paleoindian presence south of the modern geo-political US-Mexico border is relatively poorly understood when compared to that of the rest of North America. A notable exception to this gap in knowledge surrounds the work at Fin del Mundo in Sonora, Mexico. This northern Mexican site is the subject of extensive survey and excavation, revealing the only known human (Clovis)-gomphothere (*Cuvieronius* sp.) association in North America and an extensive occupation record. This study emphasizes the expansive surface locality (Locality 5) at Fin del Mundo. I present the results of a spatial analysis of Locality 5 with an emphasis on the patterning of diagnostic Early Paleoindian and Archaic archaeological materials. My analysis in conjunction with ongoing analyses at Fin del Mundo and elsewhere in Northern Mexico will contribute to the local understanding of both Paleoindian and Archaic periods in the region as well as contribute on the greater scale to the knowledge of this important transitional period

in human history.

Allcca Osorio, Patricia [46] see Kellett, Lucas

Allen, Jim [35] see O'Connell, James

Allen, Kathleen (University of Pittsburgh)

[169] Pottery Production and Community Practices: Haudenosaunee in Central New York

This paper focuses on the practices of potters within several communities in central New York State. This area was occupied during late prehistoric/early historic times and abandoned shortly after contact when populations were consolidating in greater numbers in neighboring regions. Occupants at two of these sites (Parker Farm and Carman) were engaged in subsistence and production activities, but with different emphases. Pottery production was more intensively practiced at the former site, while manufacture and trade in shell beads was evident at the latter. Previous efforts at detailed pottery analysis have been thwarted by the extensive fragmentation of pot sherds and avocational collection activities. These have posed methodological challenges for the comparative analyses of these and several nearby sites with the aim of identifying communities of practice associated with one of these activities, the production of pottery. For this analysis, attribute analysis of incomplete rim sherds suggests the presence of community practices for rim formation, design placement, design elements, and partial motifs. Comparisons between these sites and others with complete rims illustrate the potential and challenges of this approach.

Allen, Kathryn Grow (Eastern Oregon University)

[351] A Case for Islam: Bioarchaeological Research on the Ottoman Period in Southeast Europe

The introduction of Ottoman control and the arrival of Islam in Southeast Europe during the late medieval period greatly influenced both historical and modern populations. In spite of this impact, this cultural and religious influence remains a topic understudied in archaeology. With Christianity the dominant religion, other religious influences can be overshadowed, particularly those antithetical to normative views of Europe. The connection of this period to modern sociopolitical conflict in the Balkan peninsula also made it a contentious focus of archaeological analysis in the recent past. These reasons provide an impetus for expanding what we know about this cultural anomaly in medieval Europe. Making a case for Islam, this paper discusses the impact of conversion and migration processes during Ottoman expansion. These processes influenced regional demography, religious diversity, and the historical trajectory of Southeast Europe, proving their importance to medieval history. Ongoing bioarchaeological research highlighting demographic and biological diversity, migration patterns, and conversion practices, including the child tribute system or 'blood tax', highlight these influences. The combination and comparison of biological, archaeological, and historical data reveal avenues for future work on this understudied subject.

Allen, Melinda (University of Auckland)

[29] Human Ecodynamics in Central East Polynesia

Our understanding of Pacific paleoenvironments, how they changed with human arrival, and further transformations in the post-settlement period owes much to the research and insights of Steve Athens. This paper considers palaeoenvironmental records from central East Polynesian islands in relation to human settlement, persistence, and ecodynamics.

**Allen, Mitchell (University of California Berkeley) and William B. Trousdale
(National Museum of Natural History, Smithsonian)**

[399] Timurid Period Rural Settlement in the Sar-o-Tar Desert, Afghanistan

Archaeologists generally recreate settlement patterns based on vestigial remains of rural landscapes destroyed by later settlement, agricultural activity, or environmental degradation. The 14th and 15th century Timurid settlement of the Sar-o-Tar plain, east of the lower Helmand River in southwest Afghanistan, is a notable exception. Dry desert conditions allowed for occupation only during times when the extensive canal system, first developed 2500 years earlier, could be reexcavated and maintained. These same desert conditions—and intensive sanding that filled the empty buildings-- prevented later agricultural activity, pluvial erosion, and even limited site looting in the six centuries after the area was abandoned. Thus, we have as close to a pristine environment from the 15th century CE as archaeology has had the opportunity to study. The 1000 square km is filled with almost untouched medieval houses, some standing three stories high, fortresses, mosques, mausoleums, canals, even field walls. The Helmand Sistan Project, working in this region in the 1970s, documented the Timurid remains of Sar-o-Tar through survey and limited excavation. This paper will summarize our findings of the Timurid period in Sar-o-Tar and suggest some general themes that may assist archaeologists working in less visible rural environments.

Allen, Susan (University of Cincinnati) and Martha Wendel (University of Cincinnati)

[404] Landscape and Plant Use in High Albania: New Results from the Late Neolithic to Iron Age at Gajtan and Zagorës

From 2013 – 2015, the Projekt Arkeologjik i Shkodrës (PASH) conducted a regional surface survey and targeted excavation at several settlement and tumulus sites in the Shkodër province of northern Albania. Two of these

settlement sites, Gajtan and Zagorës, are fortified hilltop sites that preserved intact deposits with well-preserved macrobotanical remains (wood, seeds). Gajtan, one of the largest hill forts in Albania, was occupied from the Late Neolithic to the Late Bronze Age (LBA). Zagorës was occupied slightly later, in the Eneolithic, continuing into the LBA. As part of the PASH focus on landscape archaeology, we discuss here evidence from the wood and seeds collected from flotation during the 2014 field season. Forest taxa represented include beech and fir, among others, while crop taxa are limited to the cereals einkorn wheat, spelt, hulled two-row barley, and millet, and the pulses lentil, pea, and bitter vetch. Analysis of this material provides insight into landscape dynamics, land use strategies, and plant use during these periods, revealing adaptive and resilient strategies.

Alley, Karen [373] see Dods, Melissa

Allgaier, Paul (University of Utah Archaeological Center) and Brian Codding (University of Utah Archaeological Center)

[218] *Preachaic Settlement Distribution in the Central Great Basin*

The first occupants of the Great Basin settled the region when highly profitable wetland environments were abundant, but their spatial distribution was highly variable. Results of our earlier work identified an interesting pattern driven by this variation: Prearchaic (>8000 BP) settlements in the Lahontan and Bonneville Basins were closer to pluvial lakes than would be expected by chance, while settlement locations in the central Great Basin were no closer than random. This find suggests there is a different driver of site location than just wetland environments in the central Great Basin. Here, we aim to identify other environmental factors that may be driving settlement distributions in the central Great Basin.

Alligood, Nekole (Delaware Nation)

[178] *Discussant*

Allison, James [84] see Richards, Katie

Allison, James (Brigham Young University)

[188] *Simple Statistics and Archaeological Problems*

Among Keith Kintigh's many contributions to archaeology was his emphasis on understanding the connections among quantitative methods, archaeological problems, and what archaeologists can reasonably infer from their data. In both publications and in the classroom, he demonstrated the value of simple computer simulations to understand quantitative measures and how they behave when applied to actual archaeological data. Archaeological research increasingly incorporates analysis of large databases and quantitative methods appropriate to "big data", but simple statistics are still important to archaeological research. This paper uses computer-intensive methods to demonstrate that archaeologists (and others) frequently misunderstand and misapply some of the simplest statistics used in archaeology: chi-square tests and related methods for examining cross-tabulated data (e.g., artifact counts by provenience). These tests rely on assumptions about sampling that are usually not appropriate for archaeology, and, when applied to archaeological data in textbook fashion, they often give wildly misleading results. Computer simulations provide a better understanding of the issues involved, and of how to use these (not so) simple statistics to provide valid insights about archaeological questions.

Almeida, Marcia Bezerra (Universidade Federal do Pará) and Clarice Bianchetti (Universidade do Estado do Amazonas/PPGA/UFPA)

[2] *Flowers and Shards: The Practice of Collecting Artifacts in Brazilian Amazon*

In this presentation we discuss the practice of collecting artifacts, considering the perspectives of the collectors and of the State in Brazil. We assume that collecting is an act that should be understood from a phenomenological approach. Our reflections take into account the affective relationships between the collectors and the artifacts, and also the tensions that arise when this practice is categorized by the paradigms of heritage preservation. Based on research conducted with human collectives involved with these practices in the Brazilian Amazon, especially, in Parintins/AM and Joanes/PA, we seek to highlight the role of collecting in their daily life and the relevance of their entanglement with the archaeological materiality to the constitution of a symmetrical policies and management practices.

Alonso, Alejandra and Gregory Smith (Northwest College)

[407] *A Preliminary Investigation into the Political Economy of Santa Cruz, an Associated Community with Ichmul de Morley, Yucatan, Mexico*

This paper centers on the analysis of shell, lithics, and ceramics recovered from the ancient Maya community of Santa Cruz, located 3 km south of the secondary site of Ichmul de Morley in northern Yucatán. Ichmul de Morley appears to have had an expansive growth during the Late and Terminal Classic periods that might have encouraged local development of nearby communities to which it was associated. We would like to identify the degree of sociopolitical integration at Santa Cruz within the landscape dominated by the political economy of Chichen Itza, easily the largest city in the vicinity. Santa Cruz seems to have been a community where economic activities were diversified and perhaps organized into specialized workshops, a pattern seen at other neighboring sites such as

Xuenkal. The analysis of materials recovered through systematic surface collections may represent a good sample to identify aspects of production and multicrafting based on the type, function, and abundance of imported foreign items such as shell, chert, and obsidian artifacts. Future excavations at Santa Cruz aimed at differentiating residential and productive areas may increase our understanding of the varied economic strategies of communities affiliated to secondary centers such as Ichmul de Morley.

Alonzi, Elise (University College Dublin)

- [334] *Fosterage and Mobility at the Early Medieval Irish Monastery on the Island of Illaunloughan: A Bioarchaeological Case Study*

Fosterage and mobility both require creating and breaking social ties. Early medieval Irish texts suggest that mobility and fosterage, which is the practice of children leaving home to be raised and educated, were means by which monastic communities gained members and sustained a prestigious social standing. Examining these practices through biogeochemistry can begin to elucidate the relationships between religious and lay communities in early medieval Ireland. This bioarchaeological case study focuses on the practice of monasticism at an early medieval Irish ecclesiastical site on the island of Illaunloughan, Co. Kerry. The monastic phase of the burial population at this site is notable because it contains only males and juveniles. Also, the monastery on Illaunloughan was located in the Corcu Duibne kingdom, which was well-documented to contain three distinct areas controlled by kin groups. Radiogenic strontium isotope ratios and oxygen isotope values, in addition to the contexts of the monastic phase burials, are used to estimate whether the studied individuals may have originated within or outside of the three areas of the Corcu Duibne region. This study provides insights into the lived experiences of both juveniles who were fostered at ecclesiastical sites and adult members of religious communities.

- [334] *Chair*

Alquist, Tia [411] see Clark, Kristine

Alsgaard, Asia (University of New Mexico)

- [174] *Subsistence Change during the Transition to Agriculture in Southern Belize: What Amino Acid Specific Stable Isotope Analyses Can Tell Us*

The impact of the agricultural transition in the Maya region is little understood. Excavations at two rockshelters in southern Belize, Mayahak Cab Pek and Saki Tzul, have uncovered intact deposits dating from Cal.12,000 to 1,100 BP with a continuous record of both human and fauna remains. Using carbon and nitrogen bulk tissue and carbon amino acid specific stable isotope analyses, we are able to identify periods of human subsistence change in both the carbohydrate and protein portions of the diet as well as shifts in animal foraging over the agricultural transition. These changes are inherently important for understanding the gradual adoption of maize, the decrease of the animal contribution to the diet over time, and the ecological changes in Southern Belize that occurred as humans transitioned from being hunters and gatherers to intensive agriculturalists.

- [174] *Chair*

Alsharekh, Abdullah (King Saud University)

- [43] *Anthropomorphic Figures in Arabian Rock Art*

Rock art is vastly abundant in Arabia, and there are large concentrations of panels in key localities. Hail, Najran and Tabuk are the most prominent ones. These three localities house thousands of panels, which can be multi-period, and were done in various styles and engraving techniques. Anthropomorphic figures can give us an insight into these past communities, most notably, their social, economic and religious activities. This paper aims to shed light on this particular aspect, and what we can envisage from Arabian rock engravings, along with a regional focus.

- [43] *Chair*

Alt, Susan M. (Indiana University Bloomington)

- [24] *Cahokia After Dark: Affect, Water, and the Moon*

Cahokia may not be the first place to come to mind when thinking about urbanism, but given new thinking and discoveries from a series of major excavations at and around this novel kind of city, views about the causes and consequences of American Indian urbanism are substantially changing. In part this is because we realize that urbanism is an experience found in the assemblage and rhizomatic connections of sensations, atmospheres, and affects of a time and place. This is just as true for Cahokia as for any urbanism. Urbanism at Cahokia was however, as much about experiences of the night as it was about the daytime. Interpreting Cahokia's archaeological data through a lens of ethnohistorical data, as evidenced by use and proximity to caves, caverns, and underground water, it becomes very clear that Cahokians actively sought, if not also recreated, experiences of the night. Very often, those experiences were tied to water and the moon. As I will argue, an understanding of the full assemblage of what made Cahokia urban requires a consideration of the full experience of the landscapes of the night.

Altman, Arie (The Hebrew University of Jerusalem, Inst. Plant Sciences in Agriculture), Stephen Shennan (UCL Institute of Archaeology, London, UK) and John Odling-Smee (Oxford University, UK)

- [352] *Gene-Culture Coevolution and Breeding of Ornamental Plants Is a Specific Aesthetics-Driven Social Niche*

Agriculture, including plant and animal domestication and breeding, is traditionally and mainly directed towards supplying human needs for food and nutritional factors, both for improving food quantity and quality and for tolerance to various environmental stresses. Less explored are the needs and driving forces behind domesticating and breeding ornamental plants. In the following we examine the cultural-social aspects and specific social niches of ornamental plant domestication and breeding, analysing several specific case studies (rose, tulip, lawn/turf, bonsai). What drove people to domesticate, breed and cultivate cut flowers and a variety of ornamental plants, and for what purposes? Were social life and stature, or economic success, or recreational activities the driving force behind breeding? We suggest that human sense for aesthetics, combined with economic and social reasons, and in some cases religion, were the driving force behind ornamental plant agriculture. Similar examples occur in several domesticated animals (e.g. dogs, cats and fighting-oriented chicken breeds) where social and aesthetic considerations may be one of several breeding targets.

Altmeier, Brenda [251] see Kangas, Rachael

Altschul, Jeffrey (SRI Foundation/Coalition for Archaeological Synthesis)

[188] Answering the Grand Challenges of Archaeology

Keith Kintigh has been at the forefront of the digital revolution in archaeology. He was one of the first to recognize the potential and need of digital archives to house and make accessible the vast treasure trove of archaeological data. He has been a leader in developing tools to access and manipulate data from disparate data sets. Keith spearheaded the effort to define the Grand Challenges of Archaeology. And, he co-founded the Coalition for Archaeological Synthesis to answer the challenges and other major questions facing the discipline and society. In this paper, I explore the last initiative—the creation of a vehicle to conduct collaborative archaeological synthesis—in depth. The origin of the Coalition, its structure, and its vision to transform archaeological synthetic research are discussed. I close with the current status of where we are as a discipline in this process in what ultimately will be a defining part of Keith's legacy to archaeology.

[225] Moderator

[377] Discussant

Alva, Walter [286] see Strauss, Andre

Alva Meneses, Ignácio [46] see Bitencourt Mañas, Diego

Alvarado, Aimee (Northern Arizona University)

[371] Analyzing the Relationship between Peri-abandonment Deposits and the Eastern Shrine of Xunantunich, Group B

Peri-abandonment deposits in the Maya region have been a source of contention in recent years given the varied artifact assemblages and the lack of clear understanding for their purpose. This research describes peri-abandonment deposits at Xunantunich, Group B, an elite residential plazuela group located approximately 150 meters from the site core. Excavations focused on Structure B-1, the eastern shrine where multiple, layered deposits of artifacts were discovered along the southern outside wall of the structure. Artifacts collected include faunal remains, ceramic sherds, and lithics, as well as materials that are ideologically significant to the Maya such as jade, obsidian, and eccentrics. Ceramic and lithic artifacts were analyzed in-field during the June 2018 field session and faunal remains were previously analyzed in 2017. By analyzing the artifacts recovered in the deposits and incorporating ritual and symbolic theoretical approaches this research contributes to understanding the relationship between the deposits and Structure B-1.

Alvarez, Stephen [252] see Simek, Jan

Álvarez, María Clara [285] see Gutierrez, Maria

Alvarez Estrada, José, Lilia Lizama Aranda (Manejo Cultural, AC.) and María De Guadalupe Zetina-Gutierrez (Sociedad sin Fronteras del Patrimonio Cultural A.C) and Miguel Covarrubias (Externo INAH)

[71] Uso de Dispositivos Open Hardware en Proyectos Arqueológicos en México

Desde sus orígenes de relativamente baja tecnología, la arqueología ha evolucionado en una disciplina altamente tecnologizada, que emplea instrumentos para localizar, caracterizar y exhibir al sitios y yacimientos. Los arqueólogos con acceso a tecnología novedosa aumentan su productividad, dejando en desventaja a quienes usan procedimientos anticuados. En las dos últimas décadas se han desarrollado movimientos democratizadores de la tecnología como FLOSS (Free Libre Open Source Software) y Open Hardware, basados en el poder que las redes globales de comunicación dan a los amateurs para compartir ideas y proyectos. Ahora existen plataformas de prototipado electrónico como Arduino y Raspberry Pi, sistemas operativos como Linux y aplicaciones de gráficas de alta calidad. Empleando este andamiaje, han surgido innumerables proyectos que replican, a muy bajo costo y alta disponibilidad, equipo de detección y caracterización como drones (aéreos, acuáticos y subacuáticos), sensores

LiDAR, radares de penetración, medidores de resistencia de suelos y scanners 3D. Este trabajo recapitula el estado del arte de tales tecnologías; muestra los resultados de su implementación en Instituciones de Educación Superior (IES) del Estado de Quintana Roo, México; reporta su prueba por arqueólogos profesionales; analiza los resultados y presenta sugerencias para posibles líneas de trabajo a futuro.

Alves, Joel [20] see Ameen, Carly

Alves, Joel, Carly Ameen (University of Exeter), Tom Fowler (University of Nottingham), Naomi Sykes (University of Exeter) and Greger Larson (University of Oxford)

[352] *Of Rabbits and Men: Using Ancient DNA and GMM to Investigate Rabbit Domestication*

Rabbits are one of the most recently domesticated animals, and yet, over thousands of years, they have lived in a diverse range of relationships with people. This close interaction is recorded in archaeological and historical records and reflected today in the diversity of breeds worldwide. Whilst extensive research has been done to understand the differences between wild and domestic rabbits, little is known about the incipient stages of rabbit domestication, and the question of where and when this process began has not been satisfactorily resolved. Recent findings have begun to challenge our previous knowledge about the origin of domestic rabbits and emphasise the relevance of combining both modern and ancient data. Moreover, multidisciplinary approaches involving both genetics and zooarchaeology have proven successful in clarifying the domestication of many species, and show strong promise in their application to rabbits. This project aims to address the question of rabbit domestication by samples covering a wide chronological period. By generating ancient and modern DNA sequencing data we can recover demographic and selection signals associated with domestication. These results can then be combined with GMM analyses to investigate concomitant morphological changes across time, and hopefully, provide novel insights into the domestication of this species.

Alvey, Jeffrey (Mississippi State University), Evan Peacock (Mississippi State University) and Joseph Mitchell (Nichols College)

[362] *The Value of Legacy Collections for Recognizing and Reducing Error in Artifact Analysis*

All data accumulated in field studies directed at the determination of formal variation in the archaeological record contain a source of variation that results from analytical error. This type of error, if of sufficient magnitude, may significantly affect interpretation. Recent ceramic and faunal analyses from the Southeast have identified important errors that could affect archaeological interpretations that fail to recognize such problems. By discussing these specific instances of analytical error we hope to assist analysts in avoiding such mistakes in the future while highlighting the importance of reanalyzing curated collections as a means of evaluating the occurrence and magnitude of previous error.

Amador, Julio (UNAM)

[84] *Sacred Places and Rock Art Sites in the Sonoran Desert: Defining Common Patterns*

Based on landscape archaeology, archaeoastronomy, the analysis of rock art iconography, and ethnohistoric and ethnographic documents, this paper proposes to define the factors that determine the sacredness of rock art sites in the Sonoran Desert. Well characterized common patterns can be found in most of the rock art sites that will be described, facts that confirm with certainty that we can speak of shared cultural traits within the region. As basic factors to be analyzed that can determine the sacredness of a rock art site, we can name: geomorphology; the presence of valued natural resources, such as water and wild flora and fauna; astronomical orientations of constructed structures; evidence of ritual activity; mythological narratives associated to the place; ethnohistoric and ethnographic documents related to religious beliefs and practices, in reference to the rock art sites; and iconographic and symbolic analysis of rock art images.

Amaroli, Paul (Fundacion Nacional de Arqueologia de El Salvador)

[412] *New Views on the Ancient City of Cihuatán*

Since half a century ago, it has been recognized that the Early Postclassic in the territory of western El Salvador represents a sweeping departure from its Classic period antecedents, as seen in the type site of Cihuatán. Its nature has been variously described as generically Mexican, or central Mexican and Gulf Coast, and even more specifically, as Toltec. Mass migration and integration with the Postclassic Mesoamerican world system have both been given as explanations for this "mexicanization". Recent investigations at Cihuatán and affiliated sites have provided new information serving to enrich the discussion of the origins and the sociopolitical organization of this Early Postclassic city and its realm. Study of a terminal context has provided a new view of how and when occupation abruptly ceased at Cihuatán. The foregoing also has implications for the interpretation of Cihuatán as ancestral to the historic Pipil.

Amati, Viviana [127] see Scholnick, Jonathan

Ambler, Bridget

[237] *Developing Comprehensive Agreements on a Designated Cultural Landscape*

The northern San Juan region in southwestern Colorado reflects the ancestral homelands for 26 federally-recognized tribes. BLM's Canyons of the Ancients National Monument is a designated cultural landscape per Presidential Proclamation and contains the highest archaeological site density in North America. Discoveries on the Monument are governed by NAGPRA, Section 106, and ARPA. Since 2013, the BLM has been consulting with tribes to develop a NAGPRA comprehensive agreement that outlines a programmatic approach to guide tribal consultation and disposition for new discoveries. From the beginning, consulting tribes have lead the effort to develop a process that addresses tribal concerns while creating a more efficient decision-making process.

Ambrose, Stanley [32] see Bertacchi, Alex

Ambrose, Stanley (U. Illinois, Urbana-Champaign)

[32] *Calibrating the Chronology of Late Pleistocene Climate Change and Archaeology with Geochemical Isochrons*

Chronometric dating of Late Pleistocene environmental changes and archaeological sites can be refined by correlations with precisely dated volcanic isochrons, stalagmites, and marine isotope stages (MIS). Lake Malawi cores have volcanic ash from the Toba super-eruption, dated ~74 ka at levels previously dated to ~62.5 ka. Several types of core data show an extremely cold dry period spanning ~2000 years occurs directly above the Toba ash. This is consistent with ice core evidence for 18 centuries of extreme cold after Toba during Greenland Ice Stadial event 20 (GI-20s). A sand layer at Pinnacle Point 5-6 rockshelter on the South African coast contains Toba ash. This sand marks an abrupt drop in sea level ~74 ka. It may correlate with sand beds at Blombos and Klasies, and with Malawi and Greenland core evidence for severe climate after Toba. MSA backed blade technologies appear directly above this sand at 72 ka at PP5-6 and at Klasies. Howiesons Poort and similar technologies appeared at this time, suggesting that modern technological and socio-territorial organization strategies may have evolved in response to severe climate during GI-20s. Macroregional social networks may have developed at this time, and may have facilitated modern human dispersals out of Africa.

Ambrosino, Gordon (Los Angeles County Museum of Art (LACMA))

[43] *The Rock Art of the Fortaleza Ignimbrite: 4,200 Years of Landscape Inscription in the North-Central Andes*

The Fortaleza Ignimbrite (FI) is a geologic formation, situated at the headwaters of the Fortaleza and Santa Rivers in highland Ancash Peru. A 2014 survey of the FI by the Proyecto de Investigación Arqueológica Arte Rupestre del Alto Fortaleza (PIA ARAF) documented 192 rock art places on the FI, demonstrating correlations between specific images and production techniques with ecological tiers. Informed by these findings, the 2016 PIA ARAF field season focused excavations on three puna rock shelters that hold dense petroglyph panels and one collective tomb, with an associated pictograph panel, and which is located in the lower- altitude quechua ecozone, to place the FI's corpus of rock art in time. Survey data is paired with data from radiocarbon analysis, photogrammetry, digital illustration, and both ground and art panel stratigraphy to produce a typology and a spatio-temporal map for the rock art of the FI, spanning from 3,000 BC to AD 1820. These data are then cross-referenced with 16th-century Spanish ethnohistoric accounts from these river valleys to link specific motifs with named ayllu groups. These findings may offer insights regarding the temporality of other rock art sites as well as the nature of social emplacement in the region.

Ameen, Carly (University of Exeter)

[20] *Tracking Ancient Animals to Provide an Archaeological Perspective on Wild Mammal Management, Conservation and 'Rewilding'*

Human immigration and biological invasions are high-profile topics in modern politics, but neither are uniquely modern phenomena. Migrations of people, animals and ideas were common in antiquity and are frequently incorporated into expressions of cultural identity. However, the more recent the migration, the more negative modern attitudes are towards them. Native is perceived as positive and 'natural', while 'alien' is attached negatively to both cultural and environmental problems. Decisions about conservation and management are often driven by this perceived native or alien status. The zooarchaeological record offers the potential to establish the bio-cultural history of wild species and model these changing human-animal-environment relationships over millennia.

Using the Easter festival and its associated animals as a case study, this paper explores these dynamics by integrating biomolecular approaches with traditional (zoo)archaeology, art history, and citizen scientist initiatives to investigate the human-mediated dispersal of the brown hare and rabbit in connection with the Easter festival. The cultural, religious and temporal contexts of these 'alien' introductions are key factors for challenging widespread negative attitudes towards cultural and biological 'aliens'. This paper demonstrates how archaeological studies integrating faunal remains analysis with genomic and isotopic approaches can provide a foundation for building modern conservation policy.

[20] *Chair*

Ameen, Carly [20] see Murphy, Luke John

Ames, Christopher [15] see Collins, Benjamin

Ames, Nicholas (University of Notre Dame)**[46] American Spaces, Irish Places: Assessing Three Urban Communities in 19th Century Irish-America**

American industry drew millions of Irish immigrants during the 19th and early 20th century, profoundly shaping the face of modern America. This research investigates how Irish communities in the U.S. responded to local conditions within different types of urban spaces, influencing the way communities and subsequent identities within Irish-America were formed. Focusing on three industrial cities – Pittsburgh, PA, Cleveland, OH, and Clinton, MA – I use historical newspapers, maps, archival records, city directories and oral histories alongside GIS and social networking analyses to comparatively map the physical changes of the 19th to early 20th century communities in response to these local historical and social pressure. Within this study I explore how 'scales' of urbanity influence community life, with Pittsburgh's prominent steel industry contrasting the transport industry of Cleveland, and the mill town of Clinton embodying small-scale production. By investigating how cultural localism introduced by new (albeit historic) immigrants becomes transformed into social communities unique to each urban space, I aim to identify how different local conditions may be impacting how contemporary immigrant communities develop within different U.S. spaces today.

An, Lingyu [299] see Wang, Chunxue

Anaya Hernández, Armando [330] see Milley, David

Anaya Hernández, Armando [372] see Carr, Christopher

Anaya Hernández, Armando [410] see Reese-Taylor, Kathryn

Anderson, Amber (Rochester Institute of Technology (RIT))**[288] Material Culture in Pambamarca Ecuador: Comparing Finds from Two Inkan Fortresses**

As the Inka expanded north at the end of the 15th century, they were met with fierce resistance from the País Caranqui societies in Northern Ecuador. A prolonged standoff occurred, visible in the plethora of fortresses along the northern frontier. Excavations completed by the Pambamarca Archaeology Project north of Quito at three Inka fortresses within the Pambamarca Fortress Complex (Pi10 [Quitoloma], Pi20 [Censo Pucara], and Pi23 [Campana Pucara]), indicate these sites were constructed quickly, were occupied, and "battle ready". Material remains recovered consist largely of groundstone weaponry and ceramics, which this poster will focus on. Excavations at Pi10 and Pi23 were placed in residential and "elite" living areas, and analysis will show if these areas are as distinct materially as they are spatially, as well as determine if there is artifact homogeneity between the two forts. Preliminary analysis shows one site's ceramics contained higher amounts of decorated wares, Inka imperial forms, and local exotic forms than the other, even though it was smaller, closer to enemy territory, and showed signs of being attacked. The hope is that studying the material remains can help us understand the occupants of these sites and how they are related to each other.

Anderson, Dagny [207] see Carlson, Kristen

Anderson, David (University of Tennessee), Eric Kansa (Open Context/The Alexandria Archive Institute), Sarah Whitcher Kansa (Open Context/The Alexandria Archive Institute), Joshua J. Wells (Indiana University South Bend, Indiana) and Stephen Yerka (Eastern Band Cherokee Indians)

[248] Late Holocene Human Population Dynamics in Eastern North America: Lessons from Site and Artifact Records in DINAA and Beyond

Population trends in Eastern North America are explored using the incidence and distribution of diagnostic artifacts and components, using continental scale datasets like DINAA and PIDBA, and as developed by researchers at the locality, state, or regional level. Such research has a long history in the region, but only recently have sample sizes and geographic coverage been sufficient to permit fairly fine grained exploration of questions related to human demography, settlement range, interaction, adaptation, and movement. Site and artifact data are thus useful proxy measures complementing the radiocarbon record, which is also being used locally to examine these subjects. Together, these approaches offer insights as important about how the archaeological record was shaped in the present as they do about lifeways in the past. The evaluation of how visible and representative the extant site and artifact record actually is a critical part of this endeavor. Large-scale population fluctuations and movements, reflected in concentrations and abandonments of sites and artifacts, are common in the later prehistoric and early historic periods. The data also indicate similar trends occurred throughout the span of human occupation in the region, back to the Pleistocene, and these were neither uniform over space nor unidirectional in time.

Anderson, David [251] see Britt, Tad

Anderson, J. Heath [111] see Kate, Emily

Anderson, Kirk (Museum of Northern Arizona)**[254] Landscapes, Landforms, and Landform Elements: Putting the "Land" Back into Landscape Archaeology**

The Chuska Mountains are a landform that extends north-south for approximately 70 kilometers, marking the western boundary of the San Juan Basin. The low mountains, broad piedmont, and sluggish drainages grade towards Chaco Wash, the main drainage in the area. Alluvial and eolian landforms provide the locations for prehistoric habitations, commonly in active geomorphic settings. Keys to understanding the buried cultural landscapes are the surface expressions of landform elements such as small gravel bars, eolian dunes, bedrock knolls, clay-rich deposits, and exposed paleosols. The alluvial and eolian chronology spanning the Middle to Late Holocene is based on AMS radiocarbon, optically stimulated luminescence, and dendrochronology age estimates. Buried cultural landscapes are interpreted through chronostratigraphic analysis of dated thermal features, alluvium, eolian deposits, and soils. Certain places on the landscape were occupied for several thousand years, even though alluvial and eolian deposition was quite active. The last period of alluviation occurred about AD 1570 when a juniper forest was rapidly buried by well-stratified alluvial sands. The dynamic landscape preserved a history of buried archaeological stratigraphy that provides insights into climate-landscape-human interactions.

[5] Discussant**Anderson, Ryan (Santa Clara University) and Christopher Jazwa (University of Nevada at Reno)****[240] Natural and Anthropogenic Effects on Coastal Environments along the East Cape of Baja California Sur, Mexico**

Changes to coastal environments from natural and anthropogenic factors have influenced human subsistence and settlement patterns throughout the Baja California peninsula. These changes are visible both in the archaeological record and present-day human settlements. We discuss long-term human-environment interactions along the East Cape of Baja California Sur, an area that has received relatively little archaeological attention. Tourism and residential development throughout the cape have led to large-scale coastal changes through demolition, construction, and erosion, including the destruction of archaeological sites. The archaeological record of the cape region is focused around coastal subsistence. An initial assessment suggests that indigenous occupants of the region primarily oriented themselves along the coast and targeted a variety of shellfish species, particularly oyster. While many of the region's present-day residents continue to engage in small-scale subsistence and commercial fishing, others have adopted livelihood strategies to take advantage of the growing coastal tourism and real estate economies. This study will highlight how inhabitants of the region, past and present, have responded to environmental and social change through coastal adaptations and new livelihood strategies. This study provides an initial step for understanding human responses to coastal change in a relatively understudied area of Baja California Sur, Mexico.

Anderson, Sara (University of Nebraska-Lincoln)**[117] Examining Female Status and Craft Production in Chaco Canyon: Bone Spatulate Tool Use-Wear Analysis**

Chaco Canyon, located in present-day New Mexico, was a political and economic center for the Ancestral Puebloan culture between AD 800-1200 and remains an important cultural area in the American Southwest. Large-scale road networks facilitated the import of raw materials and craft goods and enabled the exchange of prestige items. Utilizing the Chaco Research Archive, I evaluate Ancestral Puebloan women's participation in prestige-driven craft production. Bone spatulate tools, including several that are distinctively embellished with turquoise, jet, and shell inlays, are found in association with female burials and other tools related to female activities at great house and small house sites, as well as in some outlier communities. I argue that these objects, commonly referenced as bone scrapers and/or fleshers have unique use-wear signatures that suggest their function and significance as tools utilized by Ancestral Puebloan women in their daily activities and participation in craft production. Utilizing legacy data in concert with new digital techniques and experimental archaeology, the androcentric and ethnocentric biases of past archaeological interpretations can be more closely examined. A thorough understanding of the functionality of these bone spatulate tools permits new archaeological interpretations of gendered craft production activities and women's status and prestige in Chaco Canyon.

Anderson, Shelby [10] see Braymer-Hayes, Katelyn

Anderson, Shelby [10] see Reed, Patrick

Anderson, Shelby (Portland State University), Colleen Strawhacker (National Science Foundation), Aaron Presnall (Jefferson Institute) and Arctic Horizons Steering Committee**[31] Arctic Horizons: Forging Priorities for Arctic Social Sciences and NSF Funding**

Arctic Horizons – a multi-institution collaboration funded through NSF's Arctic Social Science program – brought together the Arctic social science research community to reassess goals, potentials, and needs affecting the diverse disciplinary and transdisciplinary currents of social science research in the circumpolar North for the next decade. We pooled the collective knowledge and ideas of approximately 200 western and Indigenous scholars to re-envision Arctic social science research priorities, and how they are communicated and represented, for the coming decades. The full report is now available (<http://arctichorizons.org/>). In this session honoring Anna Kerttula's contributions to northern research, we will present an overview of project findings, focusing especially on aspects of the project related to northern archaeological research.

Anderson, Shelby [47] see Cody, Tia

Andrade Pérez, Axel (Arqueólogo)

[373] *La Casa del Sur: una unidad palaciega perteneciente al Conjunto Monumental de Atzompa, Oaxaca*

Se muestran los resultados de las excavaciones efectuadas desde el 2015 al 2018 en el área sureste de la zona nuclear del Conjunto Monumental Atzompa, denominada la Casa del Sur, las características arquitectónicas de esta unidad habitacional son de alto estatus, la cual servía como área de interacción, tránsito y control entre el nivel más bajo y los sectores superiores del centro ceremonial. El análisis arquitectónico y de materiales arqueológicos asociados, así como el estudio de ofrendas localizadas en la fachada Este, permite presentar de manera preliminar datos asociados al culto al agua y a la fertilidad.

Andraschko, Amanda [241] see Eldridge, Kelly

Andrews, Anthony (New College of Florida)

[227] *Discussant*

Andrews, Brian (Rogers State University)

[365] *Diversity in Hunter-Gatherer Architecture*

Diversity in the architecture of sedentary and complex societies is well-studied, but an emphasis on the role of mobility in hunter-gatherer adaptation has resulted in a lack of discussion of the built environment among these communities. Here we take a temporally broad and cross-cultural approach to document variability in archaeologically known hunter-gatherer architecture, focusing on diversity in form and function and the relationship between variability in architectural elements and environmental conditions, subsistence strategies, and social organization.

[186] *Chair*

Andrews, Brian [186] see Morgan, Brooke

Anschuetz, Kurt F. [84] see Duwe, Samuel

Anschuetz, Kurt F. (Rio del Oso Anthropological Services, LLC)

[84] *Discussant*

Anthony, David (Hartwick College) and Dorcas Brown (Independent)

[196] *From Bit Wear to Ancient DNA: Steppe-ing Out*

We found our first entry into steppe archaeology in 1989-1992 through a study of microwear caused by bits on horse teeth, which we hoped would identify bitted, and therefore ridden or driven, horses. From then through to the publication of the Samara Valley Project (2016) we attempted to understand the evolution of steppe pastoralism, while we watched the number of engaged western archaeologists increase around us. Today we celebrate the maturity of Eurasian steppe archaeology, and look ahead to being the petri dish within which the new methods of ancient DNA, calculus analysis, and isotope studies can reveal relationships that previously were debated or unknowable.

[196] *Discussant*

Anton, Shane (Cultural Preservation Program Manager)

[93] *Discussant*

Antonio, Luz (Proyecto de Investigación Arqueológica Prehistoria Urbana de Huari) and William Isbell (Director Proyecto de Investigación Arqueológica Pr)

[250] *Investigating Huari Urban Residences: An Overview of the 2017-18 Ceramic Styles*

La cerámica huari ha sido definida como una gran oleada de varios estilos contemporáneos, con sus propias características y conviviendo con un estilo sobresaliente y diferente denominado Conchopata, el cual sirvió como marcador del inicio del Horizonte Medio. Gracias a las excavaciones en Huari y publicaciones antecedentes se puede considerar que el Horizonte Medio fue una secuencia de más oleadas antes de la llegada de la iconografía Tiahuanaco. Esta ponencia tratará de desempalmar las dos visiones de Dorothy Menzel, "en su perspectiva

teórica": Tiahuanaco (y lo relacionado a Tiahuanaco) como el punto inicial del Horizonte Medio y su propia observación arqueológica, de una cerámica que ella denominó Fancy Chakipampa por tener rasgos Nasca.

Antonio, Margaret [253] see Moots, Hannah

Antoniou, Anna (University of Michigan) and Earl Davis (Shoalwater Bay Indian Tribe)

[58] On Using Archaeology within an Indigenous Rights-Based Approach to Sustainability

In the U.S., indigenous communities often suffer poor health at far greater rates than non-native populations. Lower life expectancy and the disproportionate disease burden exist often because their local food diversity and sources have been diminished by restricted access and economic stresses. To remedy these health disparities, many indigenous communities are working towards reviving traditional foodways and regaining their rights to local and sustainable food sources. We argue that an archaeological understanding of prehistoric foodways can help to accomplish these community-set agendas in three ways. First, archaeological understandings can complement traditional knowledge to establish the cultural infrastructure needed to motivate and enrich these efforts. Second, archaeological data can be instrumental in the legal battles necessary to overturn governmental laws that prevent economically stressed indigenous communities from accessing traditional and local food sources. And lastly, indigenous communities can capitalize on archaeology's broad public appeal to advance public perceptions of their own sustainability efforts. To illustrate the utility of archaeology within sustainability discourses, we present a case study from southwestern Washington State. In it, we describe our on-going efforts to use archaeological investigations at Nukuanlh Village to reinvigorate culturally important foodways that are in danger of being lost within the descendant community.

Antonites, Alexander (University of Pretoria)

[242] Salt Production in the Iron Age of Southern Africa

Salt production is directly associated with the spread and emergence of agricultural communities of southern Africa's Iron Age. It is also one of the few economic activities from the period for which direct in-situ production evidence exists. This paper presents research from excavations of salt production sites in northeast South Africa. Analysis of the context, concentration and intensity of production provide an understanding of how communities accessed resources and mobilized labor. These suggest that production was probably initially done by multiple small groups on a seasonal basis. Output was likely for own consumption rather than explicitly focused on trade. Over time though, production intensified and salt ultimately became incorporated into overlapping local and long distance trade networks that connected the interior of southern Africa with the larger Indian Ocean trading community. This research emphasizes the value of approaching resource extraction in non-state societies through distinct organizational principles often reserved for analysis of craft production in complex societies.

Antorcha Pedemonte, Ricardo

[68] Enriched Spatial Syntax Analysis of Two Late Postclassic Terraces in Tlaxcallan, Mexico

The work studies, from a human ecology perspective, the process of adapting the environment to the needs of the pre-Hispanic population of Tlaxcallan during the period of 1250-1519 A.D. It is proposed that the construction of the environment is the result of the interaction among ecological, historical, political, economic and symbolic factors which are intertwined to give shape and structure to the pre-Hispanic settlement of Tlaxcallan. The subject is addressed through the diachronic study of the environment constructed through the analysis of spatial syntax and architectural value, emphasizing the study of space by means of a comprehensive examination of cultural artifacts, architecture, and spatial configuration in two residential terraces with the aim of understanding the patterns of Tlaxcaltecs' social behavior and organization as reflected in the design, distribution, and use of spaces. The analyses show that the terraces of Tlaxcallan were multifunctional spaces, dynamic and in constant transformation, where people carried out domestic tasks and activities related to the economy of its inhabitants. It is found that urban design is the product of a particular historical process, involving a particular ecosystem, and a complex geopolitical panorama in the region, all of which were successfully addressed and overcome through policies of collective cooperation between the state and its inhabitants.

[68] Chair

Anzellini, Armando (University of Tennessee, Knoxville) and J. Marla Toyne (University of Central Florida)

[98] GIS in Vertical Spaces: An Examination of Location and Clustering of Mortuary Contexts at the Cliff Site of La Petaca, Peru

Geographic Information Systems are often applied to archaeological contexts to analyze spatial patterns within a site and ascertain social structure and identity. Vertical sites, however, pose a problem for GIS since most analyses must occur on the horizontal plane. This is particularly troublesome for studying the Chachapoya, a Late Intermediate Period group of the northeastern Peruvian Andes whose methods for disposing of their dead involved highly visible spaces on cliff faces. The vertical nature of these sites make mapping using traditional methods a challenge. This project used high resolution photography in conjunction with ArcGIS to explore the notable mortuary complex of La Petaca, which includes over 120 burial structures distributed across a vertical rock face extending 1,200 m². Its size provides the opportunity to study the applications of GIS to vertically distributed archaeological sites and thereby ascertain the relationship between location and social, cultural, or familial affiliation so often examined on horizontal sites. By adjusting our perspective on 3-dimensional coordinate data, we can conduct spatial and cluster analyses that were previously unavailable for vertical sites. Results demonstrate that GIS analyses of

vertical sites yields reliable statistical data, supporting interpretations of social identity and cohesion within the Chachapoya people.

Aoyama, Kazuo [255] see Kovacevich, Brigitte

Aoyama, Kazuo

[309] *Preclassic and Classic Maya Exchange, Craft Production and Ritual Practices: A Diachronic Analysis of Lithic Artifacts around Ceibal, Guatemala*

I discuss the results of a diachronic analysis of lithic artifacts collected from Ceibal, Guatemala, in order to elucidate long-term patterns and changes in the Preclassic and Classic Maya exchange, craft production and ritual practices. The interregional exchange of large polyhedral cores of obsidian from the Maya highlands and local production of pressure blades began as a result of sociopolitical development in Ceibal by the early Middle Preclassic Real 3 phase (775 - 700 B.C.). New ritual practices developed at Ceibal during the late Middle Preclassic period (700-350 B.C.), possibly through political interactions and negotiation involving emerging elites and other diverse community members. Common objects in ritual deposits in the public plaza shifted from greenstone celt caches to other artifacts, including those made of obsidian. El Chayal obsidian was heavily used during the early Middle Preclassic period, but San Martín Jilotepeque was the principal source of obsidian in the late Middle Preclassic, Late Preclassic and Terminal Preclassic periods. Obsidian was imported mainly in the form of more prepared polyhedral cores that were reduced into pressure blades at Ceibal throughout the Classic period. At that time, El Chayal resumed its place as the principal source of obsidian.

Aquino, Valorie (University of New Mexico)

[340] *Discussant*

Aragon, Leslie (Archaeology Southwest) and Kate Vaughn (Logan Simpson)

[258] *What Can We Learn by Digging a Trench through a Hohokam Ballcourt?*

Ballcourts have come to represent the pre-Classic Hohokam more than any other architectural or artifactual class. These sizeable basin-shaped structures with earthen embankments were built at most of the large villages throughout southern and central Arizona between AD 750 and 1080. People watching or participating in the ballgame probably came together from several different villages, which would have provided opportunities for exchanging commodities both in the form of raw materials and finished goods. While they are one of the most recognizable forms of public architecture in the southern Southwest, there have been relatively few opportunities to excavate them. Recent excavations at a Hohokam village north of Tucson provided a unique opportunity to excavate a portion of a ballcourt. Although the project area was incredibly narrow—only 10-ft wide—and in a road right-of-way that had been leveled at the surface, excavations revealed more intact deposits than had been anticipated. This poster presents what we were able to learn about the size, orientation, and construction of a Hohokam ballcourt from minimal excavations in a disturbed context.

Aragon, Leslie [263] see Lewis, Devlin

Aragonez, Irving [182] see Tantaleán, Henry

Arakawa, Fumi (New Mexico State University), Braeden Dimitroff and Fred Neils

[313] *Archaeological Landscape Studies in Alkali Ridge and Montezuma Canyon during the Pueblo II and III Periods*

The Montezuma Canyon and Alkali Ridge areas occupy a cultural and ecological boundary between the Great Sage Plain of the central Mesa Verde region and the canyon lands of the western Mesa Verde region. However, physiological and ecological differences are apparent between the two localities despite their proximity; most of the Montezuma Canyon sites lie along the floodplain, while Alkali Ridge populations cluster along the mesa top. As such, the evaluation of ancestral Pueblo populations among these two variable yet proximal areas has great potential for modeling long-term social and environmental changes, particularly the emergence of village aggregation and regional depopulation between A.D. 1150 and 1280. An intensive remapping project from 2014-2018 in conjunction with on-site pottery analysis and the recording of potential agricultural and water management features provides us with a better understanding of how ancestral Pueblo people utilized and conceived their landscapes in these areas. Based on the results of the project, this presentation highlights “cooperative and competitive” aspects of landscape use by ancestral Pueblo people in the Montezuma Canyon and Alkali Ridge during the Pueblo II and III periods.

[420] *Discussant*

Araujo, Astolfo [268] see Correa, Letícia

Araujo, Astolfo (Museum of Archaeology and Ethnology - USP) and Mercedes Okumura (Institute of Biosciences - University of São Paulo)

[268] *Long-Term Cultural Persistence in Modern Humans: Some Case Studies from Early and Mid-Holocene Archaeological Traditions in Eastern South America and Theoretical Implications*

We will present chronological, morphometrical, technological, and subsistence data coming from eastern South America related to four Paleoindian cultural traditions occupying different areas since the beginning of the Holocene. All these four traditions present a remarkable cultural stability that shows few parallels in the archaeological record. Using these four case studies as a starting point, we can begin to question if innovativeness is inherent to individual human beings, or if it is an emergent property, linked to population size and social interconnectedness. These cases are of interest not only because they tend to challenge the notion that humans are always, necessarily extremely innovative beings, but also because they challenge the commonsensical notion that change and innovation is always "good" and "desirable". They also may serve to expand our knowledge and interpretive frameworks, going beyond current sociocultural / anthropological wisdom.

Arazi-Coambs, Sandra

[25] *Tijeras Pueblo in Review: A Summary of Previous Research and Site Significance*

This paper provides an overview of the Tijeras Pueblo archaeological site, placing it within a broader academic and social context. The excavation history of the site will be discussed, along with previous research, and past and modern significance. In its current context, Tijeras Pueblo has become a center of archaeological and cultural education and a place where knowledge is both created and disseminated. Occupying a very public space in the community, the site and its collections have become teaching tools for a young generation of archaeologists, avocational volunteers, and the greater Albuquerque community. Continued collaboration with Isleta Pueblo also presents an opportunity for the site to be used as a platform for pueblo members to engage their own communities and maintain strong connections with their ancestral site.

[25] *Chair*

Arbuckle, Benjamin (University of North Carolina at Chapel Hill)

[352] *Predomestic Animal Management and the Social Context of Animal Exploitation in SW Asia*

More than a century of faunal work seeking evidence for the origins of domestic livestock in SW Asia has shed considerable light on the timing, locations and processes of animal domestication. The early stages in the shift from hunting to herding, however, remain difficult to identify and as a result both the mechanisms and motivations for early management remain unclear. A growing body of bioarchaeological evidence suggests that initial shifts from hunting to herding occurred well before the appearance of either the domestic phenotypes or demographic profiles commonly used to identify herd management, and were sporadic, hesitant, and based on dynamic local traditions of human-animal inter-relations. In this paper, I explore this current evidence for predomestic animal management in the terminal Pleistocene and early Holocene in SW Asia and address what this may tell us about the motivations for and social context of early animal management.

Arbuckle MacLeod, Caroline (University of British Columbia)

[52] *The Value of Children in Ancient Egypt*

Children have long been considered one of the "invisible" communities of the ancient world. As they are infrequently mentioned in texts and incapable of constructing their own mortuary narratives, Egyptologists and archaeologists have contented themselves with only a basic understanding of the position of children in ancient Egyptian society; however, through the manipulation of economic information, in comparison with funerary evidence, it is possible to examine the "value" of children from ancient Egypt. This approach provides a new means to assess the position of these individuals, and to deliver a more nuanced and emotional understanding of children in the ancient Egyptian family.

Archila Montanez, Sonia (Los Andes University, Department of Anthropology) and Saul Torres (Department of Anthropology, Los Andes University)

[242] *Pre-Hispanic Salt Production in Nemocon, Colombia. A Study of Environmental, Technological and Social Characteristics*

This investigation deals with environmental, technological and social characteristics of salt production among pre-hispanic societies that inhabited Nemocon region since 2350 BP. During this long period salt was obtained by means of boiling brine in ceramic pots. Salt have been considered as one of the key commodities in the region, particularly for the latest period (Muisca Period), when a broad network of trade and political interaction was developed in the Eastern Andes of Colombia. This research will allow us to fill gaps on the current information about organization of salt production, associated technologies and use of natural resources related with this activity. We are using two different spatial scales of investigation that combines regional survey and site-specific surveys using geophysical techniques (GPR and Electromagnetic Profiler) as well as excavations.

Arcuri, Márcia [286] see Strauss, Andre

Arcuri Suñer, Marcia Maria [46] see Bitencourt Mañas, Diego

Ardelean, Ciprian (University of Zacatecas, Mexico & University of Exeter, UK)

[332] *The Human Presence in the Americas during and before the Late Glacial Maximum under the Light of New Investigations at Chiquihuite Cave, the Older-Than-Clovis Site in Mexico*

The 2016-2017 excavations at Chiquihuite Cave (northeastern Zacatecas, Mexico) produced solid evidence in favor of a sustained human occupation of the Northern Mexican Highlands during and before the Late Glacial Maximum (LGM) (in process of publication at the time of the submission of this abstract); an occupation that lasted for thousands of years in the form of recurrent visitation of this high-altitude site at almost 3,000 m a.s.l. The multi-proxy evidence included an entirely new lithic industry and a long sequence of radiocarbon and luminescence dates. Explorations are scheduled to resume during the winter of 2018-2019 (dry season), with new excavations to be performed over a period of two months of continuous work inside the vast cavern. The goals of this new season are to corroborate the data obtained during previous fieldwork and replicate the intriguing evidence that set the early peopling of America to a much earlier date. This presentation presents preliminary results of these explorations that will contribute new evidence to the LGM occupation of the continent.

Ardelean, Ciprian [374] see De La Rosa-Díaz, Jesús

Ardren, Traci (University of Miami)

[76] *Bark Beaters and Cloth Production in the Classic Maya Area*

While bark cloth and paper are well known in the ethnographic and artistic records of Pacific and African cultures, due to preservation concerns these important plant based products have been challenging to investigate in the precolumbian cultures of the New World. Often our only proxy for bark cloth is the presence of stone bark beaters in the archaeological record. This paper presents a survey of bark beaters from the Classic Maya area, with attention to recent discoveries in domestic contexts that suggest bark cloth products had a variety of uses beyond their incorporation in sacred codices or almanac books. The ubiquity with which bark beaters are found in domestic settings, and their variation, can be seen as a reflection of the wide-spread usage of these tools across social classes. Bark cloth manufacture seems to have been incorporated into processes of domestic multi-crafting alongside other forms of textile and tool production. From this perspective these artifacts are strong indicators of the relationship between humans and plants in Classic Maya domestic life, and the many ways plants exerted their influence on the daily activities of household members.

Ardren, Traci [94] see Palacios, Horvey

Arellano, Cynthya [39] see Filloy, Laura

Arias, Oscar [315] see Rojas-Pelayo, Lisseth

Arieta Baizabal, Virginia (Universidad Veracruzana)

[405] *"El arroyo suena raro": Las otras esculturas Olmecas de Antonio Plaza, Veracruz*

Antonio Plaza, Veracruz, ubicado en una isla al margen del río Uxpanapa –en medio de las capitales olmecas de San Lorenzo, Veracruz y La Venta, Tabasco- es conocido y señalado como el lugar de origen de uno de los hallazgos más polémicos de la arqueología de la costa del Golfo. Hacemos referencia a la extraordinaria escultura conocida como "El Luchador". No obstante, poco se sabe de otras seis esculturas localizadas en el mismo lugar durante la década los setenta. De acuerdo a lo anterior, el Proyecto Arqueológico Antonio Plaza-Capoacan (PAAPC), enfocado en la dinámica poblacional prehispánica de la región, planteó como parte de sus investigaciones, y a la par del programa de reconocimiento de superficie, un estudio etnográfico y estilístico del conjunto de piezas escultóricas presumiblemente olmecas. En esta ponencia se presentan las primeras interpretaciones de dicho estudio, el seguimiento que han seguido las esculturas hasta hoy y los primeros resultados sobre su contexto arqueológico observado a través del análisis de materiales.

Arikan, Bulent (Istanbul Technical University Dept. of Ecology and Evolution)

[148] *Moderator*

[148] *Discussant*

Arjona, Brenda (UC Santa Cruz) and Chelsea Blackmore (UC Santa Cruz)

[179] *Queering Colonization in Early Colonial Belize*

Archaeological narratives of colonial contact have dramatically shifted from a focus on colonizer/colonized dichotomies to discussions about plurality, ethnogenesis, and hybridity. However, much of the work in Mesoamerica continues to define the practice of colonization through a largely white and male lens. Colonial Belize came to

existence through the daily interactions and struggles of diverse groups of people, including British Baymen, pirates, smugglers, runaway slaves, and free people of color. This history has led to the distinct creole identity that forms the basis of much of Belize's modern national identity. Although this colonization is often described through the narratives of European actors (e.g. the fight between British and Spanish Crowns over the region), its history is better understood through the role and impact that subaltern peoples had in its construction. Using a queer intersectional approach, this paper examines the racial and gendered dynamics of colonial settlements in 18th and 19th century Southern Belize. Specifically, how did the influx of slaves, free people of color, and immigrants from other parts of the Bay of Honduras and Caribbean shape the colonial process? How do these historical processes compare to other British and Spanish settlements throughout Latin America?

Arksey, Marieka [89] see Van Etten, Heidi

Arksey, Marieka [297] see Pierce, Greg

Arksey, Marieka (Office of the Wyoming State Archaeologist)

[411] *WyoARCH: An Update on Digital Developments to Improve Professional and Public Interaction with Federal Repositories*

Both the Office of the Wyoming State Archaeologist (OWSA) and the Wyoming State Historic Preservation Office are shifting towards digital-only submissions for professional archaeological projects through two new and interconnected database-and-web-interface systems going live in 2018/19. This talk will focus on the benefits and drawbacks to the various public and professional audiences that these systems will impact, with particular attention to the WyoARCH project – the curation application being developed by OWSA and the Wyoming Geographic Information Science Center to better manage the University of Wyoming Archaeological Repository (UWAR). The WyoARCH project will impact not only how professional archaeologists submit data to UWAR and greatly increase the accuracy and amount of data curated by UWAR, but will provide public access to, and interactions with, artifact data through a collections search tool and a GIS-powered map visualization tool. As the only federally-approved archaeological repository serving the entire state of Wyoming, UWAR holds a wealth of information derived from primarily public lands that thus far been available to members of the public in a very limited capacity. This project seeks to correct this oversight.

[411] Chair

Arkush, Elizabeth (University of Pittsburgh)

[18] *Behind the Walls: LIP Architecture and Settlement Organization across the Peruvian Titicaca Basin*

At hilltop sites in the Titicaca basin, the good architectural preservation of house foundations, patios, walkways, tombs, and dividing walls offers a glimpse of the organization and day-to-day functioning of LIP communities. These architectural choices potentially had implications for the inhabitants in many realms: inequality and property, segregation and cohesion, privacy and knowledge of others' doings, patterns of movement including gendered "taskscapes," and relevant social identities. But the spatial organization of residential architecture actually differs substantially in different zones of the Peruvian Titicaca basin. Here, I discuss the first steps of a project designed to consider and compare this variation using the drone-aided mapping of surface architecture at several LIP sites across the Peruvian Titicaca Basin. The interpretation of structures and spaces is aided by insights from a previous excavation project at the large LIP hillfort town of Ayawiri. Preliminary results show patterned differences that appear to reflect the size and composition of kin groups. These differences might relate to the preferences and practices of large ethnic groups in the region, and/or to different subsistence emphases on the spectrum from pastoralism to cultivation.

[18] Chair

Armijo Torres, Ricardo [349] see Gallegos Gomora, Miriam Judith

Armitage, Ruth Ann [252] see Baker, Suzanne

Armitage, Ruth Ann [290] see Henkin, Joshua

Armstrong, Aaron (University of Minnesota Twin Cities)

[415] *Deviant or Normal? Assessing Anomalies in Middle Stone Age Small Prey Exploitation*

Studies of forager economies in southern Africa have documented changes in subsistence strategies between the Middle and Later Stone Age. As evidenced by the disproportionate frequencies of faunal remains from large, gregarious grazers, the prevailing interpretation has been that MSA foragers hunted more large than small game in comparison to LSA foragers. Moreover, when small prey is in relative abundance at MSA sites, these faunas are dominated by slow or sessile organisms, whereas LSA sites typically feature faster moving/more difficult to capture prey. However, over the last decade deviations in the "typical" MSA small prey utilization pattern have emerged. Among these is the documentation of habitual utilization of difficult to capture small prey from MSA contexts at Die Kelders Cave 1. Are these deviations simply anomalies to be expected when considering human behavioral variability over time and space? Or do these represent a challenge to an optimal foraging perspective, particularly

when non-nutritional benefits are considered? Does a human behavioral ecology framework allow for more nuanced application when resource utilization deviates from traditional prey choice model predictions?

Armstrong, Douglas [34] see Wallman, Diane

Armstrong, Karen [25] see Phillips, David

Arnay, Matilde [417] see Hernández, Laura

Arneborg, Jette [251] see Smiarowski, Konrad

Arneborg, Jette [269] see Madsen, Christian K.

Arnett, Abraham [381] see LaValley, S. Joey

Arnold, Philip (Loyola University Chicago) and Wesley Stoner (University of Arkansas)

[56] *Taking It to the Tuxtla: How the BoM Survey Shaped Gulf Lowland Settlements*

Robert S. Santley was a junior, third author of the path-breaking *The Basin of Mexico* (Sanders et al. 1979). Nonetheless, his contribution to the volume was substantial, including co-writing almost 50% of the entire 500+ pages of text and producing almost all of the drawings and survey maps (Sander et al. 1979:xiv). Santley soon turned his attention to the Tuxla Mountains of southern Veracruz, ultimately directing what was one of the largest total coverage pedestrian surveys of a tropical rainforest environment in Mesoamerica (Santley and Arnold 1996). This almost-400 sq km survey pursued many of the cultural ecological issues that guided the earlier Basin of Mexico project, adjusting for the particular environmental conditions under which prehispanic civilization developed within the upland Tuxtla. Here we address some of these issues, particularly the relationships between agricultural practices and settlement distributions/densities. Archaeological and ethnoarchaeological data from the region indicate a complex interplay of intra- and inter-community farming strategies, several of which set the Tuxtla apart from settlements within the surrounding Gulf lowlands. We consider the implications of these strategies for the archaeological record of the Tuxtla and highlight the intellectual impact of the original Basin of Mexico research beyond the Mexican highlands.

[230] *Discussant*

Arrazcaeta, Roger [252] see Baker, Suzanne

Arredondo, Ernesto and Luke Auld-Thomas (Tulane University)

[100] *Persistence of the Anthropocene in the Maya Lowlands*

The Maya Lowlands have been a focus of human development across millennia, and the impact of Maya civilization on this tropical environment has been a focus of sustained research and intense debate. It has become common to discuss environmental crises and societal collapse in the region as analogous to contemporary socio-environmental problems. However, the Anthropocene in the Maya lowlands did not end with the collapse of Maya civilization, nor did environmental conditions ever "recover" to a pre-anthropogenic state. Here we briefly review past collapses in the region and their legacies and follow the evolution of the lowland Maya landscape from 900 A.D. up to 1950, the year when the Great Acceleration is conventionally agreed to have begun. Finally, we offer an approach to the last several decades in the region, focusing on the RBM (Mayan Biosphere Reserve) and the acceleration of anthropogenic forces seeking both to destroy and to protect this delicate and important landscape.

Arroyo, Barbara (Instituto de Antropología e Historia de Guatemala) and Gloria Ajú (Proyecto Zona Arqueológica Kaminaljuyu, Guatemala)

[303] *Interaction and Exchange at Kaminaljuyu: Trade and Ritual*

Kaminaljuyu, Guatemala, had a strategic location along important trade routes. Because of this, the site had the opportunity to access important goods such as obsidian, jade, cacao, salt, and other important goods. Some of the exchange might have involved the ball game. Recent findings from excavations near Ball Court B at Kaminaljuyu suggests the presence of non-local individuals that might have been involved in a ball game encounter at the site. The discovery of Pacific Coast pottery, candeleros, slate, jade, and other foreign goods, suggest that economic activities of long distance exchange of exotic products might have taken place connected to the ball game. This paper will present data on recent discoveries that suggest an extensive interaction network at the site during the Classic period. We hope to present data on Francisco Estrada-Belli's analysis of least cost routes connected to this network.

Arroyo-Cabralles, Joaquín, Eduardo Corona-Martínez (INAH - Delegacion Morelos) and Felisa J. Aguilar-Arellano (Consejo de Paleontología, INAH)

[56] Late Pleistocene-Early Holocene Archaeozoology and Paleontology at the Basin of Mexico: A Reappraisal 40 Years after Early Views

Back in 1970s, a great effort was undertaken to synthesize the knowledge of human and environmental relationships in the Basin of Mexico, which could be extended to at least 24,000 years BP. Since then, further studies were warranted after initial results and research has been conducted using new techniques and analyses. Here, we report on that research from the archaeozoology and vertebrate paleontology realms. We reviewed all of the available publications and much "grey" literature to obtain the most complete list of animals occurring in the range time from about 30,000 to 6,000 years BP. A large vertebrate diversity was found for the Late Pleistocene, while such diversity has been depleted to the present, initially due to natural proxies, like volcanic events, but later mostly due to direct and indirect impacts from human activities. It is advisable that further interdisciplinary studies are undertaken, but also advisable that private developers need to rescue any bone remains that are found as a collaborative effort to enhance our knowledge on the region beyond biodiversity and propose conservation goals for the future.

Arroyo-Cabralles, Joaquín [88] see Aguilar, Felisa

Arthur, John (University of South Florida St. Petersburg)

[291] Pots, Ethnoarchaeology, and Snake-Oil: James Skibo's Lasting Impact on the Future of Archaeology

James Skibo changed the way we study pottery. Jim's archaeological career incorporated many different facets of archaeological research including experimental archaeology, ethnoarchaeology, archaeology, and theory, all focusing on pottery research. One of his biggest influences is combining ethnoarchaeology and pottery use-alteration. Jim's ethnoarchaeological Kalinga research in the Philippines and his subsequent books (1992, 2016) has and will continue to provide a new perspective concerning how people use pottery to answer larger archaeological questions such as issues related to diet, social stratification, and cultural change. Besides contributing to the field, Jim's encouraging outlook when mentoring students, even students not at his university, such as myself, had a major positive impact on our careers. This paper examines Jim's contribution to ceramic ethnoarchaeology and his research on pottery use-alteration as it has been utilized in my own research among the Gamo living in southwestern Ethiopia. While some push snake-oil cures that fail to have a lasting legacy, Jim's research has already proven to have significantly influenced the field of archaeology, which will continue to grow with each new generation of scholars.

[13] Discussant

Arthur, Kathryn (USF St. Petersburg)

[363] Transferring Technological Knowledge: Becoming Craft Specialists and Craft Items through Ritual Reproduction

How do we identify the transfer of technological knowledge on the local scale and how it might change through time and in regional contexts? The Gamo of southern Ethiopia offer that their Indigenous way of knowing the world enlightens understanding of transformations in technology and technological knowledge. All matter—human and non-human move and transform, which is evidence of their life force. Humans and materials transform through reproduction, which instigates change. Reproduction may be through biology, earthly interaction, or ritual. Rituals of technology and human rites of passage parallel the Gamo perceived life cycle of birth, circumcision, seclusion, and death. Humans only begin to engage in the transformation of material culture once they have proceeded through puberty rites of passage and have become full members of society. The ritual processes of how a human proceeds through rites of passage determines their status as either farmer or craft specialist. Similarly houses, food, iron tools, pottery, leather goods, and stone scrapers transform through technological rituals accessing different statuses of prestige and different forms and locations on the landscape.

[13] Moderator

Arvin, Salem [112] see Card, Jeb

Asher, Brendon [51] see Smith, Heather

Asher, Brendon (Eastern New Mexico University) and Heather Smith (Eastern New Mexico University)

[297] The Benefits and Challenges of Active Excavations as Tools for Interpretation and Public Outreach: Examples from Blackwater Draw Locality 1

Blackwater Draw Locality 1 is one of few archaeological sites in North America open to the public with exposed cultural deposits on permanent display and protected by an enclosed structure. With deposits spanning the last 13,000 years, the locality provides a unique opportunity to interpret in situ past human behavior as well as environmental change through time from the perspective of a field archaeologist. The site continues to be excavated by archaeologists and students from Eastern New Mexico University and interpretations continue to evolve as new discoveries are made. We share these interpretations with the public through guided tours, class field trips, and special events. The site also serves ENMU as a non-traditional classroom providing students with firsthand perspectives of archaeology in action as well as hands-on experience with prehistoric technologies. However, there are many difficulties associated with operating an archaeological site as an exhibit, including long-term preservation and curation of cultural and geological deposits outside of a controlled museum setting. This paper addresses the

challenges and benefits of public outreach at one of the most significant archaeological sites in North America.

Astroth, Kirk, T. J. Ferguson (University of Arizona) and Caitlin McPherson (University of Arizona)

[190] Footsteps of Hopi History or Inscriptions by Spanish Priests? The Elusive and Enigmatic Labyrinth Glyphs of the American West

Meaning and function of rock art elements, especially when related to site location, have been discussed for years. Rock art can represent statements about group identity or social relationships and even demarcate boundaries or territories. Rock art is a visual legacy created to communicate and reaffirm symbols and metaphors of stories and worldviews projecting social concerns and cultural values. Rock art stores cultural meaning. A distinctive unicursal, 7-course, 8-walled labyrinth image is carved into the plaster on the wall above the second floor of the central room at Casa Grande Ruins National Monument. This same glyph has been reported on the Hopi Mesas, at Arroyo Hondo NM, inside the lower room of Montezuma Castle, inside the upper ruins at Tonto National Monument and at Minnie's Gap in Wyoming. Intriguingly, this image is also found across Europe and is reported to be at least 4,000 years old. How did it come to appear in the Southwest? Was it an independent innovation, or transplanted by Spanish priests among the converted? This image carries a lot of meaning and symbolism. My research focuses on the origins of this image in the Western U.S., its relative age, and its symbolic significance for Native peoples.

Astrup, Peter Moe [240] see Benjamin, Jonathan

Atalay, Sonya [244] see Clark, Dylan

Atencio, Cassandra (Southern Ute Indian Tribe)

[244] Ute "Prayer Trees", the Cultural Resource that Never Existed

Tribes regularly fight the destruction of their cultural resources and the appropriation of their culture. But what happens when someone appropriates a cultural resource that never existed in the first place? The three Ute tribes have been regularly engaged over the past few years in dispelling the concept of a Ute "prayer tree". Despite repeated appeals from the tribes, individuals continue to advertise and make money on Ute "prayer tree" workshops, events, and consultations. Some have even gone so far as to claim they understand Ute cultural resources better than the tribes themselves. In this talk, Southern Ute tribal representatives seek to set the record straight on the concept of prayer trees from a Ute perspective as well as provide guidance to other tribes and archaeologists battling the misappropriation of culture.

[62] Discussant

Atherton, Heather (Environmental Science Associates)

[193] Betwixt and Between: Negotiating Hispanic Identity from Past to Present

Research on Hispanic-descent communities in the American West appears to be betwixt and between discussions of indigeneity and nation-building, and for good reason. Drawing on historical and archaeological research of Spanish colonial land grants from the northern and middle Rio Grande, this paper examines some of the ways "Spanish" settlers navigated the tumultuous and often hostile environments they inhabited, and how those practices may have implications for present-day New Mexican Hispano/a-Chicano/a identities.

Atherton, Heather [336] see Curry, Benjamin

Attarian, Christopher

[256] The Local Effect of Changing Intra-valley Exchange Networks

During the Terminal Classic phase in the southwest Naco Valley, Honduras, a small plaza group, plaza 426, emerged as a regional actor in intra-valley exchange of pottery. The current interpretation of the structure's reuse is that, as previously documented, a more centralized hub of political and economic power in the Naco region waned, and smaller economic networks emerged. The residents of plaza 426, along with their immediate neighbors, found areas of niche specialization in a more multi-lateral regional trade system. Recent discoveries in the Valley complicate the picture, suggesting an even more dynamic network and fractious picture of pottery production.

Auld-Thomas, Luke [100] see Arredondo, Ernesto

Ausec, Marne

[256] "Archaeology is just a more productive form of boring": Learning by Doing on the Kenyon-Honduras Program

Long before terms like "underrepresented," "community engaged learning," and "undergraduate research" were popular in the field of study abroad, Urban and Schortman gave undergraduates an unparalleled field research experience. This paper explores some of the highlights of the student experience, while speaking to the immense contribution the Kenyon-Honduras Program has made to the field of study abroad, the lives of those impacted by the

program, and the knowledge of the pre-history of the Santa Barbara, Naco, and Cacalaupa regions of Honduras.

Austin, Anne (University of Missouri - St. Louis), Ixchel Faniel (OCLC Research), Eric Kansa (The Alexandria Archive Institute), Jennifer Jacobs (The Alexandria Archive Institute) and Ran Boytner (Institute for Field Research)

[87] Best Strategies for Field-based Training in Data Recording and Management

A student's first experience with archaeological recording is frequently in a field school setting. Yet, field school data recording practices can quickly evolve as archaeological projects integrate new technology, change excavation strategies, and investigate new research questions. How do these changes impact how archaeological data recording is taught, what data are being recorded, and in turn, how might this affect future data reuse? In the Secret Life of Data (SLO-Data) research project, we explored these questions through observations and interviews of archaeological field schools in Africa, South America, and Europe during the 2016-2018 field seasons. We specifically evaluated how field school participants trained in data recording and management, and the way data recording strategies were communicated, changed and implemented during fieldwork. This paper evaluates the relationship between training and data outcomes in both digital and paper-based data recording strategies. Examples from our research highlight ways that training and communication in the field may influence the consistency and re-usability of archaeological data. Through analyzing and comparing training and communication in data management at our field sites, we suggest strategies for field-based training that can help bridge the divide between data recording and reuse.

Austin, Kevin [30] see Hanratty, Colleen

Austin, Kevin (Maya Research Program), Benjamin Baaske (Texas A&M University) and Robert Warden (Texas A&M University)

[63] Re-excavating Xno'ha: Aligning Maya Architecture across Seven Years of Archaeological Research

Maya architecture at Xno'ha has been recorded digitally every field season since 2012 by the Blue Creek Archaeological Project in conjunction with the Center for Heritage Conservation at Texas A&M University. Through the application of preservation technologies such as laser scanning, it is now possible to juxtapose completely excavated structures within the same digital model. Each structure is laser scanned once the excavation has either been completed or reached its furthest extent for the season. Combined with a coordinate system established using a Total Data Station, the 3-dimensional point clouds generated using the ever-changing laser scan technologies (Riegl, FARO 120, FARO 330) are aligned across multiple seasons of data collection. This allows structures excavated in 2012 to be placed in the same spatial context as structures excavated in 2018. Archaeologists can then analyze relationships between structures at the scale of the city, plaza, and group. For structures that have been excavated over multiple seasons, architectural phases can be examined 3-dimensionally in the same spatial context. Our outputs from Xno'ha indicate a highly sophisticated means by which we can begin to analyze Maya architecture in terms of construction, style, and meaning.

Austin, Rita [34] see Wellman, Hannah

Austin, Tucker (Northern Arizona University)

[217] Investigating Ancient Maya Resiliency at Xunantunich, Belize

Despite more than a century of intensive archaeological research, factors leading to the Classic Maya Collapse continue to be debated by Maya archaeologists. This presentation discusses the Classic Maya Collapse and its effects on the people of Xunantunich, Belize. Investigations from the 2018 field season, carried out by the Belize Valley Archaeological Reconnaissance project and the Xunantunich Archaeology and Conservation project, targeted minor architectural features, such as platforms and walls, to establish a chronology of construction and function for these features. Collected data demonstrate evidence of human response to collapse in the form of minor architectural development and reorganization of public space within Xunantunich's monumental center. This research provides a better understanding of how the ancient Maya restructured their physical environment during a time of substantial change.

Austin, Tucker [260] see Gruntorad, Kelsey

Austin Dennehy, Michele [314] see Cullen Cobb, Kim

Avila, Florencia [298] see Echenique, Ester

Avila, Mary [289] see Warner, Jacob

Awe, Jaime [152] see Jordan, Jillian M.

Awe, Jaime and Christophe Helmke (University of Copenhagen)

[199] Ally, Client or Outpost? Examining the Relationship between Xunantunich and Naranjo in the Late Classic Period

Investigations at Xunantunich indicate that this important site in the Belize River Valley, rose rapidly to regional prominence during the Late Classic Hats' Chaak Phase (AD 670 – 780). While the social, political, and economic reasons for this late and rapid rise are still not fully understood, it has been suggested that this rapid ascent was a direct result of either a patron-client relationship with, or because of the direct control of, the larger primary center of Naranjo, in neighboring Guatemala. In this presentation we first examine previous and recently acquired data indicative of the relationship between the two sites, then we discuss the socio-political implications of these data.

Axelrod, Ella (Colorado College) and Scott Ingram (Colorado College)

[9] The Deadman's Cave Gulch Cache: Content in Search of Context

Found in the Rio Grande National Forest in Southern Colorado, there is very little known about exactly when, why, or by who the Deadman's Cave Gulch Cache was buried. From tough corduroy work pants to a delicate lace garment, women's home magazines to farming newspapers, the cache consists of artifacts with potential affiliation with a wide variety of communities. The research conducted on this project focuses on the examination and historical and archaeological documentation of a cache of artifacts dating from 1890 to the early 1920s but can be used as a case study of assemblages without a strong affiliation to a specific group. Through analysis of the artifact assemblage, historical documents, regional resources, digital archives, and information based on site location, this poster will address challenges unique to understanding historical assemblages with little known context.

Ayala, Dante [126] see Giblin, Julia

Ayala, Max (ENAH-Centro INAH Michoacán) and Cinthia Marlene Campos (California State University, Monterey Bay-CINAHMIC)

[202] Obsidian Distribution in Michoacán during the Epiclassic Period

During the Epiclassic, well known as a transitional period, some emerging chiefdoms sought control of exchange networks and natural resources like obsidian. Specifically, in Western Mesoamerica, in Michoacán are two obsidian sources that had a local distribution across the Lake Chapala basin, the central mountain range and southern Tierra Caliente region's archaeological sites. These regions have been explored by the Proyecto de Arqueología Paisaje del Área Centro-Sur de Michoacán in recent years. To understand the obsidian distribution in these regions x-ray fluorescence analysis was performed on archaeological objects and compared with local geologic samples to corroborate the obsidian's origin from the quarries. The objective is through comparing the raw materials in these regions, establish possible obsidian exchange networks from the source location to local sites.

Ayala, Max [375] see Martínez Vázquez, Dante

Ayala, Sergio [322] see Lassen, Robert

Ayers-Rigsby, Sara [251] see Kangas, Rachael

Ayling, Melissa (Vancouver Island University) and Marie Hopwood (Vancouver Island University)

[115] Raise Your Glass to the Past: An Experimental Archaeology of Beer and Community

A pint of beer is more than a "simple" beverage. The presence of ethanol resulting from the yeast-based fermentation contributes to making beer a unique form of embodied material culture that has fermented alongside humanity since well before written records. It is the most widely used psychoactive substance in the world, and is regularly discussed in anthropological literature as a stimulator of social relations. Beer also struggles today with the after effects of Prohibition on our North American conceptualizations of alcohol. In an attempt to unlink modern prejudices from ancient understandings, this experimental archaeology project both crafts an ancient beverage with the help of modern brewing expertise, as well as engages our local community with our recreation. To put faces back onto the past we must imagine ancient sites filled with people, practicing daily life, repeating habit and tradition, and at times, drinking beer. Our goal is not to recreate the most authentic beer recipe from the prehistoric past, but instead to reimagine the past in a way that engages our own modern public as well as the academic.

Baaske, Benjamin (Center for Heritage Conservation, Texas A&M University) and Joshua Kwoka (University at Buffalo)

[30] E-Groups and Classic Maya Ritual: Recent Investigations at Tz'unun, Belize

Maya E-groups served as foci of political and ritual practices from the Preclassic through Terminal Classic. In addition to the hallmark western pyramidal and eastern range structures, these groups are often populated by a number of ancillary structures. This paper details recent investigations of one such structure located at the site of Tz'unun in northwestern Belize. Excavations revealed this modest-sized building was likely a funerary temple with origins in the Late Preclassic. Multiple caches attest to its continued importance during the Early and Late Classic. The deposition of two large termination deposits marked the cessation of activities and abandonment of the group

during the Terminal Classic. Both the contents and symbolism of these ritual deposits are discussed.

Baaske, Benjamin [63] see Austin, Kevin

Babcock, Thomas

[303] *Archaeological Evidence and the Chronology of K'iche'an Dominance in the Guatemalan Highlands*

The K'iche'an ethnohistoric documents posit movement of Chontal-Nahuan groups into, and conquest of, the central Guatemalan highlands. A list of K'iche' rulers was used to establish a timeline for occupation of the archaeological sites of Chujuyub, Jakawitz, and Q'umarkaj. Accordingly coinciding with the fall of Chichen Itza around AD 1200, Chontal-Nahuan groups arrived in the Quiche Basin at Chujuyub. Intermarrying with local K'iche' they gained dominance, relocating to Jakawitz was around AD 1300, and subsequently Q'umarkaj was founded at around AD 1400. Occupation of Q'umarkaj ceased a short time after its conquest by Pedro Alvarado in AD 1524. Excavations at these sites yielded radiocarbon dates not supportive of this timeline. Subsequent reinterpretation of ethnohistoric documents argued in support of Toltec-related residence at Chujuyub around AD 500-800, with consolidation of power at Jakawitz, and regional hegemony at Q'umarkaj. The site of Jakawitz, however, lacked Mexican-style architecture and foreign trade goods when Mexicanized groups were hypothesized to begin dominating the region. This supports an alternative view that indigenous K'iche'an peoples developed in situ at Chujuyup between AD 500 and 800, establishing architecturally more complex Chitinamit around AD 800, and ultimately attaining regional hegemony at Q'umarkaj by AD 1300.

Baca, Katherine (University of Montana)

[121] *An Overview of Forensic Trophy Skull Analysis in Montana*

Retaining a skeletal element, especially a skull, whether it be for ancestor veneration, social memory, or as a trophy, is a common practice throughout human history. Keeping a cranium can reflect a lot of information about cultural beliefs concerning death, war, and victory at specific points in time. It is more common than one might think to come across these "trophy skulls" in archaeological and forensic contexts. Most often, they come to us, as Forensic Anthropologists, through a Medical Examiner's lab, usually under questionable or unknown circumstances. This poster reviews three separate cases of "trophy skulls" in Montana, including the findings of the biological profile analyses and the attempts to reconcile police reports and oral histories in order to reconstruct the life histories of the unknown individuals. The term of "trophy skull" is also approached from an anthropological viewpoint and an argument made for changing the terminology associated with these remains in an effort to better describe the likely circumstances of their creation.

Baci, Erina [42] see Galaty, Michael

Baci, Erina

[42] *Analysis of Settlement Patterns in Albania from the Iron Age through Greek and Roman Colonization and Integration (1100 BCE–395 CE)*

The Illyrians were an Indo-European group of people who inhabited a large expanse of the Balkans. As interactions with the Greeks and, later, the Romans increased, the sociopolitical organization of the Illyrians was undoubtedly affected. In this presentation, I present the results of my thesis research, the goal of which is to better understand how Greek colonization, followed by Roman incorporation, affected Illyrian settlement patterns in Albania. Utilizing a World Systems approach, I present colonies as semi-peripheral "cores" that act to draw people to them, like the case of towns during the industrial revolution in Europe. The data for the analysis were collected during the summer of 2017 via archival research and compiled into a gazetteer, which was imported into ArcGIS. A combination of quantitative and qualitative methods are used in ArcGIS along with appropriate statistical tests in order to analyze the different relationships between site location and proximity to colonies and other features of interest throughout time. The geospatial analysis reveals certain patterns that suggest a statistically significant difference regarding the dispersal of sites. Specifically, there was significant clustering around "cores" in the Greek and Roman periods and this clustering was predominantly located in southern, coastal Albania.

Backhouse, Paul [19] see Mahoney, Maureen

Backwell, Lucinda [338] see Stratford, Dominic

Bacon, Kelli [104] see Rissetto, John

Badal, Ernestina [144] see Real, Cristina

Badenhorst, Shaw [57] see Ryan, Susan

Badillo, Alex (Indiana State University)**[192] Quiechapa: A Window into the History of the Sierra Sur**

Southern Mexico has been the site of many large-scale regional settlement pattern projects that have been instrumental in developing the regional histories that contribute to our understandings of the sociopolitical and economic climate that was encountered by the Spanish upon their arrival nearly 500 years ago. It is because of these regional survey projects that much is known about areas of southern Mexico such as the Valley of Oaxaca and surrounding hinterland, the lower Río Verde Valley, the Mixteca Alta, and the Isthmus of Tehuantepec. In contrast, the archaeology of the southern mountains of the modern state of Oaxaca, also known as the Sierra Sur, is largely unknown. Recent settlement pattern research in the municipality of San Pedro Mártir Quiechapa provides a window into the settlement history of the southern mountains. In this paper, we present the Quiechapa region's settlement history spanning two millennia within the context of the broader macroregion discussing the events that shaped the sociopolitical and economic landscape before the arrival of the Spanish in A.D. 1521.

[59] Discussant

Badillo, Alex [72] see Peterson, Ryan

Badillo, Alex [183] see Higelin Ponce De Leon, Ricardo

Baer, Alexander (Defense POW/MIA Accounting Agency)**[354] There Are No Chiefs Here: Contrasting Questions of "Marginality" in Kaupo, Maui, and the Mauna Kea Adze Quarry, Hawai'i Island**

While core-periphery studies have long been employed to highlight distinctions between areas within a shared sociopolitical sphere, less articulated is what it means to actually be "peripheral." Or, for that matter, "liminal," "a hinterland," or "marginal," among others. This paper uses examples from two regions, the district of Kaupo, Maui, and the area surrounding the Mauna Kea Adze Quarry, Hawai'i, to explore the very different natures of these terms, and the ways in which they may frame very different archaeological approaches.

Baichtal, James [10] see Carlson, Risa

Baichtal, James [10] see Schmuck, Nicholas

Baide, Alexis [172] see Wile, Kim

Baide, Alexis (Texas State University)**[172] Dabbing in Time: Using Tobacco Clay Pipes to Trace Changes in Leadership of the Dutch Caribbean Island of St. Eustatius from 1680 to 1800**

St. Eustatius (Statia) developed into a primary trading port in the northern Caribbean during the late 17th century and early 18th century. During this time, Statia experienced changes in leadership, tax policies, and social relations; however, the island leadership maintained trading allies from all nations. This project's research goal is to understand how the people of St. Eustatius were affected by globalism, and how the island's extensive trading activity influenced regional and global trading networks. Analysis of tobacco clay pipes from Ft. Amsterdam was conducted to determine if the ratio between the amounts of time the Netherlands were in charge of St. Eustatius was proportional to the amount of pipes found to be of Netherland origin. Documentation of changes in legal policies, historical data of Statia's commanding country, maker marks, and pipe diameters are used to determine the date and origin of each base/spur. The quantity of pipes of Gouda origin reveal Netherland's long-term occupation of the island had an effect on trade networks.

Bailey, Chris [401] see Curteman, Jessica

Bailey, Geoff [240] see Benjamin, Jonathan

Bailey, Kassi [415] see Rowe, Matthew

Bair, Andrew [224] see Cearley, Daniel

Baires, Sarah [168] see Baltus, Melissa

Baires, Sarah

[308] *Exploring Kinship Ties through Mortuary Practice at Cahokia's Ridge-top Mounds*

Kinship, roughly defined, is a web of social relationships forming a central part of human lives. Kinship contextualizes patterns of behavior, familial ties, socialization, parenting, and relationships that extend beyond biological affinity. In this paper I explore how kinship ties (fictive or otherwise) transform in death through an examination of burial patterns at Cahokia's ridge-top mounds. Cahokia, North America's largest urban landscape north of contemporary Mexico, was a unique social and political behemoth located in the American Bottom floodplain of the Mississippi River. Crisscrossed by large earthen mounds, plazas, and neighborhoods, this urban landscape was populated by diverse groups of people. Mortuary practice at Cahokia manifests in diverse ways; of particular interest here are the ridge-top mounds that house hundreds of bodies buried in unique assemblages of persons and materials. Focusing on Wilson Mound, I explore how kinship ties transform and transcend our common notions of 'family' to include other-than-human persons in these complex relationships. Considering 'family' as inclusive of multiple persons, not all of which are human, engages the rich dialectic of social experience. Examining this in and through death can provide an understanding of how the living viewed their world and experienced social relationships.

Baisden, Rebecca

[90] *Fire Meets the Past: Archaeological Site Thinning on the Jemez Ranger District of the Santa Fe National Forest*

The Southwest Jemez Mountain Landscape Restoration project located in the Jemez Ranger District of the Santa Fe National Forest in New Mexico encompasses approximately 116,000 acres. To increase resilience against undesirable, large-scale fires, a number of landscape scale treatments were implemented, one being prescribed burning. As 90% of the 3,045 known archaeological sites are considered fire-sensitive, the Archaeological Site Thinning project was implemented in 2013. Now that over 1,500 archaeological sites have been treated, Jemez Ranger District archaeologists are able to compare and contrast the effects fire has on sites with various levels of fuels treatment as well as treatment needs across different fuel types.

Baitzel, Sarah [289] see Baka, Abby

Baka, Abby (Washington University in St. Louis) and Sarah Baitzel (Washington University in St. Louis)

[289] *An Exploration of Perimeter Wall Architecture at the Terminal Middle Horizon Site of Los Batanes, Sama, Peru*

Archaeological survey and excavation at the coastal desert site of Los Batanes, a Late Middle Horizon-Early Intermediate Period settlement of highlanders in the Sama Valley, southern Peru, have revealed mortuary and residential site components as well as a perimeter wall enclosing the site. Here I report on the findings of perimeter wall excavations in 2018 which exposed the stratigraphy of the collapsed wall and recovered ceramic and organic remains and a human burial. Using stratigraphy, ceramic typology, and radiocarbon dating, I investigate the chronology of the wall construction and collapse, and the relation to the interment. I also investigate the wall's function, taking into account such possibilities as defense, ritual, and settlement organization. The wall is considered in its local context as well as in the broader context of this period on the far south coast of Peru.

Baker, Brenda [32] see Olszewski, Deborah

Baker, Joe

[61] *Discussant*

[357] *Chair*

Baker, Larry (San Juan County Museum Association/Salmon Ruins)

[400] *Site Stewards in Northwest New Mexico: Protecting Our Cultural Heritage via a Community-Supported Program*

In northwestern New Mexico, there are thousands of archaeological sites that span the complete cultural and temporal spectrum of human occupation in the region. Many of these cultural resources are located in remote areas and as backcountry sites, are often prey to looting and vandalism, particularly those exhibiting standing architecture and rock art. In many instances, these cultural sites are considered significant or "high value" as a result of their inclusion on the National Register of Historic Places and/or their potential for future scientific study. In order to preserve and protect our heritage sites, volunteer site stewards patrol and monitor these resources within the

framework of a program designed to deter vandalism of cultural properties and the looting and subsequent trafficking of priceless antiquities. Collaborating with the Bureau of Land Management and State of New Mexico Site Watch, the Northwest New Mexico Site Steward's Program is an volunteer organization, which has been operating independently in its current capacity since 1999. This paper provides insights into the "first line of defense" in the protection of our shared past through engaging the public in a community-supported program. In this context, examples of site types and respective impacts are discussed.

[203] Discussant

Baker, Suzanne (A/HC (Archaeological/Historical Consultants)), Ruth Ann Armitage (Department of Chemistry, Eastern Michigan University), Roger Arrazcaeta (Director, Gabinete de Arqueología de La Habana, Of) and Silvia Torres (Department of Chemistry, Eastern Michigan University)

[252] Recent Investigations in Rock Art Dating in Several Cuban Caves

Cuba has many karst caves with pictographs, but there has been uncertainty about who created the rock art. The prehistoric population, historic indigenous groups pushed to the margins by the Spanish, and maroons or escaped African slaves are all possibilities. Cuban archaeologists have debated for decades which groups were associated with which rock art styles. The complexities of Cuba's history made dating rock paintings attractive as a method for determining origins. Recently, the first AMS radiocarbon dates for Cuban rock paintings were produced from one cave in Matanzas Province and three from the Las Charcas caves in Mayabeque Province. Samples from the Matanzas cave and one of the Las Charcas caves were consistent with carbon black and yielded reliable prehistoric dates. However, two other Las Charcas caves, located in close proximity, had dates much older than expected (on average 14,000 BP) and undoubtedly did not reflect true age. Compositional analysis indicated that resins from *Pinus* species as well as significant hydrocarbons were present. Further analysis of the hydrocarbons indicated these were probably gilsonite, a solid bitumen material present in the region—the first instance of the use of bitumen as a paint matrix for rock art that we have found.

Bakke, Gwen (Southern Methodist University)

[386] Viking Age Port of Trade in Gotland, Sweden: Understanding Inter- and Intra-site Logistics through Faunal Analysis

This study examines human-animal relations in the context of a Viking Age (9th to 11th century) port of trade and farming settlement of Ridänäs located in Gotland, Sweden. The objective is to gain an understanding of inter- and intra-site interactions through the faunal data. The primary questions focus on subsistence strategies, trade connections, socioeconomic conditions, and animal husbandry practices that were occurring at the archaeological site during the latter end of the Viking Age. These questions were answered through a zooarchaeological analysis of the faunal remains from two contexts at what is now known as the Fröjel Parish, Gotland.

Balco, William [321] see Kolb, Michael

Balco, William (University of North Georgia)

[321] Inferring Social Change from Archaeological Survey Data: Monte Bonifato and Calatubo as a Case Study

Recent archaeological survey at Monte Bonifato and Calatubo, two prominent sites in western Sicily, has facilitated a comparative study of the two sites via artifacts recovered from surface contexts. Settlement patterns, land-use, pottery production methods, and artifact-class densities are discussed, demonstrating the variety and scale of social transformation at and between each site. The results of this material culture study suggest occupation alternated between the two sites intermittently over a long period. We interpret this mobility as the result of patterns of socio-political stabilization and destabilization coupled with an increase in social, technological, and economic complexity over time.

[321] Chair

Baldwin, Anne [90] see Bremer, Jon

Bale, Martin [156] see Lee, Rachel

Balenquah, Lyle [244] see Yaquinto, Jessica

Ball, Kaitlyn (Alma College)

[88] Old Main: Archaeology of a 19th Century College Campus

This paper synthesizes the ongoing archaeological research of one of the first academic buildings on the Alma College campus, located in central Michigan. Old Main was built in 1886, and destroyed by a fire in 1969. Although the building only burned down 50 years ago, the cause of the fire and exact location of the foundation remain a mystery. Throughout this paper I discuss and evaluate research questions and methods used in past seasons of the project. In 2014, 2015, and 2018, students and professors in the Alma College anthropology department conducted

archaeological excavations on the site of Old Main. Through a review of previous excavation reports, artifacts, maps, and other collected data, I explain how archaeological sites like Old Main are capable of providing information about 19th century college building construction, architectural materials, and renovations over time. I present results from a deeper analysis of Old Main's artifacts and the archival record, coupled with new information from oral history and community interviews. Finally, I show why archaeology matters in understanding the life and history of a 19th century campus.

Ballance, Matthew (University of North Carolina - Chapel Hill), Patrick Mullins (University of Pittsburgh) and Brian Billman (University of North Carolina - Chapel Hill)

[287] *Cerro Cumbray: A Chimu Frontier Outpost*

Cerro Cumbray is a Chimu hilltop settlement located near the modern town of Simbal, Peru. During the 2018 field season, the authors used aerial photography via drone to create a site map and conducted a limited pedestrian survey in order to better understand site chronology and context. While Cerro Cumbray lacks indications of large-scale fortification; the viewshed afforded by its location, its strategic position relative to the confluence of two rivers, and its natural fortifications in the form of cliffs imply a largely defensive motivation to the site's occupation. The mapping and survey data is used to identify habitation zones and activities within the site. At a larger scale, GIS software allows for the analysis of the role of the site within the Chimu defensive network of the Moche Valley.

Ballenger, Jesse [125] see Garcia-Fox, Joseph

Balter, Michael (Freelance)

[340] *Discussant*

Baltus, Melissa (University of Toledo) and Sarah Baires (Eastern Connecticut State University)

[168] *Commensal Politics and Changing Neighborhoods: Preliminary Pottery Analyses of Cahokia's Spring Lake Tract*

In the Cahokian sphere, building termination was embedded within broader relational practices tied to politico-religious space and neighborhood dynamics. Drawing from our preliminary analyses of three buildings in the Spring Lake Tract of 'Downtown' Cahokia, we argue for an intentional closing down of these buildings using fire and earth. Focusing here on deposition of pottery specifically, we consider the ways in which community was (re)created through practices of building termination and commensal politics in neighborhood contexts. The termination practices we see at the Spring Lake Tract speak to broader relational aspects of community, transforming landscapes, and dynamic cities.

Bamforth, Douglas and Kristen Carlson (Augustana University, Sioux Falls, SD)

[409] *Documenting the Archaeology of Ethnogenesis at the Lynch Site (25BD1), Nebraska*

Maize farmers settled the Lynch site in northeastern Nebraska from the late 1200s through the 1300s during a period of significant drought and social, demographic, and economic changes linked to Cahokia's decline. Oneota groups expanded westward into the central Great Plains during this time as indigenous Central Plains Tradition farmers abandoned the western parts of their ranges and moved east. Lynch and other nearby sites show ceramic patterns suggesting that these two distinct groups may have lived side-by-side, forming new communities with distinct identities. The Lynch site is far larger than sites in the region before or after (it covers at least 69 hectares [170 acres]) and likely represents a fundamental social transformation in the region. Fieldwork in the 1930s and 1950s documents some aspects of the site and provides a baseline for current work. This paper presents the results of geophysical prospecting and new excavations. We document the presence of at least 1300 archaeological anomalies, suggest that the site may be even larger than previously thought, and discuss preliminary analyses of new collections.

Bandy, Matthew (SWCA Environmental Consultants) and Scott Ortman (University of Colorado)

[315] *Dates as Data 30 Years Later: An Alternative Perspective on Neolithic Demographic "Collapse"*

In 1987, shortly before I met John, he published the first systematic treatment of radiocarbon dates as a source of data on regional demography. In addition to pointing out the interpretive potential of these datasets, John also discussed some of their pitfalls and limitations; caveats that have often been overlooked by the many researchers who have followed behind. A recent analysis of European radiocarbon datasets, for example, has been interpreted as evidence of a continent-wide demographic collapse some centuries after an initial population expansion driven by the introduction of agriculture. In this presentation I will consider this proposal in light of the limitations of radiocarbon datasets that were recognized by John 30 years ago and propose an alternative model that also can account for the observed pattern.

Banerjea, Rowena [310] see Pluskowski, Aleks

Bánffy, Eszter**[275] The Diversity of the European Neolithic Transition**

The advent of the Neolithic period in Europe, as elsewhere globally, represents a powerful transformation in human history. In spite of important contributions, neither global explanations nor single-site-based case studies have so far led to a general model for the history (histories) of the transformation. This is what our new project intends to challenge. We plan to investigate Neolithisation in Europe at large in five regional case studies, 'Windows', chosen by their differences in temporal terms and in their character of transformation, but also by already existing archaeological, palaeo-environmental and bioarchaeological data. In close cooperation with researchers active in each region, the still missing parts will be completed. Three approaches will be combined: 1. all archaeological data; 2. off-site, non-invasive landscape analyses; and 3. human osteological, DNA, stable isotope and pathogen investigations. The ultimate goal is to understand the Neolithic transformation as a major historic turn with many faces, but all ending with similar results: a sedentary and food producing Europe. In the presentation, I give a draft of the project initiated by the German Archaeological Institute, Romano Germanic Commission, Frankfurt am Main.

Banikazemi, Cyrus (UIC)**[290] Color Me Red: A Preliminary Examination of Pigments in the Moquegua Valley, Peru**

This preliminary study explores how pigments were sourced and manufactured in the Moquegua valley of southern Peru. The ethnohistoric and archaeological records provide ample evidence of the economic, religious, and social significance of colors and pigments in the pre-Columbian Andean world; however, there currently exists little work dedicated to how these goods were sourced and combined to make a breadth of expressible colors. This research combines what we know from the ethnohistoric record with tests done using portable X-Ray Fluorescence (pXRF) focused on chemically profiling raw, processed, and artifact-associated pigments. Analyzing pigments as both a material for utilitarian production as well as an independently valued cultural resource is intended to highlight how this type of good was imbued with cultural meaning.

Banks, Jennifer (University of Iowa)**[207] Dismal River Housing: A Comparative Study of Apache Housing Structures**

Ancestral Apache sites located in the eastern Central Plains of Kansas and Nebraska date to AD 1500-1800, and are frequently associated with small, circular wickiup house structures. A number of these localities have a high degree of preservation that allows for a detailed study of the architecture and construction techniques of these people. This poster will use GIS analyses to summarize published data and results from recent fieldwork on household size and structure. This study will allow us to compare data from new finds to data from previously excavated sites. Because the presence of Apache groups on the central Great Plains is part of a larger migration involving many different groups, we hope that the study of ancient household architecture can tell us something about past social landscapes.

Banks, Kimball (Metcalf Archaeological Consultants Inc. & Combined Prehistoric Expedition Fdtn)**[167] Moderator****Bankston, Brittany (National Park Service)****[380] How Chaco Got the Point: Exploring the Technological Transition from Atlatl to Bow and Arrow at Chaco Canyon**

Recent scholarship has recognized that the foundational elements of the Ancestral Puebloan culture observed during the height of the Chacoan Phenomenon first began to appear during the Basketmaker III time period (AD 450-750), with the construction of kivas, the emergence of vast trade networks, and population aggregation. However, one interesting aspect of the Basketmaker III time period at Chaco, which had previously been overlooked, was the introduction of bow and arrow technology and how that played a role in the developing social configuration that lead to the distinctive Chacoan culture. This study examined projectile points from previously excavated Basketmaker III sites in Chaco Canyon, now Chaco Culture National Historical Park, using the dart-arrow-index to identify evidence of atlatl or bow technology. A study in levels of point variability was used to determine how bow technology may have been introduced through the theoretical perspective of cultural transmission. Additionally, comparative studies of projectile points from Basketmaker III sites from the Four Corners area were also used to understand the broader technological trends and how that may have affected the technology seen at Chaco.

Banner, Jay L. [63] see Locker, Angelina

Banning, Edward (University of Toronto), Kevin Gibbs (University of California, Berkeley) and Philip Hitchings (University of Toronto)**[399] Wadi Quseiba and the Shellfish-Eaters? Searching for Late Neolithic Sites in Northern Jordan and Finding an Enigmatic Yarmoukian Site**

During 2012 and 2013, a survey of Wadi Quseiba's drainage basin in northern Jordan employed Bayesian search methods to find late prehistoric, and especially Neolithic sites that often escape more conventional surveys. This resulted in the discovery of some definite and "candidate" sites, one of which is a Yarmoukian site up to 0.5 ha in

size that was the subject of test trenching in 2014 and more extensive excavation in 2018. Paradoxically, the site exhibits abundant pottery with distinctive Yarmoukian forms and decoration, figurine fragments, pits, and both mud-brick and stone architecture, and large volumes of lithic debitage, but is missing some of the hallmarks of the period. Most notably, sickle elements are extremely rare and mammalian bone completely absent, while remains of river crab (*Potamon potamios*), freshwater mussel (*Unio terminalis*) and snail (cf. *Helix pomatia*) are the only fauna represented in the assemblage. Whether this is due to unusual preservation, disposal practices, or specialized non-agricultural activities at the site is the major question. It also demonstrates how new kinds of survey can lead to unexpected elements of ancient cultural landscapes.

Bansal, Suramya (Rock Art Research Institute, University of the Witwatersrand)

[95] *Practical and Interpretive Implications of Experimental Hand Imprints*

This research experimentally investigates and theoretically situates the distinct impression and expression of hand imprints (prints and stencils) in rock art studies. This hominin act of imprinting hands, which cuts across spatial and temporal boundaries, showcases essential behavioural and cognitive characteristics. The various intricacies involved in the present experiment have been helpful in digging out the underlying anatomical mechanics and adaptive chemistry of hands. These imprints, apart from expressing left or right orientation of hand, also incorporate hand ability, skill and preference linked to the broader concept of handedness. This opens interpretive challenges due to the undercurrents of mixed-handedness and ambidexterity along with an embedded socio-cultural matrix, if any. The exercise of replicating ways of making plain and decorated hand prints and hand stencils sheds new light on how best to theoretically situate them. The web of embodiment and lateralized symbolism, along with haptic and embodied cognition lenses, supports a framework for this qualitative and quantitative trait. The hand motif can have multiple symbolic meanings varying from one society and culture to another in historical and contemporary times. As a result of its diverse contextual and detailed dynamic manipulation, hand imprints definitely hold much more than meets the eye.

Bao, Qingchuan [361] see Zhao, Chao

Baquedano, Elizabeth (UCL Institute of Archaeology)

[304] *Symbolism of Frogs and Toads in Postclassic Mesoamerica*

Frogs and toads were important animals in Mesoamerica with several species of Mexican frogs. They were especially associated with the rainy season. Some species of frogs are active above ground only in the reproductive period while some species of toads spend part of the year underground. These batrachians are associated to Tlaloc and to the Earth. Both frogs and toads also undergo metamorphosis, an important biological aspect associated with seasonality. Interestingly, frogs or toads are not abundant in the excavations of the Templo Mayor. While gold or sculpted batrachians are more abundant among the Maya and frequent in Mexica sculpture. This paper will study both their context in the archaeological record as well as the ethnohistorical evidence. The symbolism of these amphibians as well as their behaviour will also be evaluated.

[304] *Chair*

Barba, Luis [41] see Schulze, Niklas

Barba, Luis (Universidad Nacional Autonoma de Mexico)

[71] *La Red de Ciencias Aplicadas a la Investigación y Conservacion del Patrimonio Cultural (CAICPC-CONACYT)*

El patrimonio cultural es un concepto amplio y complejo que demanda de una aproximación interdisciplinaria para tratar de abarcar aunque sea una parte de su complejidad. Para esto, la creación de redes nacionales e internacionales han permitido una aproximación que intenta cubrir estas expectativas. En Mexico, la Red de Ciencias Aplicadas a la Investigación y Conservacion de Patrimonio Cultural es una propuesta que pretende convocar a los laboratorios en nuestro país que destinan su infraestructura científica y su experiencia para abordar algunos de los problemas que enfrenta nuestro patrimonio. Entre los retos mas importantes se encuentra la creación de bases de datos compartidas que permitan el crecimiento de la disciplina, muestrarios de materiales que permitan su estudio comparativo, protocolos y procedimientos que faciliten la comparación de los resultados de investigación, etc.

Barba, Luis [71] see Zetina-Gutierrez, Maria De Guadalupe

Barba, Luis [407] see López, Eos

Barber, Michael

[133] *Time and Tide Wait for No Man: Responses to Sea Level Rise on Virginia's Eastern Shore*

With sea level rise inevitable, archaeologists can no longer cling to the 'Preservation in Place' paradigm as there will no longer be a place. The 'place' of the past will readily become the eroding beach and, eventually, sea bottom. The Threatened Sites Program of DHR anticipated the loss of shoreline sites in the early 2000s and funded survey of the

coastlines of both the Chesapeake Bay and Atlantic Ocean on Virginia's Eastern Shore. With the recent destruction of Hurricane Sandy, funding was made available through NPS grants adding survey work on both the Eastern and Western Shores. On the Eastern Shore, sites were re-surveyed and damage over a 15 year period evaluated. On the Western Shore, a predictive model was developed using a series of environmental attributes, historic cartographic data, and site survey. Significantly, the impacts threaten sites from the earliest episodes of Native American occupation to the more recent eras of the history of the Commonwealth. Accordingly, DHR is bringing together various strategies to better understand the full scope of the threat and to combat data loss. Realizing these are only the beginning of needed mobilization, this paper outlines some of the initiatives that are under way.

Barber, Sarah (University of Central Florida)

[197] Constituting the Divine: Coastal Cuisine and Public Places in the Formative-period Lower Rio Verde Valley

Food was central to the constitution of sacred public spaces during the Formative period in the lower Río Verde valley on Oaxaca's Pacific coast. Public facilities at small sites and at the region's largest precolumbian architectural complex, the Rio Viejo acropolis, were the location not only of collective food consumption but also of food preparation. Drawing on architectural and archaeological features, as well as analysis of fauna, flora and ceramics, we examine the context of cooking and eating in the lower Río Verde valley's public spaces during the Terminal Formative period. If cuisine is understood as a regionally distinctive way of preparing, presenting, and consuming food, then our data allow us to begin defining a civic-ceremonial cuisine for coastal Oaxaca. We propose that the generation of this cuisine—from preparation to discard—was closely bound with manifestations of the divine. The experience of Formative period civic-ceremonial cuisine was thus far more than the ingestion of calories for survival. Instead, it was a means of creating spaces where people, the divine, and other animate beings requiring sustenance could encounter one another and simultaneously constitute, negotiate and contest regional social affiliations.

[139] Moderator

Barber, Sarah [307] see Hedgepeth Balkin, Jessica

Barberena, Ramiro (CONICET), Valeria Cortegoso (CONICET - Universidad Nacional de Cuyo), Alejandra Gasco (CONICET), Erik J. Marsh (CONICET) and Augusto Tessone (CONICET - INGEIS)

[364] Human Biogeography, Life Histories and Bioavailable Strontium in the Southern Andes (Argentina and Chile)

While regionally focused in Patagonia, Luis Borrero's research has contributed to shape archaeological practice beyond this region, encompassing South America at large. As a regional case attesting his widespread and multifaceted intellectual influence, here we assess the spatial scales and geographical organization of past human societies from the southern Andes (Argentina and Chile, 32°-34° S), involving aspects of paleomobility, life histories, and patterns of highland occupation. We focus on the last 2500 years, a period characterized by intense socio-economic and demographic change. These issues are analyzed in a biogeographical framework inspired by Borrero's approach to the archaeology of large regions, where the concepts of nodal and internodal areas have a key role. To achieve this goal, we present the results of an ongoing project studying strontium isotopes ($^{87}\text{Sr}/^{86}\text{Sr}$) from plant, animal, and human samples. Strontium isotopes vary according to bedrock and can be used to infer the sources of dietary strontium, hence revealing human movements between geologically distinct areas across the Andes. By integrating these results in a biogeographic scheme informed by multiple archaeological proxies, we define scale of territories, behaviorally meaningful archaeological regions, and patterns of social interaction across regions.

Barbosa, Isabel and Patrick Mullins (University of Pittsburgh)

[287] Salinar Phase Ceremonial Architecture in the Middle Moche Valley: A View from MV-67

The Moche Valley site, MV-67, is composed of several sequential hilltop platforms, whose orientation and structure suggest a ceremonial function. Throughout the 2017 and 2018 field seasons, the authors used aerial drone photography to generate a three-dimensional map of the site and conducted surface collections in order to gain a greater understanding of the site activities and chronology. Based on these architectural and ceramic analyses, the densest occupation of this site appears to be Salinar (400BC–1BC) with a light Chimu (AD 900–1470) reoccupation in its lower terraces. These findings allow for more complete understanding of the site, and Salinar ceremonial architecture, particularly when examined in the context of the larger Moche Valley.

Barbour, Matthew (New Mexico Historic Sites), Audree Espada (New Mexico Historic Sites) and Ethan Ortega (New Mexico Historic Sites)

[367] Life under the Franciscans: Giusewa Pueblo after 1621

In 1621, Franciscan Missionaries arrived at Giusewa Pueblo. They came to convert the native Jemez peoples to Catholicism and with their aid built the Mission of San Jose de los Jemez. Two years later, the Jemez revolted burning the mission and abandoning the village. The subsequent three year war led to an estimated 3,000 Jemez casualties and forced resettlement at Giusewa. It was to be the first of many uprisings for the Jemez people. This presentation examines the results of the 2018 excavations at Giusewa Pueblo and the impacts of the mission system as related through archival documents, the archaeological record, and the oral tradition of the Jemez.

Bardolph, Dana (Cornell University), Amber VanDerwarker (University of California, Santa Barbara) and Marcie Venter (Murray State University)

[158] *Changing Patterns of Plant Use at Formative and Classic Period Matacanela*

Although there has been much speculation about the nature of agriculture along the Formative and Classic period Gulf Coast of Mexico, the local and regional subsistence economies of these periods remain poorly understood, particularly for Classic-period sites. In this paper, we present the results of the macrobotanical analysis from the Matacanela Archaeological Project. Spanning the Middle Formative through Late Classic periods, plant data from the Matacanela site provide key insights into the nature of changing agricultural dependence through time and the organization of site-level plant food processing. An examination of presence and abundance of maize and coyol palm, in addition to a full analysis of assemblage diversity and equitability, suggest a restriction over time in the places in which these resources were processed and cooked. These patterns have broader implications for understandings of sociopolitical power, economy, and inequality in the Gulf lowlands.

Barg, Diana (Bureau of Land Management, Utah)

[21] *Looted and Recovered Artifacts: The Art of Deciding What to Curate as Demonstrated Through the Cerberus Collection*

The Bureau of Land Management (BLM) of Utah, much like other federal agencies with a law enforcement arm, recover looted or distributed artifacts through various scenarios including cases and forfeitures. The Cerberus Collection is BLM-Utah's largest collection obtained under these circumstances, consisting of 50,000 artifacts originating from the American Southwest and recovered as evidence or forfeited by defendants involved in the Cerberus case between 2007 and 2013. The high quality and large quantity of artifacts in the collection led the BLM to develop criteria for long-term disposition focused on determining which artifacts to curate, which to incorporate into educational collections, and which to return to tribes for use outside of the NAGPRA process. These decisions are currently being made by a specially designated team who are determining the best long-term dispositions for each artifact or artifact type. This is accomplished by assessing the quality, archaeological significance, regional origination, and rarity of the artifacts as they pertain to federal laws and regulations and Department of Interior policy. This process and the associated criteria developed by BLM-Utah will help set future precedent and serve as a guide to agencies in managing current or future collections generated under similar circumstances with related needs.

Barker, Alex (University of Missouri)

[1] Moderator

Barker, Claire (Arizona State Museum)

[93] Discussant

Barker, F. (Power Engineers)

[265] *Patriot, Federalist and Masons, Politically Oriented Artifacts from the Revolutionary War to the Federal Period Occupation of the Anthony Farmstead in Southeastern Massachusetts*

Recent excavations of the mid-eighteenth to mid-nineteenth century Anthony Farmstead in the town of Somerset, southeastern Massachusetts, yielded thousands of period artifacts, including numerous objects reflecting the patriotism and political affiliations of its occupants and the region as a whole. Several members of the Anthony family were of military age during the American Revolution and records indicate they may have participated in the War for Independence. In the decades following the war on through the Federal Period, patriotic sentiments and a participation in the popular Masonic Order in the first quarter of the nineteenth century are prevalent at the Anthony home. This analysis attempts to contribute to the understanding of the founding generation of Americans during this formative period.

Barkwill Love, Lori (University of Texas at San Antonio), Jeffery R. Ferguson (University of Missouri Research Reactor) and Darrell Creel (University of Texas, Austin)

[263] *Plain Pots Do Travel: Insights into Mogollon Early Pithouse Period Pottery Circulation*

Ceramics in the Mogollon region, particularly the Mimbres Mogollon, have been the focus of numerous neutron activation analysis (NAA) studies to discern pottery circulation and social networks throughout the region. However, most of these studies have focused on the painted ceramics with little attention given to the undecorated ceramics. Generally, it is assumed that plain brown ware represents local production and, thus, offers little insight into issues of pottery circulation. Alternatively, this poster explores pottery circulation during the Early Pithouse period (AD 200-700) in the Mogollon region through NAA of plain brown ware and red-slipped ceramics from seven Early Pithouse sites from the Mimbres, Upper Gila, and Reserve areas of the Mogollon region. The results of these analyses suggest that social boundaries were open and fluid within and between the different areas of the Mogollon region during the Early Pithouse period. In addition, this study demonstrates the utility of compositional analyses on plain ceramics for providing insight into social boundaries and the circulation of pottery.

Barna, Benjamin (ASM Affiliates)

[354] *Varied Outcomes of the Colonial Encounter in Hawaii Island's Hinterlands*

Beginning in the late 18th century CE, the Hawaiian archipelago's sustained interaction with foreigners transformed the islands from independent kingdoms at the center of their world to a globalized frontier, trade entrepôt, military outpost, and, ultimately, an economic and political colony. At the same time, the seats of power and settlement patterns changed rapidly along with a contracting population, leaving many areas virtually abandoned. Consequentially, the notion of "hinterlands" may be applied to the islands during this period at several scales--globally, within the archipelago itself, and within each island's traditional land divisions. In many cases, the geographical marginality of these spaces afforded opportunities for a variety of social and cultural outcomes of the colonial encounter. A review of archaeological investigations within a few of these hinterlands on Hawai'i Island provides examples of several of these outcomes, including the persistence of traditional lifeways, acculturation and adoption of foreign mores, and the emergence of novel subcultural forms. Results from these studies imply that the influence of elites and core regions in Hawai'i's hinterlands was not always straightforward, and dependent on a number of factors.

Barnard, Els (Rheinische Friedrich-Wilhelms-Universität Bonn)

[146] *Rags and Riches: Wealth Inequality at Late Classic Uxul, Campeche*

Many recent studies about the distribution of wealth in ancient Mesoamerican cities are revealing new insights into the ways socioeconomic processes were organized. Measures of inequality, like the Gini index, reveal patterns of wealth distribution and socioeconomic stratification, permitting research into the relationships between the rich and the poor. In this paper, using evidence from household contexts, I discuss the distribution of wealth and its implications at the Maya Lowlands site of Uxul, Campeche. A Gini index based on construction volume is used to examine wealth inequality at the site during the Late Classic. Modern economic models help reveal the nature of socioeconomic processes that were been responsible for these distributions. The paper goes on to examine the ways in which wealth inequality impacted the daily lives of the rich and the poor in Uxul, focusing on how their access to different types of resources was affected. Artifact assemblages reveal whether certain object categories were restricted for specific layers of society. A study of the origins of obsidian, using pXRF, shows whether people had access to the same exchange systems. The access people enjoyed to public spheres and services in terms of proximity and visibility is studied using GIS.

Barnard, Hans (Cotsen Institute of Archaeology at UCLA)

[157] *Discussant*

[157] *Chair*

Barnard, Hans [286] see Cheever, Sylvia

Barnes, Gina (University of Durham)

[141] *The Geology of Nephrite Jade in China and Its Sourcing for Archaeological Comparisons*

The occurrence of nephrite is primarily linked to ophiolite locations around the world and is associated with serpentinite (S-nephrite); however, most nephrite in China is associated with metamorphosed magnesian limestone (dolomarble) deposits (D-nephrite). Characterizing D-nephrite by chemical variation rather than major mineral components has greatly improved in the last two decades. Analyses of D-nephrite sourced from different areas of China are beginning to show patterns that may help in linking archaeological artefacts to raw material sources. Unusual quantities of particular trace minerals (e.g. Wollastonite), elemental ratios (e.g. Mn/Fe), Rare Earth Elements (REE), and isotopes (e.g. strontium) are now known for several source deposits of both D-nephrite and S-nephrite in China. A few can be related to specific archaeological artefacts, though characterization of the latter is impeded by restrictions on destructive techniques.

[141] *Chair*

Barnes, Kelli (BLM-ID-SO)

[400] *Preservation or Perseveration: The Cost of Trying to Save Everything*

The National Register of Historic Places Criteria help to guide the valuation and protection of significant archaeological sites. Lithic and trash scatters are often recommended as eligible for the Register based on their data potential or left with undetermined eligibility, though relatively few of these sites are actually nominated for the Register or scientifically excavated. Such sites tend to be the most common on the landscape, though their potential to yield unique and significant data is often limited beyond what might be collected during a thorough initial recording. A case study from Bureau of Land Management lands in Owyhee County, Idaho, provides an estimate of the various potential costs and feasibility of protecting large numbers of sites to preserve presumed data potential. Development of updated regional context documents that detail past investigations and formulate modern research questions can improve eligibility determinations and focus data collection. Applying the National Register eligibility criteria in standardized ways and taking the least significant sites out of management can free up time and funding for outreach, scientific inquiry, and the preservation of sites with greater heritage and data values.

Barnes, Monica (Andean Past)**[306] John Murra's "A Study of Provincial Inca Life" Project; The Archaeological Survey**

This paper examines an aspect of John Victor Murra's "A Study of Provincial Inca Life Project" (1963–1966), centered around the large Inca site of Huánuco Pampa. Archaeological survey was an important part of this multi-disciplinary endeavor. Probably for the first time, systematic reconnaissance was conducted in the Peruvian highlands. Methodology differed from that of the earlier, coastal Virú Valley survey which aimed to cover an entire drainage. In Huánuco, project archaeologists followed the route of a sixteenth century colonial inspector, Iñigo Ortiz de Zúñiga, attempting to locate settlements he mentioned. These were recorded, and sometimes test excavations were conducted. Ethnographers Emilio Mendizábal Losack and César Fonseca and botanist Robert McK. Bird collected data in those communities that were still occupied. This innovative fieldwork design allowed for diachronic comparisons. However, it did not permit full coverage or objective sampling. Although never published in its entirety, aspects of this survey were disseminated in scattered articles. Field notes and thousands of photographs are housed in the American Museum of Natural History.

[306] Chair**Barnett, Kristen (Bates College)****[123] Governing Powers: Conceptualizing Research Sovereignty in Archaeology**

Throughout the past decade there have been significant dialogue and debate surrounding Indigenous Archaeology and the perceived challenges of designing and carrying out research. Indigenous approaches demand an individualized place-based approach, eluding the ability to establish a specific methodology. This can result in challenges regarding accessibility for interested and/or curious researchers. This poster addresses Indigenous scholarship using a Research Sovereignty Model. Although this addresses only one facet of Indigenous research design, it provides a framework that is clearly defined, transparent, and accessible for project design and data management.

[13] Discussant**[123] Chair**

Barnett, Kristen [136] see Meyer, William

Baron, Dirk [202] see Holt Mehta, Haley

Barr, W. Andrew [390] see Porter, Joshua

Barrera, Jimmy (U.S. Army Corps of Engineers)**[241] The U.S. Army Corps of Engineers and Section 106 – A Discussion of our Authority**

The U.S. Army Corps of Engineers (Corps), Regulatory Program evaluates activities that require Department of the Army authorization under various legislative authorities. The most common authority managed under the Corps' Regulatory Program is Section 404 of the Clean Water Act. This presentation will introduce the Corps' various authorities, provide examples of activities regulated under each authority, with an emphasis on Section 404 of the Clean Water Act. Types of jurisdictional waters of the United States such as wetlands and streams will be discussed, along with defining features of various aquatic resources. Individual Permits, Nationwide Permits, and other Department of the Army authorizations will be explained, including the appropriate application of these permits. Prior to authorizing a permit, the Regulatory Program must first ensure compliance with Section 106 of the National Historic Preservation Act.

Barrett, Linda [262] see Maki, David

Barrientos, María José [33] see San Román, Manuel J.

Barrier, Casey [312] see Sherwood, Sarah

Barrios, Edy (CUDEM-USAC)**[103] Transition and Resilience: Commoner Occupation in the Río Amarillo East Pocket of the Copán Valley during the Postclassic Period**

Recent and ongoing research at residential groups at the sites of Río Amarillo and Quebrada Piedras Negras is providing a better understanding of the lives of commoners and of the population dynamics during the latter part of the Late Classic through the Postclassic Period. These sites share the second-widest pocket of the Copán River Valley, and lie in the middle of one of the main trade routes between Copán and Quirigua. The excavations and mapping of the households groups distributed in this landscape provide an increased understanding of the people

who inhabited this area close to the Copan metropolis during a time of complicated political, economic, and environmental change. Of particular interest are some of the differences found in the material culture of sites that all lie within the visual limit of each other. This paper will discuss both results from specific households and those of a larger mapping program.

[103] *Chair*

Barry, Krista [89] see Nash, Stephen

Bartczak, Marcel (University of Lodz)

[395] *Public Archeology in Poland on the Example of the Leading Archaeological Reserves*

Since the 50s and 60s of the twentieth century in post-war Poland, human past researchers have paid more and more attention to shaping knowledge of the public by disseminating results of archaeological research. Today, the field of archeology called "public archeology" is characterized by the multifaceted nature of the problem. One of its issues is dissemination of research results. Reconstruction and demonstration of research findings in the field constitute the most attractive forms of making archaeological monuments public. Objects located outside museum exhibitions, in a place of actual archaeological research, are generally defined as archaeological reserves. This presentation will focus on the three leading cultural objects created in the most important archaeological sites in Poland. The first one is the "Archaeological Museum in Biskupin", where one can find full-sized reconstructions, mainly the fortified settlement of the Lusatian culture from the Bronze Age. The next object is "Archaeological Reserve in Krzemionki", representing the world's largest complex of the Neolithic flint mines. The last object is "Wietrzychowice" Cultural Park, created in Kujavia region, to protect and present five megalithic tombs of the TRB culture. The above-mentioned places of archaeological heritage protection will be thoroughly discussed in terms of "public archeology" methods implementation.

Barton, Loukas (University of Pittsburgh)

[35] *What More Can We Learn about Complex Prehistoric Phenomena from an Aged, Simple Model?*

The Ideal Free Distribution is a heuristic device used for understanding or explaining behavior as a product of density-dependent habitat selection. More recently, the model has been used to track the emergence of social and political complexity through change in the patterns of prehistoric habitat selection. There may be many other ways that the logic of this simple model might reveal complex sociocultural phenomena through observation of indirect or seemingly unrelated material remains. And yes, most archaeologists are exuberantly skeptical. Here I'd like to explore a variant of the model focused on choices about behavioral repertoires rather than resource habitats. In particular I explore the utility of the adjusted model for understanding subsistence transitions such as the shift from foraging to farming.

Barton, Loukas [416] see Bingham, Brittany

Bartone, Robert [400] see Hudgell, Gemma-Jayne

Bartram, Laurence (Allgens Medical, Inc.)

[22] *Off the Beaten Path: Employing an Archaeological Education in Non-traditional Careers*

What utility does an archaeological education provide students who choose careers off well-trodden archaeological paths? What do these students bring to their careers and society at large? This paper focuses on why academic training in anthropological archaeology can offer students a desirable and diverse smorgasbord of perspectives, skills, and knowledge that fits well with jobs and careers that may not initially jump to mind. The irresistible intellectual excitement of archaeology attracts students to a discipline that teaches them, through disciplined explorations, to envision places, people, and worlds at new scales. Archaeological education cultivates valuable skills in critical thinking, project management, and current technologies that are useful in many career contexts. Through archaeology, however, these skills are combined with a deeper understanding of how human societies have formed, functioned, and faltered. As a result, an archaeological education yields flexible, informed professionals who understand and embrace cultural diversity. Their dispersal beyond more traditional careers also enriches awareness in the public sphere about the importance of archaeology and cultural resource preservation.

Bartusewich, Rebecca (University of Massachusetts Amherst)

[301] *Political Change and the Social Power of Potters at Idalion, Cyprus during the First Millennium BCE*

On Iron Age Cyprus, the polities are described as "city-kingdoms" that are autonomous, independent, and led by kings. Idalion is one such polity located in the south central region of Cyprus. Using petrographic analysis, I investigated the way craft production was impacted by economic, social, and political power mechanisms to understand the power structures at Idalion through material culture. Idalion's political order is disrupted by Kition, its coastal neighbor, at least twice during the Iron Age, once about 500 BCE and again at the end of the 4th century BCE. Kition annexed Idalion and consequently Idalion potters lost their primary source of Troodos raw materials. After the approximate 200 years of Kition control of Idalion, only one or two groups of potters regained access to

igneous sources. In the first half of the first millennium BCE, potters were able to use their own social power and connections to access raw materials and standardize some of their wares but once political and economic control shifted to Kition, potters had to change their production mechanisms. Political and economic power before, during, and after the administration of Idalion by Kition had immediate and lasting effects on the social power of potters.

[301] *Chair*

Barun, Ana [388] see Gill, Jayson

Bar-Yosef Mayer, Daniella (Tel Aviv University)

[15] *The Color of Personal Ornaments in Prehistoric Periods of the Levant*

Shell beads appear first in the Middle Palaeolithic of the Levant. Their use as personal ornaments is evidence for cognitive abilities and symbolic expressions, however, their colors are limited to white, red and black. Humans' transition from a foraging economy to agriculture in the Neolithic of the Levant brought with it the first use of stone beads and the first appearance of other colors. Stone and shell beads in the Neolithic came in many colors and shapes. Because beads in white, red and black colors had been used before, I propose that the occurrence of green beads was related to the onset of agriculture. A synthesis of personal ornaments of the Chalcolithic period, following the emergence of agro-pastoralism provides insight into the possible ways in which the society of used to decorate itself. The dominance of white, green and red beads, pendants, bangles, and amulets apparently had additional amuletic or apotropaic functions at the critical time of religion formation. A large variety of raw materials were procured and the interpretation of the shapes and colors of these artifacts is largely based on Ancient Egyptian historic examples and on ethnographic analogies.

Bar-Yosef Mayer, Daniella [15] see Schechter, Heeli

Barzilai, Rebecca (Indiana University, Bloomington)

[205] *Vibrant Recipes: The Variability and Composition of Special Clay Linings in Mississippian Shrines from the Illinois Uplands of Greater Cahokia*

In several Mississippian sites circa 1050 CE, shrine houses and some other features were lined with a special bright yellow clay or clay mixture. This study looks at the variability and composition of these clay linings to determine what is the key vibrant ingredient in these ceremonially active clay linings. In this study methods of texture analysis, X-Ray Diffraction, and X-Ray Fluorescence to quantify the composition of 17 samples from a range of sites in the Illinois Uplands of the Greater Cahokia area in Illinois.

[205] *Chair*

Bass, Angelyn [85] see Guebard, Matthew

Bass, Angelyn [380] see Williams, Katharine

Bass, Angelyn (University of New Mexico) and Heather Hurst (Skidmore College)

[411] *The Afterlife of the Discovery of a Lifetime: Preservation of the Maya Murals of San Bartolo, Guatemala*

In 2001, rarely preserved Maya murals were discovered at the site of San Bartolo, Guatemala. Subsequent archaeological excavations revealed an elaborate artistic program of wall paintings and numerous hieroglyphic texts buried in successive architectural phases dating from ca. 400-100 B.C. The corpus of paintings found within the Las Pinturas pyramid includes in situ murals and over 7000 fragments from artworks that were intentionally broken into fragments and concealed by the Maya as they dismantled older architecture and built new construction. Today, the in situ mural chamber and the fragment collection have been carefully excavated, stabilized, catalogued, analyzed, and curated; many fragments have been reassembled. These outcomes are the result of a 17-year collaboration between an international team of archaeologists, conservators, artists, engineers, materials scientists, epigraphers, and iconographers. This presentation will detail how archaeology, art, and materials science provide evidence of how the San Bartolo murals were created, used, and cached, followed by a description of the materials and methods used to conserve the paintings. Challenges for ongoing preservation of the murals through establishing protection measures for the site and providing broad access to the fragment collection will be discussed in light of the extremely under-resourced cultural heritage institutions of Guatemala.

Bassett, Hayden (U.S. Navy, NAVFAC Atlantic), Christopher P. Chilton (U.S. Navy, NAVFAC Atlantic), Bruce J. Larson (U.S. Navy, NAVFAC Atlantic) and E. Clay Swindell (U.S. Navy, NAVFAC Mid-Atlantic)

[168] *Riverine Resource Subsistence in Early to Middle Woodland Saginaw Valley, Michigan: An Investigation of Site 20SA1427*

From the terminal Early to late-Middle Woodland periods (500 BC – AD 500), Native groups living in the central Saginaw Valley of Michigan dramatically shifted subsistence strategies from a reliance on medium to large game, to a focus on aquatic resources. Regional sites illustrate this shift, though from the point of deposition in central domestic spaces, rather than source exploitation areas. This poster details the investigation of site 20SA1427, a peripheral procurement and processing area for aquatic resources in support of a significant Eastern Woodland

domestic complex. Delineated and investigated using Ground Penetrating Radar (GPR) and deep subsurface testing, the site is characterized by intensive episodic use, integral to the settlement ecology of Early to Middle Woodland groups in the region. Reporting initial phases of fieldwork, this poster: 1.) provides an effective approach for survey of ephemeral, deeply buried sites; 2.) demonstrates the value of geophysical methods for identifying ancillary site components; and 3.) argues the analytical value of peripheral, resource-focused sites in understanding shifting dynamics at domestic centers.

Bassett, Hayden [391] see Bassett, Madeleine

Bassett, Madeleine (William & Mary), Bruce J. Larson (NAVFAC), Hayden Bassett (NAVFAC), Christopher P. Chilton (NAVFAC) and Neil Norman (William & Mary)

[391] *Analysis of Pastoralist Settlement Patterns in Eastern Djibouti (ca. 1200–500 BP)*

River drainages have long been loci of seasonal migration and settlement for pastoralist societies in the Horn of Africa. Dotted with pastoralist camp sites, eastern Djibouti's Amboule River drainage is an ideal location to study long-term pastoralist settlement dynamics at a sub-regional scale. In 2017 and 2018, as part of a systematic survey of pastoralist sites in the eastern Amboule River drainage, archaeologists from William & Mary and NAVFAC identified and mapped dozens of previously unrecorded pastoralist sites near the Chabelley Airport. This poster summarizes the results of those surveys, and uses GIS to develop preliminary understandings of the feature typology and settlement ecology of pastoralism in eastern Djibouti (ca. 1200–500 BP).

Bates, Brian (Longwood University)

[168] *The Wade Site: Evidence for Long-Distance Trade Networks in the Southern Piedmont of Virginia*

Located in the southern region of the Virginia Piedmont, the Randy K. Wade site (44CH62) is identified as a Late Woodland, Amerindian community which exhibits expected pit storage technology, boundary features, and material culture (Dan River Series ceramics, diagnostic lithics, dietary remains). However, high-status mortuary treatments and the village's central plaza layout are atypical for comparable temporal regional sites. This poster examines hypotheses that suggest an unusual complexity in exchange networks for both material goods and ideology.

Bates, Lynsey [362] see Bollwerk, Elizabeth

Battillo, Jenna (University of Florida, Florida Museum), R.G. Matson (University of British Columbia) and William Lipe (Washington State University)

[362] *Tale of a Test Pit: The Research History of a Midden Column from the Turkey Pen Site, Utah*

In 1972 R.G. Matson and a small crew excavated a dry, stratified midden at a Pueblo Cliff Dwelling site in Grand Gulch, as part of the Cedar Mesa Project. Materials from the column (excavated and kept intact) and the matrix surrounding it (bagged separately by layer) are curated at Washington State University's Museum of Anthropology and have been used in numerous projects on topics ranging from turkey husbandry, to paleonutrition, to maize genetics, to early tattoo practices. The wealth of information derived from the contents of this 50 x 50 x 170cm column, analyzed using a variety of traditional and advanced techniques, has helped to shape the way we view preceramic agricultural populations of the northern Southwest. Here we will detail the history of research at Turkey Pen Ruin focusing on studies utilizing this test pit, buoyed by the encouragement to research and openly share research related to Cedar Mesa, emphasizing the scientific potential of well-maintained organic deposits as museum collections, and culminating in the definition of a new Basketmaker II variant resulting from study of this collection nearly five decades following its original excavation.

Bauer, Brian

[233] *Discussant*

Bauer, Hannah (The College of Wooster) and Olivia Navarro-Farr (The College of Wooster)

[371] *A Cross-Comparative Study of Problematic Deposits from M13-1 at El Perú Waka' and the North Acropolis at Tikal*

Archaeological research on problematic deposits has provided a generic category for otherwise unexplainable bodies of evidence for ritual activity. This research focuses on data from two similarly constituted problematic deposits in the Maya area, one very well known from the North Acropolis at Tikal, and one lesser known from civic ceremonial structure M13-1 at El Perú Waka', both of which are situated in Petén, Guatemala. Analysis conducted in 2017 and 2018 by the Waka' team on ceramic deposits recovered from this structure provides a more thorough dataset on remains previously identified as problematic deposits. Excavations in the North Acropolis of Tikal have yielded similar types of deposits associated with political centers and public spaces. By conducting a comparative analysis of ceramic data collected at these sites, I investigate how they are similar and different in nature, context, and content to further explore what problematic deposits look like in the archaeological record, and how this identification is limited in describing deposits that do not fit into narrowly defined categories of desecration or termination. Through this research, my goal is to contribute to the debate surrounding the classification of ritual remains in various contexts by careful comparative examination of these enigmatic deposits.

Baugher, Sherene**[83] Tutelo Resettlement in the Cayuga Heartland: Haudenosaunee Approach to Refugees**

The Tutelos were driven out of their homelands in North Carolina and Virginia by land-grabbing Europeans. The Tutelos fled to refugee settlements in Pennsylvania along with other displaced Native Americans from diverse Indian nations. In 1753, the Tutelos were offered sanctuary with the Cayugas, one of the Six Nations of the Haudenosaunee/Iroquois Confederacy. The Tutelos maintained their separate cultural identity, continued their own language and customs, and governed their internal affairs, while the Cayugas handled all "external" affairs such as diplomacy and trade with the colonists. The Tutelo village was Coreorgonel, near present-day Ithaca, New York. During the infamous Sullivan Campaign of 1779, Coreorgonel was burned to the ground, the Tutelos were forced from the region, fleeing westward toward Niagara Falls and ultimately resettling on the Six Nations Reserve in Canada. Archaeological work on an engaged, collaborative project with the Tutelos and Cayugas resulted in the design and opening of a commemorative park and a greater understanding of the long-term social impact of the humane treatment of refugees by the Cayugas.

Baumann, Steve**[85] When Contemporary Becomes Historic: Preservation Maintenance to Mission 66 Architecture at El Morro National Monument**

El Morro National Monument's Mission 66 maintenance/utility complex is a distinctive Cecil Doty design uncharacteristic of Mission 66 program utilitarian buildings. Extending from the maintenance building is a service yard enclosed by a fence with battered stone masonry piers and vertical wood plank fence sections. A double-leaved gateway accesses the large trapezoidal yard. Because the maintenance/utility building was attached to the facade of the overall visitor center complex, the design required architectural distinction that is unusual for Mission 66 program maintenance buildings. The stone pier supported fence is a prominent feature of this design. After more than 50 years of use, expedient repairs and weathering, the now historic fence was ready for a preservation maintenance project. The funding goal to improve the condition and appearance of the fence included replacement of all original wood fabric and repointing of the piers. Improvement to the condition and appearance was achieved by El Morro's VT program in 2018 while retaining most of the original fabric. Clever refitting techniques and careful assessment and conservation of original materials resulted in a VT project that exceeded funding goals and restored the appearance of this unique architectural element integral to El Morro's Visitor Center/Maintenance complex façade.

[5] Discussant**Bausch, Ilona (Kokugakuin University Museum)****[141] Cultural Biographies of Japanese Jades: Temporal and Spatial Variability during the Jomon Period**

Jadeite from the Itoigawa source was highly valued among hunter-gatherers inhabiting the Japanese archipelago during the Jomon period, circulating widely from its discovery during the late Early Jomon (c. 4000 BCE) until the end of the period (c. 400 BCE). While there is some indication that raw material may have been valued in its own right, the overwhelming majority involves finished artefacts. Due to the presence of a drilled hole, these have been uniformly classified as 'ornaments' ('large pendants' during the earlier phase, small round and curved beads during the later phase), and—based on several well-published finds from mortuary contexts—interpreted as conferring magical and/or social power, worn as prestige objects by 'leaders' or 'shaman'. However, diversity in shape, size, wear and depositional context demonstrate that there is much variability in function and social value. In some contexts, other minerals /rocks were substituted for jadeite. Moreover, it is necessary to take into account the heterogeneity of Jomon societies through time and space, as well as varying levels of social inequality. This presentation will examine the diversity in Jomon jade artefact practices, discussing regional and chronological differences in production, use wear and deposition.

Baustian, Kathryn (Skidmore College)**[353] Bioarchaeological and Mortuary Indicators of Social Order in Mimbres Society: Seated Burials, Occupational Stress, Health, and Trauma**

The Mimbres culture of the American Southwest is most recognized for its beautiful black-on-white ceramics but recent research is revealing greater understanding of social organization, community interactions, and the response to social and cultural change. Bioarchaeological and mortuary data are contributing important evidence of power differentials and social relationships within communities. This paper presents data from burials and human skeletal remains to explore theories of cooperation within Mimbres communities. Of particular significance are burials exhibiting bodies in upright seated positions and the inclusion of high numbers of mortuary goods, particularly decorated ceramic bowls. Seated mortuary positioning is not typical for the region and may have been reserved for community members who held specific social roles or elevated standing. Previous research has linked household clusters and seated burials to social memory and land tenure. Skeletal observations of occupational activity, pathogen exposure, stature, and trauma also indicate that Mimbres people engaged in more cooperation than competition.

Bautista, Stefanie [315] see Fernandini, Francesca

Bautista, Stefanie (University of Rochester)

[356] *The History of Archaeological Investigations at Quilcapampa, Siguanas Valley, Peru*

The archaeological site of Quilcapampa La Antigua, located in the Siguanas Valley, Peru, has attracted the attention of scholars since the 1960s. The architecture and settlement layout of Quilcapampa looks similar to other Wari administrative centers in the Andes, which has prompted scholars to discuss what role this site might have played in the expanding Wari empire. This presentation will discuss the findings of previous research conducted at Quilcapampa as well as introduce the recent archaeological investigations at Quilcapampa that have sought to better understand the nature of Wari's presence at this site, and how this site fits into larger networks of interaction in the Andean region.

[315] Chair

Baxter, Carey [112] see Hargrave, Michael

Baxter, Carey (USACE ERDC-CERL) and Michael Hargrave (USACE ERDC-CERL)

[241] *Cultural Resource Management at an USACE Research Laboratory: Methodology Development in CPP Rapid Response*

The CRM team at the U.S. Army Corps of Engineers (Corps) Construction Engineering Research Laboratory (CERL) provides research in archaeology, Native American issues, historic buildings and landscapes as well as environmental planning. Our team provides direct technical and subject matter expert support to military installations and Corps districts. Additionally we conduct original research in methodologies to streamline the CRM process in conjunction with the U.S. Military mission. These efforts include national contexts, programmatic solutions to CRM issues and guidance on the deployment on new technologies. One ongoing effort, presented in this paper, is the development of a globally applicable decision matrix that will facilitate the rapid response to developing or ongoing man-made or natural disasters that impact cultural sites. Cultural Property Protection (CPP) approaches need to be cost-effective and scalable to challenging circumstances that may include serious shortages in time and trained personnel, and the need to work in harsh and even potentially dangerous conditions. The matrix under development takes into consideration the amount of time, resources, and trained or untrained personnel available and what data collection methodologies can be best deployed to achieve maximum results with the available resources.

[282] Discussant

Baxter, Erin (University of Colorado, Boulder / Denver Museum of Nature & Science), Steve Nash (Denver Museum of Nature & Science), Michele Koons (Denver Museum of Nature & Science), Deborah Huntley (Denver Museum of Nature & Science / Tetra Tech, In) and Octavius Seowtewa (Pueblo of Zuni)

[122] *Kiva Collaboration – The Toriette Lakes Great Kiva Project: Excavation, Oral History, Augmented Reality and Other Things We Should All Be Doing*

The Toriette Lakes Great Kiva near Reserve, New Mexico was the subject of a 2018 field project under the auspices of the Denver Museum of Nature & Science. This high altitude, threatened site appeared to be a shallow, disturbed, somewhat isolated, square great kiva of unknown date. Survey, excavation, and remote sensing have refined this interpretation. This poster provides an overview of summer fieldwork, contextualizes the kiva within its surrounding landscape, reports on collaboration with Zuni cultural leaders, and makes a preliminary appraisal of its architectural features. Data are presented with augmented reality – multimedia effects (audio, video, graphics) that are keyed by viewers' devices; this makes for a 'smart' poster that has minimal text, ever changing content, conveys data through multiple sensory modalities (which can be ADA accessible), and offers a snazzy alternative experience to a typical academic poster.

Baxter, Scott [336] see Curry, Benjamin

Bayarsaikhan, Jamsranjav [154] see Égüez, Natalia

Bayham, Frank (California State Univ., Chico)

[35] *Reflections on the Life, Career and Influence of Stephen D. Fretwell*

Steve Fretwell served as a Visiting Maytag Professor at Arizona State University in the Biology Department in 1976-1977. He was a well-published, aspiring young evolutionary ecologist and taught several courses and seminars. I was a first-year graduate student in anthropology at that time and had the opportunity to take Animal Ecology and Mathematical Ecology from him. He later served as a member of my doctoral committee. I worked with him in the field in Kansas and Nebraska and had many discussions with him on science, ecology, spirituality and life. I here share some of my reminiscences on his work and career and reflect on his influence in evolutionary ecology and archaeology.

Bayman, James**[246] From Hohokam Archaeology to Narratives of the Ancient Hawaiian 'State'**

Interpreting the political economies of early complex societies that lacked texts is a profoundly difficult challenge for anthropological archaeology. Such models compel archaeologists to examine material evidence of agricultural intensification, community organization, craft specialization, monumental construction, and mortuary practices. In this comparative study, I consider such evidence to examine the political economies of ancient societies in two regions: the Arizona desert and the Hawaiian archipelago. A comparison of archaeology in the two regions confirms that Southwestern scholars have underestimated the degree of social stratification among the Hohokam -- if we accept claims that ancient 'states' developed in the Hawaiian Islands. This finding underscores the limitations of using conventional archaeological correlates to characterize ancient societies elsewhere in the world.

[13] Discussant

Beach, Timothy [63] see Krause, Samantha

Beach, Timothy (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin) and Nicholas Dunning (University of Cincinnati)**[79] Ancient Maya Water Control, Wetlands, and the Fiery Pool**

One of Steve Houston's sublime volumes is *The Fiery Pool*, which was also a groundbreaking exhibit. These explored the themes of the Maya and their relationships with water. Here we consider the themes from *The Fiery Pool* from the perspectives of ancient Maya Wetland fields, "creatures", and water control and quality. Water and water management has grown to be a major part of Maya studies with research into water features such as terraces, dams, diversions, reservoirs, canals, and wetland field complexes. Steven Houston has had an eye on all of this work from insights into terracing at Tamarindito decades ago to the massive El Zozt reservoir and dam to wetland fields popping out in unexpected places. We focus on Houston's contributions to our shared work in each of these areas over the decades as the environment and particularly water and climate have burgeoned as Maya topics from the perspectives of archaeological science.

Beacham, Brad [213] see Martinez, Daniel

Beale, Gareth [87] see Richards, Julian

Beale, Nicole [87] see Richards, Julian

Beamer, Dawn (University of Connecticut, Center for Integrative Geosciences), Lisa Park Boush (University of Connecticut, Center for Integrative), Mary Jane Berman (Miami University, Ohio, Department of Anthropology), Perry Givnecki (Miami University, Ohio, Department of Anthropology) and Amy Myrbo (University of Minnesota, Department of Earth Sciences)**[37] Climate and Culture in the Caribbean and Western Atlantic Regions**

The islands of the Lesser and Greater Antilles were permanently settled as early as 8000 ybp, but the earliest human presence in the Bahama archipelago is dated ~1200 ybp, some 6700 years later. It has been noted that a connection between climate variations in the Caribbean/West Atlantic region may be the key to understanding the timing of the expansion into the Bahamas and shifts between Lucayan archaeological periods. Periodic climatic fluctuation in the Caribbean/Western Atlantic region follows similar trends when observed at a millennial resolution, however at multi-decadal and centennial scales, the timing and location of precipitation and temperature regimes vary. Climate proxies such as Fe, Sr:Ca, Ca and δ¹⁸O from the pan-Caribbean show whether specific regions in the Caribbean and Western Atlantic experienced similar or different climate patterns, and if those patterns correlate. We have assembled a synthesis of high resolution paleoclimate records from Mesoamerica, South America, Puerto Rico and the Bahamas to create a framework that can be used to view human decision making processes regarding migration, colonization, resource procurement, trade, settlement and sociopolitical relationships in the Caribbean\Western Atlantic around the time of the Medieval Climate Optimum.

Bearheart, Robert [17] see Guilfoyle, David

Beasley, Melanie (University of Tennessee, Knoxville), Julie Lesnik (Wayne State University) and Angela Perri (Durham University)**[397] Identifying Consumption of Putrefied Meat in the Archaeological Record from δ¹⁵N Values**

Speth (2017) proposed that the consumption of putrid meat and fish might be a dietary item that is underexplored in the Upper Paleolithic food menu. In this presentation we explore ways to identify the consumption of putrid foods. We compare the results from our study of Δ¹⁵N observed in mammal muscle tissue decomposing during winter with published stable isotope data of prehistoric arctic and subarctic groups. Our modern muscle tissue study indicates that during the first 40 days when daily temperatures average 9.3 °C, no significant difference is observed from the starting δ¹⁵N value (mean Δ¹⁵N = 0.1‰). However, from days 41-76, there is a significant increase in Δ¹⁵N with an

average increase of 1.7% despite no significant change in the daily temperature average or max daily temperature, 10.0 and 25.6 °C, respectively. Ethnohistoric accounts indicate that putrefied meat and maggots were consumed as a delicacy by arctic and subarctic groups. While muscle tissue does not seem to contribute significantly to elevated $\delta^{15}\text{N}$ values, maggots associated with decomposing meat do have significantly higher $\Delta\Delta^{15}\text{N}$ values, up to a 4.6% increase within 136 days of decomposition. Consumption of putrid meat and associated maggots should be considered when constructing prehistoric food menus.

Beatrice, Jared [131] see Leader, George

Beatty-Medina, Charles (University of Toledo)

[162] *Early Native and African Marooning in Northern South America and the circum-Caribbean*

This paper explores the dual development of African and Native American maroon societies in early Spanish America. Although marronage was widely practiced by Native Americans and Africans, maroon history has been largely defined by African agents. In the early colonial period Africans and Native Americans robustly participated and interacted with each other. This history of native and "mixed-race" marronage can provide new insights to African-Native relations and their role in structuring colonial society.

Beaudoin, Matthew (Timmins Martelle Heritage Consultants Inc.)

[19] *Is Archaeology Up to the Pepsi Challenge?: The Identification of Marginalized Populations in CRM Archaeology*

The determination of the ethnic or cultural affiliation of an archaeological site, Indigenous or otherwise, is often considered one of the primary starting points for the interpretation of 19th-century archaeological sites. This determination is a significant step in the archaeological process and establishes the primary set of theoretical and comparative literature that will be used to contextualize the archaeological patterning. Furthermore, this determination often acts as a gateway that determines descendant communities can, or must, be engaged as part of the archaeological process. This paper uses examples drawn from the CRM context in Ontario, Canada, to highlight how these determinations are made, as well as underlying weaknesses and assumptions, within the process. The CRM context provides a unique lens into these issues as it often results in the identification and study of a large number of archaeological sites outside of conventionally known enclaves of study.

Beaule, Christine

[367] *Blue Tunics and Royal Lions: Colonial Period Changes in Clothing and Changing Conceptions of Indigeneity in the Spanish Colonial Americas*

This paper addresses the impact of conquest and colonialism on indigenous Andean peoples' clothing styles and textile motifs in the central Andes, using examples from elsewhere in Latin America and beyond to contextualize documented patterns. Comparing Prehispanic and colonial period examples, I use several classes of material culture to shed light on sociopolitical organization, gender, and ethnic identity. Specifically, I explore the impact of Spanish public policies, gender roles, and social ideals on the maskaypacha scarlet forehead fringe, the form and decorations on male Inkan unku tunics, and gendered costume changes. All of these examples reveal patterns in indigenous clothing that can be linked to colonial period conceptions of indigeneity.

Bebber, Michelle

[116] *A Comparative Functional Analysis of Old Copper Culture Utilitarian Implements via Artifact Replication, Materials Testing, and Ballistic Analyses*

North America's Old Copper Culture (4000-1000 B.C.) is a unique event in archaeologists' global understanding of prehistoric metallurgic evolution. For millennia, Middle and Late Archaic hunter-gatherers around the North American Upper Great Lakes region regularly made utilitarian implements out of copper, only for these items to decline in prominence and frequency as populations grew and social complexity increased during the Archaic to Woodland Transition. Yet, it may be reasonably asked whether these demographic and social factors are the only, or predominant, factors contributing to this evolutionary pattern. To answer this question, an extensive archaeological experimental program was initiated which compared replica copper tools (spear points, knife blades, and awls) to analogous ones made of stone or bone in order to assess whether relative functional efficiency also contributed to the decline of utilitarian copper implements. This series of experiments consists of a controlled ballistics study, a cutting efficiency and durability study, and a punching efficiency study using an Instron materials tester.

Bebber, Michelle [365] see Meindl, Richard

Becenti, Alicia

[150] *A Zooarchaeological Analysis of Diné Hunting Traditions*

Throughout history, the Diné have worked to manage the arrival of new people, ideas, and resources into their communities. Following the introduction of Old World domesticates to northwestern New Mexico during the Gobernador phase (c. 1700-1775), Diné groups increasingly incorporated sheep-based pastoralism into their earlier hunting-gathering-farming way of life. The re-examination of faunal remains and lithic artifacts originally recovered from seven Dinétah pueblos by the BLM (Marshall 1995) shows that this period of transition overlaps with shifting

hunting practices and ritualization. Rituals coinciding with this shift allowed for a more efficient hunting tradition and perhaps the creation of stories and prayers suited for their subsistence strategies. Given that hunting strategies are dependent on the geography of the area, season and the type of game exploited, this project opens the door to a broader discussion of Diné hunting efficiency, mobility, and traditional relationships with wild game as they relate to the adoption of new cultural influences during the Gobernador period.

Becerra, Gibránn (Universidad Veracruzana) and Marcie Venter (Murray State University)

[158] *Vestigios de lo olmeca en la montaña. Contexto y contraste del depósito de hachas de piedra verde de Matacanela*

En el año 2015, Venter dirigió un programa de excavación arqueológica en Matacanela. En la unidad 2, realizada al oriente del conjunto arquitectónico principal, se registró una secuencia estratigráfica que permitió documentar y distinguir dos momentos de ocupación en el área del sondeo, la más antigua data al periodo Formativo medio (900-400/300 aC). En este contexto, se recuperó un depósito que incluye un fogón conmemorativo asociado a una "vasija volteada" con tres hachas pequeñas de piedra verde en su interior. En la ponencia, se discute la asociación de las hachas, la vasija y el fogón como un depósito relacionado al sistema ritual y de representación olmeca del sur de Veracruz. Aunque evidencias del Formativo han sido registradas al oeste del Lago de Catemaco, Matacanela provee una oportunidad para entender la incorporación de las prácticas "olmeca" en las poblaciones locales de la sierra y su gradual transformación hacia los patrones sociales del periodo Clásico en Los Tuxtlas.

Becerra, Gibránn [307] see Budar, Lourdes

Becerra Alvarez, Marimar (Universidad Veracruzana) and Marcie Venter (Murray State University)

[158] *Técnica y secuencia constructiva de la arquitectura prehispánica de Matacanela, Los Tuxtlas, Ver.*

Matacanela es componente esencia de la historia regional de Los Tuxtlas, su estudio es fundamental para la comprensión de la dinámica social diacrónica y sincrónica que se dio en la región. El sitio cuenta con una secuencia ocupacional desde el Formativo Medio hasta el Clásico Tardío (ca. 900 a.C. – 800/1000 d.C.) y una ocupación menor que persistió hasta el Posclásico, sin embargo, su apogeo ocurre durante el Clásico Medio y Tardío (ca. 450-800/100 d.C.). A pesar de su larga trayectoria y de que es un sitio conocido desde principios del siglo XX, escasos ha sido las investigaciones sistemáticas en Matacanela, recientemente los trabajos hechos por el PAM (Proyecto Arqueológico Matacanela) en el 2014 y 2015, han proporcionado nueva información. Específicamente, las investigaciones realizadas en el núcleo arquitectónico de Matacanela han brindado la posibilidad de entender la construcción del sitio. Esta contribución pretende dar a conocer y discutir la secuencia constructiva y las técnicas arquitectónicas de Matacanela.

Becerra-Valdivia, Lorena (ORAU, University of Oxford), Katerina Douka (The Max Planck Institute) and Thomas Higham (ORAU, University of Oxford)

[326] *Tracking Early Human Presence in North America and Beringia during the Late Pleistocene through Bayesian Age Modeling*

The timing of early human presence in the Americas is a debated topic in First Americans research. The variable of time is, after all, fundamental in the study of human dispersal; it forms a base with which to elucidate spatio-temporal patterns, study applicable bio-cultural processes, and frame environmental data. As such, this investigation analyses current chronometric and archaeological records from North America and Beringia, using a Bayesian age-modelling approach. The incorporation of 42 archaeological components from across these regions into five categories - pre-Clovis, Beringian Tradition, Clovis, Clovis-coeval, and Western Stemmed Tradition - allow for a region-wide analysis that produces a clearer image of early human dispersals into the American continent. Results obtained are framed against current data on faunal extinctions, ancient DNA, and climatic records.

Becerril Miró, Ernesto [71] see Pantoja, Luis

Bechhoefer, Melissa [89] see Nash, Stephen

Beck, Charlotte (Hamilton College)

[249] *Discussant*

Beck, Jess (University of Cambridge)

[353] *The Labor of Building a Community: Collective Organization and Mortuary Practices in Copper Age Iberia*

The Iberian Copper Age (c.3200-2250 BC) witnesses a suite of interrelated changes, including expansion of exchange networks, intensification of agriculture, increases in population density, and greater investment in site infrastructure. Accordingly, it is noteworthy that third millennium collective mortuary practices hark back to the Neolithic, even at some of the unprecedented "mega-sites" that appear during this time. Some of these mega-sites show indications of the emergence of institutionalized inequalities through increasing spatial and material attention to the individual, and inter-tomb variability in the quality and quantity of grave goods. In contrast, the 113 ha enclosure settlement of Marroquíes lacks clear or overt evidence for domestic or mortuary inequality. Here, bioarchaeological results suggest that village inhabitants led relatively similar lives in terms of diet and disease, most individuals had local strontium isotope ratios, and males, females, adults, and subadults were all incorporated into

mortuary practices. Skeletal analysis thus indicates that within third-millennium Iberia there were multiple ways to build a community, from large-scale centers that emerged in tandem with indicators of increasing social inequality, to other mega-sites where archaeological and bioarchaeological evidence suggest a more cooperative approach.

[183] *Chair*

Beck, Jess [183] see Quinn, Colin

Beck, Margaret (University of Iowa)

[291] *Ants for Breakfast for Everyone! The Legacy of James Skibo's Work on the Kalinga Ethnoarchaeological Project*

In 1988, James Skibo lived and worked in a small village along the Pasil River in the northern Philippines. His observations there of women cooking, and the material traces of vessel use, still have a lasting impact on archaeological ceramic analysis 30 years later. In this paper I consider some of Skibo's contributions to the Kalinga Ethnoarchaeological Project, describing his innovations within the broader context of ceramic ethnoarchaeology and noting how his work shaped ceramic analysis in the following decades.

Beck, R. Kelly [323] see Sykora, Lydia

Beck, Robin [367] see Rodning, Christopher

Becker, Janee [120] see Noldner, Lara

Becker, Sara (University of California, Riverside)

[353] *Why Hierarchy? A View from the Tiwanaku State's (AD 500-1100) Labor Force.*

When past peoples congregated to form complex societies, a question arises as to under what circumstances would heterarchical, reciprocal labor be emphasized over top-down hierarchical configurations? In the Central Andes of South America, modern indigenous people practice reciprocal labor with groupings organized around family hamlets and kin networks in an ayllu (i.e., kinship, administrative, and political) system. Heterarchical teamwork to till fields, plant, and harvest makes logical sense with smaller groupings of people spread across a wide area. The Tiwanaku state within this same region had an estimated 40,000 people living within a few hundred square kilometers of each other. Archaeological and bioarchaeological evidence point toward a shared, reciprocal, and heterarchical labor force that emerged as one basic tenet of this civilization. Exploring questions about heterarchical labor, this research evaluates activity evidence from Tiwanaku skeletal remains from before, during, and after the emergence and expansion of the Tiwanaku state. Results show that people may have labored less extensively and repetitively on heavy effort tasks like farming after the advent of the state. Obligations within something like an ayllu network during state times may have strengthened social obligations and kept this expansive state functioning for over 500 years.

[353] *Chair*

Beckerman, Ira

[61] *Discussant*

Beckett, Emma (University of Western Australia)

[305] *Monuments to Symbolic Behaviour in the Dampier Archipelago, Western Australia*

The Dampier Archipelago in Northwest Australia is famous for containing dense concentrations of spectacular rock art that reflect varied and changing landscape use over time. Standing stones are another important site type found throughout the archipelago and they range from single, isolated stones to large clusters of propped or chocked uprights. These features are underexamined despite their prevalence, and can be found in association with a range of other archaeological material including: rock art, stone structures, quarries, artefact scatters and middens. This paper explores the spatial patterning of standing stones in conjunction with rock art and other archaeological material. The variety in location and extent placement suggests that these features were being used both in association with, and independent of other symbolic forms of communication such as rock art. Being both visually impressive and visible over reasonable distances means these features could have functioned to signal across significantly larger distances than the rock art. This does not preclude previous interpretations of these features as Thalu or increase sites; instead, it provides a more nuanced understanding of these features in context as another medium for inscribing the landscape.

Beckmann, Taylor [131] see Dudzik, Beatrix

Beekman, Christopher [314] see Cullen Cobb, Kim

Beekman, Christopher (University of Colorado Denver)

[314] *Shell and Symbolism in Mesoamerica and the Andes: Are There Parallels?*

Much research on the links between Mesoamerica and South America has focused on the methods of exploitation of shell (e.g. *Spondylus*, *Strombus*) and its possible trade across sub-regions. However, superficially similar methods of exploitation may be local solutions to common problems and methods for sourcing shell remain in their infancy. There has been less consideration of the potential parallels in shell's meaning across larger regions. This paper examines iconographic and burial contexts (particularly from Colima, Mexico and the central coast of Ecuador) in order to evaluate the meanings associated with specific shells and their uses, their association with specific social identities, and their symbolic pairings with other materials.

[314] Chair

Begay, Richard (Navajo Nation)

[254] *Inter-agency Inter-cultural Cooperation*

The Navajo Nation has been working with the Bureau of Reclamation and several southwest Indian Tribes on the construction of the Navajo Gallup Water Supply Project (NGWSP) for the last couple of years. The Heritage and Historic Preservation Department is the Navajo Nation lead for cultural resources, including burials on the project. We are working together to preserve the cultural history of the greater San Juan Basin by working together, and respecting each other despite bureaucratic roadblocks. The Navajo Nation is a key player as much of the project is on its lands.

[5] Discussant

Begel, Johann and Julien Hiquet (Paris I – Panthéon Sorbonne)

[410] *Skull Offerings: The Koxol Offertory Assemblage in the Maya Area*

Skull offerings among the ancient populations of Mesoamerica are well documented by archaeological, ethnohistorical and iconographic sources. New finds in 2017, in the Lowland Maya Classic site of Naachtun (Guatemala) required intersite comparisons beyond the few well-known cases such as Uaxactun E-Group's deposits. The association of a cached human skull and a pair of ceramics was defined by William Coe as Tikal's Koxol so-called "offertory assemblage". The human remains in these peculiar deposits are obviously linked either to sacrificial, burial or post-interment practices, but even at this scale of analysis, no attempt was ever made to undertake a systematic study. As a consequence, this paper represents the first step in the remarkably difficult task of understanding the sense and meaning of these very peculiar Maya offerings, and of caches in general, often described in the literature, but actually very poorly understood. A careful selection of truly isolated skull offerings revealed a broadly shared ritual tradition among most of the Maya area. On the basis of a corpus of 73 deposits from 27 Maya sites identified to date, this paper aims at classifying the variations of this skull offertory assemblage and to follow its distribution in the Maya area through time.

Beggen, Ian and Kelsey A. Schmitz (East Carolina University)

[216] *Interpreting Resharpening Patterns of Paleoindian and Early Archaic Projectile Points from the Carolina Piedmont*

Resharpening occurs throughout the use-life of a tool and may indicate the intention to rejuvenate the blade edge or the reconfiguration of a tool for a new function. Analysis of this aspect of projectile point maintenance can reflect variation in resource use strategies amongst the users of these tools. This study concerns the differences in resharpening patterns of four projectile point styles from the Paleoindian and Early Archaic periods of the Carolina Piedmont, known as Hardaway Dalton, Hardaway Side-Notched, Palmer, and Kirk. In this research, we analyze the evidence of retouch or resharpening on these points to infer how mobility patterns, resource use, and land use changed during the Paleoindian to Early Archaic transition in the Carolina Piedmont. We contextualize these data concerning resharpening patterns into the different landforms at which the points were found as well as their unique geographic locations across the landscape. In utilizing two different methods of assessing projectile point resharpening, along with geospatial and statistical analyses, we infer how mobile hunter-gatherer groups adapted and modified their usage of the landscape during the earliest occupations of the Carolina Piedmont. These data contribute to the overall research concerning hunter-gatherer lifeway variation across long periods of time.

Beisaw, April (Vassar College)

[136] *Archaeologists as Indian Advocates? Lessons from Skinner, the Little-Weasel, and Moorehead, the Indian Commissioner*

Archaeologists who study the Native past have a responsibility to the Native present. But our academic training does little to prepare us for advocacy work. Personal interests, ethics, and the precariousness of employment often dictate what can be done. Doing nothing is easier and safer than speaking out, but idleness reinforces the irrelevancy of archaeology to contemporary social issues. Recalling the advocacy decisions of two archaeological ancestors, Alanson B. Skinner and Warren K. Moorehead, helps us to consider how and when archaeologists should act beyond their own job descriptions. Skinner's attempts to educate the white public and Moorehead's work to guide governmental policies were not flawless. But their willingness to do something helps us reconsider if we, as

individual archaeologists, are doing enough.

[136] *Chair*

Belardi, Juan (Univ Nac de la Patagonia Austral)

[364] *Big Pictures, Broad Questions, and Archaeological Knowledge along the Steppe and the Forest in the Southern Argentinean Patagonia*

Luis Alberto Borrero changed the way archaeological knowledge was produced in Southern Patagonia (and beyond). We consider three analytical units that underlie his legacy: the landscape, the artifact, and the element (bone). The distributional perspective allows analysis of the interrelationship of the three units within ecological-evolutionary frameworks and allows the comparison of different environments. This is the structure –plus an epistemology centered on falsification– for building broad questions mostly related to Holocene hunter-gatherer landscape use in a changing environment. Case studies from the Tar-San Martin and Viedma Lake basins as well as from the Coyle, Gallegos and Penitente River basins are discussed.

[364] *Chair*

Belcher, William (Division of Social Sciences (Anthropology))

[402] *Comparison of Fish Habit and Exploitation—A Comparison of Two Third-Millennium BCE Sites in the Arabian Gulf Region*

During the third millennium BCE, one of the earliest civilizations emerged in South Asia, the Indus Valley Tradition/Civilization. It had a trade network that spread throughout the Persian and Arabian Gulf, including sites on the Omani coast. This paper will compare two sites, Balakot on the Makran coast of Pakistan associated with the Indus Valley Civilization and a third millennium BCE site of the Namm-an-Nar Culture in Oman, Ras al' Hadd (HD-1). Both sites have extensive fish remains and both seem to have been involved in the trade of fish. This paper will compare and contrast reconstruction of fish technology, procurement, and seasonality based on macro- and micro-environmental analysis of fish habitat. Additionally, some preliminary assessment of processing, related to dried fish trade, will be examined in order to assess the possibility that dried fish trade was an important part of the trade within the Arabian/Persian Gulf region of the third millennium BCE era.

Belden, Robert [69] see Roquemore, Katie

Belfer-Cohen, Anna [366] see Goring-Morris, Nigel

Beliaev, Dmitri [384] see Safronov, Alexander

Beliaev, Dmitri (Knorozov Mesoamerican Center, Russian State University for the Humanities), Monica De Leon Antillon ([1]San Carlos University; [2] Proyecto Atlas Epig), Sergey Vepretskiy (Russian State University for the Humanities) and Camilo Luin (Popol Vuh Museum, Francisco Marroquin University)

[384] *At the Periphery II: Reconsidering Early Monuments in the Environs of Tikal*

El Encanto is a peripheral site (frequently classified as a 'minor center') northeast from the Ancient Maya metropolis of Tikal. It is famous because of the stela with hieroglyphic inscription dated to AD 305-308 and mentioning the king Siyaj Chan K'awil I. Previously Simon Martin suggested that the stela originally stood in the center of Tikal and was removed from the site core to El Encanto after Teotihuacan 'entrada' of AD 378 (as well as other early monuments of Corozal, El Temblor and Uolantun). In order to provide archaeological context for this text and to understand better the early history of Tikal polity, in 2018 we mapped the site and excavated test pits in the South Group.

Bélisle, Véronique [289] see Brown, Matthew

Bélisle, Véronique (Millsaps College), Hubert Quispe-Bustamante (Ministerio de Vivienda, Peru), Allison Davis (U.S. Department of State), Carlos Delgado González and Matthew Brown (Millsaps College)

[289] *Evaluating Wari Impact on Regional Trade Networks: Patterns of Obsidian Exchange in Cusco, Peru before and during the Middle Horizon*

The Middle Horizon (600-1000 CE) in the Central Andes was a time of important changes due to the expansion of the Wari and Tiwanaku states. Many scholars have argued that these polities, the Wari in particular, had a major economic impact on local communities, including the disruption of regional exchange networks and the reorientation of long-distance trade to the benefit of state elites. Obsidian data are particularly well suited to test this idea since provenience studies can trace the exact origin of obsidian artifacts. In this paper, we present new obsidian data from three sites in the Cusco region dating from the Late Formative to the Middle Horizon (Ak'awillay, Yuthu, and Bandojan) to document the organization of trade networks through time and Wari impact on the local economy. A portable X-Ray Fluorescence (XRF) spectrometer was used to determine the provenance of obsidian items recovered in horizontal excavations. Results indicate the emergence of trade with Wari-affiliated partners in the Middle Horizon, but also continuity in exchange networks through time, including those associated with the Titicaca

Basin despite Wari presence in Cusco. These data suggest that, like other early states worldwide, the Wari polity had a limited impact on regional trade.

Bell, Alison [11] see Gaylord, Donald

Bell, Ellen [256] see Douglass, John

Bell, Ellen (California State University, Stanislaus)

[256] *Power from the Periphery: 40 Years of Insight on the Maya Lowlands from Southeast Mesoamerica*

For more than 40 years, Pat Urban, Ed Schortman, and their student-colleagues have toiled long and hard in the blazing heat of Northwestern Honduras to understand the “non-Maya” populations resident in Southeast Mesoamerica. Their work stretches from the beginnings of complexity in the Middle Preclassic period (600 B.C.E.) through the Contact and Early Colonial periods (C.E. 1550) in the Naco Valley, Cacaulapa Valley, and Santa Barbara region of Honduras. Through this exposition of more than 2,000 years of human experience, Urban and Schortman have produced results that not only bring Southeast Mesoamerica and its peoples into sharp focus, but also provide insights into practices linked to craft production, political organization, systems of ritual and belief, interregional interactions, and daily life in the “high-culture” Maya Lowlands to the north. In this paper, I explore their contributions to Maya studies, and archaeology more broadly, by posing the question, “What wouldn’t we know about the Maya if Pat and Ed hadn’t spent so much time studying the “non-Maya?” I complement a review of their published work with reflections from their colleagues on the “other” side of the Motagua River.

[256] Chair

Beller, Jeremy (Department of Anthropology, University of Victoria.)

[338] *Lithic Procurement at a Levantine Desert Refugium during the Middle Pleistocene*

Recent excavations at Shishan Marsh 1 in the Azraq Basin, Jordan have uncovered several artifact-bearing layers that date to the late Middle Pleistocene (300-220kya; 130-120kya). A paleoecological assessment of sediments from this period indicates predominantly arid and warm conditions in the region, similar to those of the present. Hominins living under these conditions were forced to contract around a receding spring- and wadi-fed water source or refugium for subsistence. Consequently, Shishan Marsh 1 presents the opportunity to investigate lithic procurement strategies practiced by Lower/Middle Paleolithic hominins in a water-stressed environment. Chert is the dominant type of lithic material of the hand axe assemblage. A provenance study of potential raw material sources in the region and the hand axe assemblage was conducted using ICP-MS. The results indicate that local procurement was the predominantly strategy. Various wadi sectors likely operated as secondary sources as well, transporting nodules towards the refugium.

Bello, Charles (Federal Emergency Management Agency (FEMA-DHS))

[17] *Opening Remarks to the Session and A Case Study of Tribal Involvement with Research into the Indian Division of the Civilian Conservation Corps (1933-1942)*

The CCC and other federally sponsored work programs provided needed employment during the Great Depression and have been examined by scholars in a range of fields. Archaeologists have examined CCC projects as examples of early scientific excavations that trained many American archaeologists, setting the stage for Cultural Resource Management practices of the modern day. Archaeologists have also examined CCC sites as archaeological projects in their own right – excavating camps and work areas as significant resources – many CCC projects are now eligible for the National Register of Historic Places. However, few are aware that a parallel program, Indian Emergency Conservation Work, later subsumed into the CCC as the Indian Division (CCC-ID), offered similar programs for Native American young men and performed extensive conservation work on reservations. This project outlines preliminary efforts of working with Tribal governments to recognize and document CCC-ID sites and reveals the complicated, and in some cases negative, relationships that tribal governments and individual tribal members had with the CCC.

[167] Discussant

[17] Chair

Bellarado, Benjamin (University of Arizona)

[313] *Obsession with an Icon: Sandals, Sandal Imagery, and Social Identity Across Thirteenth Century Cultural Landscapes in Southeastern Utah*

Ancestral Pueblo people in southeastern Utah seem to have been obsessed with sandals and their depictions during the thirteenth century. Recent research has documented hundreds of sandal depictions on plaster and rock surfaces in the area dating to this period, but how should archaeologists interpret these data? This presentation investigates how people in the southeastern Utah used clothing and representations of clothing in other media, to signal important aspects of social identities in the thirteenth century. Recent field- and collections-based research of plaster building murals and rock art depicting sandals and other types of clothing, and actual twined sandals and other woven garments from southeastern Utah and the larger region are outlined. Next, cross-media approaches and clothing theories are applied to the study of identity expression, in an effort to understand some of the ways that Ancestral Pueblo people materialized concepts of personhood, group and community-level identities, and religious

ideologies across diverse classes of decorated media during this era. Finally, the ways that changes in clothing styles, and their depictions, signaled major developments in the ways people expressed aspects of group affiliation and social position across the area, just prior to the depopulation of the region are addressed.

[313] *Chair*

Bellorado, Benjamin [313] see Heller, Eric

Belluzzo, Nick [295] see Schwartz, Erin

Belluzzo, Nick (College of William & Mary)

[354] *Moving within the 'A'a: The Influence of Liminality in the Hinterlands of Manukā, Ka'ū, Hawai'i Island*

Situated at the transition between windward and leeward sides of the island of Hawai'i, Manukā is a tapestry of environmental and sociopolitical gradients perpetually reconfigured by the lava flows from Mauna Loa. As a geographically liminal region, place-names describe it as where "the trade winds of Ka'ū give way to the gentle breezes of Kona." The result is a high ecological diversity providing numerous agricultural opportunities, albeit within small and widely dispersed clusters. However, the discontinuous and diffuse nature of environmental resources in this region mandated novel subsistence and settlement strategies, solutions which were enabled by the sociopolitical liminality of Manukā, residing in the boundary between rival cores. This facilitated fluid regional political affiliations, allowed non-elite mobility, and empowered local agency and innovation in social and subsistence practices. This paper explores notions of social and spatial liminality and deploys these concepts to define a model of hinterlands based on regional dynamics within an island setting. It does so through a preliminary geospatial analysis of settlement patterns, networks of movement, and symbols of authority and community. The results assert hinterlands as spaces for active and creative social negotiation within existing political structures and networks.

[354] *Chair*

Belmaker, Miriam [116] see Williams, Nancy

Belmaker, Miriam (The University of Tulsa) and Ron Hull (Independent Scholar)

[402] *The First Paleoecological Analysis Derived from a Small Vertebrate Assemblage from the Byzantine Galilee and the Implications for Settlement Patterns*

The flourishing of settlements in the Levant during the Roman-Byzantine period has been attributed to an increase in humid conditions between 300 –700 CE with a concomitant increase in tree cultivation. Small vertebrates which provide high-resolution paleoecological proxy are rare in the Byzantine period overall and totally absent from Galilean sites. This paper examines an assemblage of micro-vertebrates (<1 kg live weight) retrieved from a 5th c. CE cistern sediment found at the Galilean village of Horvat Kur (www.kinneret-excavations.org). It represents the first well-dated Byzantine Small vertebrate assemblage from the Galilee. The assemblage is heavily dominated by several species of shrew, non-commensal murids such as *Apodemus*, and a low proportion of grassland species (e.g., voles), all consistent with a closed wooded environment. Furthermore, the fauna does not appear to reflect an anthropogenic habitat e.g., agricultural fields. This reconstruction points to a Mediterranean woodland and scrubland surrounding the periphery of the site. This contrasts recent palynological research which may be explained by the different spatial and temporal resolution presented by the two proxies. The difference underlines the importance of multi-proxy approaches in resolving the local paleoecology in historical periods.

Belmiro, Joana (ICArEHB), Joao Cascalheira (ICArEHB) and Celia Goncalves (ICArEHB)

[386] *A Geometric Morphometrics Approach to Test Microlith Variability at Cabeço da Amoreira Shellmidden (Muge, Portugal)*

Geometric microliths are one of the most important lithic technological adaptations of the Mesolithic in Westernmost Europe. At Muge shellmiddens, previous studies have revealed great variability in the morphology of these implements, especially the triangles, although the reason for such variability is still unclear. Three hypotheses have been suggested to explain this: 1) idiosyncratic cultural behaviour; 2) successive application of maintenance retouch (Frison effect); 3) or the application of each morphology for different functionalities. Drawing upon recent developments on Geometric Morphometrics analysis, this poster presents new data on the morphometric variability of geometric microliths from Cabeço da Amoreira, one of the largest shellmiddens at Muge. Our goal is to test one of the three mentioned hypotheses, specifically the one that argues that identified subtypes are a consequence of discard at different points along a continuum of remodification and reduction. With this study, we expect to contribute to a better understanding of Mesolithic lithic technology and offer new interpretations to the economic and technological strategies of the last hunter-gatherer communities in the Western Atlantic facade of Iberia.

Beltran, Boris [219] see Clarke, Mary

Beltrán, José (Centro INAH Nayarit)

[314] Puerto, materiales y productos de intercambio

Desde los primeros estudios arqueológicos desarrollados en el occidente mesoamericano han sido encontrados diversos rasgos culturales, vocablos y artefactos similares a materiales existentes en el norte sudamericano. Destacan entre ellos los materiales Capacha, los de tumbas de tiro y la metalurgia, aportando evidencias claras sobre los intercambios mercantiles y culturales que existieron en el Pacífico intertropical americano, desde el golfo de California hasta el norte de Perú. Hay dos lugares costeños que aportan evidencia de la presencia sudamericana en el Occidente de Mesoamérica, ellos son Playa del Tesoro y Punta Mita, ubicados en las bahías de Manzanillo y Banderas respectivamente. Ambos muestran claramente los puertos que fueron utilizados en estos intercambios, junto con los materiales arqueológicos de influencia sudamericana encontrados en las excavaciones. De igual manera, la investigación en estos sitios proporcionó información acerca de la explotación de los ecosistemas de costa y estuario, en especial sobre la captura de los géneros preciosos de concha, como *Spondylus*, *Strombus*, *Pinctada*, *Púrpura* y otros más, los cuales fueron la base de su riqueza y en gran parte de los intercambios mercantiles.

Bement, Leland (Oklahoma Archeological Survey, OU), Kristen Carlson (Augustana University) and Dakota Larrick (University of Oklahoma)**[322] Discard, Stockpile, or Commemorative Cairn: Interpreting the Bison Skull Pile at the Ravenscroft Late Paleoindian Bison Kill, Oklahoma Panhandle**

Bison crania without mandibles form a vertical cluster in the earliest of two arroyos at the ~10,400 year old Ravenscroft bison kill site in the Oklahoma panhandle. The skulls were stacked on the arroyo floor, eventually forcing subsequent kills to relocate to an adjacent arroyo. A combined total of five winter kill events have been documented in the two arroyos. Skulls representing four of five events, including at least one skull from a kill in the adjacent arroyo, populate the accumulation. Reasons for stacking the skulls are considered, including discard, deliberate stockpiling for future retrieval, persistent cairn building to commemorate multiple successful bison hunts, and "bison calling" to ensure future successes. Archaeological, ethnographical, and historical examples from around the world fuel the discussion.

Bemmam, Jan (University of Bonn)**[101] Cities in the Heartland of the Mongol Empire**

From 2016 to 2018 the two largest cities of the Mongol Empire, 13/14th century, in nowadays Mongolia were mapped using a SQUID-(Superconducting Quantum Interference Device)-magnetometer coupled with a DGPS. Thanks to this pioneering technique it was possible to create a high precision topographic and magnetic map in one go. For the first time it is possible not only to compare the maps of two cities – Karakorum the first capital of the Mongol Empire and Khar Khul Khan Balgas – but also to analyze the function of the city, its size, the density and size of buildings, the infrastructure (roads, fortification, gates, markets), the spatial organization of religious activities, the connection and dependence of the city from the moving court of the emperors, the social organization that means the question of different quarters, and not the least to deal with the question where the cemeteries are. Thanks to these new maps it is also possible to differentiate between four types of permanent settlements or settlements with permanent structures in contrast to campsites in Inner Asia.

Benavides, Oswaldo**[228] Discussant****Benden, Danielle (Driftless Pathways, LLC)****[89] A Career to Celebrate: The Achievements of S. Terry Childs and Her Impact on Archaeological Collections**

For many years, S. Terry Childs has led the charge on all things related to archaeological curation and collections management. With a keen focus, she has carried the torch on training and practice, shining a light on archaeological collections and the need for their long-term preservation. She has moved the needle on training for management and care of archaeological collections with her online course. She played an instrumental role in the passage and implementation of federal curation legislation, 36 CFR Part 79, the Curation of Federally-Owned and Administered Archaeological Collections and has worked tirelessly on the promulgation of the federal archaeological deaccessioning regulations. Furthermore, she regularly encourages colleagues to utilize collections for research, public education, and exhibition, and has long been an advocate for making collections accessible to various stakeholders, including descendant communities. She conducts her own collections-based research focused on metallographic and chemical analysis of iron and copper artifacts from Africa. Her life's work has done more for the care and management of archaeological collections than any other, and for that we honor her.

Bendrey, Robin (University of Edinburgh) and Guillaume Fournié (Royal Veterinary College)**[20] Cause and Effect: Human-Animal Relationships and Zoonotic Brucellosis in Long Term Perspective**

Zoonotic diseases remain a persistent global challenge, with some 60% of human pathogens of zoonotic origin. They disproportionately impact the world's most vulnerable populations, particularly those living in close proximity with their animals and who have less access to health information and care. Archaeology's cultural and biological datasets have the potential to provide long-term perspectives on change in the complex socio-ecological systems that define evolving disease ecologies. In this paper we consider zoonotic brucellosis in archaeological perspective, focussing on the relationships between humans and goats. Brucellosis likely emerged as a zoonosis with caprine

farming, yet evidence is elusive in the archaeological record. We explore the potential impact of goat domestication on brucellosis disease dynamics and human infection risk. Results are presented of a model developed to simulate the transmission of *Brucella melitensis* within early domestic goats in the Early Neolithic Zagros mountains. These show that the pathogen could have been sustained even at low levels of transmission within these populations and also inform on contributing cultural practices. We evaluate our results within the context of holistic 'One Health' views of the complexity of zoonoses and consider how archaeology can contribute long-term perspectives to the health impacts of current trajectories.

Bendtsen, Aká [31] see Turley, Cameron

Benedetti, Michael [403] see Zinsius, Brandon

Benedict, Cynthia (Cibola National Forest & Grasslands) and Jeremy Kulisheck (Cibola National Forest & Grasslands)

[25] *Tijeras Pueblo - Challenges and Opportunities of Managing a National Register Property within a US Forest Service Administrative Site*

The Sandia Ranger District administrative site has been in continuous use since the 1920s and is co-located with Tijeras Pueblo, a National Register historic property. The District office, only 20 minutes outside of Albuquerque, is one of the most heavily visited Ranger Stations in the Region. The history of development of the site and ease of access to Tijeras Pueblo present opportunities and pose challenges for the ongoing management of the administrative site and Tijeras Pueblo. Much of the Ranger Station's core infrastructure was put in place prior to current historic preservation regulations. As a result, ongoing maintenance of the Ranger Station is complicated by the presence of buried utility lines within the Pueblo's archaeological deposits. Ease of access and high visibility of the Pueblo contributed to its early recognition as a significant archaeological site resulting in a long record of research that continues to this day. This research history and associated public engagement has contributed to public and tribal partnerships ultimately yielding a strong interpretive program around the Pueblo. This paper will highlight these and other opportunities and challenges posed by the co-location of the administrative site and Tijeras Pueblo.

Benedict, Laura and Virginia Lucas (University of Nevada, Las Vegas)

[260] *Faunal Exploitation Practices of Prehistoric Peoples: A Comparative Study of Three Rockshelter Sites along the California Wash in Southern Nevada*

The archaeology of the California Wash in southern Nevada, north of Las Vegas, is not yet well understood, particularly when compared to contemporaneous occupations. Previous excavations at three sites located in the Dry Lake Range along the Wash resulted in the recovery of a number of artifacts, including lithics, ceramics, and faunal remains that enhance our understanding of Prehistoric and Protohistoric occupations of the California Wash. Excavations in the 1970s, in preparation for the construction of the Navajo-McCullough Transmission Line, yielded faunal remains from three rockshelter sites. Dates indicate a middle Pueblo II occupation at two sites, 26CK1081 and 26CK1112, as well as dates extending into the Paiute occupations. Early analyses indicate that these sites were likely used as processing areas for agave and yucca. In addition, 26CK1112, has a Late Archaic occupation. Analysis of extant collections, curated at the Las Vegas Natural History Museum's Southern Nevada Federal Repository, allows researchers to apply modern analytical methods to older data in order to gain a better understanding of past subsistence practices. This poster presents the results of our analysis, and discusses the implications for understanding Late Archaic and Puebloan occupations in southern Nevada.

Benfer, Adam [191] see Colon, Justin

Benfer, Adam (University of Calgary)

[378] *Modeling Mobility in Inland Waters*

While rivers, lakes, lagoons, and estuaries were commonly navigated in prehistory, the only well-established methods for modeling aquatic human movement are restricted to the open sea. A small handful of researchers have proposed methods and/or attempted to simulate travel in rivers and lakes, but these methods have not been consolidated into a user-friendly, GIS-based format. This avenue of research is difficult since variables such as vessel type, mode of propulsion, assumed navigational skill, type of inland water body, surface current patterns or flow rates, wind patterns, and seasonality, among other factors, all need to be appropriately addressed in these simulations. Adapting the methods used for simulating intentional and drift maritime voyages and learning from past attempts at simulating navigation in rivers and lakes, I propose procedures that can be applied in standard GIS software to model human movement in inland waters. I demonstrate these procedures using case studies from my research in Southern Central America.

Benfer, Bob (University of Missouri-Columbia)

[181] *Astronomical Meanings in Hearths from the Middle Preceramic Villages of Paloma and the Late Preceramic Site of Buena Vista in Central, Coastal Perú*

Hearths from over 50 domestic structures at the stratified Middle Archaic fishing villages of Paloma, Chilca Valley, Peru, were found within circles of house poles. Domestic structures were burned and abandoned, sometimes with

an old male burned on top. Burials in the last occupation were placed with males towards the entrance, females towards the rear, and children in a line towards the Milky Way extreme. The entrance was towards the December solstice sunset. Two valleys north, in the Chillón, the Late Preceramic monumental site of Buena Vista had two ventilated hearths, one in a Mito Temple. The Mito offering chamber was finally filled with debris of a feast. Another ventilated hearth was too badly looted to make the determination of final use. The Mito Temple was associated with the rise of the Andean Fox constellation on the December solstice and equinox and shortly after twilight, with the rise of the sun over a rock carved into a human head. An alignment to the equinox was to a stone pillar carved into the shape of a condor. The structures containing the other ventilated shaft were oriented to the major lunar standstill, as was the principal pyramid containing the Fox Temple.

Benitez, Robert

[247] *The Coevolution of Niche Construction and Niche Adaptation in the Hominin Lineage: Toward Understanding Culture*

One of the most significant, yet understudied, subjects in paleoanthropology is the emergence of culture and its resulting transition from biological evolution to human-specific biocultural evolution. Scholarship on this topic has historically been lacking partly due to an absence of a coherent framework that incorporates biological (i.e., fossil) and cultural (i.e., archaeological) datasets. The extended evolutionary synthesis (EES)--with its emphasis on niche construction, developmental plasticity, and reciprocal causation--provides paleoanthropologists an opportunity for integrating the fossil and archaeological record. Here, we use EES as a preliminary interpretive structure for examining the origins of culture and biocultural evolution. Our approach is based on the conceptualization of biocultural evolution as dynamic feedback loops of niche construction and niche adaptation. We apply this concept to the Plio-Pleistocene record and demonstrate how different hominin niche construction behaviors (e.g., perturbation, relocation) create varying patterns of inheritance (e.g., cultural, ecological) and potentials for novel cultural and biological adaptations. The coevolution of hominin niche construction and niche adaptation also appears to intensify in its potency over evolutionary time, which may explain the adaptive success of our species. We close with a discussion of implications for our proposed research agenda.

[247] Chair

Benjamin, Jonathan, Peter Moe Astrup (Moesgaard Museum, Denmark), Claus Skriver (Moesgaard Museum, Denmark), Chelsea Wiseman (Flinders University of South Australia) and Geoff Bailey (University of York, UK)

[240] *Investigations of a Submerged Prehistoric Midden on Hjarnø, Denmark: Climate, Sea Level and Culture*

Shell middens, or shell-matrix deposits, occur in large numbers across the coastlines of the world from the mid-Holocene onwards, often forming substantial mounds, but they become smaller, rarer or absent as one goes back into earlier periods, suggesting a world-wide process of economic intensification. Since sea levels were generally lower during these earlier periods, a critical question is whether shell middens could have existed on now-submerged palaeoshorelines, and if so, whether they could have survived the potentially destructive impact of sea-level rise. Here we present results of a systematic investigation of a rare example of a known underwater shell midden at the Mesolithic site of Hjarnø in Denmark. In doing so, we offer a proof of concept that shell middens can survive submergence and can be detected. Our results provide encouragement to the search for submerged shell middens in other parts of the world and at greater depth, and a suite of methods for their investigation.

Bennett, Abigail [288] see Dunn, Stacy

Bennett, Matthew [187] see Bustos, David

Benson, Wyatt [117] see Laurich, Megan

Bentley, Nicholas

[171] *Paleostorms and Precolonial Societies: Hurricane Deposits in Inundated Archaeological Sites in Northwest Florida*

How people respond to their environment is an ongoing theme in archaeological research. However, it is not well understood how people in the past responded to rapid high energy events such as hurricanes and if planning for these events did or did not occur. To understand how hurricanes affected people in the past, we need to first be able to see hurricanes in the archaeological record. Multiple inundated archaeological sites in Northwest Florida contain Holocene deposits composed of interspersed sand and peat layers not seen in any earlier deposits. This poster looks at these sand layers through proxy evidence: microfossil, isotopic, and grain size analysis to determine if these sediments are marine sediments and therefore likely from a hurricane. These potential hurricane deposits are examined at two sites (Page-Ladson and Sloth Hole) and compared to regional paleostorm records to discuss site formation processes and human responses during the Holocene.

Bentley, R. Alexander (University of Tennessee)

[27] *Kinship and Migration in Prehistoric MSEA: Insights from Isotopic Analysis over the Years*

Kinship is an important but often under-researched aspect of the rise of complex societies. Whereas early

agricultural communities in Neolithic Europe and East Asia were patrilineal and patrilocal, the nature and impact of prehistoric kinship systems in Mainland Southeast Asia (MSEA) is becoming better understood. This paper will review over a decade of previous work isotopic work on Neolithic skeletons from Thailand and Vietnam that suggests the origins of complex societies in parts of MSEA might lie in matrilineal kinship systems. Isotopic evidence has suggested matrilocality among Neolithic to Iron Age skeletons at some, but not all, sampled sites in northeast Thailand. There is an exciting future ahead for multi-method investigations into prehistoric kinship and social differentiation in MSEA.

[175] *Discussant*

Beramendi-Orosco, Laura [38] see Acosta-Ochoa, Guillermo

Berard, Benoit (Université des Antilles et de la Guyane-EA 929)

[378] *Putting a Man in the Machine: Experimental Archaeology and Computational Modeling*

In recent years, numerous studies have shown the importance of the links that existed between the various islands of the Caribbean archipelago in pre-Columbian times. The notion of connection has thus become the central paradigm of the approach of these island but not isolated societies. Thus, until now little addressed, the question of assessing the navigational capacities of these populations, which can be described as genuine maritime societies, has become central to their study and, in particular, to our understanding of their specific relationship to space. The first numerical simulation studies based on the study of drift phenomena did not or only slightly integrate the anthropogenic factor into their approach to the subject. The objective of this presentation will be to show how, both the evolution of our questions and the development of new types of simulations require us to take this factor into account more effectively. We will try in particular to show how the establishment of a dialogue between numerical modeling and experimental archaeology can only be extremely fruitful in this field.

Berdan, Frances (California State University San Bernardino)

[192] *Discussant*

Berdan, Frances [223] see Robertshaw, Peter

Berger, Elizabeth (Lieberthal-Rogel Center for Chinese Studies, University of Michigan) and Hong Zhu (Jilin University)

[183] *Farmers and Late Holocene Climate Change on the Edge of the Qinghai Plateau*

In the late Holocene, a cooling and drying climate, greater intergroup contact, and increasing sociopolitical complexity prevailed across Eurasia. On the eastern edge of the Qinghai Plateau, at the edge of the East Asian summer monsoon zone, millet farming societies faced local, cyclical changes to moisture and vegetation between 3000 and 2000 BCE. This study examines human skeletal remains from three sites in the warm steppe zone around 2200 masl, to study the impact of the climate and social changes on human health and diet from the late Neolithic (2600-2000 BCE) to the middle Bronze Age (1500-1000 BCE). Changes in oral health are consistent with an increasingly diverse agropastoral subsistence system; osteoarthritis, frailty, and childhood growth disruptions remained constant; and non-specific markers of infection and childhood anemias declined. Biodistance analysis suggests that there was some population movement into the area from further north, though the populations in this study were still closely related. The flexibility of agropastoral food production, the introduction of new plant and animal species, and economic specialization at different altitudes could account for the apparent success of the people of the eastern Qinghai Plateau in adapting to late Holocene climate change.

Bergin, Sean [47] see Snitker, Grant

Bergmann, Christine (University of South Florida)

[182] *Subsistence and Exchange in the Chincha Valley (Peru) Using Portable X-Ray Fluorescence Spectrometry*

The Chincha Valley was one of the most productive regions on the southern coast of Peru, yet little is known about the subsistence practices of the pre-Inca communities that existed in the inland valley of Chincha during the Late Intermediate Period (AD 1000-1476). The Chinchas formed a powerful socio-economic entity within the Chincha Kingdom in part of the southern region of Peru nearest to the Pacific Ocean. This research tests the hypothesis that individuals relied more heavily on a food-based exchange networking system with coastal rather than highland populations, using a portable X-ray fluorescence spectrometer to measure strontium, barium, calcium, and other elements in twenty-six human bones from four tombs in the Chincha Valley as a case study. Although the use of a non-destructive pXRF has become a very beneficial tool for the analysis of archaeological materials, relatively little has been done on human bone to elucidate subsistence practices, mainly due to limitations of surface analysis on potentially degraded and/or contaminated material. In addition, newly created bone standards are used to calibrate and enhance the validity and reliability of our data.

Berikashvili, David (International Archaeological Center of the University of Georgia)**[359] Samshvilde and the Medieval Kingdoms of Kartli**

Samshvilde, a settlement in southern Georgia, is a complex and multi-period archaeological site. The city occupies a strategic and impregnable location on a basalt cape flanked by the gorges of the Khrami and Chivchava rivers. This distinctive landscape position, combined with environmental conditions that include a mild climate and an abundance of natural resources, have attracted human occupation for millennia. Samshvilde and its surroundings may have been inhabited since the Neolithic era, but the urban complex dates mainly to the medieval period, under Armenian and then Georgian control, when it became the region's main fortress and political-economic centre. Proximity to the northern branch of the Silk Road further increased the site's importance. Samshvilde was therefore a place where various ethnic groups and cultures converged. Despite the site's importance and longevity, until recently there has been little concerted archaeological study of Samshvilde. In 2012 the Samshvilde Archaeological Expedition was initiated by the University of Georgia and has taken a multi-disciplinary approach to the site. Future expansion of the project is envisaged through cooperation between the University of Georgia and research institutions and individual specialists who will bring new perspectives to the study of the medieval occupation in the Armenian-Georgian border region.

[359] Chair

Berman, Mary Jane [37] see Beamer, Dawn

Berman, Mary Jane (Department of Anthropology, Miami University)**[37] Variability in Molluscan Assemblages: Indicators of Changing Cultural and Environmental Factors in Lucayan Life**

We compared molluscan faunal assemblages from two neighboring Lucayan sites, the Pigeon Creek dune 1 (Late Lucayan) and the Pigeon Creek dune 2 (Early Lucayan) sites located on San Salvador, Bahamas. Two species, *Lombatus gigas* (Queen Conch) and *Codakia orbicularis* (Tiger Lucine), demonstrated the most significant temporal change in frequency and weight. At the Early Lucayan period settlement, we see significantly more conch and very little codakia. During the later period, the amount of conch decreased and codakia dominates the assemblage. There are greater numbers of nerites in the earlier period, while the tulip shell, *Fasciolaria tulipa* only appears in the later occupation. Why the changes? We offer a number of cultural and environmental explanations such as over predation, climate change, and other factors influencing collection and consumption. We compare our observations with other findings from the insular Caribbean.

[159] Discussant**[37] Chair**

Bermann, Marc [409] see Canaday, Timothy

Bernard, Henri Noel**[230] Discussant****Bernardini, Wesley (University of Redlands)****[188] Tools for Quantitative Archaeology: Spreading Numeracy to a Generation of Southwestern Archaeologists**

More than any other scholar in the American Southwest, Keith Kintigh is responsible for spreading numeracy – the ability to understand and work with numbers – to the current generation of Southwestern archaeologists. His Tools for Quantitative Archaeology (TFQA) software package provides access to statistical methods developed specifically for archaeology that are not available in most commercial statistical software packages, including tools for spatial analysis, diversity and distance measurements, and chronology. But these are not merely tools, they represent a philosophical approach to data that emphasizes the quantification of uncertainty; Keith's programs don't just produce an "answer," they help researchers to understand the strength of patterning in their data. A review of work by scholars who have published analyses using TFQA demonstrates the profound impact that Kintigh's quantitative approach has had on the discipline.

Bernardini, Wesley [258] see Solometo, Julie

Bernbeck, Reinhard (Freie Universitaet Berlin)**[200] Discussant****Bernstein, Bruce (Tribal Historic Preservation Officer, Pueblo of Pojoaque)****[311] Background and Motivations: The Anthropology of K'uuyemugeh**

The K'uuyemugeh Project is designed to develop new methodologies, providing opportunities for Pojoaque community members to oversee, participate and interpret ancestral sites and their continuing relevance in telling ancestral and more recent histories. As a cultural anthropologist the work is also designed to bring the complexities of living cultures and communities to the work of archaeologists.

As anthropologists are we willing to have new insights that might change the way we see and understand New Mexico? The investigations privilege Pojoaque and Tewa narratives about the northern Rio Grande region, outlining methodologies to incorporate insights that have the ability to change the way non-natives have interrupted the region. The project's goal is to return a Tewa presence to the site and region, telling a fuller story of Pojoaque settlement, culture, and history. The Pueblo's partnership ensures that Pueblo history and voice frames all investigations, developing collaborative-partnership methodologies and instituting and safeguarding Tewa agency throughout the investigation.

Bernstein, Bruce [311] see Lopez, Fermin

Bernstetter, Jessica (University of Missouri), Kate Trusler (University of Missouri) and Amie Green (University of Missouri)

[387] *Urban Planning and Access to Water in Pompeii*

The process of urbanization and urban planning plays an important role in understanding how people utilize their space to access resources. Pompeii's water system includes a combination of household water collection features, primarily cisterns. However, an aqueduct system was installed in the first century AD providing new access to water leading to a variety of water utilization strategies, including piped water for public and private use, long-term water storage, and even elaborate water displays amongst the wealthier citizens. Several houses were analyzed using GIS Distance Analysis to determine cost-effective pathways for lead pipes connecting the aqueduct and water tower systems to individual houses. In addition, this study also looked at how water was collected and accessed within properties by analyzing the spatial relationship between household water features and important domestic spaces.

Berquist, Stephen (University of Toronto) and Alexei Vranich (University of California, Berkeley)

[233] *The Terraced City*

Standing architecture is an important and impressive part of Inca Cusco, but comprises only a portion of the pre-Columbian built environment. Developing a sense of the grand plan of Cusco involves forgetting our fascination with the standing architecture and concentrating on recreating the three-dimensional form of the terraces that formed the surface of the city. The common representation of Cusco as a flat gridded city not only misrepresents the actual form of the capital, but also obscures its unique qualities. Harvesting the necessary data to form a three-dimensional model that accurately represents the topography and the genius of Inca planning and construction requires the use of aerial photography, historic maps and photographs, present (modern and colonial) building form and elevations, ground inspection of visible remains, and an understanding of basic construction methods of Inca terracing. In this format a series of large-scale basic urban design canons become evident and provided insight into the manner that the city was conceptualized and designed. Specifically, this research supports and expands on the historic claims that the capital was remade early in the imperial career of the Incas, and in that process certain elements of its pre-imperial form were preserved and transformed.

Berquist, Stephen [233] see Floerke, Kevin

Berrier, Margaret (Jornada Research Institute)

[369] *Ceremonial Depictions of Bighorn Sheep Anthropomorphs in the Jornada Mogollon Region*

The Jornada Mogollon region is known for its rich body of rock art. Researchers have suggested that elements such as cloud terraces, masks, goggle-eyed figures, and horned serpents are associated with ceremony. Although hundreds of bighorn sheep images exist in the regional rock art these figures are not usually mentioned except in a general inventory of frequently found motifs. Nonetheless, there are some unusual anthropomorphs with bighorn sheep headdresses that suggest a possible ceremonial use. These images appear mostly in the eastern Jornada Mogollon as delineated by Lehmer in 1948. Other highly stylized bighorn sheep images as well as artifacts and a few examples of bighorn sheep on Mimbres pottery contribute to the evidence that bighorn sheep also had ceremonial use.

Berrocal Gonzales, Alcides [46] see Kellett, Lucas

Berry, Nora [211] see Conlee, Christina

Berryman, Judy [413] see Berryman, Stanley

Berryman, Stanley (New Mexico State University), Judy Berryman (New Mexico State University) and William Walker (New Mexico State University)

[413] *The Landscapes of the Cottonwood Springs Pueblo, Southern New Mexico*

LA 175 (Cottonwood Spring Pueblo, A.D. 1000-1450) is one of the largest multi-component settlements associated with Cottonwood Draw on the west side of the San Andres Mountains in southern New Mexico. It has been the site of multiple field excavations by New Mexico State University anthropology students. The pueblo complex consists of multiple pueblos, artifact concentrations, and agricultural features that straddles a prehistoric cultural boundary between the Mimbres Branch of the Mogollon Culture on the west and the Jornada Mogollon Branch to the east and south. The Cottonwood complex provides an opportunity to look at how and why a series of population aggregations and abandonments occurred. The site and surrounding areas are made up of basin and range transitions to more rugged mountainous terrain. With this terrain are both physical and ideational landscapes, including extensive rock art images. Given the complexity of the archaeological record and the extensive use of the entire Jornada Basin, the question addressed in this paper is why and how does LA 175 fit into the larger physical and ideational landscapes of the western San Andres mountains.

Bertacchi, Alex (Department of Anthropology, Yale University), Jessica Thompson (Department of Anthropology, Yale University), Stanley Ambrose (Department of Anthropology, University of Illinois), Andrew Zipkin (School of Human Evolution and Social Change, Arizona) and Elizabeth Gomani-Chindebvu (Malawi Ministry of Civic Education, Culture, and C)

[32] *Late Pleistocene Archaeofauna from the Kasitu Valley of Northern Malawi: Palaeoenvironments and Evolution of Faunal Communities in the Zambezian Ecozone*

The Zambezian Ecozone of east-central Africa comprises faunal communities that include elements from both southern and eastern Africa. The region has long served as an important crossroads for faunal exchange, but its timing and implications for hunter-gatherer behavior are unknown. Late Pleistocene faunal assemblages from east-central Africa are rare, and none have been reported from Malawi, which occupies a key position between north and south. Here, we report the oldest archaeofaunal assemblages from Malawi, recovered by the Malawi Ancient Lifeways and Peoples Project in 2016 – 2018. These assemblages from the rock shelter sites of Hora 1 and Mazinga 1 span the Late Pleistocene (>30 ka) and Early Holocene (~8 ka), providing a rare opportunity to examine the evolution of faunal communities across the transition from the last glacial. We discuss the taxonomic composition of the Pleistocene assemblages relative to modern and Early Holocene occurrences. Zooarchaeological findings are complemented by light isotope analyses of land snail shell, ostrich eggshell, and mammal teeth for paleoenvironmental reconstruction, and strontium isotope ratios for spatial provenience. This work represents the first step towards a better understanding of the region's biogeography, which provides an essential framework for investigating the behavioral adaptations of Stone Age foragers.

Berthold, Christoph [417] see Mentzer, Susan

Bertola, Stefano [195] see Negrino, Fabio

Bérubé, Éloi [197] see Morell-Hart, Shanti

Bérubé, Éloi (McMaster University) and Jamie Forde (University of Pennsylvania Museum of Archaeology)

[197] *The Oaxacan Cuisine at Achiutla during the Early Colonial Period: A Story of Resilience*

Using paleoethnobotany, this paper examines the Mixtecs' reaction to the arrival of Spanish at Achiutla, located in the Mixteca Alta. Faced with many challenges during the Early Colonial Period (1521–1600 AD), we examine how Mixtecs' inhabitants of Achiutla negotiated the arrival of new, introduced foods in the region. To do so, we compare the plant consumption at two residential terraces occupied during the Postclassic (900–1521 AD) and Early Colonial periods. The plants were identified following an analysis of macrobotanical samples (carbonized seeds) collected from soil samples and microbotanical samples (phytoliths and starch grains) obtained from unwashed artifacts. Although Spanish colonialism fostered considerable upheaval in many aspects of daily practice, our data indicate few if any changes in indigenous foodways at Achiutla immediately following the conquest. This pattern is particularly striking given that evidence shows that Mixtec families here adopted many other items of foreign material culture, suggesting that practices related to food consumption might have been some of the most enduring or resilient aspects of domestic life, perhaps reinforcing ideas of cultural identity.

Besser, Alexi (Department of Biology, University of New Mexico), Emma Elliott Smith (Department of Biology, University of New Mexico), Jonathan Dombrosky (Department of Anthropology, University of New Mexico), Thomas Turner (Department of Biology, University of New Mexico) and Seth Newsome (Department of Biology, University of New Mexico)

[174] *A Southwestern Producer Essential Amino Acid d13C Library: Potential Archaeological Applications*

Well-defined patterns in essential amino acid (AAESS) d₁₃C values of autotrophs (plants and protists) and heterotrophs (bacteria and fungi) that can synthesize AAES de novo provide enhanced discriminatory power to trace energy flow through freshwater and adjacent terrestrial foodwebs. This method may be useful for studying the impacts of (pre)historic human activities on aridland rivers like the Middle Rio Grande (MRG) in New Mexico, USA. However, no study has generated a library of producer AAES d₁₃C patterns in either freshwater or terrestrial ecosystems at the landscape scale. We generated AAES d₁₃C patterns for 15 producer taxa, including instream

algae and riparian trees from the MRG and C3 forbs/shrubs, C4 grasses, and CAM plants from the northern Chihuahuan Desert, New Mexico (n = 120). This AAESS d13C library will be invaluable for characterizing the nature and timing of key ecological shifts throughout the millennial-scale history of human occupation along the MRG. Pilot AAESS d13C data show that a diverse fish assemblage recovered from prehispanic Ancestral Pueblo sites in the MRG derived a substantial portion of their AAESS from C4 plants, which suggests that terrestrial energy inputs into riverine food webs was higher in the prehistoric MRG relative to today.

Best, Julia [20] see Larson, Greger

Betarello, Juliana [268] see Bueno, Lucas

Bethard, Jonathan [386] see Zejdlik, Katie

Bethke, Brandi (University of Oklahoma)

[80] *Zooarchaeological Investigations at the Boarding School Site (24GL0302), Glacier County, MT*

This paper presents an analysis of the faunal assemblage recovered from excavations at the Cut Bank Creek Boarding School Site (24GL0302), located on the Blackfeet Indian Reservation in Glacier County, MT. Excavations at the site took place following the inadvertent discovery of a large bone bed initially unearth by the construction of the foundation for a new school being built by the Tribe on the site. The assemblage represents contexts associated with both the adjacent Late Precontact period bison kill site first excavated by Thomas Kehoe in the 1950s and the historic occupation of the site during its use as a boarding school for Blackfeet children during the first half of the 20th century. Through these remains, this paper provides new insight into both the Precontact and historical role this continually used landscape played in the lives of the Blackfeet people.

[80] Chair

Betzenhauser, Alleen (Illinois State Archaeological Survey), Thomas Emerson (Illinois State Archaeological Survey), Brad H. Koldehoff (Illinois Department of Transportation) and Tamira K. Brennan (Center for Archaeological Investigations - SIUC)

[357] *Discovering Buried Pasts: Illinois Transportation Archaeology and the Rediscovery of America's First Native City*

Archaeology and transportation share a 60-year partnership in Illinois during which large-scale approaches to data recovery have become standard practices. These practices were recently employed to expose 28.5 acres of a precolumbian mound complex that is an integral part of Greater Cahokia. Investigations at East St Louis were undertaken as part of the construction of the Stan Musial Veterans Memorial Bridge linking the cities of St. Louis and East St. Louis. Excavations exposed 4% of the mound center revealing 1,501 domestic and elite buildings, the base of an unrecorded mound, plazas, monumental posts, and several thousand pit features as well as a late Victorian neighborhood buried under 1 to 3 meters of modern industrial rubble. This research demonstrated the urban composition of Greater Cahokia and won recognition from both the Federal Highway Administration and the Chinese Academy of Sciences noting it was one of the top 10 international discoveries of 2015.

Bevan, Andrew [299] see Li, Xiuzhen

Bews, Elizabeth

[42] *Cooperation, Co-funding, and Confusion: EU Funding for Bulgarian Archaeology*

In the post-Brexit era, the impact of EU policies and funding on archaeological and cultural heritage projects has come under renewed scrutiny by those in both the public and private sectors. Academic and commercial institutions alike are now questioning the influence that membership in the EU, and its corresponding funding, has on the ways in which archaeology and heritage are practiced in member states. Using ethnographic data gathered in Bulgaria and at the EU headquarters in Brussels, this paper examines the relationship between EU funding and Bulgarian archaeological practice. Bulgaria is a suitable case study for assessing EU heritage practices because it recently marked ten years of membership in the Union, and therefore sufficient time has passed for funding to impact practice. Specifically, this paper focuses on Bulgarian archaeologists' participation, or lack thereof, in EU-funded archaeological and heritage programs. I demonstrate that while there is a mutual entanglement between the EU and Bulgarian heritage practitioners, there is also considerable friction in how they interact with each other.

Bey III, George J. [219] see Parker, Evan

Bey III, George [372] see Brownstein, Nathan

Bey III, George [387] see Shrader, Mason

Beyin, Amanuel (University of Louisville)**[32] Revealing Hominin Occupation of the Western Margin of the Red Sea Basin: Recent Progress**

The western periphery of the Red Sea (WPRS) occupies a pivotal location as a potential biogeographic corridor for hominin movement between Africa and Southwest Asia. Its long, coastal niche that once extended into the Danakil Depression would have made the WPRS a natural destination for hominins dispersing from the interior East African landscapes. From there, some populations would have launched a northward coast-wise dispersal up to the Levant. Unfortunately, the immediate peripheries of the basin, especially the African side had seen little prior Paleolithic research, hindering well informed assessment of its contribution to hominin survival and dispersal. This paper will discuss recent progress made in revealing the Paleolithic potential of the WPRS by presenting results of field investigations recently carried out on the Red Sea coast of Eritrea and the Sudan. These recent projects have recorded sites spanning the Acheulean up to the Later Stone Age cultural phases. Paleolithic data from the Eritrean and Sudanese coastal regions has direct relevance for clarifying the potential role of the WPRS as a viable ecological niche and dispersal corridor for Pleistocene hominins.

[32] Chair**Bhattacharyya, Tiyas (University of Oregon), Alison K. Carter (University of Oregon), Miriam Stark (University of Hawaii) and Sophorn Kim (Ministry of Culture and Fine Arts, Battambang)****[300] Angkor from the Outside In: Household Archaeology in Battambang, Cambodia**

The exploration of residential spaces through the study of household archaeology helps create a better understanding of society from multiple perspectives. Previous work on Angkorian households has focused on sites that were within the capital. There has been a record of archaeological occupation within Battambang Province from the early Holocene. Battambang is also currently a major rice producing area within Cambodia, making its agricultural contributions a point of interest when studying this region's past relationship with the Angkorian heartland. Our fieldwork was centered around the 11th century temple of Prasat Basaet and focused on understanding the nature and timing of occupation in this area. Household archaeology within Battambang provides an opportunity to study how distance from the Angkorian capital may have affected how people lived. This paper presents the preliminary results from the excavation, provide a comparison to earlier work, and explore prospective research opportunities.

Bianchezzi, Clarice [2] see Almeida, Marcia Bezerra

Bianchi, Leonard [357] see Speal, C. Scott

Bible, Zachary [126] see Mengyán, Ákos

Bicho, Nuno [82] see Gomes, Ana

Bicho, Nuno (Universidade do Algarve)**[144] Chair**

Bicho, Nuno [338] see Raja, Mussa

Biddle, David [258] see Solometo, Julie

Biddle, George (James Madison University), Umazi Munga (George Washington University), David Braun (George Washington University) and Olivia Weibe (Highline Community College)**[390] Social Mechanism of Information Transfer in the Paleolithic: The Influence of Raw Material Quality**

Humans are distinct in their ability to transfer information between individuals with remarkable fidelity. Although this feature defines our lineage, the antiquity of this distinction is not well known. This is due to difficulties in deciphering levels of information transfer in Paleolithic assemblages. Recently, several new techniques were developed to investigate this phenomenon in stone artifact assemblages. These methods take account of the nuanced details of how artifact manufacture is learned. One such method is the "Behavioral Approach to Cultural Transmission". This method has been widely applied because of its ability to measure aspects of information transfer in a variety of contexts. Despite its widespread use, we know very little about how features of raw material may influence the variables used in this method. Here we investigate patterns of information transfer in controlled knapping experiments. We conduct mechanical tests of raw materials to understand how and why different raw material properties influence the variables used to determine information transfer. In particular, aspects of the platform maintenance domain are sensitive to differences in raw material hardness and elasticity. A detailed understanding of

the impact of raw material properties will allow a broader application of this approach to various assemblages.

Biddle, Keith [121] see Radford, Britney

Biernat, Maryse [390] see Porter, Joshua

Bies, Michael (OW Heritage Research L. C.)

[369] A Keelboat Petroglyph in the Northern Bighorn Basin of Wyoming

Wyoming's Big Horn Basin is one of the areas where Dr. Larry Loendorf has worked for years. This paper talks about a new rock art site in north-central portion of the Big Horn Basin. In 2015 two ranch women Lynette Kelley Cook and Phyllis Preator contacted the author about rock art in the northern Bighorn Basin, particularly any boat petroglyphs. They took the author to the recently discovered site in early 2016. This is the only known petroglyph that depicts a Rocky Mountain Fur Trade keelboat. The author first published this discovery in the 2018 issue of the Rocky Mountain Fur Trade Journal. This paper discusses the discovery of the site, background of other boat drawings in the Upper Missouri River area, the early use of keelboats, and the rock art at the site.

Bigelow, Nancy [269] see Funk, Caroline

Biggie, Michael [113] see Shaw-Müller, Kyle

Biggs, Jack [134] see Hair, Amy

Biittner, Katie (MacEwan University)

[215] Comics, Colonialism, & Pseudoarchaeology: The Case of "La Crane de Mkwawa"

Archaeologists are frequently represented in comic books as caricatures, where adventure and profit are exaggerated and the interpretation of finds is oversimplified. In this paper it is argued that these misrepresentations of how and why we do archaeology directly reinforce pseudoscientific explanations of the past, as well as contribute to the ongoing colonialism of indigenous peoples by exoticizing their identities and denying their voices. The narratives and places focused on in these pseudoarchaeological comics also emphasize the colonial heritage and contemporary practices of our discipline. This argument is primarily examined in relation to the author's own work on the historical, colonial narratives of Hehe Chief Mkwawa from the Iringa Region, Tanzania - a narrative that has local and national significance which has also been retold in comic book form. Additional comic texts are presented as examples of how this medium of science communication can be effectively and ethically utilized.

[376] Discussant

Billeck, William [9] see McCabe, Kendra

Billeck, William and Meredith Luze

[53] A Mid-16th to Mid-20th Century Glass Bead Sequence for South America

Glass trade beads recovered during excavations by Smithsonian archaeologists Betty Meggers and Clifford Evans in Brazil, Guyana, and Ecuador can be readily placed in time using bead chronology studies developed in North America. The bead assemblages from their South America excavations date to multiple time periods, including the mid-16th, early-17th, mid-18th, mid-19th, and the mid-20th centuries. Nearly every one of the South American bead varieties are present in North America with the exception of 16th century transparent green donut-shaped beads that appear to have been made by piercing a globule of hot glass. Meggers' and Evans' excavations are used to establish a glass bead sequence for South America.

Billman, Brian (UNC & MOCHE, Inc), Patrick Mullins (University of Pittsburgh and MOCHE, Inc.) and Nicole Payntar (University of Texas Austin)

[54] Big Data, Big Challenges: The Preliminary Results of the Moche Valley Ancient Settlement Survey (MVASS) on the North Coast of Peru

We present the preliminary results of the Moche Valley Ancient Settlement Survey. MVASS involves systematic recording of all known prehistoric sites in the Moche Valley (2,708 km²) and creation of an open-access GIS environmental and archaeological database. The project involves archival research, drone mapping of key sites, and additional pedestrian survey. To date, we have created a GIS database with information on more than 1,200 sites. The data set includes sites recorded during the Harvard Chan Chan-Moche Valley Project as well as subsequent surveys of the middle and upper Moche Valley. In addition, we completed three seasons of drone-mapping and extended pedestrian survey into the highlands. Our goal is to understand the social history of the Moche Valley across the long span of the prehistoric era.

Billman, Brian [120] see Feltz, William

Billman, Brian [271] see Payntar, Nicole

Billo, Evelyn [190] see Hays-Gilpin, Kelley

Billo, Evelyn, Robert Mark (Rupestrian CyberServices) and Kelley Hays-Gilpin (Northern Arizona University)

[369] *With Beauty Around: The Canyon del Muerto Rock Art Documentation Project*

A Navajo prayer ends: "with beauty all around, may I walk." Canyon de Chelly National Monument in the heart of Navajo country presented Larry Loendorf, then Professor at New Mexico State University, and his rock art recording crew with beauty in the alcoves, on the cliffs, and with every landscape view. Canyons de Chelly, del Muerto, Twin Trails, Black Rock, and Many Cherries revealed ancestral Puebloan images, traditional Navajo depictions, and historic scenes/inscriptions that provided an ideal setting for the team to make new discoveries and overcome challenges. We review highlights from 1999-2002, such as panoramic and enhanced photography, hidden rock art gems, flash floods, and radiocarbon dates of storage cyst mortar over various pictograph designs including the earliest ancestral Hopi butterfly hairwhorls.

Bills, Madalyn [220] see Cutrone, Daniel

Bingham, Brittany [9] see DeSilva, Upuli

Bingham, Brittany (University of Oklahoma, Department of Anthropology, LMAMR), Loukas Barton (University of Pittsburgh) and Brian M. Kemp (University of Oklahoma)

[416] *Genetic Species Identification of Large Birds from the Dadiwan Neolithic Site in Northern China*

We present information and insight drawn from the Neolithic of northern China (ca. 8,000 – 5,000 BP) about the manner by which large, meaty birds (including potential precursors of the domestic chicken) were drawn into the human biome. Long before they were essential staples, they (along with a range of different, but similar birds) were an occasional, and strategic feature of low-level agricultural life, itself marked by cyclical variations in the relative importance of domestic taxa. Here we analyze ancient DNA to identify the species of eight bird samples from the Neolithic components of the Dadiwan site. DNA was well preserved in each, with six of the samples yielding mitochondrial DNA sequences indicating they were of the common pheasant (*Phasianus colchicus*). Further genetic differentiation of four of these specimens indicates them to be one of three subspecies: *Phasianus colchicus pallasi*, *Phasianus colchicus strauchi*, or *Phasianus colchicus alaschanicus*. Importantly, no chickens were identified.

Binning, Jeanne (California Department of Transportation)

[67] *Identifying Pressure Flakes Generated during the Reduction of Small Bifaces: The Results of a Blind Test*

Frequently, in the reported results of the analysis of flaked-stone artifact assemblages, pressure flakes, ostensibly from small bifaces (arrow points, dart points, and knives), are distinguished. This category of debitage is difficult to identify unless the knapper who created the pressure flakes used the Ishi pressure method (this approach creates a distinctive morphology) or the analyst identifying the pressure flakes used fractography to make the determination. Specific morphological attributes that have been used to distinguish pressure flakes from other debitage categories are also found on small, percussion-created flakes. To better understand what attributes would permit the recognition of pressure flakes, a blind test was conducted. Three lithic analysts were each provided with 20 flakes to evaluate (n=60). Some of the flakes provided were created via percussion reduction and some were created via pressure flaking with an antler-tipped pressure tool. Each analyst was asked to determine which of the 20 flakes resulted from pressure removal and which did not. The implications of the results of this experiment are discussed.

[67] *Chair*

Birch, Jennifer [23] see Brannan, Stefan

Birch, Jennifer (University of Georgia)

[73] *Major Implications of the Dating Iroquoia Project: Rethinking Coalescence, Conflict, and Early European Influences in the Lower Great Lakes Region*

This paper details the preliminary results of the Dating Iroquoia project and reviews some of the most significant implications of our revised radiocarbon chronology as they relate to current understandings of Iroquoian cultural development. First, a brief review of traditional approaches to chronology-building in Northern Iroquoia and associated temporal schema are outlined. Next, the results of our dating program are presented and timeframes for key sites and site sequences summarized in the context of how our new chronology serves to reframe existing understandings of Iroquoian archaeological history. The major component of these findings includes a shift in the

timing of coalescence and conflict from the mid-fifteenth century to the early-to-mid sixteenth century. These results have significant implications for understanding the directionality of conflict, understandings of "traditional" enmity between the Huron-Wendat and Haudenosaunee, factors contributing to confederacy formation. Major insights also stem from identifying how community-level events diverge from regional culture-historical schema, including the timing and processes through which European goods appear in certain site sequences. The conclusions outline directions forward for the project and future research plans.

Bird, Ashlee (University of California, Davis)

[14] Synthetic Spaces and Indigenous Identity: Decolonizing Video Games and Reclaiming Representation

In her essay "Tradition and Performance", Stephanie Nohelani Teves details the importance of living Hawaiian tradition and identity, embodied by Kanaka Maoli performers. These performers preserve, shape, and embody indigenous tradition and knowledge, as well as personify what it means to be indigenous in Hawaii in that particular cultural moment. The topic of the survivance of tradition and indigeneity through the vessel of a synthetic indigenous identity is the topic that will be explored in this paper. Branching from the discussion of Tanya Tagaq's creation of a synthetic indigenous self through her music, this presentation will discuss the creation of alternate forms of indigenous synthetic selves through native produced and developed video games such as Never Alone (Kisima Ingitchuna), as well as the work I have done with ROM Hacking Super Mario Bros. and my own game design, and their importance to the furthering and shaping of synthetic tradition. This presentation will demonstrate that indigenous identity cannot only be created through games, but entire worlds and teachings surrounding community, collective knowledge and oral tradition, and indigenous ways of knowing can be created within this digital medium, and thus embodied by the player.

Bird, Broxton [348] see Wilson, Jeremy

Bird, Darcy (Utah State University) and Jacob Freeman (Utah State University)

[248] Managing the Current Mass Extinction for Human Populations

Recent analyses of large sample of radiocarbon ages illustrate the potential of these records to investigate general problems in human ecology. While much of the current literature focuses on the relationship between local ecology shifts and population booms or busts, no one has yet to address the general ecological problem of stability. Stability measures the severity of booms and busts in a population/system over time. We propose plant and animal species richness affects the stability of human population systems. Human population stability is necessary for sustained economic and socio-political growth. We propose a model that describes the effects of species richness on the long-term stability of human societies, controlling for other ecologically relevant variables. We will evaluate this model on a regional US and Canada scale and on a global scale. In this way, we can then analyze human population stability in North America within the context of global population stability.

Birge, Adam (University of Texas at San Antonio)

[345] The Materiality of Movement and Rhythm in Sajama, Bolivia

Movement and the rhythm of life, from procuring food to trade and ritual, are major structuring forces of human lives. However, examining these practices archaeologically can prove difficult due to the minimal and/or short lived evidence of routes. The Sajama landscape of the Carangas provides an example of these difficulties, but also how it may inform topics of identity, memory, space, and power. In the past, movement through llama caravans and ritual processions patterned the landscape through pukaras, villages, rest areas, and other features. This movement in Sajama is examined through settlement patterns, construction of outlying features, place memory, the continued use of routes, and the importation of goods. In movement, the Carangas negotiated colonial encounters with the Inka and Spanish empires through the reuse of place and the creation of new spaces that impacted Inka and Spanish colonial projects in the region. Today movement still impacts practice through identity and tourism.

Birkett, Courtney (Fort Eustis Cultural Resources Program)

[169] From the Unknown to the Known: Reexamination of a Small Prehistoric Site in Southeastern Virginia

Fort Eustis, a small military installation in southeastern Virginia, has over one hundred sites containing prehistoric components, most of which yielded no diagnostic artifacts when identified at the survey level. These sites were subsequently labeled as camps of indeterminate time period and assumed to have little research potential. Reinvestigation of one of these supposedly insignificant sites yielded a large quantity of debitage, along with ceramic sherds, concentrated within a very small area. This unexpectedly productive site lets us refine our understanding of what activities were undertaken in small temporary camps and of how the landscape was used during the Woodland period. The results of this excavation also demonstrate that the information potential of a site may not be exhausted by a few shovel test pits.

Birkmann, Joseph (University of New Mexico), Christopher Merriman (University of New Mexico) and Nicholas Hlatky (International Archaeological Research Institute)

[124] Late Archaic (San Pedro Phase) Occupation in Niagara Canyon, Chiricahua National Monument: Results of the 2017 UNM/NPS Excavations

In the summer of 2017 a joint crew of UNM/NPS researchers undertook test excavations at two Late Archaic loci within Niagara Canyon, a small watershed in the northwestern corner of Chiricahua National Monument. Located 0.6

kilometers from one another, both sites (CHIR00032 and CHIR00040) have yielded an impressive array of San Pedro phase lithic artifacts. The San Pedro phase dated between 3200 and 2500 b.p. is associated with some of the earliest farming communities in Southern Arizona and has been the subject of several major CRM investigations within the greater Tucson area. While our sample of San Pedro village localities has grown substantially over the past two decades, our sample of smaller foraging and hunting camps utilized during this period remains small. Sitting along the margins of the Chiricahua uplands and lacking any evidence for maize agriculture, both CHIR00032 and CHIR00040 represent likely foraging/hunting camps, providing valuable new data on upland land-use and farmer - forager lifeways during this period. This poster provides a brief introduction to the site as well as a summary of the results of the 2017 investigations.

Bischoff, Robert (Arizona State University)

[313] *San Juan Red Ware Distribution Patterns and Social Networks in Southeastern Utah*

San Juan Red Ware was produced primarily in southeastern Utah beginning around AD 750, and these vessels were traded throughout the Four Corners region of the U.S. Southwest. Its distribution in southeastern Utah demonstrates intriguing patterns of consumption, as some areas within the production zone of this ware either did not participate in red ware exchange or only participated in limited exchange. Prior studies indicate this ware is closely connected to identity and was likely introduced to the region by migrants to the area. This paper examines both the distribution patterns of San Juan Red Ware and the social networks of southeastern Utah to investigate patterns of exchange in this area involving this ware. This analysis highlights the diversity apparent in the region and demonstrates the complexity of social networks found therein.

Bishop, Andrew [128] see Harris, Jacob

Bishop, Anna

[146] *Preliminary Results from La Luna: A Late Classic Residential Group at El Zootz*

This paper will discuss the preliminary results of excavations at La Luna, a residential group outside of the El Zootz core. Initial investigations from this Late Classic complex yielded a large volume of high-quality polychrome sherds and prestige items that are inconsistent with the simple architecture of the group. The source of these materials and the processes involved in their deposition are considered here through the analysis of ceramics from both a midden and architectural fill. Stylistic, glyptic, and modal attributes are combined with observations about sherd preservation to shed light on how the population at La Luna used these materials, and how the prestige items affected the social status of this community.

Bishop, Caitlin (California State University, Chico) and Katherine Jorgensen (California State University, Chico)

[116] *Shattered: Conducting Experimental Archaeology to Better Diagnose Contact Period Lithics*

Contact period studies tend to focus on the interactions between indigenous peoples and non-native peoples and the commerce produced from said interactions. As such, a plethora of information can be gleaned from the study of tools and materials procured during this time period with a focus on changes in tool form or material choice, if any. As a result of these encounters, lithic substitutes made of glass, ceramic, and metal have emerged within the archaeological record. Is the material substitution a result of reduced access to traditional lithic sources or do these alternate materials prove as, or more, efficient than stone? This experimental study will explore the fracture mechanic properties of glass and ceramic compared to that of lithics to determine the efficiency, success, and resiliency of these lithic artifacts and those who created them. The results of this study will provide further insight into how the relationship between Euro-American expansion and Native populations transformed lithic technology.

Bishop, Katelyn (University of California, Los Angeles)

[260] *Birds in Ritual Practice and Ceremonial Organization in Chaco Canyon, New Mexico*

Birds have remained one of the most symbolically valued animals in human cultures, from prehistoric past to ethnographic present, and across the globe. Especially in the North American Southwest, whole birds and their parts have been an integral part of Pueblo ceremonial life for centuries. Their ritual and symbolic value has been demonstrated both archaeologically and ethnographically, where birds have been ritually interred and their feathers and claws used in the manufacture of ceremonial paraphernalia. This poster explores the use of birds in Pueblo II period (AD 900-1150) Chaco Canyon, New Mexico. Seven museum collections from across the country were examined to produce a single dataset that presents all avifaunal remains recovered from multiple excavations conducted over the last 120 years in Chaco Canyon. Preliminary results are presented from this research, which also includes the analysis of objects of bird imagery, such as effigy vessels, figurines, and painted designs. Results not only speak to the use of birds in Pueblo II period Chaco Canyon and the nature of ritual practice and ceremonial organization, but also demonstrate the value of (re)examining museum collections from historic excavations, and uniting multiple collections into synthetic databases that focus on one material type.

Bishop, Ronald L. (Smithsonian Institution)**[191] Fred Lange: Archaeologist-Collaborator**

From his early work at Bandelier National Monument in 1959, research in Wisconsin, Southern Illinois, Colorado, California, Barbados, and especially Costa Rica and Nicaragua, Fred Lange has left an unmistakable mark of professionalism on the archaeological record. And, he has done it with numerable field-based teaching opportunities and through extensive collaborations. The latter, especially, are not easy to maintain over several decades. In this presentation I look back on four decades of my collaboration with Fred, drawing attention to overarching characteristics of his involvement and attempting to ignore some events best forgotten. During almost 60 years he has achieved a stunning career dedicated to enhancement of archaeological knowledge and promotion of public awareness of archaeological research.

Bishop, Ronald L. [303] see Robinson, Eugenia

Bishop, Ronald L. [349] see Rich, Michelle

Bisson, Michael (McGill University)**[399] Tool Fragments from the Late Lower Paleolithic of Tabun Cave, Israel**

The Acheulo-Yabrudian (A-Y) is the final manifestation of the Lower Paleolithic of the Levant. This paper reports on numerous A-Y tool fragments discovered among the small finds collected during the Jelinek excavation of Tabun Cave, Israel. Tabun is the longest stratified Paleolithic sequence in the Eastern Mediterranean and includes all three facies of the A-Y. As expected, tool fragments from the Yabrudian facies were broken scrapers and spalls from scraper edges that renewed the scraper with a single oblique blow. The Amudian facies included fragments of utilized and backed blades. Acheulean facies produced biface tips created by end-shock during manufacture or resharpening, deliberate tip removal to renew the edge of the tool, and breakage during use of the handaxe as a wedge. Microwear on tool edges is described. The implications of that wear for activities carried out at the site and for taphonomic conditions in the Tabun deposits are discussed.

Bisulca, Christina (Detroit Institute of Arts), Marilen Pool (Arizona State Museum) and Nancy Odegaard (Arizona State Museum)**[41] Indigenous Use of Mesquite Exudates in Arizona**

The mesquite tree (*Prosopis spp.*), endemic to the desert regions of the American Southwest, has been utilized by indigenous peoples for centuries. The anthropological literature often cites the use of the mesquite gum in the material culture of the O'odham as a paint, adhesive and dye, and also notes its medicinal applications. Most described is the use of mesquite gum as a black paint on red wares. However, mesquite trees actually produce two chemically distinct exudates: a polysaccharide gum and a polyphenolic termed a "kino". In this study raw materials and artifacts in collections were analyzed, including mesquite "gum" collected by Frank Russell (1868-1903), an anthropologist who did fieldwork in Gila River. Results show that in most instances it is the kino, not the gum, that is used in material culture. This talk will cover the difference in chemistry and physical properties of these exudates, and discuss their uses in light of historic descriptions. Based on these accounts, it is evident the O'odham distinguished between these two exudates and used them selectively.

Bitencourt Mañas, Diego (University of São Paulo, Department of Ecology, LAAAE), Bruno Tripode Bartaquini (University of São Paulo, Museum of Archeology), Rui Sérgio Sereni Murrieta (University of São Paulo, Biosciences Institute), Marcia Maria Arcuri Suñer (University of São Paulo, Museum of Archeology) and Ignácio Alva Meneses (The Museum of the Royal Tombs of Sipán, LAAAE)**[46] Thinking about Ecotopes: Two Thousand Years of Landscape's Continuities and Discontinuities in the North Coast of the Central Andes**

This work seeks to analyze the continuities and discontinuities on the landscapes occupied by ancient Moche (an archaeological culture which flourished on the north coast of the central Andes between the first and eighth centuries) and contemporary populations. We intend to refine the discussion about the effectiveness and limitations of the ecotopes concept – considered by Ethnoecology as "minimum landscape unit" or "type of place". About 230 Moche fine-line ceramic vases – selected from the collections held by the Larco Herrera Museum (Peru) and the Ethnological Museum of Berlin (Germany) – were analyzed. In addition, we carried out ethnographic research among the living populations in the district of Mórrope (Lambayeque). This included interviews, ecological participative mapping and guided tours. Our results point to four main types of landscapes in ceramic iconography: green hills, dry forests, deserts, and flooded zones. The use of plants as ecological markers proved to be very efficient, especially for the green hills portrayed in the vessels. The most important ecotopes are still identified by the local population and, in some cases, with high degree of details and confidence. However, all the ancient rite practices portrayed on the vases have disappeared.

Biwer, Matthew [356] see Melton, Mallory

Biwer, Mattheuw (University of California, Santa Barbara)**[356] An Analysis of Botanical Remains from the Site of Quilcapampa**

This paper presents the results of the recovery and identification of plant remains from the site of Quilcapampa La Antigua. Located in the Department of Arequipa, Peru, Quilcapampa provides evidence of cultural material associated with the Wari Empire (AD 600-1000). This presentation focuses on the plant remains recovered from the 2015-2016 excavations. The well-preserved botanical remains from Quilcapampa provide a wealth of information, including local food production strategies and spatial organization of the processing, cooking, and discard of plant resources. My analysis of foodways at Quilcapampa provides context for plant-based activities at the site. Finally, I provide a brief discussion on how the plant remains situate Quilcapampa in relation to other Wari sites in the south-central Peruvian Andes.

Blaber, Thomas

[46] '77 to '17: Re-investigating the Perimeter of St. Catherines Island after Four Decades

In 1977 Drs. Chester DePratter and David Hurst Thomas began a complete perimeter survey of St. Catherines Island. In their initial survey they identified more than 100 new archaeological sites that were either visible on the surface or eroding out of the bank of the island. Many of these sites were not investigated again until January 2017 when archaeologists from the American Museum of Natural History began an 18-month systematic survey that followed and expanded upon the original 1977 survey. This poster will show the objectives, methodology and initial findings of this investigation.

Black, Marielle [186] see Morgan, Christopher

Black, Stephen [36] see McAuliffe, Richard

Black, Valda (Washington State University), Ricky Nelson (Arizona State University) and Danielle Kurin (University of California-Santa Barbara)

[286] Pre-Inca to Inca Demographic Shifts in the South Central Andes Using Stature Estimation

During times of social upheaval, such as the implementation of new imperial rule, major demographic changes can occur in populations. One osteological aspect that can be scored are changes in stature through time due to new stressors, inequalities, immigrations or migrations, and/or other such phenomena. This study aims to discover if there were major demographic shifts in stature for communities in the Andahuaylas region of the southcentral Andes dated between the Late Intermediate Period (LIP, AD 1000-1400) and Late Horizon (LH, AD 1400-1532). During the LIP, the Chanka cultural group were the prominent population, but then the Inca expanded into the region during the LH. The LIP sample population consists of Chanka individuals at the site of Cachi (n=37). The stature variation of the Chanka at Cachi will be compared to the newly excavated individuals at the complex site of Sondor (n=11), which has evidence of both LIP Chanka and LH Inca occupations. Using the Chanka at Cachi as a baseline, this project is the first step in understanding what happened to the local culture of the Chanka at Sondor and how the Inca influenced them.

Blackmore, Chelsea [179] see Arjona, Brenda

Blackmore, Chelsea (University of California, Santa Cruz)

[421] Illicit Landscapes and Illegal Economies in 19th Century Southern Belize

This paper examines how peripheral landscapes, along the coast and cayes of Southern Belize, shaped the region's early colonial period (AD 1544-1840). Specifically, who were the people who settled southern Belize and how did the economies and industries that formed around them critically impact both Spanish and British colonial projects, particularly in their forms of resistance both overt and covert? Deemed "off-limits" by the colonial powers, the southern Belize wilderness provided protection and refuge for a wide array of Spanish and British colonists, pirates, runaway slaves, and indigenous Maya. Although archaeologists have long dealt with evidence of smuggling and piracy, these have been treated as unimportant or subordinate to the processes of colonization. As Hartnett and Dawdy (2013) note, ignoring their role in state-making is nonsensical. While peripheral landscapes were often precarious and violent, these spaces provided at least a temporary refuge for those fleeing the state. Research conducted as part of the Southern Belize Historical Archaeology Project focuses on the identification and recovery of archaeological sites associated with the early Colonial period as well as documenting how these illicit landscapes were integral in the formation, maintenance and construction of divergent economies and new ways of life.

[149] Discussant

Blackwell, Bonnie A.B. [42] see Dakovic, Gligor

Blackwood, Alexander [32] see Schoville, Benjamin

Blackwood, Alexander (La Trobe University), Jayne Wilkins (University of Cape Town), Matthew Meredith-Williams (La Trobe University), Matt Caruana (University of Witwatersrand) and Andy Herries (La Trobe University)

[277] *Changing Stone Tool Technologies during the Middle Pleistocene at Amanzi Springs, Eastern Cape, South Africa*

The Acheulian site of Amanzi Springs, first excavated by Ray Inskeep and Hilary Deacon in the 1960's, has featured prominently in syntheses of the Earlier Stone Age in the Eastern Cape Province of South Africa. The site is comprised of eleven spring eyes and the unique depositional contexts and ground-water chemistry at Amanzi Springs have preserved botanical remains in association with stratified artefact accumulations. Originally assigned to the late Acheulian based on artefact typology, the absence of an absolute chronology for Amanzi Springs has limited its potential contribution to our understanding of spatial and temporal patterns of hominin occupation and technological organisation in this region during the Middle Pleistocene. Here we report on recent excavations at a newly discovered spring eye at Amanzi Springs, referred to as Area 7, which contains a stratified sequence of Earlier to Middle Stone Age artefacts, associated with preserved wood and macrofossil remains. Work at this new locality at Amanzi Springs aims to develop a robust, high-resolution chronology, providing an opportunity to examine technological change in an open-air context during a time period that is not well documented in the southern regions of South Africa.

[277] Chair

Blackwood, Emily (University of Maine)

[271] *Reconstructing the Ostra Collecting Site Using Virtual Reality*

Virtual reality (VR) provides a powerful platform to disseminate, showcase and protect archaeological research; it is a relatively inexpensive tool that can be applied to the discipline of archaeology by offering a new way to analyze and visualize archaeological sites as they once were. VR can immerse the user in the simulated environment, allow them to walk around, pick up and move objects, and experience the stratigraphic layout of the site as a whole rather than as individual units. As part of an ongoing project, a phase one initiative was carried out to collect data from the field in northern Peru in the form of aerial and ground-level images. These data, along with radiocarbon and OSL dating techniques and paleogeographic reconstruction, will be used to create a virtually simulated reconstructed environment of the mid-Holocene Ostra Collecting Site when it was in use. This VR simulation will help answer questions about site logistics and possibly military tactics.

[271] Chair

Blair, Susan [77] see Gupta, Neha

Blair, Susan (University of New Brunswick), Neha Gupta (University of New Brunswick), Victoria Clowater (University of New Brunswick), Ramona Nicholas (University of New Brunswick) and Katherine Patton (University of Toronto)

[87] *Podcasting and Two-Eyed Seeing: Digital Practice, Community Engagement, and Reconciliation in Archaeological Discourse*

Community or public archaeology has been the focus of professional effort and academic examination for decades. Most of this has a goal of creating public value, and takes the form of 'outreach' from a presumed disciplinary core, potentially downplaying conflict within the discipline. It is also a vehicle for engagement, and more recently, a means for drawing descendant communities into archaeological fieldwork. While recently many projects have extended public understanding beyond fieldwork, lay interest in archaeology is often framed through discovery and adventure, making careful discussion of 'whose past' difficult. As we broaden our ideas about 'public', consider indigenous ways of knowing, and integrate new digital tools and practice, public 'outreach' might be transformed into a locus of reconciliation, and re-conceptualized as a place for exploring and evaluating the very epistemologies that underpin 'conventional' archaeologies, opening new possibilities for engagement and involvement in the discipline. In this paper, we describe a developing podcasting project that explores these underpinnings by engaging and building capacity within communities (publics, both indigenous and non-indigenous) through concepts like two-eyed seeing, to create intellectual space for examining archaeology on indigenous terms, for training young archaeologists and potentially, for transforming the discipline.

Blake, Emma (University of Arizona), Robert Schon (University of Arizona) and Rossella Giglio (Soprintendenza dei beni culturali di Trapani)

[421] *Bottles, Blue Jeans, and a Boat: Material Traces of Contemporary Migration in Western Sicily*

The Sicilian Channel receives global attention as a major migratory route for undocumented people entering Europe clandestinely, a tragic nexus of transnational displacement and desperation. While the plight of massively overloaded and unseaworthy boats of people justifiably receives media attention, there is a less documented movement that occurs and has occurred for thousands of years: small boats expertly transporting handfuls of people back and forth across the Channel between Tunisia and western Sicily. Material traces of these border crossings share some features with the migrant material culture strewn along the border zone of the Sonoran Desert of Arizona. These include migrants' strategic triangulation of speed, invisibility and survival in deciding what to bring and the tactical triage of gear en route. Further, the political and economic injustices that are catalysts for the movements are comparable, as is the criminalization of the migrants which has done more to endanger than dissuade them. However the exigencies of sea crossing require a distinct set of material culture and technologies of mobility, shedding new light on migrant choices and challenges. This paper explores the material vestiges of these cross-Channel migrations through assemblages identified during fieldwork along the southwest coast of Sicily in

Summer 2018.

Blakeslee, Donald (Wichita State University)**[262] Quivira in a New Light**

The identification of the “great settlement” visited by Juan de Oñate in 1601 has led to a wholesale revision of our understanding of protohistoric archaeology in Kansas. Instead of clusters of villages, the habitation sites of the Great Bend Aspect are large towns that contained thousands of residents. Sites of this scale require the use of remote sensing technology and other adaptations of archaeological field techniques. This poster presents some of the initial results of the fieldwork at Etzanoa and other Great Bend sites.

[262] Chair**Blakey, Michael (College of William and Mary)****[60] Discussant**

Blancas, Jorge [373] see Vidal Aldana, Cinthya

Blanchard, Cheryl (Bureau of Land Management)**[16] Transcending Boundaries and Exploring Pasts: Conservation Efforts on Public Lands near the Borderlands**

The Bureau of Land Management (BLM) manages nearly a million acres of public lands near the Arizona-Sonora borderlands. Most of the area is remote back-country that has a long and interesting cultural history. Volunteers, cultural staff members, and researchers have all played important roles in trying to understand and protect the cultural heritage sites that are associated with the many cultural traditions represented here. The landscape, the diversity of site types, and the stories of the people are only just beginning to be understood.

Blanco Peña, Kelvin [418] see Torres Roldán, Isaac

Blanton, Richard (Purdue University)**[68] Discussant****Blatt, Samantha (Idaho State University), Amy Michael (University of New Hampshire), John Dudgeon (Idaho State University), Rebekah Rakowski (Idaho State University) and Kateea Peterson (Idaho State University)****[121] Altered States: Evaluating Postmortem Modification of Dental Tissues**

Teeth are the most likely skeletal elements to survive taphonomic insult, but are not impervious to diagenetic changes. The bulk of dietary, migratory, and climatic studies pursued by bioarchaeologists are reliant on unaltered preservation of dental tissue. Yet, contextual value of depositional environments is often overlooked. Though study of the physical, chemical, and microbial alteration of dental microstructures from archaeological and forensic contexts has long been pursued, such studies are poorly integrated. Estimating discrete parameters influencing dental taphonomy is difficult in inhumation experiments alone, and only obliquely inferred from descriptive studies. Here, we present a model-based approach for taphonomic alteration which explores discrete parameters in a controlled experimental fashion, using proxy mechanisms (temperature, humidity, pressure, pH and matrix composition) to measure mode and tempo of change in histological context. We apply this experimental approach to dental tissues to visualize introgression of tracer compounds and create an integrated classification of empirical referents for evaluating biominerals recovered from archaeological and forensic contexts, as well as parsing diagenetic from biogenic histological variation. These models can provide deeper explanatory power about the impact of specific taphonomic variables on DNA preservation, modification to calculus and isotope analyses, and inclusion of depositional micro-artifacts upon tissues.

Blecha, Erika [396] see Mallouf, Robert

Blinman, Eric [419] see Lipe, William

Blinnikov, Mikhail [320] see Vyazov, Leonid

Blitz, John (University of Alabama)**[348] Migration and Climate Change in Mississippian Archaeology: An Introduction and Brief History**

This paper introduces the symposium "Migration and Climate Change: The Spread of Mississippian Culture ca. A.D. 1050-1400." I provide a brief history of migration and climate change research in the archaeology of Mississippian societies. These earlier research efforts -- the theoretical contexts in which they occurred, the critiques they encountered, the insights they produced, and the limitations of their methods -- serve as a prologue to the papers in the symposium.

Bloch, Lindsay (Florida Museum of Natural History, UF)

[362] Rose Red-Filmed by Any Other Name: Pottery Typology and Genealogy in the Southeastern US

Working with legacy collections, it is common to come across labeled artifacts or reports listing now defunct names. Over the years, archaeologists have chosen to define ceramic assemblages based on any number of attributes; often the primary consideration being the site or region in which they were first discovered and described. These names are time capsules, capturing typological moments in the history of the discipline. Ware types have been devised, revised, split, combined, and ignored. A select few are canonized. Here, I revisit a pottery type collection assembled in the mid-20th century, tracing the sherds and their names back to founding figures and institutions of Southeastern archaeology. The process of reclassification according to modern conventions is an opportunity to examine typological legacies and dead ends, critically examining the naming structures that underlie our analysis and interpretations.

[362] Chair

Blohm, Tre (University of Montana), Jordan Karsten (University of Wisconsin-Oshkosh), Ryan Schmidt (University College Dublin) and Meradeth Snow (University of Montana)

[253] Presence of the Mycobacterium Tuberculosis Complex (MTBC) in Ancient Skeletal Samples from Ukraine

This research aims to investigate biocultural interactions by studying ancient disease among the Tripolye, a Neolithic group dating to 4,900-2,900 calBC, and one of the first agricultural populations in Eastern Europe. The Tripolye lived at higher population densities and had closer contact with bovines than the hunter-gatherers that came before them. This research seeks to provide the biocultural context for tuberculosis transmittance from cattle to humans. The identification of the insertion sequence IS611 has been targeted to identify the presence of tuberculosis. Here I present data that builds upon previous identification using gel electrophoresis with aDNA sequencing analysis to further establish and clarify the specific strain of IS6110 from the site. Gel electrophoresis showed banding patterns of the genetic element suggestive of the presence of IS6110 in three out of four samples of bones with lesions characteristic of tuberculosis. Newly obtained sequencing data elaborates on these findings and provides specific strain identification from the Mycobacterium tuberculosis complex. Through this investigation, we can achieve a better understanding of cultural processes on human health, the antiquity of tuberculosis, and European prehistory.

Blomster, Jeffrey [197] see Gonzales, Alicia

Blomster, Jeffrey (George Washington University) and Victor Salazar Chavez (George Washington University)

[197] Foodways and Human-Animal Relations at Early Formative Etlatongo: An Ontology of Differentiation

The origins of Oaxacan cuisines can be found in the later half of the Early Formative period, a time of emerging socio-political complexity. The incorporation of maize as a dietary staple and less reliance on wild plants and animals were part of a profound change in subsistence practices and conceptions of food in much of Mesoamerica. We argue that newly excavated zooarchaeological data from Etlatongo, in the Nochixtlan Valley, indicate that changes in Early Formative foodways both reflect and contributed to emerging socio-political differentiation. Focusing on the Cruz B phase (1150-850 uncal BC), we explore intra-site comparisons, contrasting public and domestic spaces. Commensal events provide an arena to explore the ways in which animals were prepared and consumed, as well as the incorporation of particular animal species and parts of the carcass into specific deposits in the public space at the site. We also track the changing nature of ceramic vessels and figurines with the start of the Cruz B phase, looking at dramatic shifts in inventories of vessel forms and figurine imagery. Changes in foodways and human-animal relationships represent an important transformation in ontologies, reflecting greater differentiation within societies and the world in which they were situated.

[230] Discussant

Blomster, Jeffrey [394] see Ronsairo, Karleen

Blondino, Joseph [396] see Gonzalez, Kerry

Blong, John (Newcastle University), Helen Whelton (University of Bristol), Lisa-Marie Shillito (Newcastle University), Ian Bull (University of Bristol) and Dennis Jenkins (Museum of Natural and Cultural History, University)

[209] Multiproxy Reconstruction of Human Diet in the Northern Great Basin: Coprolite Research at the Paisley Caves

Human coprolites from archaeological contexts can provide valuable information about human health, dietary

practices, and land-use patterns. Traditional coprolites studies have focused on identifying animal macrofossils and plant macrofossils and microfossils, but more recent research has shown the utility of biomolecular research (e.g., lipids, aDNA) for providing important additional information in multi-proxy studies of human diet and health. Because there are so many important constituents in coprolites it is important to establish best practice guidelines for the multi-proxy analysis of these remains. This poster describes recent methodological studies using coprolites from the Paisley Caves, south-central Oregon. The Paisley Caves have produced a large assemblage of human and non-human coprolites from terminal Pleistocene through late Holocene contexts, offering an important resource for a diachronic study of human occupation and subsistence in the region. These coprolites also provide a valuable resource for establishing best practice methods for coprolite analysis. This research is part of a broader project investigating site formation processes and human occupation of the caves using biogeochemical, plant micro- and macrofossil, and sediment micromorphological analyses.

Blumenfeld, Dean [56] see Morehart, Christopher

Blumenfeld, Dean (Arizona State University)

[406] *The Flaked Stone Economy of Los Mogotes: Access and Exploitation during the Epiclassic Period*

This study examines the flaked stone economy at the Epiclassic site of Los Mogotes, located north of the Basin of Mexico in central Mexico. We quantified obsidian and chert artifacts based on form and material in order to examine the nature of the regional lithic economy during this time. The findings suggest were dependent on long-distance exchange for already manufactured goods. Despite being close to high quality obsidian sources in Pachuca, Hidalgo, Los Mogotes relied on grey obsidian from sources located farther away. The obsidian assemblage exhibits little evidence of primary production and suggests a down-the-line model of exchange of tools, many of which were later reworked into secondary or tertiary items. This pattern contrasts with evidence of primary production using more locally available chert. These findings conform to broader regional trends observed at contemporaneous sites during this time and shed light on the ways in which regional economic systems re-organize.

Boaretto, Elisabetta [321] see Cooper, Aspen

Bocinsky, Kyle [86] see Coffey, Grant

Bocinsky, Kyle (Crow Canyon Archaeological Center), Andrew Gillreath-Brown (Washington State University) and Tim Kohler (Washington State University)

[86] *The Climates of Pueblo Emergence*

In this paper, we explore the emergence of the first Pueblo Canon — how the period of initial Pueblo exploration in the northern upland Southwest coalesced into the suite of material and social patterns archaeologists readily identify as Basketmaker III. Steadfast development of temperate maize varieties set the stage for upland expansion; a warming climate invited migration by maize farmers; strikingly high birth rates among the immigrant population filled the readily available farming niche; and the Canon emerged as both the process and the product of social consensus and community formation, seeded by core concepts from Basketmaker II ritual practices and social identity. We present a new synthesis of high- and low-frequency temperature reconstructions from tree rings and pollen to identify environmental conditions structuring this emergence. Ultimately, we develop an account of a people prepped and fettled, a culture socially and economically primed for expansion and the development of Pueblo identity.

Boehm, Andrew (Museum of Natural and Cultural History, University of Oregon)

[274] *Perishable Tools from Fort Rock Cave, Oregon*

The dry caves of central Oregon provide exceptional preservation of Paleoindian-aged perishable artifacts. Excavations at Fort Rock Cave, Oregon by Luther Cressman, Stephen Bedwell, and, most recently, Thomas Connolly and colleagues have produced a sizeable number of perishable and rare artifacts, as well as large faunal and lithic assemblages. Notably, this site has produced the oldest dated shoes in the world, at 10,500 to 9,350 cal B.P. While the sagebrush sandals, cordage, and other woven materials from the site have been well reported, the plant and bone tools have not. This presentation details the perishable tools from the Fort Rock Cave excavations, including material identification, metric, and use-wear analyses. A detailed study of the perishable tools provides valuable insight into the diversity of activities of early Great Basin peoples, as well as recognition of the variety of raw materials utilized for tool making, most of which do not generally preserve.

[274] *Chair*

Bogaard, Amy, Charlotte Diffey (School of Archaeology), Elizabeth Stroud (School of Archaeology) and Amy Styring (Institut für Archäologische Wissenschaften, Goethe)

[102] *From Present-Day Fields to Ancient Samples...and Back Again: Strategies for Establishing Principles of Interpretation in Plant Stable Isotope Work*

Plant stable isotope analysis presents a series of 'middle range' challenges for archaeologists, but also unique opportunities for reconstructing ancient agroecologies. Here we focus on the potential and limitations of modern crop studies for informing interpretation of archaeobotanical cereal and pulse d₁₃C and d₁₅N values as evidence of crop

growing conditions. From experience gained in modern crop and weed surveys in Europe, Western Asia and North Africa, we consider several issues, such as the complementarity of experimental and 'traditional' farming studies, integration with other ecological indicators such as weed functional traits and the challenges of comparing modern and ancient crop varieties. We also suggest how a growing body of archaeobotanical stable isotope data can shed light on some uniformitarian dilemmas, as well as prompting new questions. Interpretation of ancient values appears most robust when supported by distinct lines of evidence subject to different sources of error and ambiguity, and with emphasis on exclusion of unlikely scenarios.

Bogaard, Amy [102] see Stroud, Elizabeth

Boger, Rebecca (Brooklyn College, CUNY) and Sophia Perdikaris (University of Nebraska, Lincoln)

[276] Archaeology of Resistance? Barbuda in the Aftermath of Hurricane Irma

Barbuda, a small island in the Lesser Antilles, was directly hit by mega storm, Hurricane Irma, in September of 2017. 90-95% of the modern structures were either completely destroyed or lost their roofs, windows and doors. Additionally, there was tremendous loss to both intangible cultural heritage and heritage sites. Erosion in coastal areas decimated more than 25 feet of coastal archaeological sites. Historic sites that survived more than 200 years lay in collapsed ruins. While Barbudans were forcibly evacuated the day after the storm, stunned, trying to take in all the loss and determining ways to move forward, the central government in Antigua began around the clock excavation for a large airport. With no protocols for a proper Environmental Impact Assessment, prime agricultural land, pristine protected forest, watersheds and wetlands, along with archaeological sites, fell victim to misplaced agendas that prioritized uninformed capitalist ventures instead of helping local recovery. We will take a critical look at the state of archaeological sites and the place of heritage and heritage sites in an area of heightened political tensions and conflicting agendas towards development.

Bogucki, Peter (Princeton University)

[196] The Lengyel Interaction Sphere in East-Central Europe during the Fifth Millennium BC

Sites of the Lengyel Culture are found from the Drava River in Croatia to the lowlands of northern Poland during the fifth millennium BC. While the Lengyel Culture is clearly in the great "Danubian" tradition as a successor to the first farmers of this area several centuries earlier, it appears in a multitude of regional variants defined by pottery and other material culture. Linking these groups are manifestations of ritual mortuary behavior and distribution of exotic materials that comply with the criteria set forth decades ago by Caldwell for "interaction spheres" in which local traditions in crafts and subsistence underlie the acquisition and display of exotic materials by nascent elites. Seeing the Lengyel Culture in all its forms within the interaction sphere framework perhaps can provide an improved understanding of its concurrent diversity and uniformity.

Boileau, Marie-Claude [355] see Davenport, James

Boisvert, Richard [72] see Leach, Peter

Bojakowski, Piotr [129] see Young, Eric

Bolender, Douglas (University of Massachusetts Boston) and Elizabeth Sweet

[351] The Missing Medieval in the North Atlantic

Archaeological research in the North Atlantic has overwhelmingly focused on the long-term political and environmental impacts of the Viking Age colonization of these remote, marginal islands. In places like Iceland, these impacts were profound and resulted in the radical transformation of the previously uninhabited island and the establishment of a farming landscape that has endured over the past millennium. This remarkable continuity can give the illusion of an unchanging and stable society and aspects of the archaeology, such as the enduring settlement pattern and relative paucity of preserved artifacts, make investigation of the medieval period difficult. The archaeological emphasis on the impacts of Viking Age colonization and the development of a basic Icelandic ecological pattern has resulted in a flattening of time between the Viking Age and the historically documented early modern period that tends to elide the Middle Ages as a distinct period. This paper will address the methodological difficulties of accessing and interpreting medieval Iceland and suggest ways to move forward.

Boles, Oliver (University of Pennsylvania), Emily Hammer (University of Pennsylvania) and Kathy Morrison (University of Pennsylvania)

[92] Pastoralism and Anthropogenic Land Cover Change (ALCC) Mapping

PAGES LandCover6k explores the relationship between past human activity and variability in the palaeoecological record to produce global maps of anthropogenic land-cover change based on sound archaeological knowledge and palaeoecological proxies, maps which will be available for use by the climate modelling community to better understand past climate dynamics. As a first step, we are producing global maps of human land use at various points across the last 6000 years. The vast majority of global land use is today dedicated to food production via

livestock and crop cultivation. While the potential impacts of the latter are relatively well-understood – land is cleared of existing vegetation and replaced by domestic species – the changes effected by animal husbandry are far more diverse, ranging from the ephemeral to the devastating. In order to successfully and usefully map the implications of such economic practices, it is necessary to understand both the diversity of pastoralism, from mixed agriculture to nomadic herding. This paper discusses the various impacts that pastoralism can exert, framed in the context of how we can reasonably expect to chart and delimit these practices; specifically, we consider the relationship between pastoralism and ALCC, and implications for PAGES LandCover6k.

Bollwerk, Elizabeth (The Thomas Jefferson Foundation - Monticello), Jillian Galle (The Thomas Jefferson Foundation - Monticello), Lynsey Bates (The Thomas Jefferson Foundation - Monticello), Leslie Cooper (The Thomas Jefferson Foundation - Monticello) and Fraser Neiman (The Thomas Jefferson Foundation - Monticello)

[362] *Creating Context: Analyzing Legacy Documentary Data to Understand the Emergence of Enslaved Societies at Flowerdew Hundred Plantation*

By late 1619, 15 of the first 25 enslaved Africans imported into British North America were laboring at Flowerdew Hundred, a thousand acre plantation on the James River in Virginia. They joined indentured Europeans, neighboring Weanock Indians, and elite European landowners in shaping the mid-17th century expansion of plantation settlements across the Chesapeake, an expansion which led to the emergence of a tobacco plantation labor force comprised almost entirely of enslaved Africans and their descendants by 1700. Since the 1970s, archaeological research at Flowerdew has produced hundreds of thousands of artifacts and dozens of linear feet of unbound field records and maps. A new project led by the Digital Archaeological Archive of Comparative Slavery (www.daacs.org) is re-analyzing collections from four of the earliest and most significant 17th-century archaeological sites at Flowerdew. We describe the protocols used to parse these documents into a relational PostgreSQL database that allows us to directly link legacy field data to related artifacts, images, and maps. We also illustrate how the standardized digital data produced by DAACS will enable students, scholars, and the public to advance our understanding of the multicultural dynamics behind the emergence of a slave society in British North America.

Bolte, Christina (University of West Florida) and John Worth (University of West Florida)

[367] *A "Snapshot" of the Mid-Sixteenth-Century Colonial Culture of New Spain: the 1559-1561 Tristán de Luna y Arellano Settlement on Pensacola Bay*

Since the 2015 discovery of the 1559-1561 Tristán de Luna y Arellano Settlement on Pensacola Bay, archaeological investigations have yielded material traces of a distinctively "New Spanish" colonial culture. In 1559, a mere 38 years after Cortes' conquest of Mexico, Luna was dispatched from Veracruz with 12 ships, 1,500 colonists, including 200 Aztec Indians, and an abundance of supplies to establish a settlement on Pensacola Bay. After just over a month, a hurricane struck the settlement, destroying seven ships and the majority of the colony's food stores. Over the next two years, the Viceroy of New Spain sent four relief fleets to Pensacola that included items produced in Mexico, as well as items adopted by resident colonial Spaniards (whether Spanish-born or New World-born) from indigenous Mexican cultures. Utilizing documentary evidence and artifacts recovered from the Luna settlement site, this paper characterizes a "New Spanish" assemblage, explores the adoption of Aztec or other indigenous food and material culture, and the continued incorporation of indigenous Aztec people into exploratory expeditions launched out of New Spain (including the 1540-1542 Coronado expedition), offering a "snapshot" of the colonial culture of New Spain and providing some instructive insights into Spanish-Aztec relations during the mid-sixteenth century.

Bomberger, Joseph

[414] *Seneca Pigeon Hunting on the Allegheny National Forest*

The passenger pigeon, *Ectopistes migratorius*, is an extinct subspecies of pigeon that was used as a staple food source by the Haudenosaunee. The largest passenger pigeon flocks were described by eyewitnesses as covering hundreds of miles and their peak population has been estimated in the billions. During the nineteenth century, Euroamericans industrialized the hunting of passenger pigeons, leading to extinction in the twentieth century. The development of railroads facilitated these industrialized hunting practices. Low birth rates and high casualty rates combined to eliminate the passenger pigeon, once the most common bird in North America. The pigeon was important to the Seneca. While there are a variety of ethnographic accounts describing the Seneca hunting in northwest Pennsylvania, archaeological evidence is scant. This research aims to establish a site signature for Seneca pigeon hunting camps on the Allegheny National Forest, corroborate documentary and ethnographic data, and identify landforms that were favored by the Seneca. The research will not focus on identifying all the camps in the region but may aid future researchers in doing so. These camps could yield data about trade and hunting practices in addition to adding important cultural data about the Seneca.

Bond, Julie [251] see Maher, Ruth

Bond, Stanley [3] see Chavarria, Sara

Bond, Stanley

[135] *ARPA and Confidentiality in the Digital Age*

The Archeological Resources Protection Act (ARPA) and 54 U.S.C. 307103 (Title 54) exempt archeological site location data and other site information from the Freedom of Information Act (FOIA). The digital age, however,

provides site looters with a new range of tools to discover archeological site locations on federal and tribal lands. At times, our own agency archives have inadvertently published archeological site reports on line, while a number of third party archives continue to make sensitive reports available. Maps from online sites such as Google Earth provide means for looters to locate sites from their home computers. Digital communication and social media sites such as chat rooms and Facebook allow looters to share location information and even encourage each other to loot sites during government shutdowns. Federal archeologists need a better understanding of digital media in order to remove inappropriate material from the web and more vigilantly monitor potential site looting activities.

Bond Reis, Lucas (University of Arizona) and Lucas Bueno (Universidade Federal de Santa Catarina)

[393] Building Histories of Territory Formation: The Case of Southern Jê Expansion, Santa Catarina, Brazil

In this paper we discuss the expansion process of southern Jê groups since 1400 BP until today. Working with Zedeño's proposal of territorial history (Zedeño 1997), we explore the available archaeological and ethnographic data to propose phases of establishment, maintenance and transformation of territories occupied by Southern Jê groups since, at least, 1400 BP. To do that we explore the interaction dynamics between Southern Jê groups with different cultural groups that inhabited the same or adjacent region during this period: hunter-gatherers related to Umbu tradition, fisher-hunter-gatherers related to Sambaqui occupation, Guarani groups, and Europeans after AD 1500. We focus in the region that nowadays corresponds to Santa Catarina State and we use published data as well as new data from recent excavations realized by the LEIA/UFSC.

Bondura, Valerie (Columbia University)

[193] The View from Here: An Introduction to Nuevomexicano and Chicánx Theory for Archaeology

This paper is an introduction to an organized session on Chicánx Archaeology. It argues for the ethical and intellectual imperative of drawing Chicánx Studies scholarship in to archaeological method and theory. Archaeological frameworks for studying culture contact, ethnogenesis, and identity have tended to bypass theory that falls under the umbrella of Chicánx Studies. While archaeology has rightfully moved to incorporate Native Studies and Indigenous ontologies into our method and theory, other traditions and scholarship have been neglected. In approaching Hispanic/ized communities, archaeologists have focused on Spanish colonialism, emphasizing the performance and transmission of a "Spanish" identity in new contexts. This approach has the effect of devaluing or ignoring Hispanic heritage that can only be tangentially related to peninsular Spain. This, in turn, reifies a long-standing stereotype that portrays Hispanic-descent communities in the U.S. as both foreign and lacking a distinct cultural heritage. Thus, archaeologists have been complicit in the writing of historical narratives that have dismissed, devalued, or excluded Chicánx communities. This paper, based on five seasons of fieldwork in the southern Sangre de Cristo Mountains, outlines relevant frameworks from Chicánx Studies for archaeological research, drawing especially on nuevomexicano thought from the northern Rio Grande region of New Mexico.

[193] Chair

Bongers, Jacob [182] see Larios, Jennifer

Bongers, Jacob (UCLA Cotsen Institute of Archaeology)

[182] Local Mortuary Practice and Inca Imperial Conquest in the Middle Chincha Valley, Peru

I investigate the relationship between local mortuary practice and imperial conquest in the middle Chincha Valley of Peru, a landscape that was incorporated into the Inca Empire in the 15th century. Indigenous groups developed strategies for dealing with invasive imperial control. One strategy was mortuary practice, a means of expressing relationships among the living and the deceased. Such relationships can form the basis of society, knit together extended family groups, and enable the continuation of cultural practices and identities. To what extent did indigenous people transform their mortuary practices during periods of conquest? To address this question, I examine indigenous mortuary activities in the study area that date to the Late Intermediate Period (AD 1000–1400) and Late Horizon (AD 1400–1532). I report 25 14C dates associated with two distinct grave types: above-ground and subterranean mausolea (chullpas) and subterranean cists. I employ Bayesian modeling to analyze these dates. Results demonstrate that local groups maintained, transformed, and innovated their mortuary practices as they were brought under Inca rule. These data carry implications for understanding how societies are reconstituted through mortuary practice during times of profound sociopolitical change. These implications are drawn out in this paper.

[182] Chair

Bonneau, Nicholas [131] see Leader, George

Bonneau, Nicholas (University of Notre Dame)

[131] The Patient Work of Patient History: The Creation of Medical Records for Eighteenth and Nineteenth Century Interments at the First Baptist Church of Philadelphia Burial Ground

As of Fall 2018, the remains of approximately 500 individuals have been recovered from a disturbed burial ground site at 218 Arch Street in the historic "Old City" district of Philadelphia. These are a fraction of the larger interred population. The Arch Street Project's historical research team uncovered incomplete records for burials at the site totaling 2699 between the years 1702 and 1859. From among these records names and dates of death for 1659

individuals have also been recovered, along with assorted demographic, cultural, and medical information. Over the course of the past year, ASP researcher focused on seeking out further medical information for all known individuals buried at the site.

This paper describes the results of research conducted by the historical team of the Arch Street Project into the medical records of the 1659 individuals identified to have been interred at 218 Arch Street, Philadelphia. The resultant medical histories, gathered from physicians' daybooks, account books, personal memoirs, and death records, are an unprecedented record of health and health care for early Philadelphia. This research model promises to inform similar burial site recoveries in the Philadelphia area and across the Eastern United States.

Bonorden, Brooke [199] see Houk, Brett A.

Bonsall, Clive (University of Edinburgh) and Maria Gurova (National Archaeological Institute with Museum, Sof)

[392] *Pitchstone in Prehistory: New Insights into the Mesolithic and Neolithic use of Pitchstone in Scotland*

Pitchstone is a glassy volcanic rock similar to obsidian but in Europe, its geological occurrence and its use as a raw material for prehistoric chipped-stone assemblages are much more restricted. In northern Britain where good quality flint is scarce, pitchstone circulated widely in the Neolithic with artifacts made from this material being found over 400 km from the primary sources on the Isle of Arran in western Scotland. In contrast, during the preceding Mesolithic pitchstone use was much more restricted geographically.

This paper:

- Reviews current knowledge on the use of pitchstone by Mesolithic and Neolithic societies in northern Britain, and present.
- Discusses new XRF analyses of pitchstone samples from geological sources on Arran and archaeological sites on Arran and the Scottish mainland.
- Presents the first use-wear analyses of Neolithic pitchstone assemblages from Scotland. A major challenge of this research was to design and conduct experiments in producing a definitive complex of wear patterns and to compare them with archaeological pieces.

Bonzani, Renee (University of Kentucky)

[158] *Carbonized Wood Remains from the Matacanela Site, Veracruz, Mexico*

This paper describes the carbonized wood remains recovered from fifty-five heavy fractions of flotation from seven units and fifty light fractions of flotation from six units collected during the excavations of the Matacanela Site in Veracruz, Mexico. Environmental comparisons are made to the forest composition in the natural reserve at Los Tuxtlas (la Estación de Biología Tropical Los Tuxtlas) and ethnobotanical uses of the identified wood taxa are discussed based on information from the Huastec Maya from the northeastern part of Mexico within the states of Veracruz and San Luis Potosí (Alcorn 1984: 747-748). Differences in wood composition within the site of Matacanela are also presented.

Booker, Emily (Brown University)

[301] *Cypriot Clay Bodies: Contact, Corporeality, and Figurine Use in the Cypriot Late Bronze Age*

The clay "Astarte" figurines of Cyprus' Late Bronze Age are enigmatic and well-known, and their emphasis on female reproductive organs lead most scholars to argue for fertility functions. Yet how were these figurines actually used? And how do they fit within the much larger repertoire of Late Bronze Age figurines both on Cyprus and within the wider eastern Mediterranean?

This paper examines clay figurine use, reuse, and deposition on Late Bronze Age Cyprus, and, more broadly, the multifaceted ways Cypriot figurine production and use incorporate and respond to increased contact with the Aegean and Levantine coast. It takes a contextual approach to figurine analysis, looking for patterns in production, style, body attributes, assemblage, and fragmentation of both anthropomorphic and non-anthropomorphic figurines at a number of well-excavated sites on Cyprus.

Through a material and context-focused analysis that considers issues of corporeality and materiality, it becomes clear that there are far more complex meanings and functions for Cypriot figurines than just female fertility. Clay figurines provide a focused lens into the ways people interact with objects, create or adjust identities, and perceive of their place in the world around them.

Boone, Elizabeth

[304] *Discussant*

Boone, James [8] see Ruth, Susan

Boone, James (University of New Mexico)

[351] *Comparative Eurasian Statecraft: al-Andalus in the context of the Medieval West*

Attempts to describe and explain differences between Western and Asian state structures have a long history, starting with Marx's Asiatic Mode of Production and Wittfogel's Oriental Despotism. The bottom-up approach offered here argues that differences between the two forms are due largely to the way primary producers are organized locally, which in turn affects how the state extracts surplus from producers. This case study, based in political ecology and landscape archaeology, compares state development north and south of the Pyrenees in the second half of the first millennium AD. In al-Andalus, the Córdoba Caliphate took the form of a highly centralized Middle Eastern style polity, complete a separate, self-sufficient palace complex with resident full-time craft specialists producing sumptuary pottery, silk, bronze and ivory crafts, all centered around one of the largest cities in the world at the time. The state funded itself with taxes drawn from tribally organized land tenure and primary production. North of the Pyrenees, contemporary polities consisted of long chains of personal dependence that stretched from the monarch to primary producing households, with minimal urban development and sumptuary craft production. Here, an ever-weakening rent-based state culminates in a near complete decentralization of power among local and regional lords.

Borchert, Jeani (North Dakota Dept of Trans)

[369] Instructor, Boss, Mentor and Friend: The Multi-talented Dr. Loendorf

I was a college student in elementary education when I was inspired by the enthusiasm of an instructor in a class I took for fun: Intro to Archaeology and Physical Anthropology. It changed the course of my life. Larry's contributions to our field are enormous and varied as he is a man of intellectual curiosity, vision, drive, daring, and humanity. I highlight some of his research that I have been involved in or became aware of through the years. This includes the study of buttes in western ND, the beginnings of UNDAR-West, his work in the Pryor Mountains, recording/nominating the Knife River Flint Quarry District to the National Register, and his work at Pinion Canyon Maneuver Site in SE Colorado. I also focus on some of the other projects Larry has done in ND including a rock art site that he recorded with Signe Snortland in 1986 to a site mentioned in a 1924 manuscript and recorded by Larry in 1986. Large and small wherever I look I see evidence of his career and the students he helped along the way.

[7] Moderator

Borchert, Jeani [357] see Stoermer, Stephanie

Borck, Lewis (Faculty of Archaeology, Leiden University) and Jeffery Clark (Archaeology Southwest)

[246] Building Collapse: Hierarchy and an Anarchic Social Movement in the Hohokam Classic Period

Archaeologists have offered multiple explanations for the dramatic architectural, subsistence, and political shifts that happened at the end of the Hohokam Classic period. Many of these explanations are good at exploring potential factors leading to these changes in regional contexts, like the Phoenix Basin where it is often discussed as a large-scale collapse. However, these explanations are often less applicable in other areas of the Hohokam world. Is there a unified explanation, or even a series of inter-related explanations, for this cultural transition that occurred in multiple regions within the Hohokam world, such as the Phoenix Basin, Tonto Basin, Tucson Basin, Safford Valley, San Pedro Valley, and the Papagueria? Is there an inference to the best explanation? In this paper, we will compare previously proposed models for Hohokam Classic period "collapse" to evaluate how they apply across different regions. These will be compared to O'odham oral traditions. Finally, using indigenous and anarchist political theories and a social movement framework, we will explore a potential explanation.

[421] Chair

Borck, Lewis [421] see Herrera-Malatesta, Eduardo

Bordy, Emese [338] see Stratford, Dominic

Borejsza, Aleksander [38] see Rodríguez López, Isabel

Borejsza, Aleksander (Universidad Autónoma de San Luis Potosí), Arthur Joyce (University of Colorado) and Jonathan Lohse (Gault School of Archaeological Research/ Moore Arc)

[197] Food from the Barranca: A 13,000-Year Perspective from the Yuzanú Drainage of the Mixteca Alta

Barrancas are marginal spaces in the cultural ecology and cultural perceptions of modern-day inhabitants and visitors of the Mixteca Alta. They tend to be little-contested commons where the poor graze their animals, hunt, gather fuelwood and occasional culinary curiosities. They rarely figure in the villagers' get-rich schemes or outsiders' research and development programs, with the partial exception of those showcasing environmental degradation. Using the results of geoarchaeological survey and excavation in the vicinity of Yanhuitlán, we point to the radical transformations in streamside ecology wrought by climate change and human management and argue that in the past the barranca was often a place of plenty, playing a central role in food procurement and production. Paleoindians camped along wet meadows grazed by large herbivores. Their Archaic successors used barranca floodplains as places for seasonal congregation and managed their vegetation communities by intentional burning. Cross-channel agricultural terraces were built by the Formative and by the Postclassic formed monumental staircases planted in staple foods, with both property rights and the movement of water receiving close scrutiny. It

was only with the catastrophic channel deepening and widening in the wake of Colonial terrace collapse and overgrazing that the barranca began to lose its allure.

Borges Vaz, Erika [364] see Martinez, Gustavo

Borgstede, Gregory

[303] *Settlement Fission in the Western Guatemala Highlands*

This paper examines dynamic changes in Maya settlement patterns through a comparison of expansion and contraction of settlement patterns during the pre-Columbian, historic, and contemporary periods. In particular, it looks at when and why settlements are formed, within what is generally considered to be a single sociocultural context—the Huista region of western highland Guatemala. Data from archaeological investigations, historical documents, and ethnography are collated to demonstrate that there are discontinuities in the settlement pattern, in ways that are occasionally predictable, and that the etic organization of archaeological data into hierarchies of sites may underestimate this change. The paper provides a contribution to the discussion of how settlement patterns, as reflections of populations, change over time in a landscape, postulates some predictable patterns of settlement expansion and contraction, and comments on the necessary limitations of using the ethnographic present as an analogy for interpreting pre-Columbian archaeological data.

Borrero, Luis (CONICET) and Fabiana Martin (CEHA, IPA, Universidad de Magallanes)

[26] *Fragmented Records: Fuego-Patagonian Hunter-gatherers and Archaeological Change*

One common assumption in the interpretation of Fuego-Patagonian archaeological long stratigraphic sequences is that they represent occupational continuity. Several archaeological markers, including chronological and stratigraphic gaps, as well as recent molecular results erode that assumption, inviting us to consider more complex occupational histories. Abandonment, displacement and extinction are important processes that must be taken into account. One important consequence of considering these processes is related to our understanding of past human lifeways during the last 11,000 years, usually encapsulated within the rather rigid categories of maritime and terrestrial hunter-gatherers. A variety of analyses within a wider framework are required to analyze the changing distribution of archaeological traits.

[364] *Discussant*

Borrero, Mario (University of California, San Diego)

[134] *Methods for the Application of Structure from Motion (SfM) 3D models for the Recording and Consolidation of Archaeological Architecture.*

Photogrammetry is the process of generating 3-Dimensional digital models from still photographs. The process is applied in a variety of field and lab settings for documenting the archaeological record. Currently, there is a need for focus on individual applications and the development of a standard methodology to ensure consistent and comparable 3D models. We present our system for incorporating photogrammetry into the documentation of architecture, developed at the site of Nim li Punit, Belize, during our 2018 field season. The archaeological excavation of architecture involves the documentation of the pre-excavated building, the liberation of earth and material overburden, the documentation of all in situ construction (including wall fall, fill stones, and standing architecture), the drawing of consolidated architecture, and the documentation of the final state of the post-excavated buildings. The generation of 3D models greatly assists in all facets of the excavation, documentation, analysis, and consolidation processes.

[134] *Chair*

Borzić, Igor [337] see Zaro, Gregory

Bostwick, Todd (Verde Valley Archaeology Center), Douglas Mitchell (Pueblo Grande Museum) and Laurene Montero (Pueblo Grande Museum)

[194] *A Monument of Memories: The Pueblo Grande Platform Mound*

Located at the head of a large canal system in Phoenix, the Pueblo Grande platform mound is one of the largest structures ever built by the Hohokam. This building is nearly 4 m in height, 4,000 m² in area, and incorporates 16,000 cubic m of rock, trash, soil, and structural remains in its cell-like design. Although built in stages, this platform mound was clearly a massive undertaking that had social and ritual importance, possibly representing a symbolic mountain. We argue that the mound was used as a center for food storage, feasting, and ceremonial activities relating to rain and agricultural fertility and was central to the social and ritual functioning of the village and related agricultural territories. It was built to emphasize the importance of land ownership and honor the memories of the ancestors who settled that location several centuries before the mound was constructed. This paper will discuss ethnographic information about the role of platform mounds and describe the special artifacts and architecture that suggest the Pueblo Grande platform mound had a ceremonial function, and then place the platform mound within a regional context during a time of increasing competition for fertile farmland and irrigation water.

Boswell, Alicia [200] see Gidding, Aaron

Boswell, Alicia (UC Santa Barbara) and Joanne Pillsbury (Metropolitan Museum of Art)**[363] Technical Knowledge, Metal Artisans, and Moche Visual Culture: A View from Piura, Peru**

Technical knowledge is passed along through individuals and the exchange of objects. While technical studies of artifacts illuminate the physical evidence of evolutions in manufacturing processes, what are the mechanisms via which ideas are exchanged? What is the role of human agency, and what are the sociopolitical contexts in which technical innovations occur? From sixteenth-century sources, we know that when the Incas conquered the Chimú they kidnapped the metalsmiths and forcibly relocated them elsewhere. How far back does this practice of "craftsperson capture" extend? This paper focuses on the Moche, predecessors of the Chimú. Moche artisans developed a suite of sophisticated technologies, including different ways to gild and plate metals. While it may be possible that in the southern Moche region rival polities "borrowed" artisans as attached specialists, our recent research suggests that at least in the case of Piura, on Peru's far north coast, the introduction of Moche metalwork may have been less direct. Elite metal regalia in the two regions exhibit similar forms and Moche iconography, but the technical features of the Piura tradition are sufficiently different to suggest that in this case, objects and non-specialists likely played the role of transmitters rather than technical specialists themselves.

Boudreaux, Edmond, Brad Lieb (Chickasaw Nation) and Stephen Harris (University of Mississippi)**[414] Native Communities after Contact in the Blackland Prairie of Northeast Mississippi**

Hernando de Soto and his army spent the winter of 1540-41 in the Blackland Prairie region of Northeast Mississippi, wintering in a significant settlement of the native polity of Chicasa. The Spanish noted two other polities known as Saquechuma and Alimamu in the area. A high density of Late Mississippian through Early Contact period sites in the Blackland Prairie may correspond to these native polities, but the area appears to have been abandoned by the late seventeenth century. Little is known about what happened to native peoples in the Blackland Prairie during the decades after their contact with Soto. In this paper, we report on recent work at the Stark Farm site, located in Oktibbeha County. This work is the result of a collaboration between Chickasaw Nation which is native to this area, and several universities in the Southeast. The results of metal detecting, magnetic gradiometry, shovel testing, and excavations indicate that Stark Farm is a dispersed settlement of widely scattered households that date to the fifteenth through early seventeenth centuries. These investigations suggest significant continuity in native lifeways in the first generations after contact.

Boudreaux, Sarah (University of Texas at San Antonio)**[30] Ceramic Technological Trends in the Three Rivers Region: A Late Classic Maya Overview**

It is now well recognized that Late Classic Maya communities were highly variable politically, economically, and environmentally. Researchers often assume that community and household variation are corollary with the broader political climate—and this remains under problematized. Thus, research that explores differences in household provisioning practices across communities is needed to rectify this situation. The incorporation of a broad, multi-community comparative data-set will facilitate a greater understanding of the sociopolitical dynamicity on multiple social and economic levels within the study area of the Three Rivers Region in Northwestern Belize. This paper will focus on ceramic distribution patterns and technological programs (including production) from sites in the Three Rivers Region, specifically from the Programme for Belize property.

[345] Chair**Boulanger, Matthew (Southern Methodist University), Ryan Breslawski (Southern Methodist University) and Ian Jorgeson (Southern Methodist University)****[365] A Systematic Approach to Quantifying Diversity in the Morphology and Spatial Distribution of Eastern Paleoindian Projectile Points**

For nearly 100 years, archaeologists have commented on the perceived morphological diversity in projectile points dating to the Paleoindian period in eastern North America, though the significance of this diversity and what explains it remain underexplored topics. Hesitancy to address these broader questions is, we argue, attributable to several factors including: Poor or inconsistent definition of "diversity," absence of a replicable and systematic method of classification, and substantial biases in the spatial scale and distribution of archaeological data. Several studies have grappled with the first two of these issues. But the third concern remains problematic, because while archaeologists are often interested in addressing questions at several spatial scales, our data are often aggregated by modern political units and show clear distribution biases from historical and modern land-use patterns. Here, we build on prior work on projectile-point forms in the East and integrate an explicit geographical component aimed at minimizing recovery and visibility biases at spatial scales—and in units—defined by the research question, rather than by modern administrative boundaries. We also explore hypotheses concerning environmental and biogeographic factors may best explain morphological diversity in these stone tools.

Bousman, Britt [338] see Morris, Sarah

Boutin, Alexis (Sonoma State University)**[317] Bioarchaeology as Archaeology: Past Practices and Future Prospects**

This paper reflects on bioarchaeology as archaeology (after Armelagos 2003) by tracing the discipline's past and identifying current research trends. Bioarchaeology's roots run deep into the 20th century, but it was only in the late

1970s that it received its name in the U.S. and began to blossom as a discipline. The first generation of bioarchaeologists set the tone for this synergistic field, drawing on biocultural models, archaeological contexts, and clinical research. Because of their training in human skeletal biology, bioarchaeologists traditionally felt a professional kinship with biological anthropologists, which was reinforced by having to "choose sides" within the four-field structure of American anthropology. On archaeological projects, bioarchaeologists were commonly identified as specialists, whose reports were frequently relegated to the appendices. But second- and third-generation bioarchaeologists are reclaiming their archaeological heritage: training in human osteology is essential to a career in cultural resources management; overt theoretical orientations are now prioritized; and a new emphasis on community engagement recognizes the diverse groups who have a stake in the study bioarchaeological research. The paper will conclude with an example of how research on affective interpretations of bioarchaeological data should be of interest to, and benefit, all practitioners of archaeology.

[317] *Chair*

Bovy, Kristine (University of Rhode Island), Madonna Moss (University of Oregon), Jessica Watson (SUNY-Albany) and Julia Parrish (University of Washington)

[312] *New Insights from Old Collections: Investigating Bird Bones from Pacific Northwest Shell Middens*

Julie Stein has been a leader in facilitating research on legacy collections in the Pacific Northwest Coast. Although challenges exist when working with existing collections in museums and repositories, re-analyses of these assemblages have the potential to provide valuable information and support the conservation ethic in archaeology. We highlight examples of zooarchaeological projects conducted on legacy shell midden collections in the region, focusing on our recent synthesis of Native American bird use along the Oregon coast. We present data on three legacy collections: Umpqua/Eden (35DO83), Whale Cove (35LNC60), and the Dunes Site (35CLT27), and compare these data with 23 previously analyzed assemblages. We evaluate potential bird procurement strategies, including nearshore and offshore hunting, hunting on breeding colonies, and collecting beached carcasses, using statistical tests and comparisons with contemporary surveys of naturally beached birds as observed by COASST (Coastal Observation Seabird Survey Team). While 71% of the identified bird remains belong to just three families (Anatidae, Alcidae, and Procellariidae), closer analysis reveals the incredible diversity of birds used by Oregon coast peoples. The assemblages vary considerably in terms of taxonomic diversity and composition, leading us to conclude that people used birds opportunistically, likely incorporating multiple strategies for procurement.

Bowden, Taylor [172] see Ruiz Vélez, Gabriela

Bowen, Corey (University of Illinois at Chicago), Emma Branson (University of Illinois at Chicago), Patrick Ryan Williams (The Field Museum) and John Janusek (Vanderbilt University)

[290] *Were-felines? An XRF-Based Sourcing of Tiwanaku's Chachapuma Sculptures*

Turnovers in political and religious authority in the ancient Titicaca Basin correspond with significant, intentional shifts in material procurement practices. During the 5th century AD, the developing Tiwanaku elite asserted a new ideological hegemony through a novel monumental and iconographic tradition. Tiwanaku masons also switched from the red, locally sourced sandstone common in earlier ritual constructions and began quarrying, among other stones, volcanic andesite and basalt for use in temple walls and free-standing sculpture. Prior studies have used XRF based compositional analysis to locate the quarries of prominent temple stones and anthropomorphic monoliths. The results have shown how this highly visible change propagated a rejection of prior cosmology and naturalized the new order by incorporating the animate, symbolically potent environment into a constructed landscape. This study applies the same techniques to locate the quarrying sites for a set of stone sculptures called "chachapumas," or were-felines, that hold decapitated human heads and were once situated at the entrance to temples in the Tiwanaku capital. The chachapumas' violent imagery is a drastic departure from pre-Tiwanaku art and has a clear implication of power, so we consider them key to a better understanding of the emergence of Tiwanaku hegemony.

Bowen, Kristin (Bureau of Reclamation)

[254] *Managing the Navajo-Gallup Water Supply Project: A Federal Archaeologist's Perspective*

The Omnibus Public Lands Management Act of 2009 authorized Reclamation to construct the Navajo Gallup Water Supply Project (NGWSP) to provide a long-term water supply to the Navajo Nation, the Jicarilla Apache Reservation, and the City of Gallup. This project was subsequently expedited as the DOI's highest priority infrastructure project by Presidential Memorandum making it an out-of-the-ordinary compliance project. The NGWSP goal of fulfilling long-outstanding water rights claims is complicated by the location and the density of the archaeological resources in the Greater Chaco Landscape. Being a congressionally mandated project brings additional complications to the large project such as determined starting and completion dates that have to be met as well as budget caps. Additional unique challenges are faced when constructing a project in a sovereign nation, as there is mixed land status, but the majority is on Navajo Nation land. Reclamation has made a concerted effort to manage this project with archaeological best practices with a high level of involvement with descendant communities. This project is a prime example of the unique challenges that federal cultural resource managers can face, and this paper is intended to give guidance for professionals who find themselves facing similar situations.

Bowers, Jordan (University of Texas at Austin)

[386] *Exploring Settlement Connectivity in the Lower Ave River Valley (Northwest Iberia) during the Iron Age Using Least-Cost Path Analysis*

During the Late Iron Age, the Ave River Valley of Northern Portugal was one of the most densely populated areas of the Castro Culture, an archaeological culture in Northwest Iberia. Settlements at this time varied in size from small agricultural sites to large urban hillforts. In this poster, I explore the movement of people, and, by connection, goods and ideas, between the settlements of the Lower Ave River Valley. I use GIS to identify least-cost paths between settlements over land, rivers, and a combination of these two that include natural barriers to travel, such as steep slopes and river cataracts. The goal of this project is to better understand the connections between settlements and their inhabitants, as well as barriers to connection during this time period.

Bowser, Brenda (CSU Fullerton)

[308] *Discussant*

Boyd, Carolyn (Texas State University)

[305] *Images-in-the-Making: Process and Vivification in Pecos River Style Rock Art*

The Lower Pecos Canyonlands of southwest Texas and northern Mexico are home to one of the most sophisticated and compositionally intricate rock art traditions in the world—the Pecos River style. This style is characterized by finely executed, polychromatic figures woven together to form mythic narratives. Artists depicted and vivified the actors in these narratives by means of semantically charged attributes, such as color, paraphernalia, and body adornments. However, also integral to image-making and equally charged with meaning is the mural's placement on the landscape, its interaction with the rock surface, the interplay of light and shadow, the order in which artists applied paint to the wall and modifications made to painted image through incising and rubbing. By analyzing these aspects of the image-making process we can begin to identify choices made by the artist in the production of the art. These choices reflect the framework of ideas and beliefs through which the artists interpreted and interacted with the world. Images-in-the-Making will demonstrate the effectiveness of this approach using examples from Pecos River style rock art.

[305] *Discussant*

[305] *Chair*

Boyd, Jon (Pima Community College)

[125] *Footprint Analysis of the Sunset Road Rillito Fan Site, AZ AA:12:788(ASM)*

In March 2016 a study investigating human footprints discovered at the Rillito Fan Site, AZ AA 12:788(ASM), located in Pima County, Arizona, was conducted by Pima Community College archaeology staff and students, in partnership with other Pima County-based archaeological organizations. This poster looks at the results of the footprint analysis of multiple sets of tracks that were examined, including one set of tracks that had such a remarkable level of preservation the weave of the sandal could be seen. The study allowed a greater understanding of movement through the site, numbers of individuals, and body and head positions. The County was able to use this information to support further investigation of the extent of the site to the southeast.

Boyd, Siobhan [350] see Cossin, Zev

Boytnner, Ran [87] see Austin, Anne

Boytnner, Ran [200] see Dodd, Lynn

Boytnner, Ran (Institute for Field Research)

[157] *Introduction: Out-of-the Box Archaeology Session*

In 2017, a group of leading archaeologists published a manifesto calling for the advancement of synthetic archaeology. In their manifesto, they wrote that "Among the benefits that archaeologists should deliver to the public are rigorous, evidence-based narratives of what happened in the past and how these events shaped today's world" (p.11000). We took this task to heart. But instead of emphasizing the synthetic nature of archaeology, we wanted to highlight its relevance. We choose to do this through the presentation of highly innovation projects that choose to work on issues not usually associated with traditional archaeology. This group of papers will demonstrate how rigorous archaeological methods may be applied to issues highly familiar in our daily lives and provide significant insights that are relevant, fascinating and informative of human culture and human behavior. These are not your grandfather archaeology but projects and ideas that are truly out-of-the-box.

[157] *Chair*

Boza Cuadros, Maria Fernanda (Syracuse University)

[53] *Mirages of the State: Maritime Landscapes of Southern Peru at the Beginning of the Republic, 1821-1879*

The intersection of trade regulation and geopolitical reconfigurations that followed Independence from Spain in 1821 gave the Peruvian coasts new importance in the Post-Colonial Period. Global commodity trade was an inherently

maritime endeavor and aided in the consolidation of a new oceanic world in the Pacific basin during the mid-nineteenth century. Importantly in the case of Peru, the first boom-and-bust cycle of the Republic was bird guano from the nearby Pacific islands. The ports, coves and other coastal areas gained new importance as the country's political economy underwent a maritime turn. In this paper, I employ a landscapes perspective and build on archaeological, cartographic and documentary data to understand this maritime turn as it unfolded along the southern coast. This region, which today spans southern Peru and northern Chile, experienced a faster post-independence economic recovery than the rest of the country in good part due to its links to foreign traders. As it is shown here, the southern ports became loci of contestation where the pulses of capitalism took local form, notions of power and authority were reformulated, and national belonging took new meanings.

Bracken, Justin (CUNY Graduate Center)

[345] How Monumental Architecture Directs Movement: Defensive and Hydrological Features at Muralla de León

Tracking patterns of everyday movement by individuals within a local population offers deep insight into the spatialized social structure of the group, providing information such as who interacts with whom, which areas are public and which are private, and the tightness or openness of different social circles. Like most human activity, though, movement is ephemeral, leaving only indirect traces of its existence. While archaeologists cannot hope to reconstruct daily movement within societies from the distant past on a granular, individual level, increasingly robust approaches are being developed to assess the bigger picture. Everyday paths of travel are strongly influenced by the natural and human-altered local terrain, which imposes barriers and conduits to movement in ways both physical and conceptual. The work presented here begins by addressing the physical impact of constructed monumental features upon such paths. An encircling rampart wall and associated hydrological features at the site of Muralla de León are the focus of the study, which uses Least Cost Path and other GIS analyses to understand their tangible alteration of potential movement. This first analysis is then measured against parallel conceptual interpretations of the space.

[234] Moderator

[234] Discussant

Bradley, Brenda J. [286] see Forst, Jannine

Bradley, Bruce [261] see Hughes, Tyson

Bradley, Cynthia (Primitive Tech Enterprises, Inc.)

[259] Remaking the Mazeway: Pueblo Bonito House Society, Redux, at Wallace Ruin

In contrast to the ubiquitous Ancestral Pueblo practice of residential burial, at least 32 deceased were transported 10 kilometers or more for deposition within the Wallace Ruin great house. This Chacoan outlier, situated near Mesa Verde, Colorado was a ritual-economic center c. AD 1060-1150. Upon the collapse of the Chacoan system, habitation of this building, three great houses nearby, and all domiciles within several kilometers ceased. Between c. AD 1180 and 1220 a minimum of six rooms were used as a Pueblo III mortuary facility for a series of primary burial deposits. The interrogation of this anomaly involved a bioarchaeological approach that included spatial and statistical analyses of mortuary location choices. The diachronic analysis of c. AD 1050-1300 data from roughly 100 San Juan Region sites and about 1200 primary burial deposits revealed several ways in which post-AD 1180 mortuary decisions involving Wallace Ruin departed from longstanding communities of practice. The evidence detailed here supports the proposition that the Pueblo III use of this former Chacoan great house entails a Mesa Verde region reformulation of ancestor veneration protocols established by Pueblo Bonito house societies during Pueblo II times.

Bradley, John [252] see Brady, Liam

Bradley-Lewis, Neeshell (Appalachian State University), Larry R. Kimball (Appalachian State University) and Keith C. Seramur (Appalachian State University)

[120] The Use of Geophysics to Image Structures at Broyhill Mound (31CW8)

Geophysical surveys were conducted at the Broyhill Mound, a protohistoric late Burke village in the foothills of the Southern Appalachians ~30 km northeast from Fort San Juan/Berry (1566-1568), to guide investigations. The site was first discovered by John Rogan for Cyrus Thomas in 1883, and then rediscovered by Richard Polhemus in 1964 and Appalachian State University in 1995. Field schools have expanded these tests in 2012, 2014, 2016, and 2018. In 2012 a 3-D model of GPR data showed the presence of subsurface intrusions and initial results suggested a large deep anomaly at a depth of 50 cm BS. In 2018 a magnetic susceptibility survey was conducted across this same area. Field school excavations exposed a 7m diameter protohistoric Happy Valley Phase structure with a semi-subterranean floor and associated post holes – which are yet to be excavated. This investigation and these results are presented herein.

Bradshaw, Kayla (SWCA Environmental Consultants)

[135] New Perspectives on Cultural Heritage Protection Informed by Public Opinion Surveys

Despite past cultural resource protection efforts, looting remains a prevalent issue throughout the U.S. While the laws may be adequate, current methods of and emphasis on detection and enforcement of these crimes are not. This paper discusses new perspectives on cultural heritage protection based primarily on the results of two surveys. The first involved Wyoming archaeology advocates and members of the public within highly-looted parts of the state and focused on assessing public perceptions and attitudes towards archaeology in Wyoming. The second is the 2018 American Perceptions of Archaeology Survey conducted on behalf of the SAA. Such concepts include a new, organized approach to methods for detecting looting; Archaeological Violation Investigation and Damage Assessment training for those involved in detection and prosecution efforts; incentivized detection and prosecution efforts and media focus on successfully prosecuted cases to emphasize the impacts and seriousness of ARPA punishments and make them more common-knowledge; incorporation of Native perspectives establishing a tangible connection to the collective past; influencing societal norms through ethics/morals-based educational efforts targeted at the future generation; and the continuation and expansion of site stewardship programs.

Brady, James [360] see Campos, Cinthia Marlene

Brady, James (Cal State L.A.)

[360] *The Planned Conversion of a Sascabera into a Man-made Cave: Evidence from Chichen Itza*

During the construction of a plaza group on a 5 m high raised platform, a sascabera was excavated into the hill that formed the nucleus of the group. The original circular opening in the cap rock was carefully maintained. When the platform was completed, the northern end of the sascabera was filled with rubble and smoothed to form the base of the platform. A floor-to-ceiling retaining wall was built against the rubble to protect the southern portion. The circular entrance now permitted entry into the cave-like chamber. The planning was such that the opening and chamber were placed in the center of the plaza on the platform. A capstone in the form of a possible turtle was found near the entrance. Over 2300 sherds were recovered from the small chamber. A number of sherds were covered with calcium carbonate, indicating that they had been redeposited from a cave. Additionally, a stalagmite in the form of a phallus was found. Clearly, the Maya had plans to create a cave from the time that the sascabera was begun and presented a clear message of their intent by caching vessels from another cave in this space.

[360] Chair

Brady, Liam (Monash University), John Bradley (Monash University), Karen Steelman (SHUMLA

Archaeological Research & Education Center) and Amanda Kearney (University of Adelaide)

[252] *The Process of Interpretation: The Antiquity of the Namurlanjanyngku and Post-Contact History in Yanyuwa Country, Northern Australia*

The search for meaning in rock art has been the focus of scholarly attention and debate for decades. A common feature that unites many of these studies is what the enquiry produces – for example, what a motif represents. However, studies focussing on the processes by which meaning is generated are, comparatively speaking, fewer in number. In this paper, we explore how Yanyuwa Traditional Owners from northern Australia engage with meaning and interpretation of radiocarbon dates for motifs linked to well-known spiritual beings. Our case study is a large sandstone rockshelter on the west coast of Vanderlin Island called Kammardaringabaya. Here, hand prints and hand stencils cover the shelter walls and roof, and are said by Yanyuwa to be the work of the namurlanjanyngku. In 2017, we began a collaborative dating project aimed at identifying the antiquity of the namurlanjanyngku. While Yanyuwa understandings of the namurlanjanyngku and their rock art are embedded in narratives concerning events from the Dreaming, Yanyuwa interpretations of the relatively recent radiocarbon dates (post-European arrival) add another layer of meaning to the site that continues to not only reinforce the complex relational structure the motifs are embedded within but also engagement with Yanyuwa post-contact history.

Brady, Niall [224] see Connell, Samuel

Bragdon, Kathleen (William and Mary)

[414] *The Materiality of Authority: 17th Century Native Leadership in Colonial New England through the Lens of Value Theory*

The practices of men and women leaders in Native Southern New England pose a number of interesting questions for scholars interested in the intersection of materiality and value. In the 17th and early 18th century, Native leaders claimed authority through descent, colonial patronage, and/or religious practice. Central to their success moreover, was presentation and performance, marked by the deployment of distinctive dress and other salient objects. This paper employs documentary, archaeological and comparative ethnographic data to explore the variety of ways in which Native leaders negotiated the upheavals of the early Colonial period through strategic performative display.

Braje, Todd [174] see Elliott Smith, Emma

Braje, Todd (California Academy of Sciences), Hannah Haas (Rincon Consultants), Matthew Edwards (San Diego State University), Jon Erlandson (Oregon Museum of Natural and Cultural History) and Steven Whitaker (Channel Islands National Park)

[368] *Trans-Holocene Human Impacts on Endangered California Black Abalone (*Haliotis cracherodii*) Population Structures: Historical Ecological Management Implications from the Northern Channel Islands*

Black abalone (*Haliotis cracherodii*) were an important subsistence resource in southern California for 10,000 years, first for coastal Native Americans, then as a commercial shellfishery. By 1993, however, black abalone populations declined dramatically, resulting in the closure of the California fishery. Recently, black abalone are showing signs of population rebound along some Channel Island shorelines, including the presence of juveniles and increasing densities. We analyzed black abalone size data from San Miguel Island at prehistoric and historical archaeological sites spanning the last 10,000 years and compared these populations to those described by Channel Island National Park biologists between 1985 and 2013. We found a statistically significant relationship between SST and black abalone size distributions during the ancient record, along with dramatic shifts in population size structure towards larger individuals between the nineteenth century and modern periods. Our study provides a deep historical perspective of abalone population size distributions, patterns within these distributions through time, and parallels to modern abalone populations, and may help managers determine whether the current (and future) size and age structure of black abalone populations around the northern Channel Islands are "natural" and healthy.

Brandenfels, Naomi [211] see Pezzutti, Florencia

Brandl, Michael [406] see Martinez, Maria

Brandt, Steven (University of Florida), Benjamin Smith (University of Florida), Abebe Taffere (University of Florida), Elisabeth Hildebrand (Stony Brook University) and Brady Kelsey (University of Florida)

[32] *Mochena Borago Rockshelter and the Southwest Ethiopian Highlands as a Late Pleistocene Hunter-Gatherer Refugium: The Current State of Research*

One of the long-term goals of the Southwest Ethiopia Archaeological Project (SWEAP) is to test the hypothesis that the SW Ethiopian highlands were a major refugium for plants, animals, and hunter-gatherer groups during the very arid periods of MIS 4 (~72-59 ka) and MIS 2 (~27-12 ka). In highland Wolaita, SW Ethiopia, Mochena Borago Rockshelter (MB) allows us to explore the archaeological record of these critical time periods. Within the 70-m wide shelter, excavations since 2015 have focused on the central area, revealing deposits that clearly date to >50 ka, and probably much earlier. Framed by current knowledge of early Late Pleistocene paleoenvironments in the Horn of Africa, we review recent research at MB, including 1) problems and prospects of chronometrically dating >50ka deposits by obsidian hydration, argon/argon and tephrochronology; 2) analysis of lithic (flaked stone) assemblages from these deposits, which represent Mode 3, 4 and 5 technologies (including Nubian), but have lower proportions of obsidian and higher percentages of non-obsidian volcanic toolstone than younger contexts in the MB Pleistocene sequence; 3) higher frequencies of ground stone artifacts, many of which are stained with ochre most likely retrieved from the shelter walls; and 4) current and future archaeobotanical research.

Brandt, Steven [82] see Jones, Mica

Brannan, Stefan (New South Associates) and Jennifer Birch (University of Georgia)

[23] *Comparing Middle Woodland and Mississippian Period Agglomerations in the Eastern Woodlands of North America*

Large aggregated settlements have been a persistent feature of the settlement landscape of the Eastern Woodlands of North America for more than 3000 years. By the turn of the first millennium ephemeral agglomerated settlements become common settings for the enactment of practices and traditions that presage the next thousand years of cultural development. The Middle Woodland period (ca. A.D. 1-600) featured sites that hosted macroband aggregations. These included large-scale seasonal events as well as repeated visits to and utilization of the same locations in the landscape. This included the construction of monumental architecture (mounds) and earthworks and group-affirming mortuary practices. Later, in the Mississippian period (ca. A.D. 1000-1550), people came together again into relatively permanent large, aggregated settlements that have traditionally been characterized as chiefdoms. In this paper, we take an approach that draws upon the global literature on and theoretical perspectives that have been applied to ephemeral agglomerated settlements to explore qualitative and quantitative differences between Middle Woodland and Mississippian period aggregations. Our results suggest that these cases are more similar than they are different in terms of: 1) What brought people together, 2) The practices that facilitated and maintained them, and 3) Why they eventually dissolved.

Branson, Emma [290] see Bowen, Corey

Brantingham, P. Jeffrey (UCLA), Randy Haas (UC Davis Anthropology) and Todd Surovell (University of Wyoming Department of Anthropology)

[175] *One Thing Leads to Another: Causal Triggering among Archaeological Events*

A causal connection between archaeological events is frequently little more than a convenient assumption. The repeated occupation of a site, the occurrence in time and space of a ceramic ware, or the phases of settlement construction are all assumed to reflect some causal sequence, but it is far from clear how we should detect and quantify such causation. Without direct evidence of causation, it is difficult to argue for ancestor-descendant relationships, compromising our ability to make evolutionary inferences. This paper extends self-exciting point process models for estimating causal dependencies between events in space and time. We argue that ancestor-

descendant relationships are more plausible when we can demonstrate spatio-temporal statistical dependence between events. We explore this problem using a large radiocarbon database from North America to estimate the date of first human colonization.

Brantley, Sandra [357] see Wells, Rebecca

Braswell, Geoffrey [103] see Otto Mejía, Raquel

Braun, David [115] see Oppenheim, Georgia

Braun, David (George Washington University), Tyler Faith (University of Utah), Benjamin Davies (University of Utah), Mitchell Power (University of Utah) and Matthew Douglass (University of Nebraska-Lincoln)

[247] Building Expectations to understand the Evolutionary Significance of Archaeological Assemblages

Although the past thirty years has witnessed tremendous advances in our understanding of the geographic and temporal scope of the Paleolithic record, we still know remarkably little about the evolutionary and ecological consequences of changes in human behavior. Are there events in human evolution that dramatically change how humans interacted with their surrounding environment? Recent inquiries have suggested that human evolution reflects a long history of interconnections between human behavior and their surrounding ecosystems (e.g. niche construction). Yet developing expectations to identify such phenomena is remarkably difficult. These long-term dynamics require an understanding of emergent phenomena that alter selective pressures over multiple generations. Generative models show remarkable promise for probing these potentially unexpected consequences of human-environment interaction. Here we describe preliminary agent-based models that can be used to develop predictions about how changes in human land use can be detected. In particular, we describe models that can be used to develop expectations for empirical measures of archaeological lithic assemblages. We explore other potential proxies of behavior and how modelling may provide expectations for a variety of different phenomena.

Braun, Gregory [301] see Michelaki, Kostalena

Bray, Tamara (Wayne State University) and Leah Minc (Oregon State University)

[355] Comparative Analysis of Imperial Inca Pottery from Ecuador using INAA

An enduring question in Inca archaeology concerns the issue of imperial pottery production. Inca ceramics, which are found across an enormous expanse of Andean South America, are known for their high degree of uniformity in vessel form, proportionality, and embellishment. How did the Inca manage the production of their signature style and achieve the level of standardization that they did? Early thinking assumed that imperial pottery was mass-produced in highly controlled workshops in the capital city of Cuzco and exported from there to points around the Empire. Subsequent studies at provincial Inca sites hinted that state pottery production and distribution was a more regionalized affair. Recent analyses of paste types and clay sources from various sectors now confirm that Inca pottery production was largely de-centralized and occurred at any number of locales throughout the Empire. The present study contributes to this picture by reporting on the compositional analysis of Inca ceramics from several key Late Horizon sites in Ecuador. Our findings indicate that imperial style wares in the northern Andes were manufactured locally in different regions. Further, within each region, these wares were produced in multiple paste recipes, implying a lack of centralized control of the manufacturing process.

Braymer-Hayes, Katelyn and Shelby Anderson (Portland State University)

[10] A Spatial Analysis of Ceramics in Northwestern Alaska: Studying Pre-Contact Gendered Use of Space

Activities and production among ethnographic Arctic peoples were primarily divided by gender. This research examines whether or not gendered division of labor extended to use of space in Birnirk and Thule era (1300-150 BP) houses through analysis of ceramic distribution patterns. We assumed that ceramics are an appropriate proxy for women's activities within the house, based on strong associations between women and ceramic production and use in the ethnographic period. We evaluated the spatial density of ceramics and other gender-specific artifacts using the HDBSCAN (Hierarchical Density Based Spatial Clustering of Applications with Noise) algorithm in Python, a programming language. HDBSCAN identifies discrete clusters of artifacts, as well as the stability of the cluster. We did not find evidence of gender specific use of space or specific activity areas within the house. There were confounding factors, including issues of sample size, house size, and depositional processes. Ceramics mostly clustered in house entrance tunnels, which is likely the result of cleaning or storage activities. In main rooms, clustering of all artifacts was idiosyncratic; male and female artifacts were not spatially segregated. While the results were inconclusive, they still are an important contribution to addressing questions of gender in the Arctic.

Breault, Sarah [394] see Ronsairo, Karleen

Breault, Sarah and Jeffrey Blomster (The George Washington University)

[398] Feasting and Performativity at Late Formative Etlatongo

Previous research on feasting in antiquity has demonstrated the importance of surface appearance and vessel form to interpret the performative aspects of rituals such as feasts. As part of the hosts' strategies, of particular importance are vessels that invoke exotic imagery and/or outside groups through iconography and or aspects of overall vessel design. Recent excavations at Etlatongo discovered a large cache of Yucuita phase (500-300 BCE) ceramics deposited following a feast; many vessels bear a strong resemblance to those produced at Monte Albán, an early urban center founded during the same period. The presence of goods that are distinctly similar to those from Monte Albán suggests a link between the hosts and urban center. This paper explores the significance of iconographic elements, with particular attention to their visibility and intended audience. Vessels were visually analyzed with particular attention paid to technique, angles of best visibility, and overall size of the vessel, complete design, and individual elements. This study contributes to ongoing discussions of iconography and leadership strategies in the Mixteca Alta at this time, and to considerations of the role played by objects in feasting and performing.

Breecker, Daniel O. [63] see Locker, Angelina

Breetzke, David**[145] "Quickly, bring me some wine, so that I may wet my mind and say something clever." Understanding the Viticulture Industry in Kentucky, Ohio and Indiana**

The agricultural industry in America was one of the most profitable industries of our past. This paper will focus on one important aspect of that industry. The viticulture industry was firmly established in Ohio, Indiana and Kentucky from as early as the 1800s. Unlike most agricultural industries, preparing, cultivating and harvesting grapes took the right property, great skill and a passion for wine. Even though the viticulture industry was ultimately crippled by a silent killer, remnants of this dynamic industry still remain. The purpose of this paper is to lay the ground work for research and recordation of this valuable Midwest agricultural industry.

Bremer, Jon (Santa Fe National Forest) and Anne Baldwin (Santa Fe National Forest)**[90] Managing Between Earth and Sky: Forested Landscape Cultural Resource Management in the Jemez Mountains**

Human use of the Santa Fe National Forest extends well back into the past. This use remains unbroken from the earliest occupation of the land by humans into the present. Unlike many other areas there has been no hiatus of human use. The ties of modern American Indian populations, the earliest of European occupations in the western United States and conquest and occupation by eastern American populations have all made their mark on the lands of the Santa Fe resulting in a dense and complicated archaeological record. This record provides challenges and opportunities for land managers seeking to meet the demands of local populations for traditional resources and facing the pressures of increasing visitation. This portrays the history of cultural resource management on the Santa Fe National Forest and presents trends in historic preservation on the Forest in collaboration with tribes, local communities and interest groups.

Brenan, Julia (Memorial University)**[87] Access to Information: The Case of Birch Island**

The recent archaeological project on Birch Island, Labrador, highlights questions of how digital data are used to gather and convey information to stakeholder communities, in particular, Indigenous groups with limited internet access in some remote locations. This paper questions if representing the research in a digital format is more effective than traditional alternatives that require less digital literacy and specialized equipment to access heritage. This will be done through data obtained during fieldwork and a review of the literature. Finally, this paper questions who has ownership over, and access to the digital data and how will these data be preserved and perpetuated after the project is over.

Brenan, Julia [271] see Lewis-Sing, Emma

Brennan, Ellen (National Park Service)**[21] Field-Based Decisions on Collection of Archaeological Materials: Monitoring and Ethics**

Cultural Resource Managers are faced with increasing challenges regarding collection of archaeological materials from site contexts. Increased visitation, information sharing through social media, and emerging forms of recreation taking people to previously unexplored areas, contribute to challenges to preserving previously unknown archaeological sites and the materials they contain undisturbed. Federal land managers are directed to manage archaeological resources in situ, "unless the removal of artifacts or physical disturbance is justified by research, consultation, preservation, protection, or interpretive requirements" (NPS Management Policies 2006). To our tribal colleagues artifacts represent tangible evidence of their ancestors. Such items also represent intangible connections to past ways of life and add an ephemeral quality to archaeological sites that is irreplaceable. Materials gathered during data recovery projects are always curated for future study and use. Those from unexcavated archaeological contexts must be carefully evaluated to determine if collections should be made. Grand Canyon National Park cultural resource managers use monitoring information and field-based decision making to guide our actions regarding collection and curation of archaeological materials in otherwise in situ archaeological contexts.

Brennan, Michael [30] see King, Eleanor

Brennan, Tamira K. [97] see Nelson, Erin

Brennan, Tamira K. [357] see Betzenhauser, Alleen

Brenner-Coltrain, Joan [313] see Burrillo, R. E.

Breslawski, Ryan [127] see Jorgeson, Ian

Breslawski, Ryan (Southern Methodist University)

[128] *Evaluating Differential Animal Carcass Transport Decisions at Regional Scales using Bayesian Mixed-Effects Models*

Zooarchaeologists frequently face the problem of explaining uneven skeletal element representation, with explanations involving either non-human taphonomic agents or differential carcass transport decisions made by humans. Existing statistical methods for evaluating these explanations are generally applicable at the assemblage level but are not suited for larger spatial scales encompassing multiple assemblages: inferences about the dietary variables underlying regional skeletal element patterns are complicated by inter-assemblage variability in sample size, in taphonomy, and in the underlying transport behaviors of interest. Bayesian mixed-effects models offer a way to address these issues, allowing for analyses of the dietary variables that structured transport decisions across assemblages of varying sample sizes and taphonomic histories. An example application is provided with the late Pleistocene record of anthropogenic bison assemblages in North America, which have been long argued to reflect transport decisions differing from those in the Holocene. This approach is generalizable to any regional archaeofaunal record containing a common prey animal that humans procured and differentially transported, and therefore, could be applicable to the archaeological investigation of hunting economies in a diversity of contexts.

Breukel, Thomas [363] see Guzzo Falcí, Catarina

Brewer, Jeffrey [372] see Carr, Christopher

Brewer, Katherine [117] see Holsten, Jarrett

Brewer, Katherine (University of New Mexico)

[414] *A Comparative Analysis of the Reactions of Native Groups to Spanish Colonization*

As many archaeologists have shown in recent years, the native groups the Spanish encountered during their colonization of what is now the Southeastern and Southwestern United States were not passive recipients of Spanish culture. Rather, each group had their own reactions to the Spanish throughout the duration of said colonization, sometimes peaceful, sometimes not. By analyzing historical accounts and looking at the archaeological evidence, we will discuss the similarities and differences in how native people in these two regions navigated early contact and colonialism and the reasons behind those similarities and differences. We will also highlight the importance of such interregional comparisons in understanding the totality of Spanish colonization in the New World.

[226] *Moderator*

[226] *Discussant*

Brewer, Simon [128] see Yaworsky, Peter

Bria, Rebecca (University of Minnesota - Twin Cities)

[181] *The Legacy of Early Fire Rituals: The Social and Spatial Prominence of Hearths after Kotosh at Hualcayán, Peru*

Scholars have long considered how the use of ritual hearths in early Andean temples, specifically those part of the Kotosh Religious Tradition, was central to early complex social practices in highland Peru. But what is the legacy of hearths as ritual spaces, objects, and tools for the transformation of materials in places where Kotosh was eventually rejected and replaced? To explore this question, this paper examines hearth rituals at Hualcayán (Ancash, Peru) spanning 1800–1 BC. Hualcayán's early temple was a mound featuring Mito-style Kotosh enclosures

where burning was an intimate rite visible only to people gathered within. By 1200 BC, people covered their last Kotosh enclosure and later burned fires in exclusive performances atop a small prominent platform—a practice that endured in the same location between 900 BC and at least AD 200, or during and after Chavín's religious influence. Fire also became important to other Chavín-era ritual activities, such as to produce ash for interring children in the mound. Thus, although hearth ceremonies changed drastically, fire maintained ritual prominence. This paper reviews these ritual and spatial patterns of burning at Hualcayán in order to reconsider the centrality of ceremonial hearths after Kotosh during Central Andean Formative Period.

[181] *Chair*

Bria, Rebecca [289] see Dahl, Ellen

Bridges, Dusti (Cornell University) and Kurt Jordan (Cornell University)

[145] *Toward a Household Archaeology of the Onöndowa'ga:’ (Seneca Iroquois) White Springs Site, circa 1688-1715 CE*

The Onöndowa'ga:’ (Seneca Iroquois) White Springs site near Geneva, New York, was occupied circa 1688-1715 CE. The town, approximately 3.4 hectares in size and likely palisaded, was founded in the aftermath of the 1687 French-led Denonville invasion that destroyed several Onöndowa'ga:’ towns and most of their agricultural fields. Cornell University-sponsored fieldwork took place at the site from 2007 to 2015, focusing on the impact of warfare and adverse political-economic conditions on Onöndowa'ga:’ community structure, house forms, and material practices. Portions of four longhouse structures were uncovered during these excavations, including well-contextualized samples of material culture and faunal and botanical remains, creating the opportunity to compare households across the site. The material traces of everyday practice within these domestic spaces attest to the economic and political strategies and cultural practices of household units within a community under duress. External spaces of activity associated with specific longhouses allow investigations of public activities and community-strengthening practices among the tightly-clustered households. This study presents preliminary findings on the domestic areas of the White Springs site, exploring these spaces as sites of household-centered and community-oriented responses to warfare and challenging conditions.

Brierty, Ann [252] see Olsen, Nancy

Briggs, Garrett [244] see Atencio, Cassandra

Briggs, Rachel (University of North Carolina-Chapel Hill)

[308] *Maize, Womanhood, and Matrilineality: A Study from the Mississippian Site of Moundville, Alabama*

Ethnohistoric and ethnographic evidence demonstrates that various factors can influence kinship patterns, but among the most influential are those related to subsistence. However, such findings are rarely applied to the prehistoric American South, where researchers largely project the matrilineal descent of historic Native groups into the pre-Columbian past. While the widespread practice of this matrilineal descent does suggest prehistoric origins, the notable shift from small-scale horticulturalists and agriculturalists of largely endemic plants during the Woodland period to large-scale agriculturalists of the introduced maize plant in the Mississippian period deserves closer attention. Here, I use complementary lines of archaeological evidence to suggest the practice of matrilineality in the Mississippian Black Warrior River Valley of west-central Alabama replaced an endemic Late Woodland system of patrilineality. I suggest that this change was triggered by the widespread adoption of a number of practices related to maize agriculture that can broadly be summarized as “Mississippian womanhood.”

Bright, Leah [39] see Emily Kaplan

Brighton, Stephen (University of Maryland)

[83] *Memories of the Past and Its Impact in the Present: Conceptions and Misconception of the Irish Immigrant Experience in the United States*

Alienating immigrant groups is not something unique to this generation. Immigrants to the United States, long before labeling human beings legal or illegal was commonplace, have been deemed either desirable or undesirable, moral or immoral, valued or value-less. Such categorizations have had a debilitating impact on the daily lives of immigrant collectives. To unmask this neglected and overlooked aspect of the immigrant experience in the U.S., archaeology must bring to light not only the impact of U.S. policy alienating immigrant communities over time, but more importantly its material signature as it reflects the experiences and daily lives of immigrant collectives. The aim of this presentation is to highlight my research of the 19th and early 20th Irish immigrant laboring communities in the United States as an entry point confronting the exclusionary nature of U.S. immigrant policies over time. Moreover, the paper includes a discussion of the research's potential to be used in confronting present-day issues of alienating U.S. policies and public sentiment, as well as provide an intimate human portrait to the thousands of people cast aside.

Briles, Christy [254] see Loven, Jeremy

Bringelson, Dawn [45] see Mahoney, Gosia

Brinkman, Adam (UMass Boston)

[414] *Served on a Pueblo Soup Plate: Food Preparation, Serving, and Identity in Early Colonial New Mexico*

Spanish colonists living on estancias and missions in 17th century New Mexico used Pueblo Indian produced goods for their much of their daily practice. This included the use of sandstone cooking griddles, ceramic serving bowls, cooking jars, and soup plates. While the use of Indigenous ceramics in Spanish households has received a significant amount of research in other contexts, this practice has not been studied in depth in early colonial New Mexico. By analyzing the practices of cooking, serving, and eating in a New Mexican Spanish household – I seek to understand how foodways and material culture worked to reify Spanish identity in 17th century New Mexico.

[414] *Chair*

Brisset, Elodie [33] see Fernandez-Lopez De Pablo, Javier

Brite, Elizabeth (Purdue University)

[154] *Home-making in the Khorezm Oasis (Karakalpakstan, Uzbekistan)*

A key feature of mobile pastoralism is the circulation of kin groups within a landscape, where movement is structured at least in part by the repeated return to places of social and ritual significance. Cultural anthropologists describe these as practices of “belonging made by moving,” where notions of lineal descent, home, and homeland are spatially and temporally inscribed on a landscape through the act of returning to dwell in places of ancestral significance. In this paper, I explore how the semi-settled, agropastoral populations of Central Asia’s Khorezm oasis may have practiced similar forms of home-making since the 1st millennium B.C. In Khorezm, mobility is enacted over the longue durée, with evidence of return documented in the recurrent re-inhabitation of settlement sites by both the living and the dead. I argue that these acts of return are more than pragmatic uses of landscape features for quotidian ends, and I highlight various sources of evidence that indicate such spaces are marked repeatedly in ways that make claims to kin, clan, and the household. Evidence of home-making through re-inhabitation practices in Khorezm serves as yet one more example of the ways this oasis may be viewed as part of the steppe world.

Britt, Kelly (Brooklyn College)

[228] *Moderator*

Britt, Tad, Mark Rees (University of Louisiana at Lafayette), Samuel Huey (University of Louisiana at Lafayette), David Watt (Tulane University) and David Anderson (University of Tennessee)

[251] *A Perfect Storm: Alternative Mitigation Strategies for Louisiana’s Gulf Coast*

A concatenation of natural and anthropogenic processes involving coastal erosion, subsidence and relative sea-level rise are obliterating evidence for millennia of sustainable human communities on Louisiana’s Gulf Coast. The Mississippi River Delta Archeological Mitigation (MRDAM) project is building on previous studies and datasets to understand and respond to coastal land loss. MRDAM is creating a database, establishing partnerships and undertaking consultations for inventory, evaluation and alternative mitigation of impacted and endangered cultural properties. The data are used to develop predictive statements for different environmental settings. This serves as a model for cultural heritage management in other coastal regions in crisis.

Brizuela-Casimir, Alvaro [330] see Fitzgerald-Bernal, Carlos

Brock, Amanda (University of Florida)

[350] *The Role of Women Following a Community Archaeology Project in Agua Blanca, Ecuador (1979-2018)*

The Agua Blanca community has participated in one of the most successful and sustainable community archaeology projects in Ecuador. Since the start of excavations in the Manabí region in 1979, archaeologist Collin McEwan and María-Isabel Silva have worked collaboratively with community members to excavate, interpret, and present findings about the Manteño culture of coastal Ecuador. When McEwan and Silva left Agua Blanca in 1995, the community assumed full agency over these projects in a sustainable community tourism practice. Much has changed in Agua Blanca since the project’s inception in 1979, including gender relations and women’s involvement in the project. My paper discusses how a shift in the women’s participation has shaped the successful development of the community archaeology project, and why it’s important for archaeologists to engage with such issues in future community collaborative research over time. Further, I seek to understand how the women perceive themselves as contributors to the project through craft production, decision making, and engagement in cultural activities.

Brock, Fiona [37] see Schulting, Rick

Brodbeck, Mark [114] see Stewart, Caitlin

Broderick, Lee [154] see Houle, Jean-Luc

Brody, Rachel (Boston College) and Andrew Bair (University of Denver)

[310] *The Use and Benefit of Integrated Geophysical Survey in the Study of an Irish Early Medieval Site Rath Maol*

This paper addresses the value of an integrated geophysical survey approach, which includes the application of GPR, DGPS, and magnetic gradiometry, to identify archaeological areas of occupation non-invasively. This approach was applied to RathMaol, as part of a larger ongoing research project, Castles in Communities, which encompasses several medieval sites, in the Connacht region of Ireland. These sites present the opportunity to study wide swaths of landscape as they changed over time, in a region that encountered both conflicts between local Gaelic lords and colonization by invading Anglo-Normans.

Integrated geophysical surveys allow for an improvement in our understanding of archaeological sites without the invasiveness of excavation and provide the opportunity to make educated decisions for targeted excavation. Here we present how integrating GPR and magnetic gradiometry, after adjusting for surface elevation changes, is used to analyze the interior and surrounding features of RathMaol. These geophysical techniques were merged and interpreted jointly to produce images of the stratigraphic units and objects found within and around Rath Maol to determine their extent and composition. The success of the data analysis methods performed at this site shows the interpretive potential of non-invasive geophysical techniques, both in Irish contexts and around the world.

Broitman, Bernardo [240] see Flores-Fernandez, Carola

Brokaw, Nicholas (University of Puerto Rico) and Sheila Ward

[30] *Connecting Archaeology and Ecology in Northwest Belize*

Some archaeologists believe that a key to the success of ancient Maya civilization was sophisticated tailoring of agriculture and forestry to varied environments. Some archaeologists and ecologists also think that ancient forestry is reflected in the tree species composition of modern forests. Based on studies in northwest Belize we suggest, first, that correlations among modern, landscape-level variation in soil, slope, and forest types show clear potential for sophisticated management. Second, we suggest that ancient Maya alteration of soil and slope by construction, agriculture, and erosion has broadly affected the forest that regrew on the ancient landscape. Third, we think studies to date that attempt to link modern forest composition to ancient forest management are flawed or open to interpretation, or show local effects on composition, at most. We present a framework for research on the effects of ancient land use on the modern Maya forest, including: 1) studying more post-conquest documents for information on historical Maya forestry, 2) systematic sampling for ancient plant remains along environmental gradients, 3) ground and remote-sensing studies to link tree species and forest types to landscape variation, and 4) "species distribution modeling" to compare likely composition of pre-ancient Maya forest with post-ancient Maya forest.

Brooke, Christopher [128] see Harris, Jacob

Brooke, Christopher (Nelson Mandela University), Curtis Marean (Institute of Human Origins, School of Human Evolution), Jacob Harris (Institute of Human Origins, School of Human Evolution) and Jan A. Venter (School of Natural Resource Management, Nelson Mand)

[368] *Using the Present to Uncover the Past: Reconstructing the Ecology and Behaviour of Extinct Large Mammals on the Palaeo-Agulhas Plain (South Coast, South Africa)*

Understanding the ecological role of extinct large mammals is an ongoing challenging research problem. The use of species traits (physical and behavioral) to characterize functional communities is becoming common in ecological modelling and is key to understanding the ecological role that species would have filled under historic conditions. This same approach may help elucidate the ecological role of extinct species. Here we illustrate this approach with extinct species of the Palaeo-Agulhas Plain (PAP) during the last glacial maximum. Using functional groups representing an array of characteristics displayed by similar species (e.g. social behaviors, stress response, forage choice, and interpretation of the landscape) we can understand the ecological niche that the extinct species of the PAP would have filled. To relate current behavior of large mammals to those that are now extinct we determined functional groups of extant species (southern and east Africa) using Principle Component Analysis combined with a hierarchical tree analysis. We then linked the extinct species of the PAP, through known taxonomic and feeding guild traits to the extant functional groups. This provides us with an understanding of the ecological and behavioral characteristics of extinct large mammals and the integral part these species played in the PAP landscape.

Brooks, Allyson [75] see Wollwage, Lance

Brooks, Allyson

[292] *Discussant*

Brooks, Mark [325] see Feathers, James

Brooks, Mark J. [122] see Moore, Christopher

Brophy, Kenneth [65] see Younger, Rebecca

Brosowske, Scott

[343] *Discussant*

Brosseder, Ursula (New York University)

[101] *The World of the Living and the World of the Dead - A Bronze Age Monumental Landscape in Central Mongolia*

The Bronze Age landscape in Mongolia is characterized by valleys with regularly arranged groups of monuments which are believed to represent the focus of a community. Depending on the ecology of the area the distance between such site clusters varies. This even distribution is punctuated by large concentrations of monuments at distinct places. Over the past years we have been conducting an in-depth-investigation of such a special locale, the cemetery of Maikhan Tolgoi located in the Upper Orkhon Valley of Central Mongolia. Additional surveys informs us about the spatial patterning of sites in the Upper Orkhon Valley as well as the locations of campsites. With our bioarchaeological approach we furthermore explore the social units who built this cemetery and discuss whether and in how far they are similar or distinct from the normal groups of monuments.

[101] *Chair*

Broughton, Jack [323] see Sykora, Lydia

Broughton, Jack (University of Utah) and Elic Weitzel (University of Connecticut)

[368] *Population Reconstructions for Humans and Megafauna Suggest Mixed Causes for North American Pleistocene Extinctions*

Dozens of large mammals such as mammoth, mastodon, and horse (i.e., "megafauna") disappeared in North America at the end of the Pleistocene with climate change and "overkill" the most widely-argued causes. However, the population dynamics of humans and megafauna preceding extinctions have received little attention, even though such information may be especially telling, as we expect increasing human populations to drive megafaunal declines if hunting caused extinctions. We present a novel test of this hypothesis here by using summed calibrated radiocarbon date distributions and simulations to reconstruct population levels of megafauna and humans. These results suggest that the causes for megafauna extinctions varied across taxa and by region.

Brouwer Burg, Marieka and Meghan Howey (University of New Hampshire)

[365] *Unbinding Diversity Measures in Archaeology Using GIS*

Several papers in "Quantifying Diversity in Archaeology" identified space as a critical factor in structuring diversity and called for whole landscape, regional-scale analyses to improve archaeological approaches to diversity. The capabilities of today's geospatial technologies were unimaginable at the time but now, the desire to analyze diversity across multiple sites from entire regions is easier to realize computationally. Nevertheless, key challenges identified by some of the papers in the original volume persist today. Of particular interest here is the challenge mounted by Cowgill: we need to understand what diversity means and how the categories we use to compute diversity are related to actual variation in past behavior(s) of interest. This paper will explore interconnections between ethnogeography and GIS and how combining indigenous cultural perspectives with spatial technologies can facilitate understandings of how sites may have been distributed in different "categories" across landscapes. Further, as Hurst Thomas wrote in his chapter, archaeologists need to understand the "strategic decision-making behind the mosaic of prehistoric cultural geography." By centering the experiences of people producing and, importantly, perceiving the variation extant in their landscape we aim to explore such cultural geographies and illustrate our ideas with case studies.

Brown, Blayne [259] see Markussen, Christine

Brown, David [129] see Stephen, Jesse

Brown, David (University of Texas at Austin), Mark D. Willis (Blanton & Associates, Inc.) and Chester P. Walker (Archaeo-Geophysical Associates, LLC)

[134] *More Than Pretty Pictures: A Decade of Aerial Imagery and Photogrammetry in Northern Ecuador*

Since 2007 our team has been conducting low level aerial reconnaissance in the northern highlands of Ecuador, a challenging environment with low air pressure, frequent high winds, misting rain, and rapidly alternating intense sun and enveloping low lying clouds. We struggled with our kites that initial year but managed to build the first high-resolution aerial map of an Ecuadorian Inka fortress. During subsequent years, the switch to drones and improved photo-analytical capacity opened a new world of visualization to us and our colleagues, though never without challenges from the difficult environment. Beyond the beautiful images of the Inka fortresses, mound sites, and haciendas that we were mapping, however, was the power of photogrammetry and 3D modeling in building not only precise images but offering a better overall structural understanding as well. Complex slope models and volumetric cut and fill calculations were among the analytical techniques we could bring to the first complete maps of the large earthen mound centers at Cochasquí and Zuleta, for example. Ultimately, the ability to analyze landscapes in real time became our standard, and in conjunction with powerful subsurface tools such as radar and magnetometry, such visualizations have become an essential tool for our investigations.

Brown, Dorcas [196] see Anthony, David

Brown, Emily

[272] *A Summary of Results of Survey of the Northern End of Guadalupe Mountain, Rio Grande del Norte National Monument*

For many years archaeologists working in the northern Rio Grande of New Mexico and southern Colorado have encountered a very fine-grained, dark gray or black material that has been identified as dacite. Dacite has previously been recognized as occurring in the Taos Plateau Volcanic Field at San Antonio Mountain and Newman Dome, and recent survey of 720 acres of the north end of Guadalupe Mountain in the Rio Grande del Norte National Monument found it naturally outcrops there as well. This paper presents the results of the survey with a discussion of settlement patterns, site formation processes, and differential uses of various lithic materials in the context of this lithic raw material source.

[272] *Chair*

Brown, James (Washington State University) and Galen Miller-Atkins

[393] *Building Nearest Neighbor Models of Hunter-Gatherer Settlement Systems Using Four Case Studies for the Northwest Coast of North America*

Spatial analysis of settlement patterns have traditionally focused on hierarchical city states. Seldom do settlement pattern studies use spatial statistics to characterize hunter-gatherer settlement systems. Through the application of nearest neighbor analysis this paper characterizes the settlement patterns for four sub-regions of the Northwest Coast of North America. The four case studies come from published datasets for Prince Rupert Harbour, the Outer West Coast of Vancouver Island, the Fraser River Canyon, and the Northern Coast of Vancouver Island. With each of these case studies and much of the Northwest Coast in general resources and habitable areas are highly localized and circumscribed. By virtue of living around large bodies of water, access to land becomes a resource itself. Many nearest neighbor models assume a homogenous landscape. The spatial models presented in this paper attempt to account for this heterogeneity considering rivers and bodies of water spaces that cannot be inhabited. By controlling for these external variables, point pattern analyses have the potential to describe the settlement distribution of groups in the Northwest Coast and, by comparing these results to other culture groups and time periods, aid in disentangling the relationship between political structure and settlement organization.

Brown, Kaitlin (University of California, Santa Barbara) and Linda Scott Cummings (PaleoResearch Institute)

[397] *Food Residue Analysis on Soapstone Cooking Vessels in the Chumash Homeland: Implications for Changing Foodway Patterns during the Mission Period across the Colonial Landscape*

This paper discusses the results of pollen, phytolith, starch, and organic residue (FTIR) analyses conducted on soapstone cooking vessels in museum collections uncovered in the Los Angeles and Santa Barbara areas, California. The vessels were excavated from distinct chronological and spatial contexts in the Chumash homeland: a pre-Mission period site (CA-LAN-243), inside the indigenous adobe apartments at Mission La Purisima (CA-SBA-520), and a historic Chumash village outside the mission space (CA-SBA-209). We show changing patterns in Chumash foodway practices during the Mission period, which include not only the consumption of new foods but also the incorporation of new subsistence technologies. In the pre-Mission period, the Chumash used soapstone vessels to cook ground grass seeds and roots/tubers. However, during the Mission period, the Chumash began to cook corn (*Zea mays*) in soapstone bowls in the mission, while outside the mission, at site CA-SBA-209, we found evidence of wheat that was cut with a threshing sledge—an introduced Spanish technology. These findings parallel recent colonial studies that evaluate the changing socio-political landscape and highlight the dynamic interplay of Spanish and Native interactions in the creation of new practices and shared social identities.

Brown, Kathryn [217] see Lytle, Whitney

Brown, Kenneth [357] see Wells, Rebecca

Brown, Kyle [32] see Schoville, Benjamin

Brown, Linda (University of New Mexico) and Kitty Emery (Florida Museum of Natural History, University of Florida)

[358] Negotiating with the Lord of Wild Animals: Maya Ritual Practices and the Distinctive Life-Histories of Animal Bones

In various contemporary Maya communities, hunting involves careful negotiations among various active agents – human and other-than-human – involved in the hunt. A pivotal actor in these negotiations is the deity known as the Lord of Wild Animals, the supernatural gamekeeper of the wild species in the forest. Hunters must maintain strong reciprocal relations with the Lord of Wild Animals, who must be approached, propitiated and appeased via proper ritual channels before and after a hunt. Ethnographic records of the activities and objects associated with the hunter's ceremonial obligations suggest that despite regional variability, some actions and objects are consistent across the Maya area. Among these is the special treatment and disposition of bones from successfully hunted creatures. Archaeological iconography documents a great antiquity for these negotiations suggesting that material markers, in the form of evidence for distinctive animal bone life-histories, might also be recognized in the archaeological record. In this paper, we examine contemporary hunting-related ritual practices and how they might impact deposition and recovery of materials including animal bones and associated artifacts. We use these data to suggest archaeological material markers that could point to the role of supernatural animal guardians in the past.

Brown, M. Kathryn [92] see Dixon, Neil

Brown, M. Kathryn [199] see Yaeger, Jason

Brown, M. Kathryn (The University of Texas at San Antonio) and Jason Yaeger (University of Texas at San Antonio)

[345] The Sacred Landscape of Xunantunich, Belize

Early Maya communities centered themselves within a broader sacred landscape imbued with meaning through ritual practices. Centuries of movement through the landscape converted spaces into places that were deeply rooted in cosmology and social memory. Ritual practices at the center of the community and important places in the cardinal or inter-cardinal directions were integral to establishing the community's sacred center and maintaining cosmological order. These important places include natural features such as hilltops and caves, as well as constructed features such as platforms and pyramids. In this brief presentation, we discuss the sacred landscape of Early Xunantunich during the Preclassic period and highlight changes and transformations that occurred during the Classic period.

Brown, Marley

[295] Convergent Pathways of Enslaved Materialities: The Case of Eighteenth-Century Bermuda and Virginia

2019 marks the four hundredth anniversary of the arrival to the first Africans to Jamestown, Virginia's founding colony, individuals captured by English privateers from a Portuguese slaver on its way to Vera Cruz, Mexico. Many captives in the same cargo were taken the same year to Bermuda, England's other colony controlled by the same joint stock company. What happened to the Africans brought to these earliest of England's New World colonies? Archaeological evidence recovered over the last thirty years from excavations in Tidewater Virginia and Bermuda demonstrate a complex dialectic of accommodation and resistance in the material lives of the respective enslaved populations of the two colonies, a dialectic that can be best interpreted using a conception of the "innovative materiality of revitalization" first developed by Matthew Liebmann for understanding the fate of the Jemez during the period of the Pueblo revolt. This model helps explain both the increasing participation in the transatlantic consumer economy by Virginia and Bermuda enslaved people, and their important revival of West African ritual practices. The value of this model to these case studies supports a more unified approach to the study of both indigenous historical archaeology and that of the African Diaspora.

Brown, Mary and Alexander Kurota (Office of Contract Archaeology)

[413] Limonite as Evidence for Pottery Manufacture at Jornada Mogollon Sites

Recent fieldwork at Cottonwood Spring Pueblo and other Doña Ana and El Paso phase sites in New Mexico's southern Tularosa Basin consistently reveal evidence of pottery manufacture. Pieces of natural and worked limonite have been found in proximity to jar fragments with a yellow coat of paint on their interior and sometimes exterior surfaces. Chupadero Black-on-White, El Paso Polychrome and El Paso Brown jars appear to be the primary types used to hold paint during the process of decorating vessels. Once fired, limonite turns red, which was used to produce either the red paint or red slip for creating El Paso Bichrome and El Paso Polychrome painted designs.

Brown, Matthew [289] see Bélisle, Véronique

Brown, Matthew and Véronique Bélisle (Millsaps College)

[289] A Study of Social Inequality at the Andean Prehistoric Site of Ak'awillay

While most research on emerging inequalities in prehistoric societies has focused on the elaboration of inequality in villages and polities on the periphery of large states, less attention has been placed on settlements existing outside

influential regional centers. In this paper, we present the case of the Andean Middle Horizon (600-1000 C.E.) site of Ak'awillay, one of the largest villages in the Cusco region at the time of Wari colonization. Ak'awillay presents an interesting case to study the elaboration of inequality because of its long tradition of interaction with the nearby Cusco Basin, its low incidence of violence during the Middle Horizon, and its apparent isolation from Wari colonists. In this paper, we compare two domestic groups excavated at Ak'awillay to verify the existence of an elite group and assess wealth and prestige differences between the two areas. Analysis of ceramic and obsidian densities, ceramic distribution, architecture, and burial offerings reveals minor wealth differences, suggesting that inequality was not fueled by the manufacture and exclusive circulation of sumptuary goods. However, the presence of a public building that likely held feasts points to differences in prestige that relied on the production of food and beverages.

Brown, Samantha [34] see Swift, Jillian

Brown, William (Department of Anthropology, University of Washington)

[127] *Inferences about and Inferences from: A Comparison of Kernel Density Estimation and Latent Mixture Modeling in Demographic Temporal Frequency Analysis*

Temporal frequency analysis (TFA) comprises methods both for the characterization of temporal distributions of archaeological samples and for drawing inferences about their underlying data generating processes (DGPs). In motivation, these two activities resemble descriptive and inferential statistics, respectively. However, several sources of uncertainty confront archaeological chronometry, necessitating engagement in statistical inference at both levels. Perhaps because of this, the demarcation between 'inferring about' and 'inferring from' in TFA has frequently been blurred, accounting for some of the contention surrounding interpretations of temporal distributions rendered through histogram aggregation, probability summation, and most recently kernel density estimation (KDE). In TFA's demographic applications, 'inferring from' is arguably the more relevant activity, incentivizing efforts to identify methods specifically well-suited to DGP recovery. While KDE has often been favored over parametric methods in this capacity for its purportedly superior ability to accommodate inconveniently complex DGPs, it also only yields single-shot estimates thereof. Furthermore, it requires single-point measures of, or guesses at, the timestamps anchoring archaeological samples to the timeline, at odds with probabilistic chronometry. Here I advocate an alternative approach – latent mixture modeling – which resembles KDE in form, flexibility, and output, yet which is better-suited to probabilistic chronometry, likelihood-based model-fitting, and uncertainty quantification.

Browne Ribeiro, Anna (University of Louisville)

[393] *Amazonia as a Perpetual Elsewhere: The Possible and the Permissible in "Natural" Landscapes*

Amazonia is the consummate, perpetual, wild jungle. Despite a century of archaeological research pointing to rich, complex, and culturally diverse ancient societies, and twenty years of mounting geoarchaeological evidence for densely settled Precolumbian towns, many people still imagine Amazonia as a pristine, primordial forest. In this paper, I dig deep into ideas about forests, climate, and moral geographies, which continue to govern how we think about places like Amazonia. I examine how archaeological tendencies toward ecological analysis – among our most grounding and dependable tools – can lead to determinative thinking about possibilities for sociality in particular places. Beyond a critique of ecological determinism, my analysis traces the history of moral geographies. Once sustained by beliefs in the influence of celestial bodies or beings on their terrestrial counterparts, 18th-Century moral geographies found purchase in scientific regional classifications grounded in botanical, climatic, and geographic knowledge. Enlightenment-period narratives about Eurasian societies foregrounded civilization, while in the Americas, nature and catastrophe prevailed. Taking Amazonia as a case study, I consider the extent to which archaeological arguments about places considered "natural" balance explanations emphasizing ecology and catastrophe with those grounded in indigenous knowledge or sociality. Can we, as a discipline, write new moral geographies?

[59] *Discussant*

Brownstein, Korey [211] see Damitio, William

Brownstein, Nathan (Millsaps College), Betsy Kohut (Millsaps College) and George J. Bey III (Millsaps College)

[372] *Obsidian Geochemical Sourcing at Hunchimul, Kiuic and Escalera Al Cielo in the Puuc Region, Mexico*

In recent years, the use of portable X-Ray Fluorescence (p-XRF) spectrometers has become increasingly common to determine the geological sources of obsidian artifacts. This study used p-XRF to obtain trace elemental data for 354 obsidian artifacts from the sites of Hunchimul, Kiuic and Escalera Al Cielo in the Puuc region of the northern Maya lowlands. These sites were heavily occupied during the Late and Terminal Classic periods [700-1050 AD] and research is ongoing. The elemental data for each artifact was compared to that of 31 known sources from Mexico, Guatemala, and Honduras in order to determine the geological source. The source data were then combined with chronological data obtained from the ceramics associated with each excavated context in order to compare the various obsidian sources utilized at each of the three sites. Results suggest that a variety of sources were used at each site and provide further evidence regarding the nature of obsidian exchange networks in place in the Puuc during that time.

Brucker, Ryan [94] see Sisneros, Brianne

Bruin, Alison**[171] Supply and Demand: Colonoware Creation and Spanish Ideals at San Luis de Talimali**

Colonoware is a type of ceramic frequently recovered from Spanish Colonial period sites in North America. Often colonoware is considered evidence of technological acculturation and Spanish- Native American interactions on the Spanish colonial frontier. The demand for ceramics outpaced the available supply and thus local indigenous potters made colonoware from local clays in desired or needed European styles. The degree to which the colonoware vessel forms identified at San Luis de Talimali, an Apalachee-Spanish site in La Florida, derive from Iberian ideals is tested using the Ceramic Organization in the Spanish Atlantic form classification system developed by Kathryn Ness.

Brumbaugh, Laura**[259] The Influence of Trade Networks on Great House Location in the Mesa Verde Region**

During the transition between the Pueblo I (A.D. 750-950) (PI) and Pueblo II (A.D. 950-1150) (PII) time periods in the Mesa Verde region, some PI settlements became the locations of PII great houses. No clear patterns have been discerned concerning why only certain PI communities generated great houses, but recognizing trends that distinguish these communities from others may provide insights into the processes of community formation in PII. This poster will discern potential motivations for great house location choice, which may encompass many factors: trade networks, landscape features, environmental factors, existing communities, and many others. Specifically, this research tests the hypothesis that PI trade networks were a factor in location choice. To do so, sites in the Mesa Verde region with both PI and PII great house occupations are compared to a control group of PI sites which did not have PII occupations. The frequencies of non-locally sourced materials in the artifact assemblages of these sites are analyzed. The results of this analysis are anticipated to indicate any significant differences in trade items found at the PI/PII sites compared to the sites with no PII occupation, to draw conclusions regarding the influence of PI trade networks on great house location.

Brunette, Jeremy (Los Alamos National Laboratory)**[90] Resetting the Anchor: Reconsidering a Historic Ranch in Remote Northern New Mexico**

This poster outlines a re-examination of historic Anchor Ranch on the Pajarito Plateau in north-central New Mexico. Anchor Ranch was developed as a modern, working cattle ranch on the western end of the Pajarito Plateau during the early twentieth century, and featured all of things you imagine when considering a cattle ranch at that time: cowboys, barns, tractors, livestock and fields growing cattle feed. The Ranch served a second purpose that is more difficult to see on the surface. The Ranch housed Alexander Ross Jr., who was intellectually disabled. This role was necessitated by the eugenics movement, in which people with intellectual disabilities were believed to be the source of social problems and were commonly institutionalized to be kept away from society. The buildings at Anchor Ranch were destroyed as part of the development of Los Alamos National Laboratory. This poster looks at the landscape and artifacts from Anchor Ranch with Alexander Ross in mind, and considers whether someone with an intellectual disability can be seen in the archaeological record.

Brusgaard, Nathalie (Leiden University)**[43] Rock Art, Animals, and Desert Landscapes: A Case Study from the Black Desert of Jordan**

In the late 1st millennium BC and the early 1st millennium AD, nomadic groups inhabited the Black Desert of northern Arabia. These desert societies are elusive, having left behind few material remains and archaeological research having been scarce. What we know about them has been based almost solely on the inscriptions they carved into the basalt rocks. Yet the nomads also carved a wealth of pictorial engravings, figurative rock art depicting wild and domestic animals, hunting, pastoral, and fighting scenes, and geometric symbols. Until now the rock art has been under-studied and under-utilised as a source of information about these societies. This paper presents the results of the first-ever systematic study of the 'Safaitic' rock art of the Black Desert. It discusses the content of the rock art, how it was produced and consumed, and its relationship to the landscape. These results reveal how the rock carvings played an essential role in connecting people to each other and to place in the desert landscape. This paper also discusses how the rock art challenges traditional dichotomies about herder and hunter relationships with animals and their environment.

Brusgaard, Nathalie [84] see Wright, Aaron

Bružek, Jaroslav [386] see Koterová, Anežka

Bružek, Jaroslav [386] see Velemínska, Jana

Bryant, Jeff (SUNY Albany)**[407] Tribute from the Underworld: The Historical Ecology of the Maya Postclassic Fish Trade with Otoliths from Mayapán and Caye Coco**

Preliminary results are presented for the analysis of fish otoliths from the Maya Postclassic sites of Mayapán in

Mexico, and Caye Coco in Belize. Fish otoliths are used investigate seasonality of fish harvest for the inland fish trade, and to contrast the diversity, trophic levels, and population structure of fish between both the archaeology sites, and modern populations. The sustainability of Maya Postclassic fishing, the disappearance of important species from the ecosystem near the end of the Medieval Warm Period (MWP) are explored. These themes are analyzed through a combination of data from thin-section analysis of seasonal growth rings, and computerized miromill sampling of stable isotope for estimations water temperature, salinity, and trophic dynamics.

Bryce, William [319] see Fox, Jacqueline

Brzezinski, Jeffrey (University of Colorado Boulder)

[394] *The Offerings of Cerro de la Virgen, Oaxaca, Mexico: Ontological Perspectives on a Unique Assemblage of Ritual Deposits*

The recent ontological turn in archaeological research has resulted in a proliferation of theoretical approaches inspired by non-representational and non-anthropocentric scholarship. In relational ontologies such as those of Pre-Columbian Mesoamerica, objects could possess a life force that allowed them to engage with other animate beings, to animate other entities, and to manifest powerful deities or ancestors. Like humans, some other-than-human entities experienced a life cycle marked by ritual acts, such as birth and death ceremonies, as well as the intake of spiritual sustenance required to maintain their animacy. In this paper, we explore how two categories of other-than-human actors—public buildings and cached objects—became entangled in ways that actively enabled or constrained social life. We focus on offerings excavated from 2013-2016 at the coastal Oaxacan site of Cerro de la Virgen, located in the lower Rio Verde Valley. During the Terminal Formative period, residents placed offerings of ceramic vessels, stone objects, and human bodies into the fill of many of the site's public buildings. Based on archaeological evidence and statistical analyses, we argue that certain offerings of cached objects and materials were placed to ensoul, sustain, or terminate the structures into which they were placed.

[230] *Discussant*

[394] *Chair*

Bubp, Rebecca

[295] *Ceramic Analysis of an Early 19th Century Plantation in the Piedmont Region of North Carolina*

Robert Davidson's Holly Bend, an early 19th century plantation located in the Piedmont region of North Carolina, was documented in the 1850 Mecklenburg County census as having 109 slaves. The plantation continues to be the focus of excavations and research projects over the past several years. Each year, excavation during these projects produce numerous ceramic sherds which vary based on form, paste, surface treatment, and decoration, piecing together a timeline of ceramic history on the plantation.

Buchanan, Briggs [67] see Maguire, Leanna

Buchanan, Briggs (University of Tulsa)

[365] *Introduction to Session with a Discussion of Measuring Stone Tool Diversity*

It has been thirty years since the publication of Quantifying Diversity in Archaeology and this edited volume has proven to be an important benchmark in archaeological diversity studies. We review the impact this volume has had on quantitative archaeological research across a number of subfields. We then provide three examples of our work in the subfield of stone tool studies that have used diversity measures to investigate Paleoindian stone toolkits. First, we describe our study of Paleoindian end scrapers from sites in the Great Lakes region in which we used diversity measures to infer mobility strategies. Second, we discuss our efforts to reassess the hypothesis that the southeastern United States possesses greater Paleoindian point diversity than other regions. Our research supported this hypothesis and suggested that finer regional distinctions in point diversity could be made. Third, we summarize our study that compared the diversity of early Paleoindian point classes between the western and eastern halves of North America. Our findings suggest that Paleoindians in the East used a more diverse set of points than in the West and we posit that environmental heterogeneity in the East promoted increased experimentation with point designs.

[365] *Chair*

Buchanan, Meghan [168] see Buchanan, Meghan

Buchanan, Meghan (Auburn University) and Elizabeth Watts Malouchos (Indiana University, Glenn Black Laboratory of Arch) and Meghan Buchanan

[168] *Just a Grog Sherd Livin' in a Shell World: Mississippian Microhistories of Practice in Ceramic Production*

Carbonized shell temper has traditionally been seen as one of the defining hallmarks of Mississippian Period societies in the Midwestern and Southeastern US. The Lower Mississippi River Alluvial Survey (Phillips, Ford, and

Griffin 1951) solidified the importance of shell temper in distinguishing Mississippian Period sites and occupation levels from earlier ceramic practices that used grog and crushed stone as tempering agents. The continued use and superficial application of Phillips, Ford, and Griffin's (as well as others) ceramic types and downplaying (or ignoring) of multiple and mixed tempers in the analysis of ceramic assemblages has perpetuated the perception that shell was king during the Mississippian Period. Drawing on digital microscopy, we present ceramic evidence from Alabama, Indiana, and Missouri identifying the presence of grog and mixed tempering practices at the bookends of the Mississippian Period. We argue that the presence of these tempers were part of the human-ceramic entanglements that part of the processes of Mississippianization.

Buchert, Martha, Emily Schach (Arizona State University) and Donna Nash (University of North Carolina-Greensboro)

[290] *Spindle Whorl and Textile Production in the Moquegua Valley*

Spinning and weaving are important ancient traditions in the Andes, evidenced by both the textiles and the tools found in archaeological contexts. Andean textiles and related tools denote layers of production, status, and trade relationships. A rueca (spindle whorl) is a utilitarian tool for turning fiber into yarn. Different types, weights, and sizes of ruedas can produce different kinds and qualities of thread and, thereby, different qualities of the end-product textile. Using a sample of ruedas from the Terminal Terrestre in Moquegua, Peru, I attempt to correlate the physical characteristics of the spindle whorls with the caliber of the material they might have created. These data may not only reveal the possible types of textiles each culture associated with the site made, but also potential exchange patterns between groups in the Moquegua Valley.

Buckley, Gina (The Pennsylvania State University) and Spencer Seman (The Field Museum)

[373] *For Richer or Poorer: A Comparison of Residential Mobility Patterns between Socioeconomic Groups at the La Ventilla District of Teotihuacan*

Excavations from the La Ventilla 1992-1994 project resulted in the recovery of over 400 individuals across four apartment compounds or frentes, the common household structure at Teotihuacan. Of these compounds, Frente 2 (El Conjunto de los Glifos) has been identified as a higher-status residential community while Frente 3 (El Conjunto de los Artesanos) consisted of lower-status, working-class individuals. Strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) isotope ratios from human tooth enamel are examined from over 100 individuals to identify long- and short-distance mobility patterns across Frentes 2 and 3, and to directly test the hypothesis that lower socioeconomic classes of people were more mobile than those of higher status. Finally, new data are directly compared to past migration research at the Tlajinga district of Teotihuacan, one of the poorest communities at this site.

Buckley, Michael [31] see Szabo, Vicki

Buckley, Michael

[34] *Technological and Methodological Developments in Approaches to Species Identification: Advancements in Zooarchaeology by Mass Spectrometry (ZooMS)*

ZooMS, or 'Zooarchaeology by Mass Spectrometry', is a relatively recently developed method in the field of archaeology, with the ability to identify large numbers of fragmentary animal bone to genus or species level. Most importantly, its advantages over ancient DNA-based approaches of identification are that it can be substantially cheaper to run experimentally, and is more likely to yield higher success rates deeper into the archaeological record and in warmer environments. This presentation will discuss the potential technological developments that ZooMS is amenable to, alongside the range of method development that has occurred over the past decade. In particular, this involves the increasing compatibility with other analytical methods commonly used in archaeological science towards a unified methodology for both isotopic and DNA-based methods, but also developments in bioinformatics approaches to dealing with large numbers of samples and sometimes unknown range of fauna, that will ultimately be needed to best inform questions regarding cultural and ecological relationships between humans and animals. Through several case studies, including those relating to the less frequently analysed faunal groups, such as micromammals, herpetofauna and fish, the potential impact that ZooMS can have on the field of zooarchaeology will be discussed.

Buckley, Mike [212] see Stone, Jessica

Budar, Lourdes [158] see Cuevas, Mauricio

Budar, Lourdes (Universidad Veracruzana) and Gibránn Becerra (Universidad Veracruzana)

[307] *Arqueología del agua y las montañas: paisaje y patrón de asentamiento en la costa este de Los Tuxtlas*

Desde el año 2008 arqueólogos de la Universidad Veracruzana han realizado el estudio sistemático del corredor costero que se encuentra en la parte noreste de Los Tuxtlas. Bajo cobertura total del terreno, se ha recorrido una extensión de 300 km², desde la Laguna de Sontecomapan al norte, hasta la Laguna del Ostión al sur, incluyendo las laderas de los volcanes de Santa Marta y San Martín Pajapan. Gracias a estos estudios, se han identificado patrones de multiculturalidad que responden al emplazamiento de un sistema portuario marítimo que se desarrolló en la zona y que estuvo interconectado con diversas partes del Golfo de México. En esta ponencia se hará un

recuento de los métodos y técnicas utilizadas, así como de los resultados que se tienen hasta el momento, derivados de estos estudios.

Bueno, Lucas (Universidade Federal de Santa Catarina) and Juliana Betarello (Universidade Federal de Santa Catarina)

[268] *About Peopling and Rivers: Connections and Boundaries in the Early Peopling of Eastern South America*

Several papers have discussed the role of rivers in the process of knowledge, occupation, and dispersion of human groups in unfamiliar or inhabited landscapes. Most of the time the rivers are seen as displacement axes, facilitating the connection between distant points in a short time. However, at the same time as connecting elements, rivers can play the role of barriers, be they geographical or cultural. In this presentation we will explore the role of rivers in the settlement process of eastern South America, with emphasis on the Tocantins River. This river, part of the Amazon basin, crosses a great extension of plateaus from central Brazil flowing into the right bank of the Amazon River, the meandering plains of the South American lowlands. With this trajectory the Tocantins River crosses distinct environmental areas like savannas and the Amazon Rainforest. Associated with the geomorphological and ecological changes, we identified in the archaeological record the existence of a cultural boundary that points to the existence of different dynamics of mobility and territoriality, both focusing on the Tocantins River Valley. We intend to present this context and explore its implications for the discussion of the ancient settlement of eastern South America.

Bueno, Lucas [393] see Bond Reis, Lucas

Buffington, Abigail (The Ohio State University)

[232] *Grasses Are Always Greener: The Technology of Herding and Mobility among Neolithic Pastoralists in South Arabia*

The development of pastoralism still features a number of gaps in the archaeological record. Principally, herders invest in the maintenance of a resource base capable of supporting their herds. While pursuing these resources through both intensive and extensive land management strategies, they impact vegetation communities and the future viability of husbandry of both animals and plants in a given location. Microfossil proxies of animal diets can inform on these practices, and when considering time, their effects. In mountainous southeastern Yemen, a rock-shelter encampment was discovered dating to the Early to Mid-Holocene featuring domestic animal remains earlier than any others in the south Arabian region. Through the later phases at this site, Manayzah, a number of superimposed burned dung mats were noted, suggestive of livestock corraling. Phytolith analysis of these levels both in intra-site terms in comparison to other combustion features supports a model of grazing and supplemental foddering of mixed herds. Broad similarity of assemblages and statistically distinction of these elements provide evidence of continuity in pastoral practice, despite multiple phases of occupation and abandonment.

Buikstra, Jane [185] see King, Jason

Bull, Ian [209] see Blong, John

Bullchief, Emerson L. (7 Bison Cultural Consulting LLC)

[7] *Discussant*

Bullion, Elissa (Max Planck Institute for the Science of Human History), Michael Frachetti (Washington University in St. Louis), Farhad Maksudov (Uzbek Academy of Sciences, Institute of Archaeology) and Ann Merkle (Washington University in St. Louis)

[183] *Believers in the Highlands: Burying the Muslim Dead at the Qarakhanid Site of Tashbulak*

Islam spread into Central Asia via the Arab invasions of the 7th century CE. According to current historical narratives, Islam's first footholds were lowland urban centers, with Islam only slowly infiltrating the highlands. New research, presented here, challenges the idea that highland areas were a barrier to Islam. This paper presents a study of the cemetery at Tashbulak, a Qarakhanid site in the Malguzaar Mountains of southeastern Uzbekistan. The Qarakhanid state (9th-13th c.), the first nomadic Turkic polity to convert to Islam, held its power in the highlands of Central Asia, during the period when Islam was thought to be practiced primarily in the lowlands. Burials at Tashbulak are some of the earliest directly dated Islamic burials in the region, and adhere to Islamic burial practices documented in mortuary communities across Central Asia. Through the burial of the dead in visibly Islamic fashion at Tashbulak, this Qarakhanid population expressed a dual nomadic and Islamic identity. The highland location of Tashbulak was not a barrier to Islam, but instead allowed the Qarakhanids to integrate their nomadic heritage with the practice of Islam, and assert a claim to the region rooted both in their ancestry and the divine.

Bundy, Paul [47] see Hajic, Edwin

Buonasera, Tammy [154] see Égüez, Natalia

Buonasera, Tammy (University of California, Davis), Antonio V. Herrera-Herrera (Archaeological Micromorphology and Biomarker Lab) and Carolina Mallol (Archaeological Micromorphology and Biomarker Lab)

[417] Sedimentary, Molecular, and Isotopic Characteristics of Bone-Fueled Hearths

Molecular and isotopic analyses of sediments from archaeological combustion features is a relatively new area of study. Applications have the potential to inform us about ancient pyro-technologies and patterns of animal exploitation in a wide range of human contexts but may be particularly informative with regards to ancient hunter-gatherers. Our analyses of sediments from experimental bone and wood fires, and from controlled laboratory heating sequences, provide information on the formation and location of biomarkers from pyrolyzed animal fats in hearth sediments. This information is compared to comparatively recent archaeological combustion features from northern Alaska (ca. 1150 – 4500 BP) and much older contexts including El Salt, a Middle Paleolithic site in Spain. Integrating sedimentological, molecular, and isotopic data can improve the recognition of bone fires in a range archaeological sedimentary contexts, even where bone preservation is poor.

[417] Discussant

Burentogtokh, Jargalan [154] see Gardner, William

Burge, Marjorie (University of Chicago)

[74] The Study of Excavated Documents in Japan

Traditional understandings of the history of writing in Japan have been both greatly enriched and substantially challenged by materials recovered from archaeological excavations. In particular, the continued recovery from archaeological contexts of the inscribed wooden documents known as mokkan has ensured that the history of Japanese writing will continue to be rewritten to accommodate new insights provided by this growing archive. As a full-fledged sub-discipline within Japanese historical document studies (J. shiryōgaku), the study of mokkan incorporates an understanding of archaeological methods and an awareness of the nature of historical written cultures in East Asia. This paper will examine the importance of archaeological data and approaches in this particular sub-field, and how the progress made in Japanese mokkan studies has contributed not only to the re-interpretation of the history of writing in Japan but to the study of early writing through excavated documents in the larger East Asian context. In addition, this paper argues that the manner in which mokkan studies has utilized archaeological data to answer particular historical questions can be a model for future interdisciplinary research which draws upon the vast body of data generated by decades of Japanese archaeology.

Burger, Rachel (Southern Methodist University), Ian Jorgeson (Southern Methodist University) and Michael Aiupalasit (Southern Methodist University)

[419] Raising a Rafter: Networks and Ancestral Pueblo Intensification of Turkey Husbandry in the Northern Rio Grande Region, New Mexico

Zooarchaeological research in the Northern Rio Grande shows that turkey husbandry became increasingly important to the Ancestral Pueblo during the Classic Period (AD 1350-1600). During this time, immigrant and local communities coalesced into increasingly larger villages and towns, with abundant evidence for turkey husbandry. Turkeys served as a critical resource for both subsistence and ritual uses. Through ethnographic and archaeological data and modern animal sciences research on turkey raising, we explore the role of intensive husbandry at certain Ancestral Pueblo sites within broader economic networks. These socio-ecological models are then tested against the archaeological record of Sapa'owinge (LA306), a large Ancestral Pueblo community with extensive evidence for large scale turkey husbandry.

Burger, Richard (Yale University) and Lucy Salazar (Yale University)

[64] Discovery at Cardal, Peru of an Initial Period Polychrome Frieze of the Manchay Culture

During the 2018 field season, the authors unearthed a portion of a large polychrome frieze at the U-shaped civic-ceremonial center of Cardal in the Lurin Valley of Peru. This talk provides a brief description of the excavations and its discovery. The frieze was located on the lower terrace of the right arm of the platform complex and was buried by the construction of a later circular plaza. The frieze consisted of incised and painted motifs on the plastered interior face of an earlier circular plaza dating to approximately 1100 BC. The frieze was subsequently covered by a layer of thick clay plaster painted with red pigment. Two sections of the frieze were exposed by removing this final layer and they reveal monstrous supernaturals combining arachnid, feline and avian elements. The content of the frieze confirms the distinctive nature of the religious iconography of Manchay culture centers.

[181] Discussant

Burger, Richard [286] see Forst, Jannine

Burgess, Laurie (Smithsonian Institution), William Billeck (Smithsonian Institution) and Torben Rick (Smithsonian Institution)

[397] Mission Period Glass Beads from the Northern Channel Islands of California

Glass beads were an important trade item and symbol of culture contact for Native Americans in coastal California and the Channel Islands where people had manufactured shell and stone beads for some 10,000 years. Glass bead assemblages from the northern Channel Islands, Santa Rosa, Santa Cruz, and San Miguel, all entered the collections of the Smithsonian's National Museum of Natural History during the 1870s, via four collectors. The glass beads are consistent with the late eighteenth–early nineteenth century time frame of the Mission period. The assemblages differ somewhat from Mission sites on the mainland, with the colors blue and green predominating on the islands, followed by red and white beads, along with some black beads. The opacifiers used in the manufacture of white drawn glass beads are also examined with pXRF to assist with the dating of the white beads. As other studies have shown, the material culture of the Channel Islands, notably glass beads and shell beads, provides insight into changes to and the maintenance of traditions outside the direct sphere of Spanish influence. The information derived from these assemblages shows the value of re-examining older museum collections, especially ones that were obtained before the emergence of scientific excavations.

Burgio-Ericson, Klinton (University of New Mexico)

- [414] *Unpacking the Dishes: The Agency of (mis)Translation in the Hybrid Ceramics of Seventeenth-Century New Mexico*

Equally of New Spain and the Pueblo Indian world, seventeenth-century New Mexico presents a fraught social context where diverse materials and imagery became entangled through the creativity of Native artists. Archaeological remnants testify to ceramics' importance in these exchanges, including combinations of Euro-American forms with Indigenous materials, techniques, and iconography. Hopi women were among the finest of these artists, producing what archaeologists call "San Bernardo" wares, after a local Spanish mission. They drew upon Mexican majolica forms and motifs, which they reconfigured through their own traditions and iconography. Artists transformed Spanish imagery into religiously significant symbols pertaining to the Pueblo world, enacting a strategy of (mis)translation and artistic agency, which simultaneously visualized and concealed new meanings in plain sight. Based on primary research of an unpublished collection of San Bernardo hybrid ceramics from the ancestral Zuni pueblo of Hawikku, this study demonstrates the persistence of Pueblo imagery and worldviews, but also agency that artists exerted through (mis)translation to evade Spanish recognition and control. Drawing on material culture theory, critical translation studies, and art historical iconography, this essay applies a discursive model to the study of these ceramics and the creative expressions of their painted motifs.

Burgos, Walter [103] see Diaz Garcia, Mauricio

Burham, Melissa (University of Arizona)

- [309] *Urbanization, Minor Temple Construction, and Local Community Formation at Ceibal, Guatemala*

Excavations and geospatial analyses of outlying residential settlement at Ceibal, Guatemala, shed light on the relationships between ritual and urbanization during the Preclassic period. The site epicenter, which consists of an E-Group assemblage carved out of bedrock, was established around 1000 BC. The settlement slowly grew during the late Middle Preclassic period (ca. 700-350 BC). However, over the course of the Late Preclassic (ca. 350-75 BC) and Terminal Preclassic (ca. 75 BC-AD 175) periods, as Ceibal grew into an urban center, minor temple-plaza complexes were constructed at regular intervals in outlying residential areas. These complexes were not built contemporaneously, and vary in their size, shape, and construction materials. This evidence suggests localized groups of people built their own temples as they moved into new areas of the site, and thus, that ritual practice was a key consideration in early urban planning. Furthermore, in contrast to previous periods, rituals performed in public, semi-public, and domestic contexts became remarkably similar. Ritual may have simultaneously differentiated local communities while also promoting social cohesion among the entire Ceibal population. This trend continued until the end of the Terminal Preclassic, when outlying communities buried their temples and depopulated the site.

[309] Chair

Burke, Adam

- [216] *Targeting Coastal Plains Chert in the Wacissa Quarry Cluster, Northwest Florida, USA: A LIDAR-Based Geomorphic Model for Locating Chert Quarries*

Although archaeological research in northwest Florida has yielded a rich assemblage of stone tools produced by late Pleistocene and early Holocene hunter-gatherers, little research has been undertaken to quantitatively define and describe the variable chert resources from which these tools were made. This paper presents the framework for a new geomorphic model for locating terrestrial and inundated chert quarries in northwest Florida using terrestrial LIDAR and underwater pedestrian survey. In environments with limited topographic variability, erosional relics of chert formation are easily exploited by LIDAR, and high-definition elevation models can be used to inform field survey strategies both terrestrially and underwater. This model also allows for the implementation of systematic and geographically-representative sampling strategies. The Wacissa chert quarry cluster in northwest Florida has historically been undersampled, presenting an ideal case study for testing the effectiveness of this model in an archaeologically-relevant environment. Regional chert-formation processes will be discussed and compared to their known geomorphic corollaries to determine which LIDAR anomalies warrant survey, and the results of ground-truthing this model will also be discussed. Newly-sampled quarries will be compared to the existing body of local raw-material data to assess the effectiveness of this model for describing chert variability and abundance.

[235] Discussant

Burke, Ariane [128] see Paquin, Simon

Burke, Chrissina [117] see Laurich, Megan

Burks, Jarrod [155] see Ruby, Bret

Burks, Jarrod (Ohio Valley Archaeology, Inc.)

[155] *Moving up in the World: Comparing Magnetic Gradiometer Survey Results from Monumental Sites Using Small, Medium, and Large Magnetometer Systems*

The problem with monumental earthwork sites in Ohio is that they are, well, monumental in scale! These large sites, many topping 50 ha in area, are a major challenge for geophysical surveys because they simply require too much time to completely survey. However, recent advances in instrumentation and computers is making it possible to survey vast areas (well over 50 ha) in a mere fraction of the time it once took. In this paper I compare and contrast the magnetic gradiometer survey results from three fluxgate instruments used at several monumental earthwork sites in Ohio, including a handheld Geoscan Research FM256 (single gradiometer), a Foerster Instruments push cart (4-probe gradiometer), and a multichannel (5-16 probes) Sensys gradiometer system. I explore some of the issues and benefits encountered as we have moved from small, careful gridded surveys with handheld instruments to large, rapid surveys with multiprobe systems guided by RTK GPS. Though large multiprobe systems have been in use elsewhere in the world for some time, their application in the USA is only just getting under way. The discussion will include topics such as survey speed, data processing, and anomaly characterization/comparisons across the three instruments.

Burley, David [402] see Matisoo-Smith, Lisa

Burnett, Katherine (Environmental Consulting & Technology, Inc.)

[80] *Exploring Cultural Identity at the Nostrum Springs Stage Station in Northwestern Wyoming*

Stagecoaches have been key players in the imagination that is the "Wild West" since the late 19th century. They live on today as one of the main symbols of the mythic American West, perhaps most easily recognized in the form of the Wells Fargo stagecoach that appears in parades across the country. Typically missing from narratives of the American West, which tend to focus on violence, romance, and adventure, are stories of the everyday lives of westerners. This paper focuses on one place, the Nostrum Springs Stage Station in the Red Canyon of northwestern Wyoming, in order to discuss how the methods of historical archaeology can and cannot be used to explore cultural identity, an important aspect of everyday life in the past. The focus of this research is on the Shoshone, who called Red Canyon home long before the stage arrived, and the Nostrums, the family with Swedish heritage who homesteaded in Red Canyon around the turn of the 20th century. These types of investigations are important because the idea of America, which is constantly being renegotiated, often rests on the ideals of an America that never was, marginalizing various groups in the process.

Burnett, Paul [128] see Schiery, Benjamin

Burnett, Paul (SWCA Environmental Consultants)

[128] *Evaluating Archaeological Predictability Across the Western United States*

Human behavior is patterned in relation to the environment, and these patterns are approximated by the archaeological record. Similarly, the ability to discover archaeological material is patterned in relation to the environment. Geographic Information Systems and statistical software have been used to develop multiple discovery-based spatial probability models across millions of acres in the western United States. Some models work better than others. However, why some models are better at predicting archaeological sites has not been an explicit focus of previous research. One hypothesis is that some archaeological landscapes are more conducive to modeling than others. Holding predictive methods constant, this study evaluated differences in model performance across various landscapes. Understanding the major archaeological and environmental parameters driving model success and failure is important considering the potential cost and time involved in model development. Bare ground visibility, topographic variability, and the use of categorical variables such as landform, plant communities, and soil types are major environmental parameters influencing model performance, as are the availability, accuracy, and distribution of site and survey data. By defining the underlying factors driving model success and failure while holding the statistical techniques constant, we gain new insight into the interpretation of archaeological landscapes through modeling.

Burnette, Dorian (University of Memphis), David Dye (University of Memphis) and Arleen Hill (University of Memphis)

[348] *Climate Change, Population Migration, and Ritual Continuity in the Lower Mississippi Valley*

Tree-ring reconstructions of cool- and warm-season moisture reveal several multi-decadal droughts that impacted the northern Lower Mississippi Valley between AD 1250 and 1450. These chronic droughts contributed to the regional abandonments and population migrations southward out of the Cairo Lowland and adjacent areas into

extreme southeastern Missouri, northeastern Arkansas, and western Tennessee. In addition, the climatic events appear to have been a major factor in the collapse of the political economy, resulting in subsequent downriver migrations of Mississippian polities. While transformations in political, religious, and social practices would have taken place, it is equally apparent that long-term continuities existed in ritual practice based on a large corpus of whole ceramic vessels from the region.

Burnette, Mae [96] see Laluk, Nicholas

Burns, Jonathan (Juniata College)

[357] *Archaeology Field School Meets Transportation Data Recovery: An Alternative Mitigation at the James W. Hatch Site (36CE544), Centre County, Pennsylvania*

Data recovery investigations at the James W. Hatch Site in Centre County, Pennsylvania via a collaboration between PennDOT, the Federal Highway Administration, and Juniata College demonstrate the potential for transportation archaeology to provide insightful data on prehistoric lifeways. The project provides a glimpse of prehistoric utilization of Bald Eagle Jasper informative at the local scale where its predominance and use define the Houserville Archaeological District, and regionally as the Bald Eagle formation jasper displays an isotopic "fingerprint" distinct from those of Eastern Pennsylvania and other quarries in the northeastern United States. Given the local jasper's prominence as the preferred lithic raw material in the district, contiguous block excavations and microwear analyses reveal a significant amount of onsite activities include various forms of butchery, hide preparation, and bone, antler, and shell working in addition to secondary reduction and biface production. Iron isotope studies funded by the project show promise as a robust means of geochemical discrimination and sourcing. The innovative collaboration resulted in a cost-effective alternative mitigation for College Township's bicycle path, and provided undergraduates and graduate students high-impact experiential learning in the form of an intensive archaeological field school.

Burrillo, R. E. (SWCA Environmental Consultants), Joan Brenner-Coltrain (University of Utah), Michael Lewis (University of Utah) and William Lipe (Washington State University)

[313] *Landscape and Agriculture in the Bears Ears Formative*

For non-industrial communities, subsistence strategies are tightly constrained by ecological factors. Prehistoric peoples in the Bears Ears area were entirely dependent upon maize—a cultivar adapted to low-altitude, subtropical conditions in Mesoamerica—by at least 400 BC. Given the differences in altitude and aridity compared with its point of origin, successful maize farming in southeast Utah relied heavily on detailed and thorough knowledge of the local environment. Ongoing research in settlement patterns and water chemistry throughout the Bears Ears area has revealed shifting strategies by Ancestral Pueblo maize farmers that demonstrate precise articulation with shifting climatic factors through time across the landscape.

Bursali, Ayse (University of Notre Dame) and Ian Kuijt (University of Notre Dame)

[8] *From Homes to Ruins: Ethnoarchaeology and Small-Scale Village Dynamics at Post-19th Century Kizilkaya, Central Turkey*

Drawing on interviews with former residents of the abandoned Turkish village of Kizilkaya, as well as photogrammetry and other visual research, in this poster we consider how this post-1800 rural village was organized around the household, the mosque, access to the river, and raising and caring for animals. The rural village of Kizilkaya, located in the Cappadocia region of Central Anatolia, was abandoned in 1963 due to the risk of major rockfalls from the high cliffs above the village. At one point the village consisted of 123 households and was home to around 983 people, who built stone buildings on top of intricately carved underground cave systems. Some of the buildings have been completely destroyed to construct new houses as part of the relocated village 500 meters away. In other cases, however, multi-storey house complexes are still well preserved and roofed. Drawing upon microhistorical research and ethnographic data, in the presentation we explore how the household and village community were organized, consider the material footprint of the household including use of intermural and extramural spaces, and the extent to which past use of space is visible in the archaeological record.

Burkhart, Greg

[29] *Buck Lake, Archaeological Research, and Subsistence and Settlement Patterns at Mount Rainier National Park*

For the past two decades, research directed at establishing onset of human use, patterned use of montane habitats, integration into lowland subsistence and settlement systems, and temporal change has been imbedded into CRM practices at Mount Rainier National Park. Once thought to be of little value to precontact people, high elevation landscapes on Mount Rainier, and Pacific Northwest mountains generally, are now known to have been a part of regional land-use systems for at least 9,000 years. Focusing on research at Buck Lake, a deeply stratified site on the NE flank of Mount Rainier, and on patterned distribution of precontact sites in the park, this paper considers the role of mountain environments in precontact Pacific Northwest land-use systems. Of particular concern are why montane environments were sought out in the precontact past; when routine human use of these landscapes began; how and why such use was environmentally patterned on the mountain; and whether or not montane land-use patterns changed through time. The paper emphasizes the importance of environmentally-based subsistence/settlement models with empirical test implications to guide research in CRM (and other) archaeological investigations; and to provide frames of reference to evaluate results and refine ongoing research objectives.

Burton, Nicole [251] see Maher, Ruth

Burtt, Amanda (Indiana University)

[80] *Unlikely Allies: Modern Wolves and the Diets of Pre-contact Domestic Dogs*

Assumptions of prehistoric domestic dogs as scavengers has been pervasive in archaeology and beyond. This project clarifies these assumption by investigating the dietary behavior of prehistoric domestic dogs via dental microwear data or features on the tooth surface that indicate types of food consumed. In order to understand the array of possible domestic dog dietary behavior, I compare their diets to their unmodified wild progenitor, the grey wolf. The use of three-dimensional tooth surface data coupled with scale sensitive fractal analysis allows for an unbiased interpretation of these surfaces. A robust baseline of wolf dietary behavior via their microwear has been collected from a large collection of modern wolves housed at the Draper Natural History Museum. Curated domestic dogs from archaeological sites located on the North American Plains and Rocky Mountain foothills are evaluated to interpret feeding practices employed by their human caregivers to contribute to a better understanding of human-to-canine provisioning strategies in the past.

[80] Chair

Burtt, Amanda [80] see Hawley, Kirsten

Bush, Leslie [36] see Hanselka, Kevin

Bussiere, Lauren [89] see Tomka, Marybeth

Bussiere, Lauren (Texas Archeological Research Laboratory, University of Texas at Austin)

[395] *Answering Pseudoarchaeology from the Repository*

As an archaeological repository, the University of Texas at Austin's Texas Archeological Research Laboratory is simultaneously a public-facing entity and a gatekeeper, standing between the public and a massive corpus of sensitive archaeological evidence in the form of held-in-trust archaeological collections and records. It is therefore not surprising that TARL receives a significant number of public inquiries, and that some of these express interest in topics outside the archaeological mainstream—including claims of giants, supposed evidence supporting hyperdiffusionist views, and accusations that our institution is hiding “the truth.” In this presentation, inquiries of a pseudoarchaeological nature received by TARL staff over the past several years are analyzed in order to provide insight into the types of inquiries we receive, who is reaching out to us, what their expectations or desired outcomes might be, and how we tend to respond. Exploring the repository's roles and responsibilities in this ongoing public conversation is an important task as we confront common misperceptions and work toward improving public education in archaeology.

Bustamante, Shunashi Soledad Victoria [197] see Gonzales, Alicia

Bustard, Wendy

[21] *Competing Cultures: A New Age in Chaco Canyon*

Chaco Culture National Historical Park was founded to protect and preserve the cultural remains of an indigenous society whose high point was between 850 and 1150 CE. For the first 80 years of its existence, the park's museum collection policy was straightforward because the artifacts recovered represented the Native American occupation of the land. That changed after the 1987 Harmonic Convergence, which was celebrated in part in one of the park's great kivas. Suddenly, a new cultural use of the park, with its attendant offerings left in archaeological sites, forced park managers to re-examine collection policies. At the same time, Native American descendant communities were finding their political voices and making themselves heard by federal land managers. Managing the physical manifestations of competing cultural uses has evolved over time at Chaco, in response to descendant communities, ‘new age’ practitioners, and researchers.

Bustos, David (National Park Service, White Sands National Monument)

[187] *Widespread Distribution of Fossil Footprints in the Tularosa Basin: Human Trace Fossils at White Sands National Monument*

White Sands National Monument (WHSA) is well known for the world's largest gypsum dunefield, but the geological elements that created this dunefield also persevered one of the largest (in area and number) assemblages of human foot prints in the world. Tracks are revealed under specific moisture conditions, linked to near-surface geophysics. Human and megafauna tracks have been found throughout the world, but most footprints sites are limited in spatial extent and thereby preclude paleo-tracking. What sets the prints within the boundary of White Sands National Monument (WHSA) apart is not only the sheer number of tracks with densities often >10 per square meter, but the spatial area over which they are distributed. At WHSA individual humans and animals can be tracked over kilometers and seen in many places interacting. These interactions are numerous and work to date has only begun

to reveal some of these interactions. The fossil footprint data available on human - megafauna interactions provides a whole new class of information in early archaeology of the New World. This presents a tremendous opportunity to broaden our understanding for topics such as group size, hunting strategies / behavior, and group composition.

[5] *Discussant*

Bustos, David [368] see Holliday, Vance

Bustoz, David (Logan Simpson Inc.)

[346] *Crushing Traditional Hohokam Ceramic Typology: Grog Temper in the Early Formative Period*

Preliminary analysis of ceramic artifacts from Early Formative contexts at AZ T:12:70(ASM) (Pueblo Patricio) in Phoenix, Arizona, identified grog (crushed sherds) in addition to local tempering materials. Four sherds selected for petrographic analysis from radiocarbon-dated contexts confirmed the identified material is grog. Subsequent single-grain optical stimulated luminescence dating provided additional evidence of the four sherds' early production date. Previous work viewed the use of grog in ceramic production within the lower Salt River Valley as very common in Classic and historic time periods and very rare to nonexistent in others. This study conclusively contradicts previous thought and expands the known time range of this technology. This evidence of prehistoric ceramic container production variability within the lower Salt River Valley offers another avenue for exploring Hohokam origins and development.

Butler, Caelie [10] see Reed, Patrick

Butler, Virginia L. [47] see Lubinski, Patrick

Butler, Virginia L. [118] see Sukau, Dana

Butler, Virginia L. (Portland State University), Jessica Miller (Oregon State University), Alexander Stevenson (Historical Research Associates), Dongya Yang (Simon Fraser University) and Camilla Speller (University of British Columbia)

[368] *Where Did the Fish Go? Use of Archaeological Salmonid Remains to Guide Recovery Efforts in the American West*

Given the scale of habitat loss from development associated with the Industrial Age, archaeological faunas predating the modern era often represent animal populations extirpated from their former ranges. For example, anadromous salmonid populations in the Pacific Northwest of North America have become extirpated from much of their range in the past 100 years largely because of dams built for hydroelectric power and flood control. As the costs for mitigating environmental impacts from dams exceed the benefits, decisions are being made to remove these obstructions and support fish recovery in some river basins. Archaeological salmonid remains represent an important source of information that can guide recovery efforts. Analysis of aDNA provides insights on species and sometimes sub-populations that once occupied a system. Incremental analysis of otoliths can indicate life history of pre-development salmonid populations. Moreover, archaeological records can help establish whether salmonid populations even migrated into basins under consideration for "restoration", given that habitat losses often preceded biological surveys. Research from projects in the Klamath and Columbia River basins (California, Oregon, Washington, Idaho, British Columbia) highlights the value and potential of archaeological records towards recovery of extirpated fish populations in the American west.

Butts, Clancey, John Murray, Jayde Hirniak, Hannah Keller and Naomi Cleghorn

[390] *An Undisturbed Earlier Stone Age Locality on the Southern Coast of South Africa, Exposed by Fire*

The Knysna Estuary and River Basin on the southern coast of South Africa provided attractive resources for Pleistocene foragers. Isolated Earlier Stone Age (ESA) finds, including large bifacially flaked core tools, are commonly found in upland areas around the basin, particularly during construction projects, but dense vegetation cover has thus far prevented the identification of the source sites for these finds. In 2017, extensive fires devastated Knysna, removing all surface vegetation across large parts of the region, including dense shrub cover. Here we report a concentration of ESA materials, including more than 100 stone tools, exposed by the fires in the undeveloped part of the Featherbed Private Nature Reserve in Knysna. Our survey results indicate the presence of well-preserved cores, handaxes, and flake cleavers. We selected 25 large core tools for on-site analysis to compare to other known South African ESA sites. Additionally, we identified a large core re-fit. Considering the poor representation of the ESA in coastal South Africa, it is critical to study this region to shed light on early hominin behavior. This paleoscape offered early hominins rich foraging opportunities across several ecotones, which gave rise to novel and innovative adaptations during the middle and late Pleistocene.

Buzon, Michele [110] see Marshall, Jenail

Buzon, Michele (Purdue University), Katie Whitmore (Purdue University), Claire Sigworth (Purdue University) and Mohamed Faroug Ali (American Sudanese Archaeological Research Center)

[317] *Public Outreach and Community Engagement with the Tombos Archaeological Project in Sudan.*

Public outreach and community engagement has become a larger focus of efforts in recent years for the Tombos Archaeological Project. Field seasons regularly include public lectures for adults in the community and children at the Tombos elementary school. We produced a pamphlet with information on the Tombos site (English/Arabic). We also created a website for the project (www.tombos.org), with Arabic translations. This website includes information about our ongoing research, publications, team members, and active blog that is updated regularly, especially during the field season. In consultation with the Tombos community, we created teaching materials for the local elementary school. The teachers specifically requested materials that could be easily transported from one classroom to another. We designed and printed three large posters on durable weatherproof canvas that can be hung on these topics: archaeology, Nubian history, and Tombos research. These posters were well received, which we hope can assist the teachers given that no resources (textbooks, etc.) are provided in Sudan for learning about Nubian ancient history. Efforts have been made to disseminate our research in public venues and provide osteological training for Sudanese antiquities trainees. We established the American Sudanese Archaeological Research Center was established in 2017 (501c3 non-profit, www.amsarc.org).

Byerly, Ryan [390] see Egeland, Charles P.

Byers, Dave [209] see Nabity, Samantha

Byock, Jesse (UCLA)

[310] *The Mosfell Excavations: Viking Archaeology in Iceland*

Presents recent findings of the Mosfell Archaeological Project (MAP) in Iceland's Mosfell Valley (Mosfellsdalur). Reviews excavations at Leiruvogur Bay at the coastal mouth of the valley and at Hrísbrú, the farmstead of the Mosfell chieftains. These two Viking Age sites formed a 10th century Icelandic harbor and inland (hinterland) administrative unit. MAP is a large interdisciplinary archaeological project, employing the tools of history, anthropology, environmental sciences, forensics, botanics, and saga studies. We research human adaptions, social development, and environmental change in the Mosfellsdalur region. Sites extend into the surrounding highlands and at the lowland coastal areas. We define this geographic and social landscape as a "valley system," whose community took shape following Iceland's 9th-century settlement. MAP is developing a concept of 'Valley System Archaeology,' especially suited to Icelandic and North Atlantic sites. I will focus on the Viking Age harbor at Leiruvogur, a finding that may adjust the early historical understanding of the Reykjavík area. The harbor connected the community to the wider Viking world. Finds include a well-preserved longhouse from Iceland's settlement period, a pagan cremation site, a conversion-era stave church, an early Christian graveyard, and stone ship-like monuments. The mortuary practices show a mixed pagan and Christian community.

Byrd, Rachael (University of Arizona, Arizona State Museum)

[382] *Going the Distance: Tracking Migration through Population Structure in the Southwest US (2100 BC–AD 1680)*

People who migrate are forced to adapt, interact and re-organize themselves in dynamic ways not yet fully understood. This study tests three archaeological migration models spanning 3,500 years of agricultural village occupation in the Southwest United States (US) involving migration into uninhabited landscapes, internal frontiers, and diaspora. Following the Relethford-Blangero analytic model, phenotypic variation and biological distances are calculated based on craniofacial measurements collected from 1261 individuals. Results indicate two distinct Basketmaker II early ancestral lineages, including evidence of migration from Early Agricultural to Western Basketmaker II sub-regions. Increased settlement density pushed people into internal frontiers, leading to newly established groups experiencing gene flow, while other communities were impacted more by bottleneck effects (genetic drift). Long-distance diaspora issued forth heightened variance at both origin and destination sub-regions, such as the Kayenta and Mogollon Rim Pueblos. Migration patterns shifted when people became more geographically constrained and localized as population sizes began to decline 150 years before Hispanic contact.

[382] Chair

**Bythell, Abigail (University of North Carolina at Charlotte), Sara L. Juengst
(University of North Carolina at Charlotte) and Richard Luniss (Universidad Técnica de Manabí)**

[286] *Ritual and Death: A Paleopathological Analysis of Skeletal Remains from Salango, Ecuador during the Guangala Period (100 BCE-800 CE)*

There are many questions that have yet to be answered about the prehistoric people of Ecuador, especially along the southern coast. In particular, more studies are needed in order to understand how people lived and interacted with each other and the landscape at the important ritual site of Salango. Salango was occupied from 4000 BCE through Spanish contact (~1500 CE) and was an important ritual center for people throughout this time period. However, to date, there are few bioarchaeological studies investigating how the people buried there lived their lives. This study uses bioarchaeological data from human skeletal remains excavated from Salango in order to make interpretations about the lives of people buried at the site during the Guangala culture period (100 BCE-800 CE). Analyses indicate that the study group underwent significant biological stress, based on skeletal markers of malnutrition and chronic infection. Because of the ubiquity of these stress markers and the associated mortuary setting, we suggest that the people living in this region during the Guangala period experienced a marked change in health and possibly altered the nature of ritual activity at the site in response.

Cabaniss, Andrew (University of Michigan)**[337] Overlapping Traces: Categorizing Ceramic Use-Wear across Functions**

Practitioners of ceramic use-wear analysis often document qualitative patterns to distinguish between past behaviors as well as taphonomic processes. If comparisons can be operationalized in a quantitative framework, analyzing assemblages across sites at a regional scale could inform our understanding of normative patterns of use as well as the diversity of use practices. Previous quantitative work has mostly compared alterations at the level of entire vessels or at the level of individual locations within vessels. This has set the stage for more holistic analyses that attempt to recognize diverse patterns statistically. I use a statistical dimension-reduction method to identify different patterns of use-wear traces among a collection of "miniature" cookpots at two Classical period sites in Greece, Athens and Olynthos, as part of a larger project to document diversity in the use of cook pots in domestic settings. By modeling vessels as a combination of overlapping patterns of use it is possible to distinguish several distinct modes of vessel alteration. Comparisons between contexts at each site support the multifunctionality of "miniature" cookpots.

Cabella, Roberto [195] see Rellini, Ivano

Cabello, Gloria [55] see Pinder, Danielle

Cable, Charlotte [352] see Roberts, James

Cabrera Romero, Martha (Universidad Nacional de San Cristobal de Huamanga)**[24] Every Day Hath a Night: Nightlife and Religion in the Wari Empire, Peru**

What was daily life like after sundown in the ancient city of Wari, Peru? What events took place and who was involved in them? In this paper, activities of the night and the sacred rituals that occurred in the ancient capital of the Wari Empire are explored from evidence that denotes the advanced practice of astronomy. The observation and movement of the stars, the phases of the moon, and the position of the planets can be seen only when the sun is hidden. The presence of megalithic tables, little pots dug into the rock, and evidence of intense burning associated with ceremonial enclosures in the city were some of the constituents of nocturnal rituals. These activities are associated with representations of nocturnal deities or the underworld that are known in the Andean world as ccoa (winged feline), the amaru (snake) and the owl, which at night had absolute control over life and death.

Cabrera Romero, Martha [396] see Ochatoma Paravicino, Jose

Cabrera-Rodríguez, Acarelys M. [417] see De Vera, Caterina R.

Caffrey, Maria [49] see Gilmore, Kevin P.

Cagnato, Clarissa (University Paris 1-Panthéon Sorbonne)**[309] Preclassic Maya Plant Use along the Usumacinta River: A Microbotanical Approach**

Paleoethnobotanical evidence, in conjunction with other archaeological data, provides key information regarding ancient practices. This paper presents the results of microbotanical analyses—specifically the study of starch grains—carried out on diverse Preclassic Maya archaeological materials (grinding stones and ceramics) recovered from centers along the Usumacinta River, namely at Ceibal (Petén, Guatemala) and Aguada Fénix in Tabasco, Mexico. Preliminary analyses suggest that the early inhabitants of both regions consumed a variety of plant foods, including maize (*Zea mays*), chili peppers (*Capsicum* sp.), and manioc (*Manihot* sp.). Overall, these microbotanical studies not only reveal some of the plants used in the past but also provide information regarding the range of tools used to process them.

Cajigas, Rachel (University of Arizona)**[49] Early Agricultural Practices at La Playa, Sonora, Mexico**

This poster presents results from geoarchaeological research on earthen irrigation canals at La Playa (SON F:10:3), in Sonora, Mexico. La Playa's agricultural field system is associated with the Early Agricultural period (2100 B.C. – A.D. 50), which is characterized by the development of agriculture in the southwest United States and northwest Mexico. A combined dating strategy using Optically Stimulated Luminescence (OSL) dating on canal sediments and

radiocarbon dating on charcoal and semi-aquatic snails was used to date canals. The dates are between 450 B.C. – A.D. 550, a significant period both culturally and environmentally. These dates cluster at the transition between the Cienega phase of the Early Agricultural period (800 B.C. – A.D. 50) and the Trincheras period (A.D. 150 – 1450). During this time, a variety of paleoenvironmental proxies from the southwest region indicate a period of unusually wet winters followed by a drying trend. At La Playa, these dates correspond with a period of peak groundwater discharge and low energy overbank deposition followed by major erosion. The environmental and geochronological data indicate that early agricultural practices were correlated to changing environmental and depositional conditions on the La Playa floodplain throughout the Early Agricultural period.

Calabria, Darcy [388] see Skinner, Jane

Calaon, Diego [347] see Seetah, Krish

Calder, Jeff [57] see Yezzi-Woodley, Katrina

Callaghan, Michael [152] see Gilstrap, William

Callaghan, Michael (University of Central Florida) and Brigitte Kovacevich (University of Central Florida)

[199] *A Tale of Two Cities: Holtun, Holmul, and Permeable Ceramic Boundaries between Guatemala and Belize*

In this paper we use frequency distributions of ceramic types and modes to identify and assess the presence and strength of permeable ceramic boundaries between sites in the northeastern Petén and west central Belize in the early Middle Preclassic through Postclassic periods. We use the data to argue there was no immutable geographical, social, or political boundary between Guatemala and Belize, but there existed a series of temporally and geographically specific permeable ceramic boundaries marked by the ebb and flow of types and modes across the contemporary geopolitical border. These permeable ceramic boundaries certainly could have reflected ephemeral socio-political boundaries, but they could also have represented ancient technoscapes unaffiliated with socio-political processes. Ceramic data from Holtun and Holmul, two sites in different sub-regions of the northeastern Petén with long periods of occupation, are used to substantiate our argument.

Callaghan, Richard (University of Calgary), Alvaro Montenegro (Dept. of Geography, The Ohio State University, Col) and Scott Fitzpatrick (Dept. of Anthropology, University of Oregon, Eugen)

[314] *The Effects of ENSO on Travel along the Pacific Coast of the Americas*

For decades, prehistoric contacts have been suggested between Ecuador and western Mexico, occurring from 400 BC, if not earlier, to the sixteenth century based on similarities in mortuary behaviors, ceramic technology, language, and ethnohistoric accounts, and other lines of evidence. However, the frequency of these patterns and the degree to which they were sustained is currently unknown. In this paper, we harness newly collected climatic data and computer simulations of seafaring to build on a previous study that examined the difficulty of maintaining sustained contact between these two areas and the level of seafaring capabilities and navigational and wayfinding skills that would have been necessary to make these trips. The present analysis, which also incorporates the effects of ENSO variability on winds and currents, provides a more robust framework for which distributions of cultural traits, genes, and languages can be compared, allowing for a better understanding of presumed patterns and mechanisms of prehistoric contacts.

Calleja, Maryann

[142] *The Invisibility of Violent Women*

We are all capable of violence. Violence utilized by men is rarely—if ever—questioned, but for women it is presumed a tool employed only by exception. Individuals and groups of both sexes have used violence to many ends. Though sex may influence the context and mode of employment, the capacity for violence is unaffected. Whether through direct, cultural, or structural violence, as individuals or in large-scale conflict, women can and have used violence to their advantage. They have fought on battlefields, perpetuated matriarchies, resisted authority, and maintained social order through the use or threat of violence.

Still, an inflated disparity between violent men and women exists in the archaeological record. To minimize this imbalance, research on violence must consider much more than just skeletal trauma. A biocultural approach can integrate archaeological context with evidence of biological stress to examine the social or cultural origins of indirect violence. Researchers must also account for sociocultural limitations that may have reduced the open expression of violence by women, thereby obscuring archaeological evidence of such behavior. Additionally, the paucity of published alternative interpretations and tendency of adherence to more conventional analyses have nearly rendered the violent women of the past invisible.

[142] *Chair*

Calleja, Maryann [353] see Ralston, Claira

Camacho-Trejo, Claudia [202] see Holt Mehta, Haley

Camacho-Trejo, Claudia

[202] An Iconographic Analysis on the Offering H Polychrome Knives of Templo Mayor of Tenochtitlan

The Mexicas were one of the civilizations that achieved a striking power of acquisition during Postclassic Mesoamerica. Through trade routes reaching down to Central America, they were able to procure exotic materials and artifacts not accessible in the basin of Mexico. One of these exotic materials was flint, a cryptocrystalline stone that forms in limestones areas. The Mexicas procured this rock to manufacture flint knives also identified as sacrificial knives and, based on historical accounts, Mexica priests used them to perform human sacrifice. At the Templo Mayor of Tenochtitlan, archaeologists have discovered three different types of these highly specialized lithic artifacts deposited in the offerings. In offering H, excavators retrieved for the first time, 33 polychrome flint knives ornamented with unknown iconography of geometric motifs. This paper will present the iconographic analysis on the offering H polychrome knives.

[202] Chair

Cameron, Catherine (University of Colorado)

[318] Jim Skibo: Éditeur Extraordinaire

Jim Skibo is a prolific scholar, but this paper addresses not Jim's research, but his multifaceted involvement with the publication of archaeological research. As a book series editor and a journal editor (as well as in a variety of other roles) Jim has encouraged the work of scholars young and old, but especially the young. He has put an enormous amount of his considerable intelligence and energy into helping scholars craft articles and books that would speak clearly to a wide audience and advance archaeological knowledge of myriad topics, especially method and theory. In this paper I will talk about Jim's accomplishments as an editor, including my own experience of working with Jim as co-editor of the Journal of Archaeological Method and Theory for almost two decades (!). Jim's work as Senior Editor of the University of Utah Press's Foundations of Archaeological Inquiry series also transformed many careers, my own included.

[140] Discussant

Camp, Stacey (Michigan State University)

[69] Healthcare and Citizenship in the Context of World War II Japanese American Internment

During World War II, approximately 120,000 individuals of Japanese heritage were incarcerated by the United States government. One-third of those unjustly incarcerated were legal American citizens. This talk examines the types of medicine and healthcare made available to imprisoned Japanese Americans based on their citizenship status. Japanese Americans who had American citizenship were generally imprisoned in War Relocation Authority (WRA) prisons, while Japanese Americans who were unable to obtain citizenship due to the exclusionary laws of the time and who were considered "dangerous" were incarcerated in Department of Justice prisons. The latter prisons were required to follow the conditions outlined in the Geneva Convention, which stipulates the types of healthcare prisoners of war and non-citizens in enemy territory were to receive. How did a prisoner's citizenship standing affect their access to medical facilities and proper medical care at these two types of prisons?

[69] Chair

Campan, Patricia [364] see Belardi, Juan

Campana, Douglas, Pam Crabtree (New York University), Susan Johnston (George Washington University) and Zenobie Garrett (University of Oklahoma)

[196] Recent Archaeological Research at Dún Ailinne, an Iron Age Royal Site in County Kildare, Ireland

Dún Ailinne is an Iron Age (ca. 600 BCE-400 CE) site in County Kildare, Ireland. It is considered as one of the Irish "royal" sites. These sites are mentioned in the early medieval literature and are large sites surrounded by an inverted bank and ditch and containing monumental timber architecture. David Anthony's first excavation experience took place at Dún Ailinne during the 1972 season as part of the 1968-75 excavation program directed by Prof. Bernard Wailes. This presentation will discuss the 2006-2008 magnetometry and targeted topographic survey at Dún Ailinne and the subsequent excavation seasons in 2016 and 2018. The new research has led to the identification and excavation of new structures and features, as well as new radiocarbon dates for some of the original archaeological phases. We will also briefly explore Prof. Wailes' impact on David Anthony's subsequent research.

Campana, Douglas [310] see Crabtree, Pam

Campaña Valenzuela, Luz Evelia [409] see Tsukamoto, Kenichiro

Campbell, Renae (University of Idaho)

- [211] *Introducing the HJCCC: A Digital Collection of Japanese Ceramics Recovered from Archaeological Sites in the American West*

In an increasingly digital world, digital archaeological collections have established themselves as important tools for artifact identification, comparative and collaborative undertakings, and information dissemination. This poster introduces the Historical Japanese Ceramic Comparative Collection (HJCCC), the first digital collection to focus on Japanese ceramics recovered from pre-World War II archaeological sites in the American West. This poster highlights the potential of this collection to contribute to the burgeoning study of the Japanese diaspora within historical archaeology and offers reflections on the sometimes complicated process of creating a digital collection that crosses disciplinary and institutional boundaries while also being mindful of ethical, ownership, and confidentiality issues.

Campbell, Steven

- [118] *Integrating Public Archaeology and Technology to Convey the History of the Mt Tabor AME Zion Church and Its Community*

The Mt Tabor AME Zion Church is located in Mt Holly Springs, Pennsylvania and is a standing log cabin structure that dates to 1871. There is an active descendant African American community around the Mt Tabor AME Zion Church that is proud of their heritage and would like to tell their story. The main goal of this project is to interpret survey data from the church property to the public in the most comprehensive manner possible. This is done using technology such as geophysical survey, 3D scanning, and 3D printing, paired with traditional techniques of excavation, archival research, and oral history. By combining innovative techniques (geophysics and 3D scanning,) with traditional methods of archaeological testing, archival research, and oral history this research will collaborate with the Mt Tabor community to preserve and interpret the history of the Mt Tabor church and its landscape. The results of this research will be displayed in this presentation.

Campbell, Wade (Harvard)

- [150] *Na'nilkad bée na'niltin: The Early Navajo Pastoral Landscape Project (Phase 1) – Experimental Ethnoarchaeology on the Navajo Nation*

The non-coerced adoption of sheep by Diné (Navajo) communities in northwest New Mexico during the 17th century and the subsequent rise of an intensely pastoral lifeway stand out as unique developments among Native societies in the American Southwest. By applying a three-phase research design that melds experimental ethnoarchaeology with geospatial modeling and site-focused geoarchaeology, "The Early Navajo Pastoral Landscape Project" (ENPLP) seeks to better understand the history of this shift and how early Diné groups responded to the various social and economic impacts associated with incipient pastoralism.

This paper discusses the ENPLP's first phase of research – a six-month long program of participant-observation and archaeological reconnaissance at a sheep camp on Black Mesa, Arizona, Navajo Nation. The resulting dataset, which combines archaeological site data with ethnohistorical research, illustrates the complexity of late 19th/early 20th century Diné herding practices and will form the basis for a series of geospatial analyses and archaeological fieldwork investigating 17th century Diné pastoral land-use practices in the Dinétah region of northwest New Mexico.

- [150] *Chair*

Campiani, Arianna (UC Merced), Rodrigo Liendo (Instituto de Investigaciones Antropológicas UNAM) and Nicola Lercari (UC Merced)

- [410] *The Temple of the Inscriptions at Palenque: Improving Architectural Analysis, Conservation Assessment, and Public Dissemination via Terrestrial LiDAR and 3-D Mapping*

The Temple of the Inscriptions—K'inich Janab Pakal's funerary building—is an outstanding evidence of Palenque elite's grandiose architectural programs in the 7th century AD. Are terrestrial LiDAR and drone-based 3-D mapping viable techniques to inform a new architectural analysis on the construction of this iconic temple? Can digital monitoring based on terrestrial LiDAR provide conservators with a solid framework for enhancing the protection of Pakal's funerary crypt, which is rapidly deteriorating? In 2018, scholars from UC Merced and UNAM in collaboration with INAH, began a project of intra-site digital documentation at Palenque, including 3-D scanning and drone surveying. This paper presents the preliminary results of the project including new digital drawings and 3-D animations of the Temple of the Inscriptions produced via LiDAR point clouds and aerial 3-D maps. Our approach exploits 3-D models and digital documentation to improve comparative architectural analysis at Palenque to shed new light on the earlier phases of the Temple of the Inscriptions. This paper also addresses how surface change detection in multi-temporal hi-resolutions LiDAR scans can enhance monitoring and understanding of the deterioration of Pakal's funerary crypt, when combined with temperature and humidity logging conducted year-round in the chamber.

Campo, Allison [129] see Magoon, Dane

Campos, Cinthia Marlene [202] see Ayala, Max

Campos, Cinthia Marlene (Binghamton University)

[360] Caves beyond the Dripline: Reconceptualizing the Subterranean-Surface Dichotomy

As cave archaeology emerged as a specialty in the 1990, an unfortunate consequence has been the reification of the distinction between surface and subterranean archaeology. We would note that there have always been problems with this dichotomy. Andrews (1970), for instance, mentions that the entrance to Balankanche Cave was in the middle of a plaza surrounded by four vaulted range structures. Plainly, the formal boundary of the cave was defined by the architecture outside of the cave. Good and Obermeyer, as well as Tucker and colleagues have documented plazas built out from cave entrances leaving no doubt that in the indigenous conception, the cave extended beyond the dripline. Recent cave surveys conducted in 2016-2017 as part of the Proyecto de Arqueología y Paisaje del Centro Sur de Michoacán noted plazas associated with caves at varying degrees of proximity. When viewed as a group, a clear pattern emerges. This presentation seeks to critically examine the Subterranean-Surface dichotomy to recognize features that functioned as extensions of cave space while not being outside of the cave.

[202] Chair

Campos, Miriam [221] see Duenas-Garcia, Manuel

Campos-Varela, Juan Carlos [406] see Carino Anaya, Tanya

Canaday, Timothy (Salmon-Challis National Forest), Bryan Hanks (University of Pittsburgh), Marc Bermann (University of Pittsburgh) and Rosemary Capo (University of Pittsburgh)**[409] Spatial Identification and Characterization of Native American Pithouse Villages along the Salmon River and Its Tributaries Utilizing Multi-Method Geophysical and Geochemical Survey**

Collaboration between the University of Pittsburgh and the Salmon-Challis National Forest has focused on a multi-year campaign of geophysical and geochemical surveys. This work has employed a suite of techniques to develop a better understanding of prehistoric social organization and a comparative spatial study of early village sites along the Salmon River and its major tributaries in the Frank Church - River of No Return Wilderness of central Idaho. The combination of geophysical survey and soil chemistry (fluxgate gradiometry, earth resistance, electromagnetic conductivity, soil magnetic susceptibility, pXRF analysis, and soil extraction geochemistry) has provided a high-resolution, minimally-invasive approach to site characterization and is assisting with the management and protection of important archaeological sites and cultural heritage connected with early indigenous populations of this region.

Cancino, Ignacio (Stanford University)**[315] Dating Agricultural Fields and Canals in the Queneto Quebrada, Viru Valley**

The results and analysis of radiocarbon dates from canals and agricultural fields are presented and discussed. The radiocarbon samples were obtained from these agricultural features and associated structures located in the Queneto Quebrada in the Viru Valley. The evolution of agricultural techniques in the north coast and responses to environmental changes and climate variability are discussed.

Cannon, Kenneth (Cannon Heritage Consultants), Houston Martin (Cannon Heritage Consultants) and Molly Cannon (Museum of Anthropology, Utah State University)**[9] Exploring Surface Spatial Patterns of Ethnic Chinese Artifacts along the Central Pacific Railroad, Box Elder County, Utah**

Immigrant Chinese workers represented the dominant work force in the construction of the Central Pacific Railroad (1863-1869). The archaeological record they left behind provides an important snapshot of the lives of these largely male work camps in the isolated desert of northwestern Utah. Funded by the National Park Service's Underrepresented Community Initiative and the Utah Division of State History, we conducted two years of intensive inventory of two work camps, four section stations, and two towns that date between 1869 and 1910. The fieldwork involved detailed mapping and recording of the surface distribution of ethnic Chinese artifacts at these various sites. The distribution of ethnic Chinese artifacts, particularly ceramic tableware, indicates a pattern of spatial, and probably social, segregation. However, the surface artifacts also provide a starting point for exploring more sophisticated questions of the living and working conditions at these range of sites and how the workers' social and economic conditions may have changed during the period of construction and after completion of the Transcontinental Railroad.

Cannon, Molly [9] see Cannon, Kenneth

Cannon, Molly**[248] Museums Make Great Partners for Science Communication: Sharing Successful Programming from PEOPLE 3K**

I explore the role of museums as partners for science communication within interdisciplinary research teams. Using examples of curriculum and programming from the Museum of Anthropology's Educational Outreach, I discuss useful approaches for distilling scientific ideas generated from the Variance Reduction-Safe Operating Space Tradeoff Hypothesis and sharing examples of archaeological visibility of people's choices in investment, risk assessment, and futurities. Our outreach efforts engage a range of museum visitors from youth participating in school group tours to life-long learners, and extend teaching of the past to applying knowledge learned from

studying the past to explore contemporary issues.

Canterbury, J. Alex [30] see Trachman, Rissa

Cantley, Garry (Bureau of Indian Affairs)

[93] *Discussant*

Canuto, Marcello [280] see Estrada-Belli, Francisco

Canuto, Marcello (M.A.R.I./Tulane University)

[303] *Discussant*

Cap, Bernadette (University of Texas-San Antonio)

[152] *Made in a Marketplace: A Comparison of Stone Tools Crafted from Local and Non-Local Raw Materials in Classic Maya Marketplaces of the Mopan River Valley, Belize*

Is a stone tool crafted from a raw material found naturally occurring only outside the geographic zone and political control of a settlement, but made in the site's central marketplace, a non-local or local good? In this paper, I present examples of such a situation at two Classic Maya marketplaces located in the Mopan River Valley, Belize, where stone tools, made from locally available chert and limestone, and non-local obsidian were produced and exchanged side-by-side. I suggest that, multiple factors, including equitable access to an exchange good through a marketplace, the frequency of consumption, the type of raw material, and the residential history of the producer-vendor and consumer, can influence perceptions of what is a local or non-local good.

Cap, Bernadette [370] see Friedel, Rebecca

Capo, Rosemary [409] see Canaday, Timothy

Capriles, Jose M. [248] see Gayó, Eugenia

Carbajal Alegre, J. Alberto [250] see Isbell, William

Carballo, Agapito [103] see Diaz Garcia, Mauricio

Carballo, David (Boston University)

[238] *Deep Histories of Conquest: Mesoamerica, Iberia, and New Spain*

As the discipline best suited for studying changes in human societies over long periods of time and the materiality of our existence, archaeology offers a valuable perspective on historic cross-cultural encounters viewed as deep history with tangible ramifications. At the quincentennial of Spain's invasion of Mesoamerica, the Aztec-Spanish war, and the transition to the new colonial regime of New Spain it is worthwhile to apply an archaeological lens to these events framed in a comparative, trans-Atlantic perspective with temporal depth. In this paper I work towards a deep history of the "conquista" by considering parallels and divergence in the long-term development of Mesoamerican and Iberian societies, their traumatic collision of five centuries ago, and their physical entanglements and legacies in landscape, symbolism, technology, and other dimensions of society. I focus especially on the deep roots of key factors often cited in older and contemporary historical accounts, including the diffusion of maritime and military technologies and plantation crops and economies; Mesoamerican micro-patriotism and indirect imperialism versus early modern Spanish ethno-nationalism and direct territorial control; and the clash and syncretic accommodations of absolutist and incorporative religious systems.

[340] *Discussant*

[238] *Chair*

Carballo, David [373] see Hernandez Sarinana, Daniela

Carballo, Jennifer (Harvard University, Peabody Museum) and Barbara Fash (Harvard University, Peabody Museum)

[118] The Mesoamerican Laboratory Ceramic Type Collections Project at Harvard University's Peabody Museum of Archaeology and Ethnology

The Mesoamerican ceramic collections at the Peabody Museum represent the work of an array of influential scholars who collected and analyzed them, many of whom were pioneers in ceramic analysis, including Alfred Kidder, Eric Thompson, Anne Shepard, and Gordon Willey. Archaeologists in many cases still use the methods established by these scholars, and we often find pottery sherds in the Mesoamerican Laboratory that were illustrated in Peabody Museum monographs and other publications. These collections also represent the very limited number of ceramic collections that exist outside Mesoamerica, and in some cases are no longer accessible within their home country. The current project works to improve intellectual and physical control of collections housed in the Mesoamerican Laboratory through curatorial study and reorganization, so they can be used effectively by current and future generations of scholars, faculty, and students. In keeping with the Peabody Museum's priorities, the project enhances knowledge of the collections through academic research on the "who/where/what/when/why" for each collection and highlights their historical value and scholarly significance. This poster outlines the project's methodology, particularly the individual consideration applied to each collection to determine the best approach to reorganization, and how it may impact future use of the collection.

Carballo Marina, Flavia [364] see Belardi, Juan

Card, Jeb (Miami University) and Salem Arvin (Miami University)

[112] 3D Reconstruction of Early Spanish Colonial Hybrid Ceramics from Ciudad Vieja, El Salvador

The primary serving vessel at the sixteenth-century Spanish colonial site of Ciudad Vieja, El Salvador, is an indigenously produced brimmed plate made in the form of Italianate majolica. These vessels were produced in a Mesoamerican technological tradition and were painted with a modified version of designs found on pre-Hispanic Pipil pottery in southeastern Mesoamerica, yet they display remarkable attention to minor variations of form found in contemporary Italianate plates. Approximately 600 fragmentary examples of this form have been found at Ciudad Vieja, making it one of the largest collections of ceramics sometimes labeled as "hybrid" or "colonoware", but only two partially complete examples have been recovered from the site. A sample of 84 fragments, representing most of the morphological variation in the larger population, were laser-scanned to produce 3D representations. These models were then used to produce 3D reproductions of the whole vessel for examination virtually and in physical 3D printed examples. This project not only allows analysis of these fragments as a more comprehensible whole, they are useful for classroom exercises and broader public outreach.

[198] Discussant

Caretta, Nicolas (UASLP), Finn Ole Nielsen (Bornholm Museum), Michael Thorsen (Bornholm Museum) and Poul Otto Nielsen (National Museum Denmark)

[386] Vasagård Archaeological Project: A Causewayed Enclosure and Timber Circles in the Island of Bornholm, Denmark

Vasagård site is located on the southern side of the island of Bornholm, Denmark. Vasagård is separated by the 100m Læså valley from two nearly identical Neolithic sites and consists of a tomb system where a dolmen and a passage grave can be found close to the settlement. The grave system and causewayed enclosures are dated from 3500 BC., and constitute the most north-eastern occurrence of this complex type in Europe. Contemporary to the palisade enclosures timber circles have been found, as well as three hundred small and flat, engraved stones, (broken and complete) and large quantities of animal and carbonized seeds placed as offering. The engraved stones were marked with patterns of radiating straight lines and have been named "sun stones" or "solar stones" by the local archaeologist. Archaeologists from the Bornholm Museum have proposed that these artifacts were likely part of the rituals carried out by Neolithic sun-worshipping societies about 5,000 years ago. Analysis of these materials that has been discovered will present us with a clearer view of the first communities that settled in the island and the origins of agriculture, farming and rituality in Bornholm.

Carey, Genevieve [17] see Guilfoyle, David

Carhuanina, Diana (Qhapaq Ñan)

[355] La Cerámica Inka en Vilcashuamán: Hacia el Análisis de sus Estilos

En el marco del Proyecto del Tramo Vilcashuamán-La Centinela (Qhapaq Ñan-Sede Nacional) desde el año 2017 se vienen realizando investigaciones arqueológicas en la Zona Monumental Vilcashuamán (Ayacucho, Perú), interviniéndose con pozos de prueba en los sectores Templo de Sol y Ushnu. Además, se realizó un reconocimiento de los alrededores del sitio teniendo como eje central la ciudad de Vilcashuamán.

La presente ponencia presentará los resultados preliminares del análisis del material cerámico, donde se observa la influencia del estilo inca en la cerámica local para el Horizonte Tardío. Se identificaron algunos fragmentos que siguen manteniendo características de tradiciones alfareras locales incorporando elementos de la cultura Inca o incluso imitando sus formas.

Si bien Vilcashuamán es un sitio con una planificación netamente Inca y se encuentra en uno de los principales caminos que interconectaban al Cuzco con otras partes del Imperio Inca, la presencia de cerámica Inca Imperial es escasa.

Carino Anaya, Tanya (Universiteit van Amsterdam), Juan Carlos Campos-Varela (Escuela Nacional de Antropología e Historia), Irán Rivera (ENAH-Lab of Palinology), Cuauhtémoc Domínguez Pérez (INAH-DEA) and Javier Martínez González (INAH-DSA)

[406] Not Only an Archaeological Rescue: Canal de Ohtenco, Case Study of Iztacalco's Agricultural System

"Chinampas" typically are associated with Xochimilco's agricultural system. However, recent work by INAH's 'Dirección de Salvamentos Arqueológicos' was undertaken at Iztacalco due to modern population growth. Iztacalco is 15 km from Xochimilco but no information existed about the preHispanic population or the site's economic activities. Therefore, this research offers important data to study their agricultural system and the species the cultivated. Iztacalco was an islet where variable water levels inhibited permanent settlement but allowed agricultural. According to the analysis of soil samples, they cultivated an extensive variety of cultigens, such as *Chenopodium* sp., *Amaranthus* sp., and *Cucurbita moschata*. This project allowed us to employ new technology, such as drones, to produce 3D reconstructions of canals and chinampas. These data allow us to compare the chinampas of Iztacalco with ones excavated in Mexicalzingo and in area of Mexico-Tenochtitlan, near the modern area of the city's main Central de Abastos.

Carlson, Justin [312] see Crothers, George

Carlson, Kristen (Augustana University), Haley Sherwood (Augustana University), Dagny Anderson (Augustana University), Amelia Cisar (Augustana University) and Andrew Kracinski (Augustana University)

[207] Ethnogenesis at the Lynch Site (25BD1), Nebraska through Pottery Analysis

The Lynch site occupied in the late 1200s saw substantial environmental and population shifts in the context of profound regional sociopolitical and demographic changes. Oneota groups expanded into the east-central Great Plains at the same time that indigenous Plains farmers abandoned the western parts of their ranges and moved east. Interactions between these groups remain poorly understood. Lynch ceramics demonstrate patterns suggesting that these two distinct groups may have lived side-by-side, forming new communities with distinct identities. The assemblage from the Lynch Site (25BD1) includes classic Oneota shell-tempered pottery that is likely imported, classic Oneota and Central Plains Tradition pots made locally, and pots that blend elements of Oneota and CPT styles.

Carlson, Kristen [322] see Bement, Leland

Carlson, Kristen [409] see Bamforth, Douglas

Carlson, Risa (Obsidian Consulting Services), Nicholas Schmuck (University of Alaska, Fairbanks) and James Baichtal (Black Powder, Inc.)

[10] The Inland Life of Southeast Alaska

The focus of archaeological research in Southeast Alaska has long been on coastal sites. Over the past decade new inland sites have been recorded on Prince of Wales Island, including the first early Holocene lakeshore site. Waterfalls presenting natural fish barriers to migrating salmon also preserve evidence of Holocene human activity far removed from early Holocene paleoshorelines. Resource use of the island interior in recent centuries is documented by culturally modified trees found far inland. Future research should target inland procurement strategies for a fuller understanding of the seasonal round through time.

Carlson, Risa [10] see Schmuck, Nicholas

Carlson, Sarah [89] see Nash, Stephen

Carlson Dietmeier, Jenna (South Dakota State Historic Preservation Office), Michael Fosha (South Dakota Archaeological Research Center) and Chris Nelson (South Dakota State Historic Preservation Office)

[88] Bison Kill Sites in South Dakota, 9,000 B.C. – A.D. 1875: A National Register of Historic Places Multiple Property Listing

The state of South Dakota currently has over thirty recorded bison kill sites. With development, agricultural practices, and natural erosion a threat to many of these sites, the need to identify, evaluate, and protect these and other unrecorded bison kill sites within the state is imminent. To aid in this process, staff from programs of the South Dakota State Historical Society are conducting research on previously recorded bison kill sites within the state and are developing a statewide bison kill site multiple property submission for the National Register of Historic Places. Using a thematic approach, the multiple property listing outlines the environmental, ethological, and cultural contexts of bison (*Bison spp.*) kill sites in South Dakota from the Paleoindian Period to the Reservation Period. The listing also defines the property types associated with bison kills within the state and delineates each property type's significance and registration requirements. The multiple property listing provides cultural resource managers with a standardized approach to identifying and evaluating bison kill sites in South Dakota, thereby facilitating the consideration of these important cultural resources in federal and state undertakings.

Carmody, Stephen B. [35] see Weitzel, Elic

Carmody, Stephen B. (Troy University), Kaitlyn N. Weis, Jennifer Simpson (Troy University), Sarah C. Sherwood (Sewanee: University of the South) and John Cornelison (Southeastern Archaeological Center)
[325] New Investigations at Russell Cave, Alabama

Russell Cave (1Ja181), located in Jackson County, Alabama, contains one of the longest prehistoric occupational sequences known in the southeastern U.S., spanning approximately 9,000 years. Excavations were conducted by the Chattanooga Chapter of the Tennessee Archaeological Society (1953-1955) the Smithsonian Institute in conjunction with the National Geographic Society (1956-1958) and finally by the National Park Service 1962. Original analyses focused on ceramics, lithics, human skeletal remains, and faunal remains. These analyses along with radiocarbon dates have helped to define the archaeological framework of the cave as well as that of the greater Southeast. The era of the early excavations did not address plant use at the site or study the complex stratigraphy. Recently the Sewanee field school, in collaboration with archaeologists from NPS-SEAC, conducted the first excavation of the cave in over 50 years. Here we present the preliminary results of the focusing on the first float samples analyzed from the cave, new radiocarbon data, and geoarchaeological analysis of the well-preserved anthropogenic deposits.

Carney, Molly (Washington State University)

[211] Alternative Recipes: Exploring the Diversity of Foods Prepared in Prehistoric Earth Oven Cooking

Camas (*Camassia* spp.) was among the most important foods for many cultural groups of the Pacific Northwest in the past. The Pend Oreille Valley in northeastern Washington and the Kalispel people were particularly known for their large camas fields and the archaeological record of the valley is replete with earth oven features. Archaeological site 45PO422, located along the Pend Oreille River on Kalispel ancestral lands, was an earth oven site, presumed to be the location of significant camas processing. Bulk soil samples, archived for the past 20 years, were floated and processed for the identification of charred plant remains. A total of 17 plant species were identified to the genus or lower taxonomic level. Culturally important plant taxa include nodding onion (*Allium cernuum*), kinnikinnick (*Arctostaphylos uva-ursi*), berry (*Vaccinium* sp.), chokecherry (*Prunus virginiana*), hawthorn (*Crataegus* sp.), and pine (*Pinus albicaulis*, *Pinus contorta*, and *Pinus ponderosa*). This work supports the Kalispel Tribe's long-term interests in understanding its history of food selection, food security, and food safety.

Caro, Carlos (California State University, Long Beach), Hector Neff (California State University, Long Beach), Edgar Espinoza Pérez (Alcaldía de Managua), Marty Kooistra (California State University, Long Beach) and Chad Rankle (California State University, Long Beach)

[191] Field Investigations at El Quebracho, a Sapoá-Period Site in the Boaco Department of Central Nicaragua

Along the Fonseca River, southwest of the City of Boaco, Republic of Nicaragua, is the small community of El Quebracho. Within grazing parcels are remnants of a site dating to the Sapoá Period. Little is known archaeologically in the Boaco Department. Field investigations during January 2017 included reconnaissance survey, detailed mapping, and surface collection. A geophysical survey using magnetometry and ground penetrating radar was employed to create remote sensing site imagery. Findings at El Quebracho consist of cobble architecture, including an array of scattered mounds varying in size that may have been arranged around plazas, a characteristic Mesoamerican pattern. This suggestion of Mesoamerican influence at the site of El Quebracho is supported by a surface-collected Plumbate ceramic fragment. A total of 14,452 square meters were subject to geophysical remote sensing survey. Based on present knowledge, the site of El Quebracho was occupied from A.D. 1000 to 1350. Site integrity and collected surface material stimulate further interest for archaeological research in central Nicaragua.

Carpenter, John (Centro INAH Sonora) and Guadalupe Sanchez Miranda (Centro INAH Sonora)

[16] Resilience in an Arid Environment: Long-Term Climate Change and Human Adaptations in Sonora

Recent interdisciplinary investigations have revealed that the Sonoran Desert region is not only one of the earliest regions occupied in the Americas, but also demonstrates one of the longest continuous occupation records. The earliest Sonorans were proboscidean hunters in the Late Pleistocene, highly-mobile Archaic foragers and hunters in the Early and Middle Holocene and maize farmers in the Late Holocene. Several archaeological sites in the Sonoran Desert region have a well-preserved archaeological record with stratigraphic deposits that cover the last 15,000 years. Based upon multiple sources of evidence (pedological data, pollen samples, macrobotanical remains, and cultural materials) primarily from the La Playa, Fin del Mundo, El Aigame and El Gramal sites, along with Uto-Aztecan linguistic models, we explore the mechanisms implemented by the inhabitants of the desert to survive the climatic oscillations recurrent during the Holocene and how these adaptations permitted them to thrive in their cultural landscape. This paper summarizes the longue durée of climate change and human occupations and their varied adaptations represented in the archaeological record of Sonora, Mexico.

Carpenter, John [187] see Sanchez Miranda, Guadalupe

Carpenter, John [296] see Pailes, Matthew

Carpenter, Lacey (University of Michigan)

[197] Tools for Change: Food Preparation Techniques during State Formation at the Tilcajete Sites

Cooking and eating are practices with cultural significance beyond sustenance. Understanding foodways during times of sociopolitical transformation can provide a window into how people foster, resist, and mediate social change in daily life. The context in which food is produced, prepared, consumed, and shared provides insight into people's changing practical concerns as well as the social and symbolic significance of foodways and eating. In this paper, we examine food preparation in household contexts during the Middle and Late phases of the Formative period in Oaxaca, Mexico (500-100 B.C.). This was a time of significant sociopolitical change in connection with the founding of Monte Albán and the emergence and growth of the state.

We investigate households from the Tilcajete polity in the southern Valley of Oaxaca. Excavations at two consecutive occupations have demonstrated changes to domestic architecture that suggest an increase in household size. In this study, we compare food preparation features and implements including groundstone tools, ceramic cooking vessels, and hearths from both occupations. We evaluate patterns in household food preparation tools to determine whether people continued to reference traditional cooking techniques or created new styles of food preparation in response to shifting household composition and broader societal change.

[59] Moderator

Carpenter, Michelle (University of Texas at San Antonio), Robert Hard (The University of Texas at San Antonio) and Raymond Mauldin (The University of Texas at San Antonio)

[370] Stable Isotope Analysis of the San Pedro and Cienega Phases at the La Playa Site (SON: F: 10: 3), Sonora, Mexico

Previous stable isotopic studies of bone from 12 dated individuals from the site of La Playa in Northern Sonora suggest a diet dominated by C4 and CAM resources. For collagen $\delta^{13}\text{C}$, an average value of $-8.5\text{\textperthousand}$ ($n=5$) was recorded in the San Pedro phase (1200 BC to 800 BC) which shifted to an average value of $-10.0\text{\textperthousand}$ ($n=7$) in the Cienega phase (800 BC to AD 150). However, carbon from bone apatite shows no change over time. There is an unexpected decrease from San Pedro to the Cienega phase in $\delta^{13}\text{C}$ collagen values suggesting changes in C4/CAM protein intake. In contrast, other data (e.g. maize ubiquity values) suggest a dramatic increase in corn consumption between these two phases. One possible explanation is a shift in protein sources, with greater reliance of distant marine resources during the Cienega phase. However, while the high nitrogen ($\delta^{15}\text{N}$) values are consistent with the use of marine resources ($11.3\text{\textperthousand}$ to $13.2\text{\textperthousand}$, $N=12$), there are no differences between the phases in $\delta^{15}\text{N}$. We provide new stable isotope analysis on 17 additional humans, as well as selected fauna from La Playa, to explore explanations for directional shifts in diet as well as the elevated $\delta^{15}\text{N}$ signatures.

Carpio, Edgar

[270] El Diablo Rojo: An Olmec Rock Painting in Amatitlán, Guatemala

Known as "The Red Devil" or the "Muñeco", a rock painting in Olmec style, located in the municipality of Amatitlán, department of Guatemala. This was reported at the end of the 70s of the last century and has been visited on numerous occasions by various specialists. In this paper we will present a synthesis of its discovery and the investigations carried out, as well as a description of its current status, indicating whether changes have been observed over time since it was reported. We will also try to raise some interpretation that will bring us closer to establishing what was the purpose of its creation and why in that precise place.

Carr, Christopher [372] see Dunning, Nicholas

Carr, Christopher (University of Cincinnati), Jeffrey Brewer (University of Cincinnati), Nicholas Dunning (University of Cincinnati), Kathryn Reese-Taylor (University of Calgary) and Armando Anaya Hernández (Universidad Autónoma de Campeche)

[372] Ancient Maya Quarries: Limestone, Chert and Lidar

Lidar has dramatically expanded our view of the ancient Maya landscape. We have used lidar to study the key natural resources of limestone and chert- their location, extent, and relationship to other ancient Maya features. Limestone was a key building material and chert was the source for most chipped stone tools. Lidar-derived imagery and hydrological modeling informed our reconnaissance surveying at the ancient Maya site of Yaxnohcah, Calakmul Biosphere Reserve, Campeche, Mexico. We located extensive areas of limestone quarry pits adjacent to residential ruins. Excavation showed many of these quarries were converted to residential water reservoirs. We located linear, limestone, quarry scarps a half kilometer in length. Lidar shows the scarps are aligned with civic-ceremonial groups, some groups more than three kilometers distant. We located small zones of chert quarries and chert pavements. One zone is a cluster of semi-circular quarries at the intersection of upland and bajo. The zone of chert nodules was quarried in multiple individual semi-circles, rather than one large quarry. This may give an indication of the organization of this economic activity. Limestone quarries appear to be quite extensive, chert quarries quite limited.

Carr, Robert [37] see Schaffer, William

Carrara, Nicola [317] see Robbins Schug, Gwen

Carriere, Ed [95] see Croes, Dale

Carrillo, Mariza [71] see Lizama Aranda, Lilia

Carrión, Yolanda [144] see Real, Cristina

Carroll, Amanda

[332] *Perspectives on Pits of the Western Stemmed Tradition: An Analysis on the Contents of Feature 59 at the Cooper's Ferry Site*

Excavation of a pit feature designated as Feature 59 (F59) from the Cooper's Ferry site (10IH73) in western Idaho offers a unique opportunity to explore more about the Western Stemmed Tradition (WST) and how people used pits in the Far West. This project analyzes the contents from within F59. These contents include the skeleton of a wolverine (*Gulo gulo*) specimen found at the bottom of F59 in association with one WST projectile point. Furthermore, a biface, unifaces, blades, cores, modified flakes, and debitage, as well as other fragmented faunal remains, were excavated from F59 as well. A radiocarbon assay taken from a rib of the wolverine suggests an age of $9,620 \pm 30$ radiocarbon years before present. Conducting analyses on F59 and its contents will further knowledge regarding how people used pits in prehistory at the Cooper's Ferry site while also furthering research on domestic lifeways of the WST.

Carroll, Jon (Oakland University)

[409] *A Multispectral Survey of the Historical Landscape of Chateau de Balleroy, Normandy, France*

Chateau de Balleroy located in the Calvados region of Normandy, France, played an important role in launching the career of Francois Mansart, popularizer of the Mansard roof. Historic architectural features, subsurface archaeological features, and graffiti were documented using drones and multispectral imagery. The analysis of these data enhances our understanding of how the people marked and modified the Chateau and its associated landscape at multiple socio-spatial scales over the last four centuries.

Carroll, Mary (National Park Service)

[237] *Understanding Section 3 of NAGPRA*

The Native American Graves Protection and Repatriation Act (NAGPRA) became law on November 16, 1990. In the 29 years since NAGPRA was enacted, much attention has been paid to Native American human remains and other cultural items subject to NAGPRA already in museum and Federal agency collections. However, there's another aspect of NAGPRA that impacts Federal agencies and their work. Section 3 covers the ownership of cultural items subject to NAGPRA inadvertently discovered or intentionally excavated on Federal lands after November 16, 1990. But what is actually required under Section 3? This paper will set the context for the "Beyond Collections" symposium by providing a brief summary of Section 3, including what must occur in order to allow archaeological excavations; what must happen at the time of an inadvertent discovery; who is entitled to custody/ownership of the human remains, funerary objects, sacred objects, and objects of cultural patrimony; and what dispositions of "unclaimed" cultural items are allowed.

[237] *Chair*

Cartagena, Nicaela, Sheldon Skaggs (Bronx Community College) and Terry Powis (Kennesaw State University)

[113] *The Use of Geospatial Technology to Identify Patterns in the Distribution of Artifacts at the Ancient Maya Site of Pacbitun, Belize*

The archaeological site of Pacbitun is located in west central Belize between the ecozones of the Belize River Valley and the Mountain Pine Ridge. The ancient Maya occupied the site from the beginning of the Middle Preclassic (900 – 300 BC) and continuing through the Terminal Classic (AD 800-900). The use of geographic information systems (GIS) is becoming increasingly useful in the world of archaeology. Throughout the past ten years various artifacts that have been designated as "special finds" have been recovered from the site core and periphery, and based on context have been identified as either elite or commoner. These special finds belong to all material culture categories - bone, ceramic, and lithic – and have been found in isolated mounds, courtyards, plazas, temples, and palaces. In order to generate a better understanding of the significance of these special finds, either singly or in concentration/association, we use a GIS technique called heat mapping. Heat mapping will visually demonstrate any recognizable patterning of low or high frequencies of the special finds. This GIS technique will allow us to determine the kinds of activities (e.g., ritual, household, storage, midden) that were performed in different contexts through time at the site.

Carter, Alison K. (University of Oregon), Hong Wang (Institute of Earth Environment, Chinese Academy), Miriam Stark (University of Hawaii), Rachna Chhay (APSARA National Authority) and Piphal Heng (University of Hawaii)

[27] *Mind the Gap: Occupation at Angkor Wat and Implications for the Decline of Angkor*

The Angkor Empire controlled or influenced much of mainland Southeast Asia from the 9-15th centuries CE. Traditionally, scholars have dated the end of the Angkor Empire to 1431 CE, when the capital was sacked by the kingdom of Ayuddhaya in Siam (Thailand). More recent archaeological work has also demonstrated a strain to the water management network due to a series of droughts and heavy monsoons in the 14-15th centuries, which also contributed to a decline of elite socio-political power and depopulation of the region. In this paper, we add to the evolving narrative regarding Angkor's collapse by presenting radiocarbon dates from three field seasons of excavations on occupation mounds within the Angkor Wat temple enclosure. These radiocarbon dates show a 13-15th century GAP in occupation at the site. We contextualize these dates with other published radiocarbon dates from across Angkor as well as historic and art historic/architectural sources to demonstrate the complexity of the Angkorian "collapse" and to complicate narratives regarding the transition from the Angkorian to the Post-Angkorian period.

Carter, Alison K. [300] see Bhattacharyya, Tiyas

Carter, Allyson

[164] *Discussant*

Carter, Benjamin (Muhlenberg College)

[314] *Spondylus as a Driver of Long-Distance Exchange*

For many years the shellfish, *Spondylus*, has been seen as a driver for long distance exchange. Overfishing of the highly sought *Spondylus* pushed harvesters farther and farther north, possibly as far as West Mexico, in search of the red, orange and/or purple shell and promoting interaction between distant and disparate peoples. Yet, the overfishing hypothesis has been only partially tested. Current understandings of *Spondylus* ecology indicate that the shellfish may have been much more easily acquired and broadly available than originally thought and therefore much more difficult to deplete. The presentation will address the effects of updates to *Spondylus* ecology as well as the current archaeological evidence for overfishing and long distance exchange of *Spondylus*. I propose additional ways to test the hypothesis. Though clearly an important component of long distance exchange, it now appears less likely that *Spondylus* was a primary driver.

[256] *Discussant*

Carter, Nicholas (Harvard University) and Lauren Santini (Harvard University)

[384] *Epigraphy and the Archaeology of Settlement in the Dolores Region, Petén, Guatemala*

This paper summarizes recent research into the timing, distribution, and causes of ancient Maya settlement in the area of Dolores, Petén, Guatemala, in the western Maya Mountains. Integrating evidence from hieroglyphic inscriptions, ceramic studies, and GIS modeling of least-cost pathways and viewsheds, I propose an archaeohistorical narrative for the Late Classic period in which kingdoms outside the Dolores area intervened there, including through the sponsorship of religious cults and local dynasties, in order to secure control of travel routes important in the procurement of cacao and other valued crops. As the Calakmul hegemony broke down under pressure from Tikal, local kingdoms contended for dominance, repeating in miniature some of the strategies used by larger Maya polities.

Cartier, Meghan (California State University, Fresno)

[406] *The Sighing, Bleeding, Feasting Soul: Speech Scrolls in Mesoamerica*

Speech scrolls are common elements of Mesoamerican codices and their frequent use and incorporation into a wide array of human and anthropomorphic entities highlights the need for a formal study of these elements of iconography. The use of speech scrolls is not ubiquitous simply because of their function as a marker of speech in service of a larger motif or series of events, but because they are integral to the underlying cultural and cosmic foundations of these motifs. Be it as a simple volute or an intricate swirl of precious items, depictions of speech are more than mere markers of verbal communication. Speech scrolls connect the images and figures depicted to larger cosmic concerns of the soul, earthly and heavenly structure, authority, death, and sacrifice. Analysis of speech scrolls in ritual contexts illustrates the multi-layered and interdependent relationship between tangible and imagined corporeal forms with the unseen supernatural foundations underlying concepts of ritual actions and bodily performance. Through examination of speech scrolls in the Borgia Group codices, with particular focus on the ritual sequences in the Borgia Codex, connections between the depiction of speech/breath and Nahua ideas of the tripartite soul, cosmic structure, and ritual power are revealed.

Cartwright, Rachel (University of Minnesota)

[50] *Playing at Death: A Discussion of Hnefatafl Pieces in Viking Burials*

Board games, from a psychological standpoint, have been seen as a reflection of skill, cunning, wisdom, and intelligence. Since most board games were developed in order to hone one's skills in a certain area of life, the presence of them in graves should indicate a level of intellectual prowess. However, from an archaeological viewpoint, the presence of board games in burials has been seen as a signifier of high social status. Often this has been assumed given the relative expense of the materials used in the creation of board games excavated in burials. During the Viking Age (AD 793 to 1066) Hnefatafl, a tactical game much like chess, was a popular board game, with

evidence of the game appearing throughout Scandinavia and the British Isles. This paper will combine the psychological and archaeological in an attempt to better understand what Hnefatafl pieces found in Viking Age burials signify about the individuals with whom they are buried.

Caruana, Matt [277] see Herries, Andy

Carvalho, Milena (University of New Mexico)

[144] *A Stable Isotopes Analysis of Ungulate Remains from Lapa do Picareiro: An Assessment of Refugia Concepts during the Middle Paleolithic and Transition to Upper Paleolithic*

Neanderthals and anatomically modern humans (AMH) adapted to a series of environmental changes during the Late Pleistocene and may have sought refugia in the southern reaches of Europe in response to environmental degradation. Explanatory models such as the Ebro Frontier Model propose that Neanderthals were adapted to woodland environments while AMHs preferred open landscapes. This model suggests that Late Neanderthal survival in southern Iberia may have been the result of Neanderthals seeking refuge during the relatively mild conditions during MIS 3 on the peninsula. Heinrich Events, especially H4, however, may have created harsh climatic conditions that may have reduced Neanderthal populations below survival thresholds. Thus, reconstructions of paleoenvironmental conditions to which Neanderthals and AMHs were subjected are key to understanding whether both groups periodically sought refuge in Iberia. Here, we present a paleoenvironmental study using stable isotopes analysis of carbon and oxygen of red deer and ibex tooth enamel from Mousterian and Early Upper Paleolithic levels from Lapa do Picareiro (Portuguese Estremadura). These data are then compared to previous isotopic data recovered from red deer and rabbit tissues as well as other paleoclimate indicators from Picareiro to assess whether central Portugal acted as a refugia during periods of unfavorable climates.

[144] *Chair*

Casal, Fernando [309] see Eshleman, Sara

Casaly, Allison

[266] *Fluid Borders: Personal Ornamentation and Waterways in Bronze Age Northwest Europe*

This paper explores the role played by waterways in the social exchange characteristic of Bronze Age Europe. It uses personal ornamentation as a proxy for social groupings, based on strong theoretical arguments establishing the necessity of a common 'grammar' to the relay of information via physical adornment. This analysis considers the form, design, and deposition of objects of personal ornamentation in Ireland, Britain, and northern France, with particular focus on the Irish Sea, the Channel, and the major rivers of each respective region. While modern Western thought tends to conceptualize bodies of water as barriers, suggested by their frequent designation as political borders, preliminary data suggests that waterways in the Bronze Age functioned as facilitators of social exchange, as reflected in patterns of personal ornamentation.

[266] *Chair*

Casana, Jesse (Dartmouth College)

[77] *Resurrecting Lost Landscapes: Global-Scale Archaeological Prospection Using Cold War-Era CORONA Satellite Imagery*

Declassified CORONA spy satellite imagery, collected from 1960-1972, has proven to be a uniquely valuable resource for discovery, mapping, and interpretation of archaeological landscapes. These high-resolution, stereo photographic images preserve a picture of sites and cultural landscape features that have been impacted or destroyed by recent industrialization, urban expansion, and agricultural intensification in many parts of the world. However, there are significant technical challenges in integrating unusual cross-path panoramic CORONA imagery into modern GIS platforms, creating hurdles for archaeological research. The paper presents results of the CORONA Atlas Project, an effort that is making orthorectified CORONA imagery available across much of the globe as well as providing tools for archaeological analysis. Using examples from China, Iraq, Pakistan, Peru and elsewhere, findings illustrate some of the tremendous opportunities for archaeological prospection that CORONA imagery makes possible, while also highlighting a range of new challenges presented by the sheer magnitude of available data and the complexity of its interpretation and analysis.

Casana, Jesse [120] see Hill, Austin

Casanova, Edgar [39] see Filloy, Laura

Cascalheira, Joao [88] see Goncalves, Celia

Cascalheira, Joao (ICArEHB - University of Algarve), Celia Goncalves (ICArEHB - University of Algarve) and

Nuno Bicho (ICArEHB - University of Algarve)**[144] Assessing the Spatial Patterning of Middle Paleolithic Human Settlement in Westernmost Iberia**

Currently available data on the Pleistocene human occupation of the westernmost territories of Iberia attests the presence of Middle Paleolithic industries from c. 240 ka cal BP until c. 38 ka cal BP. Previous studies focusing on this timeframe have suggested that Middle Paleolithic populations were highly mobile and predominately utilized locally available raw materials, with many of cave and open-air sites being located near springs or fluvial settings. Other than these observations, no specific studies have focused on exploring the factors influencing human site location choice during that time range. Employing statistical and GIS approaches, this paper will provide an initial assessment of potential spatial patterning in human settlement during the Middle Paleolithic of Central and Southern Portugal, evaluating (1) whether the location of preserved sites was random or spatially biased and, if the latter is true, (2) what landscape features have a greater influence on site location choice, and (3) if there have been any changes in the influence of these features over time. Our data will help to shed light on the particularities of Neanderthal adaptations in a region regarded as refugium during periods of unfavorable climate during the Middle Paleolithic.

Cascalheira, Joao [144] see Horta, Pedro

Casco, Antonio García [37] see Pouncett, John

Caseldine, Christopher (Arizona State University)**[194] Dispersed Centrality: A Ceremonial Organization Underpinning Hohokam Platform Mound Ceremonialism**

The period between the collapse of the ballcourt system (ca. A.D. 1070) and the formalization of Civano phase platform mounds (ca. A.D. 1300) has long perplexed Hohokam scholars. Before and after this period, members of Hohokam society gathered together at centralized locations to participate in and observe public activities and ceremonies. Given a possible long history of centralized public ceremonialism during the Hohokam cultural sequence, above the scale of the household, it is unlikely that such activities ceased between the ballcourt system collapse and the Civano phase. In this paper, I will introduce the concept of "dispersed centrality". Public ceremonialism was likely socially-central throughout the entire Hohokam cultural sequence, but centralized nodes of ceremonies also were present at various levels of the community and not just at locations of monumental architecture. To support my argument, I will provide settlement and artifact data from the Casa Grande community and from Phoenix basin settlements. These data suggest that platform mounds were the most conspicuous manifestation of centralized ceremonialism during the Civano phase, but public ceremonies also occurred at lower levels of social organization.

Caseldine, Christopher [194] see Miltimore, Derek

Casserly, Anna-Marie (University of Kentucky) and Briana Moore (University of Kentucky)**[353] Analyzing Stress, Discovering Cooperation: A Case Study of a Late Archaic Sample from the Green River Region of Kentucky**

While considerable portions of bioarchaeological work have been dedicated to examining evidence of violence and conflict, little research has been devoted to understanding collaboration in the past. Analysis of stress biomarkers, particularly that which utilizes an osteobiographical approach, provides one potential avenue for finding evidence of cooperation in prehistoric societies. The Late Archaic communities of the Green River region of Kentucky present an ideal population for a case study on collaboration in forager groups. By analyzing osteological stress markers, this examination seeks to realize the potential for using these stress biomarkers, contextualized through mortuary analysis, to better understand cooperation as a social process. By exploring experiences of stress throughout the life course of adults, researchers have the potential to see how cooperation manifests differentially even for individuals within non-ranked societies.

Casson, Aksel (Slippery Rock University)**[119] Role-Playing Games in the Introductory Archaeology Classroom**

The use of role-playing games (RPGs) in university courses is increasingly common in the humanities and social sciences, most notably within the discipline of history. Here I describe my efforts to construct a series of mini-RPGs for an introductory archaeology course, with units designed around key behavioral developments: the emergence of technology, culture, agriculture, cities, and cooperative behavior. These units are inspired by Robert Kelly's book, *The Fifth Beginning*.

Castañeda, Alejandra [307] see Darras, Véronique

Castañeda, Amanda (Shumla Archaeological Research and Education Center) and Charles Koenig (Shumla Archaeological Research and Education Center)

[305] Petroglyphs in the Lower Pecos Canyonlands: Preliminary Analysis of Context, Style, and Chronology

Petroglyphs have been an understudied form of rock art in the Lower Pecos canyonlands of Texas, in large part due to the small number of sites known to include carved, incised, or pecked designs. The most famous petroglyph site in the region is Lewis Canyon, where over 1,000 figurative petroglyphs were pecked into the limestone bedrock. Aside from Lewis Canyon petroglyphs have been considered uncommon in the region. While petroglyphs may be far less pervasive than the hundreds of pictograph sites, Shumla has recently documented over 15 additional sites containing figurative petroglyphs. Interestingly, these newly identified petroglyphs are starkly different than the imagery at Lewis Canyon. This paper describes the documented petroglyph assemblage, and puts forth preliminary thoughts about the context, style, and chronology of these features. It is important that we begin to recognize the patterns and variation that exist among the petroglyphs of the region as well as compare these with petroglyphs in the immediate surrounding areas of Texas and northern Mexico.

Castañón-Suárez, Mijaely (Instituto Nacional de Antropología e Historia), José Luis Punzo Díaz (Instituto Nacional de Antropología e Historia) and Lissandra González (Instituto Nacional de Antropología e Historia)**[307] Distribution Analysis of Archaeological Ceramics on the "Malpaís de Tacámbaro Site", La Garita Sector, Michoacán, México**

In this paper we will present the results of the geostatistical analysis of the ceramics recovered during the archaeological prospecting works at Malpaís de Tacámbaro site in the La Garita sector. This is a big settlement located on top of a volcanic flow in the municipality of Tacámbaro, the south central of Michoacán. The goal of this study is to identify the characteristics of occupations and the use of space at this part of the site. The vast majority of materials belong to the early Urichu (900-1000 / 1100) and late Urichu (1000 / 1100-1350) phases, so we will present as well a general overview of the distribution of the ceramic materials of this period recovered in the region of the Balsas river Basin, during the works of the Proyecto Arqueología y Paisaje en el Área Centro Sur de Michoacán (PAPACSUM) from 2014 to 2018.

Castillo, Feren [200] see Prieto, Gabriel

Castillo, Karime (UCLA-Cotsen Institute of Archaeology)**[407] Colonial Glass Production in Mexico City: A Study on Technology Transfer and Adaptation**

The technology to make glass was brought to Mexico by Spanish glass artisans shortly after the Conquest in the sixteenth century. In the process of transferring their technological knowledge to the New World, these glass artisans encountered several challenges as they established workshops in Mexico City and Puebla, but were able to adapt the technology to the local conditions and resources. Through a multidisciplinary approach incorporating archaeology, history, and materials science principles and methods it is possible to investigate the transfer, adaptation, and development of European glass technology in colonial Mexico. This paper presents the results of the analysis of the chemical composition of archaeological glass from Mexico City showing how a foreign technology was adopted in a colonial context and adapted to the resources available in New Spain.

Castillo, Luis Jaime (Universidad Católica del Perú)**[1] Discussant****Castillo, Victor (University of Arizona)****[303] Conquest as Revival in the Sixteenth-century Maya Highlands: Excavations at Chiantla Viejo, Guatemala**

Archaeological investigations at Chiantla Viejo, in the western Guatemalan highlands, focused on studying how public ritual in spaces for communal gatherings mediated changes and continuities in small Maya communities during the Spanish conquest. Excavations revealed a short occupation at Chiantla Viejo at the very end of the Late Postclassic period, as well as episodes of abandonment and reoccupation of the site during the first decades of the colonial era. These episodes included the destruction and remodeling of some structures and the building of a new architectural complex of small ceremonial platforms in the plaza. Archaeological evidence from Chiantla Viejo and Zaculeu, along with data coming from archival research, suggests a steady revitalization movement of ancient ritual architectural traditions along the basin of the Selegua River during both the K'iche and Spanish invasions of the Mam-speaking area of western Guatemala. Investigations at Chiantla Viejo also highlight methodological issues for the study of Late Postclassic and early colonial sites in the Maya Highlands.

Castro, Gregg [294] see Schneider, Tsim

Castro, Patricia [39] see Maldonado, Blanca

Catenacci, Senna (University of Michigan) and Briana Doering (University of Michigan)**[10] Evaluating Late Holocene Stone Tool Production at Delta Creek, Alaska**

This project aims to better understand the lifestyles of nomadic hunter-gatherers in Alaska by analyzing early Holocene lithic material from the multicomponent Delta Creek site (XBD-110). This was achieved by conducting a

functional lithic analysis of the tools and lithic debitage found within the rich early Holocene component, dated to $9,435 \pm 100$ calibrated years before present. The results of this lithic analysis give insight into important information about mobility and diet during one of the earliest periods of Subarctic prehistory that can be compared to contemporaneous sites in the Tanana Valley. A greater understanding of subsistence during this period can help us to potentially understand the movements and habits of hunter-gatherers from this important time period, and thus allow us to create a more detailed picture of how hunter-gatherers moved across this changing landscape and what motivated their subsistence decisions.

Cates, Kari and Cyler Conrad (Los Alamos National Laboratory)

[90] Long-Term Changes in Human-Animal Relationships on the Pajarito Plateau

Previous research from the northern American Southwest suggests that human populations gradually transitioned their animal-based diet away from artiodactyls to a focus on lagomorphs and turkeys throughout the Basketmaker to Pueblo periods. Faunal data from the Coalition period on the Pajarito Plateau suggests that a similar pattern was present throughout the 1150s-1300s A.D./C.E. In this poster, we examine several zooarchaeological metrics to identify whether a similar pattern of human subsistence change occurred throughout the entire Developmental to Classic period (600-1600 A.D./C.E.) on the Pajarito Plateau. Given the long-term human occupation of this region in the northern Rio Grande of New Mexico and the diversity and availability of wild game populations, this analysis provides an important investigation for determining the exact processes of human occupation, landscape and subsistence use and turkey husbandry and management prior to and during the Ancestral Pueblo era.

Cathers, Aaron (McMaster University)

[116] Determining the Provenance of Freshwater Sponge Spicule Inclusions in Pre-Columbian Amazonian Ceramics

Decades of archaeological research in the Amazon Basin have shown that micron-sized freshwater sponge spicules (siliceous skeletal elements) feature prominently in many pre-Columbian ceramic traditions. This distinct technology allowed potters to craft fracture-resistant vessels and contributed to the stylistic particularities of their wares. Though several early ethnographic accounts show that indigenous potting communities acquired spicules for temper by collecting and burning dried sponges, recent archaeological work has demonstrated that potters in the past could also have exploited spicule-rich clay sources formed by the natural decomposition of sponges. To resolve this question, scanning electron microscopy was performed on a sample of Paredão Phase (700-1100 AD) spiculate sherds from the Central Amazon of Brazil and compared to experimental ceramics that tested between these potential production scenarios. Based on the presence of previously unrecorded sponge gemmules (reproductive buds) that rarely survive sedimentation, preliminary results suggest that Paredão potters manually added spicules to their clays. This research provides insights into the technological and stylistic practices of Paredão potters and contributes to our broader understanding of the social dynamics and land-use practices associated with ceramic production in pre-Columbian Amazonia.

Catignani, Tanya [81] see Sugiyama, Nawa

Catlin, Kathryn (Northwestern University)

[138] Discussant

Catteddu, Isabelle [351] see Young, Bailey

Caval, Sasa [347] see Seetah, Krish

Cawthra, Hayley [32] see Fisher, Erich

Cearley, Daniel [224] see Connell, Samuel

Cearley, Daniel (Las Positas College), Andrew Bair (University of Denver) and Samuel Connell (Foothill College)

[224] Revealing a Medieval Village: The Advantages and Limitations of Applying Geophysical Techniques

Geophysical surveys have become a common feature in archaeological investigations in Ireland and the United Kingdom. The collection of data sets tend to be carried out rapidly and in many cases results can be immediate, however the interpretation of this data is not necessarily consistent nor are the formative processes of many of the geophysical signatures well understood. After four years of intensive application of ground penetrating radar integrated with magnetic gradiometry in rural Roscommon County, the Castles and Communities (CIC) field school and research project has attempted to better understand the relationship between these two techniques and seek methods which allow a more reliable means to draw conclusions. This paper will report on the preliminary findings from the 2018 field season where an excavation unit was able to expose the cross section of a number of the more

common geophysical features. Based upon these preliminary results the scope, usage, and shifting patterns of activity may allow clearer insight into the life and ultimate abandonment of a medieval village.

Cebak, Johnny [131] see Dudzik, Beatrix

Ceballos Pesina, Xanti [409] see Tsukamoto, Kenichiro

Cegielski, Wendy (Arizona State University)

[301] New Revelations on Mediterranean Bronze Age Iberia through Network Inference

The Valencian Bronze Age, located in the modern-day province of Valencia, Spain is an overlooked player in Mediterranean prehistory. The inhabitants are the indigenous peoples and precursors to the Iberians, so famously cited by the Romans, yet so little cited despite being demonstrably connected to the trends of the “outside” world. This research explores the social structures of the Valencian Bronze Age through the use of social network analysis. Information on hundreds of Valencian sites is available, and multiple lines of data (ceramic, metal, and bone) are used for network inference on over 300 sites. This presentation will introduce a form of network inference based on Information theory, a strategy from bioinformatics where it is commonplace to infer social connections from interactions that are not directly observable. Thus, this research demonstrates how to integrate hundreds of bits of disparate archaeological information over an entire region and move toward characterizing social structure in a reproducible and comparable way, without benefit of the written record or observable events. Additionally, and possibly most importantly, it makes new discoveries about social processes through time and space in Iberian prehistory and the Mediterranean.

Celhar, Martina [337] see Zaro, Gregory

Celis Ng Teajan, María Andrea (Andrea Celis Ng) and José Ignacio Hernández Juan (Universidad Veracruzana)

[405] Tiempo y espacio a través de la cerámica: la ocupación Olmeca de Antonio Plaza, Veracruz

La región de Capoacan, al margen del río Uxpana, a pesar de ser distinguida por ser el lugar de hallazgo de la escultura conocida como “El Luchador”, definida por los arqueólogos como de tradición Olmeca, ha sido un área poco estudiada. Por tal motivo, en el año 2017 dio inicio una investigación sistemática, que continuó en 2018 por medio de un programa de reconocimiento de superficie intensivo y a través del cual se identificaron 56 sitios. Posterior a ello, a partir de los datos recabados en la investigación documental, cartográfica y preliminar de campo se derivaron resultados tentativos, entre los que destaca la definición temporal del sitio Antonio Plaza, señalado como de ocupación Olmeca. En esta ponencia se presentan los resultados de un minucioso análisis de la cerámica recuperada, y de patrón de asentamiento, que ponen a prueba las primeras interpretaciones, mostrando una visión más amplia de la región de Capoacan y, por ende, de la historia prehispánica del sur de la costa del Golfo.

Ceniceros-Rodríguez, Santos (California State University, Los Angeles), Paul Collins (Santa Barbara Museum of Natural History), Amira Ainis (University of Oregon) and Rene Vellanoweth (California State University, Los Angeles)

[48] Barn Owl (*Tyto alba*) Pellets as Environmental Proxies

Non-cultural deposits and animal accumulations have been important for reconstructing past environmental conditions. In western North America, packrat middens have been analyzed to infer past vegetation communities, precipitation rates, and other environmental variables. In this poster, we analyze owl-generated pellets deposited over a 1,500-year period at Barn Owl Cave, Santa Barbara Island. The goal of this study is to determine whether these deposits can be used to infer past environments based on the proportional abundance and types of prey species found at the site through time. Age and size profiles and statistical analysis of prey mice were calculated for deposits dated to the protracted drought of the Medieval Climate Anomaly and the appreciably cooler and wetter Little Ice Age. We predict that our results will 1) reveal greater densities of younger mice during periods of increased precipitation; 2) lower densities of mice during drought cycles; 3) greater percentage of adult mice during periods of drought; and 4) prey switching from mice to sea birds and lizards during dry conditions.

Ceniceros-Rodríguez, Santos [240] see Vellanoweth, Rene

Cercone, Ashley (University at Buffalo)

[95] Putting the Mold to the Test: The Application of Experimental Archaeology to Compare the Mold and Potter's Wheel in Bronze Age Anatolia

Moving across Syria-Mesopotamia to Anatolia and finally to the Aegean, potters during the Bronze Age gradually began to shift their ceramic repertoire from hand-made and coil-made ceramics to wheel-made pottery. Despite this rise in innovative manufacturing technology (the potter's wheel), some sites in Western Anatolia, namely Seyitömer Höyük, exhibit ceramics that are made using semispherical molds. Specifically, at the Seyitömer Mound archaeological evidence has suggested that potters preferred utilizing molds rather than the potter's wheel to produce standardized pottery at a fast rate. In recent years, with the discovery of wheel-made pottery, particularly in the Levant and Aegean islands, scholars have turned their focus to assessing the fabrics of these ceramics using

petrography and X-radiography for identifying forming techniques, and ethnographic studies for understanding the production and transmission of knowledge. Despite their numerous publications, these authors have heavily focused on the rise of the potter's wheel and neglected the use of mold technology. This paper discusses preliminary results yielded from experimental archaeology with the help of traditional potters in Turkey using both the mold and potter's wheel in order to recreate various forms of Bronze Age ceramics.

[95] *Chair*

Cerezo-Román, Jessica (University of Oklahoma)

[317] *Archaeology of Death across the International Border: Research among the Hohokam and Trincheras Archaeological Groups*

In this paper, I will explore similarities and differences between mortuary practices and concepts of embodiment of the dead from Hohokam Classic Period (AD 1150 to 1450/1500) sites in the Tucson Basin and from the Cerro de Trincheras, Sonora (ca. AD 1300 to 1450). I will discuss challenges and opportunities for conducting bioarchaeology research across the international border where archaeological practices and treatment of human remains have varied across time and space. The Hohokam and the Trincheras Tradition of northern Mexico are two relatively close archaeological culture areas operating within different social networks. Both the Classic Period Hohokam from the Tucson Basin and the Trincheras people cremated their dead as the main funerary custom. Very different from the Hohokam from the Phoenix Basin where inhumation was their main funerary custom. Results from burial treatment research on remains from Cerro de Trincheras and the Tucson Basin Hohokam suggest that they are fundamentally similar in how they treat the bodies of the dead and likely also concepts of embodiment, but different in how the dead are transformed through the life and death continuum. These are different from the Phoenix basin where probably concepts of embodiment were changing at a different rate.

Cesaretti, Rudolf [56] see Morehart, Christopher

Cetina Batún, Joana [146] see Lamb, Céline

Chacaltana-Cortez, Sofia (Universidad Antonio Ruiz de Montoya)

[143] *Discussant*

Chacon, Richard

[358] *Tukano, Embera, and Achuar (Shiwiar) Supernatural Gamekeepers/Animal Masters: Environmental Impacts of Native Beliefs in a Changing World*

This paper investigates the belief in Supernatural Gamekeepers/Animal Masters of wildlife in three South American indigenous societies: the Tukano of Colombia, the Embera of Colombia, and the Achuar of Ecuador. Findings show that Supernatural Gamekeepers/Animal Masters are believed to grant success to hunters who adhere to prescribed restrictions. Specifically, among the Tukano, local petroglyphs and pictographs are believed to be the abode of the Master of Animals. At such rock art locations, Tukano shamans relay hunters' petitions to this supernatural who grants success to foragers who do not exceed their allotted bag limits. Likewise, among the Embera, shamans mediate between hunters and the Supernatural Gamekeeper who grants success to those who refrain from harvesting in designated "no take" zones. Among the Achuar, a Supernatural Gamekeeper named Amasan grants hunters success as long as they take only what is needed. Findings indicate that belief in Supernatural Gamekeepers/Animal Masters fosters sustainable game harvests. However, as socio-economic and demographic conditions change in the Neotropics, continued belief in Supernatural Gamekeepers/Animal Masters may actually facilitate the overharvesting of wildlife by native peoples.

[358] *Chair*

Chadwick, William (Indiana University of Pennsylvania)

[61] *Discussant*

Chakraborty, Kalyan Sekhar (University of Toronto), Greg Slater (McMaster University, Canada), Shyamalava Mazumdar (Tata Institute of Fundamental Research, Mumbai), Prabodh Shirvalkar (Deccan College Postgraduate and Research Institute) and Heather M.-L. Miller (University of Toronto, Canada)

[232] *What's in the Menu? Harappan Culinary Practices during the Urban Phase of the Indus Age*

The study of ancient food residues does not only provide information on the ancient diet but also sheds light on the nature of food selection, processing, storage and finally the discard of food wastes. The presence of large quantities of animal bones, primarily from cattle/buffalo and sheep/goat in all Harappan settlements suggest that these two categories of primary domesticates played a major role in the Harappan diet. Many have argued that as most of the cattle lived into adulthood, they might have played a vital role in secondary consumption, such as for milk and for labor-oriented exploitation. On the other hand, sheep/goat, primarily goats, were consumed predominantly for meat. These conclusions have been based on the mortality age-profile pattern of zooarchaeological studies. With the recent advancement of lipid residue analysis from the archaeological pottery, lipid residues were extracted and analyzed from 59 archaeological pottery sherds excavated from Kotada Bhadli, a rural Sorath Harappan settlement

located in Kachchh, Gujarat. The results from this pilot study for the first time provide direct evidence on the nature of human preferences, processing, and consumption of milk and meat that were most likely a major part of the Harappan menu.

Chalfin-Smith, Eliot (Bates College) and Beverly Johnson (Bates College)

[123] *Temporal Studies of Salmon Isotopes at Temyiq Tuyuryaq*

This research is part of a larger collaboration with the Togiak community to excavate, analyze, and interpret the stable carbon and nitrogen isotope composition of archaeological salmon bones excavated from the Temyiq Tuyuryaq site. Sources of carbon, fueling the base of the food web and the trophic level of the salmon, are sensitive to shifts in climate and changes in food web dynamics as well as subsistence practices. This research explores reconstructed fish diets relying on archaeological data along with contemporary samples, a temporal span representative of variability in climate regimes and subsistence practices. Our research will contribute to a better understanding of fishing/subsistence pressures on a cultural continuum of more than 1200 years. Collaborations with the Togiak community will ensure relevance to contemporary fishery understanding, management, and predictions based on subsistence practices and cultural identity.

Challis, Sam (Rock Art Research Institute, South Africa) and Brent Sinclair-Thomson (Rock Art Research Institute, University of the Wit)

[347] *Runaway Slaves, Rock Art and Resistance in the Cape Colony, South Africa*

The protracted colonisation of southern Africa's Cape created conditions of extreme prejudice and violence. Like the Caribbean equivalent, however, the Cape conditions presented opportunities for the colonised to escape. Slaves, the unwilling migrants to the Cape comprised of all sorts from the Dutch and British colonies: people with Malay, Malagasy, West African and local African heritage combined to form the labour force for the colonial project. Escaped, or 'runaway' slaves joined forces with groups of 'skelmbasters' (mixed outlaws) who themselves were descended from San-, Khoe-, and Bantu-speaking Africans (hunter-gatherers, herders and farmers). Together they mounted a stiff resistance that held up the colonial advance for many decades. Engaging in guerilla-style warfare they raided colonial farms for cattle, and especially horses and guns. The ethnogenesis of such raiding bands is increasingly coming to the attention of archaeologists discovering the art they made of themselves in the hidden rock shelters of the Cape Fold Mountain Belt, and in the Maloti mountains of today's Kingdom of Lesotho. The 'reverse gaze' provided by this painted record gives us the perfect opportunity to view something of the slave and indigenous resistance from outside the texts of the colonial written record.

Chamberlin, Matthew (James Madison University)

[65] *Symbolic Conflict and Mobility in Village Formation*

This paper considers whether processes of symbolic conflict propel change in the spatiality of social groups from ethnographic and archaeological vantage points, particularly with respect to the mobility of agents positioned differently within and at the edges of nascent communities such as small villages. Of special interest is the interaction between cultural producers and actors marginal to the dominant culture in the context of historic processes of village formation.

Chan, Evelyn [198] see Pugh, Timothy

Chandler, Susan

[340] *Discussant*

Chang, Claudia

[154] *The Square or the Round? Agro-pastoral Household Structure in Southeastern Kazakhstan*

The Iron Age agropastoralists of the Talgar region built a variety of houses including rectangular double-walled mud-walled houses, semi-subterranean pit houses, mud brick platforms, and central circular rooms with multiple plastered floors. In earlier periods of prehistory the description of transition from mobile to sedentary year-round habitations often signaled the transition from round houses to rectangular, agglomerated rooms or households. A discussion of the spatial layout of Iron Age villages and hamlets at three excavated sites in the Talgar region also considers the nature of household organization, gendered space, and settlement form in communities that practiced both transhumant farming and the cultivation of wheat, barley, and the two millets. Ethnographic analogies drawn between Kazakh yurt organization and the ancient Iron Age house forms will be explored as part of the 'nomadic tradition' within a settled community. The dispersed spatial organization of the Talgar settlements contribute to a larger regional perspective on the nature of landscape use by the Saka and Wusun confederacies of the Semirech'ye Region.

Chang, Nigel (James Cook University)

[27] *Individual, Family, Site, 'Community' or Region? Thinking Across Spatial and Social Scale in Prehistoric Laos and Thailand*

Prehistory is made up of individuals and families going about their daily lives. Surely, no one in NE Thailand 3000 years ago was thinking deeply about how to craft a 'state' from small semi-agricultural villages. However, it can also be argued that large scale social and technological change and Asia-wide population movement were driving a shift towards the 'rise of the state'. How do we reconcile these different scales of analysis? Is this simply a clash of philosophies that contrast an emphasis on individual agency with 'processual' law building? Can new insights be developed by working across scales (and between philosophies)?

This paper focuses on two areas of intensive archaeological research; the Upper Mun River Valley (UMRV), NE Thailand and the Vilabouly Complex, Savannakhet Province, Lao PDR. In each area individuals can be identified in grave contexts and both areas are tied to significant regional innovations; metallurgy in Laos & intensive agriculture in Thailand. Crucially, a number of related sites have been investigated in each area allowing us to consider 'local cultures'. Is it this intermediate social and spatial scale that will be the key to integrating, rather than polarising, our analyses?

Chapa, Reymundo

[6] *Moderator*

Chapoose, Betsy (Ute Indian Tribe)

[244] *Tribal Consultation: What We Lose When It's "My way or the highway"*

Over my years as Director of the Cultural Rights and Protection Department for the Ute Indian Tribe, I have seen tribal consultation in many different forms. In my presentation, I will be talking about tribal consultation as collaboration and how we can all move forward together. As Tom King (2004) notes, tribal consultation should not become a "dictatorship". Consultation should not mean one party wins and one party loses, but rather where both sides' perspectives have been represented and considered. Both agencies and tribes need to be ready for an open-minded give and take. Furthermore initial meetings should be brainstorming sessions rather than the parties having developed ideas that prohibits meaningful dialogue. Finally actions should not be taken in the tribes name, without the tribes involvement. When tribal consultation is approached as collaboration, we can all win.

[5] *Discussant*

Charles, Douglas (Wesleyan University)

[183] *Discussant*

Charles, Michael [102] see Stroud, Elizabeth

Charles, Michael (School of Archaeology, University of Oxford), Charlotte Diffey (School of Archaeology, University of Oxford), Laura Green (School of Archaeology, University of Oxford) and Amy Bogaard (School of Archaeology, University of Oxford)

[352] *An Agroecological Perspective on Crop Domestication in Western Asia*

Domestication has been discussed *inter alia* as a syndrome, a case study in niche construction and a reversible process. These perspectives frame new understandings of how management practice shaped domestication processes. For plants, recent experimental work has also been important for clarifying the effect of domestication on key parameters such as yield, as well as the importance of certain growing conditions for achieving this potential. Here we present recent work at Oxford on the agroecology of Neolithic-Bronze Age cultivation in western Asia, especially from the perspective of early weed flora. We find indications of increasing labour inputs per unit area through the Neolithic ('intensification') but a reversal of this tendency as agrosystems became more extensive in the Bronze Age ('extensification'). These agroecological trends, in turn, correspond with changes in domestication traits, including grain size.

Charlie, Juana

[178] *Discussant*

Charlton, Michael (UCL Institute of Archaeology)

[363] *Niche Construction and Iron Smelting Technology: Some Thoughts on the Development of Regional Metallurgical Economies*

Linking the evolution of smelting technology to the development of regional economies remains one of the greatest challenges for archaeometallurgy. It is neither possible to explain technological evolution without reference to its costs and benefits in a given socioeconomy, nor explain the economic patterns of a society without regard to production systems and their associated changes. Metallurgical production is an example of cultural niche construction, through which producers continuously modify the selective context of their future technological

behaviour and that of other members of society simply by adding more and different products into circulation. Modelling and testing hypotheses about the relationships between changes in metallurgical technology and the development of economies is not a new goal. However, investigative tools and data volume have only recently reached sufficient maturity to see it realized. This endeavour requires the consideration of technological transmission, production quantifications, livings earned through production, and characterization of socioeconomic networks. Using examples from archaeological and experimental investigations of ironmaking systems in the UK and Sudan, this paper discusses the prospects for exploring the interconnectedness of evolving metallurgical practice and developing socioeconomies. It highlights the importance of experimentation and the construction of large open databases for identifying and explaining interconnections.

Charro, Ariel [350] see Cossin, Zev

Chase, Adrian [58] see Chase, Arlen

Chase, Adrian [81] see Hundtoft, Brooke

Chase, Adrian (Arizona State University)

[113] Maya Inequality at Caracol, Belize: District-Level Urban Analysis within a Garden City

In 2009 and 2013, LiDAR data collected for Caracol, Belize revealed the anthropogenic landscape of this Maya city. These data have advanced our understanding of water management, agriculture, markets, urbanism, and inequality at Caracol. Now with the analytical unit of the district – an urban administrative boundary of urban service provisioning within a city – the variation between these administrative units can be investigated. Beyond Gini indices and Lorenz Curves of household areas and volumes, this research analyzes the population densities within districts with respect to the urban service facilities located within these district nodes. These formal plazas, ballcourts, monumental reservoirs, and E-groups provide a built environmental indicator of specialized urban function with widespread distribution. Urban districts reconstructed through least cost area allocation and nearest neighbor analysis in contrast with the sampled plazuela density at Caracol demonstrate the variation in urban density present within one Maya city. While density drop-offs are often used to identify the boundaries of Maya cities, density variation within the city is rarely discussed. The LiDAR dataset in conjunction with 35 years of excavation data uniquely allow the Caracol Archaeological Project to analyze inequality at the intra-site level within this garden city.

[177] Discussant

Chase, Amanda

[290] Use-Wear Analysis of the Middle Horizon

Use-wear analysis is a qualitative method of study that observes abrasion patterns on material remains. Wear traces can come from stirring, lids, storage techniques, and other culinary practices. Apparent wear patterns and abrasion coarseness are features that help infer the use of different vessel forms. I applied this technique to vessels from the Wari-affiliated sites of Cerro Baúl and Cerro Mejía, which were occupied during the Middle Horizon (600-1000CE). I examined over one hundred vessel rims for traces of wear from the use of lids and other forms of apparent use-alteration. Abrasion information was qualitatively and quantitatively collected from wear location, depth, length, width, and patterning. Use wear was split into four characteristics: soft wear (i.e. resulting in a buffered texture), coarse abrasion (e.g. gouges, scratches), no use wear, and not enough evidence (i.e. too much post-depositional erosion to ascertain apparent use wear pattern). The two-tailed t-test show significant similarities of rim diameters between sites; however, use-wear percentages taken from alteration characteristics show wear pattern differences between sites. The analysis documented rim-wear consistent with patterns of abrasion consistent with the use of lids, which provides insight into culinary and storage practices of the Middle Horizon.

Chase, Arlen

[58] Ancient Maya Sustainability at Caracol, Belize: Implications for Past and Future

Long-term archaeological research at Caracol, Belize has revealed a sizeable city with over 100,000 inhabitants at A.D. 650 that practiced intensive agriculture within its urban boundaries. Over 160 square kilometers of the landscape within Caracol was anthropogenic, having been rebuilt to both provide agricultural sustainability for the city's inhabitants and to control the flow of rainwater over the karstic environment. Archaeological data shows that their landscape adaptions underlay half a millennium of sustainable occupation (here defined as the ability to feed family units and provide needed quotidian and prestige items to households). Yet, today this landscape is unpopulated and completely covered by jungle canopy. With few exceptions, the subsequent modern-day populations that occupy the country of Belize import much of their food from elsewhere, but new services and technologies provide modern populations with lifestyles that were unavailable to ancient populations. These changes need to be factored into any consideration of applying past sustainability practices to the future. The ancient Maya technologies that promoted sustainable agriculture and habitation in largely rainfed environments that lacked standing and running water have not been replicated by modern people, but hold the potential to significantly improve modern lifeways.

[1] Discussant

Chase, Arlen [255] see Martindale Johnson, Lucas

Chase, Diane [58] see Chase, Arlen

Chastain, Matthew (Massachusetts Institute of Technology), Jianli Chen (Peking University) and Xingshan Lei (Peking University)

[299] *Material Properties, Sensory Experience, and Production Techniques in Early Chinese Bronze Casting*

The extraordinary bronze ritual vessels of Shang- and Zhou-period China were produced by casting in multi-part ceramic molds. Laboratory analysis of casting-mold fragments has found that these molds were made from an unusual ceramic material—a paste that was quartz-rich, clay-poor, highly porous, and therefore quite unlike pottery clays in terms of its composition. A program of replication experiments has allowed this casting-mold paste to be reproduced and assessed in the laboratory. This paste possesses specialized engineering properties that would have significantly improved the reliability of the casting process. However, the handling characteristics and tactile qualities of this paste are also very different from those of familiar pottery clays. This presentation describes the qualitative, sensory characteristics of casting-mold paste and explores the ways in which those qualities likely shaped foundry workers' interactions with this material as well as their choices regarding production techniques.

Chavarria, Benji, Danny Naranjo (Santa Clara Pueblo), Jesse Gutierrez (Santa Clara Pueblo) and Isaac Gutierrez (Santa Clara Pueblo)

[254] *Santa Clara Pueblo's Rights Protection and Tribal Historic Preservation Office's Involvement in the Navajo-Gallup Water Supply Project and Other Regional Projects*

The Santa Clara Pueblo people are indelibly tied to the land, animals, air, and waters of the American Southwest. Since the formation of Santa Clara Pueblo's Right's Protection office a few decades ago, and more recently their Tribal Historic Preservation Office in 2014, their staff have worked on a number of Cultural Resource projects both on their Pueblo and throughout their ancestral lands. Representatives from Santa Clara Pueblo's Right's Protection and Tribal Historic Preservation Office will discuss their participation on the NGWSP over the last 5 years as well as some of their experiences on other Cultural Resources projects they have been involved with. Part of the presentation will include their perspective of best practices in Tribal consultation, collaboration and lesson's learned through the NGWSP and other projects in the region that Santa Clara Pueblo has worked on.

[342] *Discussant*

Chavarria, Sara (University of Arizona College of Education), Stanley Bond (National Park Service), Barbara Mills (School of Anthropology, University of Arizona) and Rebecca Renteria (School of Geography and Development, University of)

[3] *Linking Southwest Heritage through Archaeology: Engaging Diverse High School Students and Their Communities*

Through programs like Linking Southwest Heritage through Archaeology (LSHTA), the National Park Service (NPS) reaches out to diverse neighbor communities and highlights their cultural heritage. LSHTA introduces local high school students and educators to NPS units, other heritage sites, and archaeology-related labs on the University of Arizona campus. In combination with these visits, program participants learn about Southwest United States history through an archaeological lens. The emphasis of LSHTA is to participate in: 1) experiential informal education activities that provide students with hands-on, in-the-field opportunities, such as participation in excavation experiences, site tours, and tours of archaeological laboratories; 2) visits to traditional and local communities to learn about their heritage programs; 3) interpreted visits to NPS and other heritage sites; and 4) positive experiences on a university campus that open up windows for potential educational and career opportunities. This process allows students to gain a deeper knowledge of the diversity of their own and others' Southwest culture.

Chavez, Christina [259] see Kerr, Stanley

Chavez, Franklin (BIA Special Agent)

[341] *Discussant*

Chazine, Jean-Michel (AMU-CNRS/CREDO-France)

[15] *Hands Stenciling: Men & Women as Healing Process?*

The checking of thousands of hands stencils from Borneo's caves and rockshelters, followed by the application of Manning's formula measuring at least the 2D/4D ratio, inasmuch as other world data from Africa and South America, witnessing the men and women presence, have led to the hypothesis of an healing process representation. Discussion concerning Manning's ratio and functional goals of hand stenciling will be therefore open.

Chechushkov, Igor (University of Pittsburgh)

[48] *Gone with the Wind: The Modelling of the Wind Conditions of the Prehistoric and Historic Communities around the World*

Climatic conditions determine the ways in which local communities live to a great extent. The wind is responsible for the everyday life experience by bringing precipitation, moving dust and fire. The general assumption of the current research is that in the past people chose to live in relatively calm spots of the local landscapes to prevent themselves from unpleasant or dangerous conditions. To test this hypothesis, the current research draws settlement data from around the globe. The average annual value of wind speed and the dominating wind direction are the input values to calculate the wind speed at the local terrains. The individual wind models are based on a digital elevation model with a resolution of 100 m by 100 meters. A specialized software package (WindNinja) is used to compute the models of wind speed for each cell of the DEM. In the Southern Urals, the chosen settlement spots are optimal in the given environment to maintain the highest possible temperatures and prevent heat loss in the cold months. Together with the erected wall and densely packed houses, this strategy allowed the inhabitants of the settlements to protect their livestock in the harsh winter conditions.

Cheever, Sylvia (The University of Chicago), Maria Lozada (The University of Chicago), Danny Zborover (The Institute for Field Research), Erika Simborth (Independent Researcher, Arequipa-Perú) and Hans Barnard (The Cotsen Institute of Archaeology, UCLA)

[286] *Under Pressure: Evidence of 'La Vida Cotidiana' in Cranial Shape Typology at Jarana, an Inca Site in Southern Perú*

This poster details the results of cranial modification typology research conducted at Jarana, a Late Intermediate and Early Inca administrative site located in the San Juan de Churanga river valley of southern Peru. Cultural cranial modification was particularly widespread among pre-Hispanic societies in the Andes. The practice is commonly interpreted as a deliberate expression of identity, with different cranial shapes used to delineate social groupings within a society or to emphasize differences between cultural or political groups occupying a region. Crania at Jarana were expected to display similar modification patterns indicative of social differentiation. However, while Jarana shows a site-wide uniformity of general cranial shape, there is significant variation in the location of the posterior pressure plane, causing most of the crania to appear to have occipital modification that is shifted either to the right or to the left. This variation is not associated with any known demographic patterns within the population. This significant and seemingly random variation in occipital pressure placement during shaping could indicate that cranial modification at Jarana is a byproduct of daily life practices associated with the care and transport of infants rather than a deliberate visual cue to delineate social groupings.

Chen, Hong, Jinqiong Tang (Chinese Academy of Social Sciences, Institute of A) and Mingli Sun (Suzhou Institute of Archaeology)

[299] *A Design Diagram and Production Process for Ground Stone Tools at Wufengbei Site during the Liangzhu Culture Period (5300-4200 BP) in China*

The Wufengbei Site is located in the Mudu Ancient City Neolithic sites at Suzhou, Jiangsu Province, southern China. Excavations in 2016 yielded a total of 3850 pieces of lithic artifacts. Based on the concept of Chaîne Opératoire, artifacts were classified and analyzed by the hierarchical dynamic typology and use-wear analysis. The results display a whole and clear life history of the ground stone tools, including procurement, manufacture, utilization and discard. Using the abundant chisel sample from Wufengbei site as an example, it is suggested that two techniques existed. Through reconstructing those techniques archaeologists can uncover the apparent design diagram and production process of ground stone tools created by the people of Mudu Ancient City.

Chen, Honghai [361] see Li, Yue

Chen, Hsi-Wen

[461] *Spatial Analysis in Pre-Columbian Nicaragua*

This poster presents the result of a systematic spatial analysis of lithic and ceramic artifacts and how ratios thereof change over time in order to assess the applicability of the social-risk model originally proposed by Manuel Antonio Román Lacayo (2013) in explaining patterns of population aggregation observed during the Sapoá period (800-1350 CE) in Nicaragua. Regional systematic pedestrian survey has revealed an unprecedented change in demographic distribution, indicative of a change in pre-Columbian sociopolitical arrangement in Masaya, Nicaragua. He proposed a model focusing on social risk induced by deteriorating climate as the major factor driving social change in order to offer possible explanations of this demographic change. In this poster, I present expectations about spatial distributions of lithics and ceramics according to the social-risk model and test them against empirical archaeological evidence. These pertain to how humans interact with environmental change and how this interaction could have motivated social transformation.

Chen, Jennifer (University of California, Davis), Randy Haas (University of California, Davis), Jelmer Eerkens (University of California, Davis) and Bryna Hull (University of California, Davis)

[398] *Meat and Potatoes: A Mixed 7,000-Year-Old-Diet*

This presentation examines the diets of 16 prehistoric burials at Soro Mik'aya Patxja, a high-elevation Archaic Period site occupied 7,000 years ago in the Peruvian Andes. Stable carbon and nitrogen isotopes were analyzed to infer the prehistoric hunter-gatherer diets during a period that preceded the domestication of tubers, quinoa, and vicuña. Plants such as tubers played a more important role than originally thought in ancient hunter-gatherer diets. Vicuña were also an equally important and abundant food source as well. Analysis of prehistoric diets can give insight to the domestication of these important meat and plant resources. The results confirm previous studies, which have suggested a mixed diet of C3 plants and camelids.

Chen, Jianli [299] see Chastain, Matthew

Chen, Liang [78] see Ling, Xue

Chen, Liang (Northwest University), Yaqin Jing (Northwest University School of Cultural Heritage), Xiaoya Zhan (School of Humanities, Nanyang Technological University), Xiaodong Cui (Jinzhong Archaeological Research Institute, 3 Jinl) and Hui-Yuan Yeh (School of Humanities, Nanyang Technological University)

[389] Probable Pathological Evidence of Adult Scurvy, Dating Back to about 200 B.C. in Yuci, Shanxi, China

Scurvy is a disease resulting from inadequate intake of vitamin C. This can happen to all age groups but has a relatively high prevalence in children and subadults. Subadult scurvy has been studied thoroughly over the past decades; however, little research has been done on adult scurvy. This is because scurvy presents ambiguously in adults; in addition, scurvy is hard to distinguish from anemia, non-specific infection and similar diseases. Till now, there are no confirmed scurvy cases found in archaeological contexts in China. The authors examined the skeletal series from the Mao'er Hill site, Yuci, Shanxi (3rd century BCE to 2nd Century BCE) and found one potential case of adult scurvy. This individual showed the typical traits of scurvy on his cranium, mandible, and lower limbs. By focusing on this site, the authors aim to discuss the nutrition, diet, and health conditions of this ancient population during the transition period from the Qin to Han Dynasties.

Chen, Quanjia [299] see Wang, Chunxue

Chen, Shengqian

[26] Living in the Marginal Land of Agriculture: The Adaptive Changes and Risks in the Ecotone of North China

Ecotones are characterized by diverse resources which would attract hunter-gatherers and early practitioners of food production, but they also have a disadvantage that the resource boundary easily changes with climatic fluctuation. Long-term climatic changes, as well as annual seasonality, would produce significant influence on adaptations of local groups. In North China there is an ecotone between the Mongolian grassland and the deciduous forest zone of the northern plain, and it can be divided into two subzones. This research studies adaptive changes and differences of both subzones during the prehistoric period, focusing on the cultural influence that resulted from long and short-term environmental changes. Explanations are offered for different features of archaeological records in site abandonment, artifact assemblage (especially stone tools), and settlement pattern. Combined with the most recent discoveries, this study shows that Neolithic cultures emerged in both subzones, with the coming of the Holocene Optimum, then formed a mixed economy including early farming and hunting-gathering in a state of unstable sedentism. Interestingly, both subzones apparently had a catastrophic event occur almost simultaneously, in which sites were abandoned entirely and suddenly, possibly due to serious infectious disease.

Chen, Xingcan [416] see Liu, Yan

Chenault, Mark [194] see Deaver, William

Cheney, Chelsea (University of Wyoming) and Jason Toohey (University of Wyoming)

[114] GIS Approaches to Modeling the Shifting Andean Coastline through the Holocene

The long-term study of changing social and ecological patterns along the Andean coastal strip throughout the Holocene requires the identification of archaeological sites and their data of various ages. The presence of a broad continental shelf offshore of much of the Peruvian Andes has meant that early sites on this shelf have been inundated by early Holocene sea level rise. The rates of discovery of early and middle Holocene sites along the coast can be greatly assisted by the estimation of previous coastline locations, with an understanding that where the continental shelf is narrower, early sites will be more likely to exist on the shore today (as opposed to being inundated). Here we present ongoing GIS analysis of paleoshorelines, taking into consideration both sea level rise and coastal uplift over the Holocene. We seek to create relatively fine grained reconstructions of changing coastline, identifying no-longer existing bays and inlets which may have been attractive to early human occupants. This work will produce much more detailed models of Holocene sea coasts than have previously been proposed, and will form the basis for predictive locational models of site location for future research.

Cheng, Wen Yin

[299] Exploring Production Methods of Casting Molds and the Artisans Who Made Them

The production of Shang dynasty bronze vessels is based on the artisans' mastery of loess material and how they manipulated them to produce the casting molds. From the beginning stage of raw material procurement to the firing of the molds, these steps all left marks in the molds' microstructure and physical build up. The key to our understanding of bronze vessel production lies in the production of bronze molds, but also in cases where the artisans left their marks. In order to see the artisans through their work, the ideal artifacts to analyze are the molds themselves, the marks left behind and preserved within the loess. These tell the story of the artisans and their

relationship with the raw materials. Through petrographic analysis of the molds housed at the Royal Ontario Museum, the correlation between the various steps of production and the artisans who made them can be further discussed.

[299] *Chair*

Cheong, Kong (American University)

[41] *The Pickett's Mill Farmstead: An Archaeology of the Inarticulate Whites*

Archaeologists often use both archaeological data and historical records to assist in their reconstruction of the past. However, historical records are usually written by a small portion of the population and this written history is usually about themselves and not a representation of the whole. The inarticulate Whites are a group of European descent people that are not represented in written history. This is because the written history of the South is that of the Planter class and also because the inarticulate Whites passed down their histories and traditions orally. Unlike their plantation owning neighbors, they are typically land rich but cash poor farmers. In popular history, they are usually depicted as dirty, lazy, and uncultured. But the analyses of the material possessions of the inhabitants of the Pickett's Mill farmstead in Paulding County, Georgia, paints a different picture. This paper will utilize this archaeological data to illuminate the lifestyle of its inhabitants as well as contribute to the fragmentary history of the inarticulate Whites of Upland Georgia.

Cherico, Peter [118] see Skaggs, Sheldon

Cherkinsky, Alexander [94] see Napora, Katharine

Chhay, Rachna [27] see Carter, Alison K.

Chiang, Chihhua (Department of Anthropology, National Taiwan University)

[333] *The Transition from the Middle to the Late Neolithic in the Yilan Plain, Northeast Taiwan (ca. 4,200 ~3,700 B.P.)*

This paper discusses the transition from the Middle to the Late Neolithic period in the Yilan Plain, Northeast Taiwan (ca. 4,200~3,700 B.P.) with a specific focus on analysing the material objects excavated from two sites, the Tatsuwei site (4,200-3,700 cal. B.P.) and the Wansan site (3,900-2,500 cal. B.P.). Previous research emphasized the importance of environmental change and the agricultural activity during this transitional period. However, I try to argue that the transition might signify the process of the formation of new social relations. I demonstrate that people began to form smaller social groups in the Late Neolithic period and that the social differentiation became more evident. The difference between the sites clearly displays two contrasting ways of organizing society. The difference is discernible from the comparisons of the tools associated with the subsistence activities, the production and use of nephrite objects, the lithic and ceramic resources utilized, the ornaments people used to adorn themselves, the styles of daily articles they preferred, and the way they interacted with their landscapes. The result of these analyses suggests that the society might have undergone a great transformation during this transition period.

[333] *Chair*

Chick, John [184] see Colaninno-Meeks, Carol

Chicoine, David (Louisiana State University)

[236] *Vibrant Ruins and the Construction of Casma Ancestralized Landscapes: Preliminary Insights from the Lower Nepeña Valley*

In coastal Ancash, archaeologists have been puzzled by the presence of Casma style objects (~AD 800-1300) at archaeological sites with earlier cultural components. This has led to significant cultural historical and chronological confusion including the classification of several Early Horizon sites (800-200 BC) as centers of the Casma Polity. Field research and excavations in the last two decades have helped disentangle those components and document the extensive reuse of abandoned buildings, fortifications, and other ruins by late prehispanic groups including the Casma. Yet, little attention has actually been given to the motivations, meanings, and broader structuring impact of those material engagements. This paper examines the vibrancy of the built environment in the lower Nepeña Valley as seen through its reuse by groups producing Casma style things. I am particularly interested in exploring mortuary practices, in particular the placement of Casma dead within the lower Nepeña, and how those helped in the social construction of ancestralized landscapes. I detail a model that integrates the material vibrancy of things, monuments, and landscapes in shaping the aesthetic attentiveness of Casma makers, especially potters, architects, and sculptors. Results are discussed in light of the sociohistorical conditions surrounding the emergence of Casma style cultural manifestations.

Chicone, Sarah (Johns Hopkins University)

[139] *Discussant*

Childs, Terry (Department of the Interior)**[21]** *Discussant*

Chilton, Christopher P. [168] see Bassett, Hayden

Chilton, Elizabeth (UMass Amherst)**[377]** *Discussant***Chinchilla, Oswaldo (Yale University)****[243]** *Flower Worlds of the Pacific Coast*

One of the richest repertoires of Mesoamerican flower imagery comes from the Pacific coast of Guatemala. In this paper, I trace the temporal variations in religious beliefs and imagery related to portentous places of beauty known that modern scholars designated as "flower worlds." Lush vegetation and birds were important themes in the area, beginning in the Late Preclassic sculptures of Izapa. During the Early Classic, a new and elaborate set of icons and meanings appeared in Teotihuacan-style cylinder tripods and censers from the coastal plain of Escuintla. Reinterpreted by coastal artists, flower world images reappeared with a novel range of religious connotations in the Late Classic sculptures from Cotzumalhuapa. The enduring presence of related beliefs is made evident by ethnographic attestations from modern communities in adjacent highlands, particularly Santiago Atitlán. The pervasiveness of flower imagery is surprising in a region that witnessed considerable ethnic and cultural changes. Building on earlier work, I highlight some of the lesser-known representations, tracing common threads and shifting meanings that can be perceived in the works of coastal artists across millennia.

Chiou, Katherine [102] see Szpak, Paul

Chiou, Katherine (University of Alabama)**[302]** *Variety Is the Spice of Life: Chili Pepper Domestication and Agrobiodiversity in the Americas*

Chili peppers (*Capsicum* spp.) are one of the extremely rich and varied crop genetic resources of the Americas. The independent domestication of five chili pepper species (*C. annuum*, *C. baccatum*, *C. chinense*, *C. frutescens*, and *C. pubescens*) across the Neotropics beginning around 10,000 BP was an intricate co-evolutionary process between these piquant plants and humans. As the predominant spice in pre-Columbian cuisines, an important medicinal ingredient in indigenous pharmacopoeias, and a frequent participant in ancient rituals, prehispanic remains of chili pepper have been recovered from numerous archaeological sites across North, Central, and South America. Although the practice of cultivating and consuming chilies survived the ravages of conquest and colonization, beginning in AD 1492, demographic collapse, forced relocation, and changes in land tenure disrupted existing agricultural practices—impacting *Capsicum* genetic diversity in ways that we are only beginning to comprehend. In this paper, I present an overview of the current state of research on the historical trajectory of chili peppers, highlighting the potential contributions of archaeobotanical data to the broader discussion on plant domestication and agrobiodiversity in the past and present.

[137] *Moderator***Chiou, Kenneth (University of Washington)****[137]** *Discussant***Chiou-Peng, TzeHuey (Univ. Illinois UC)****[130]** *Chair*

Chiou-Peng, TzeHuey [130] see Wu, Xiaohong

Chirikure, Shadreck (Department of Archaeology, University of Cape Town, South Africa), Munyaradzi Manyanga and Genius Tevera**[24]** *After Dark: The Nocturnal Urban Landscape of Great Zimbabwe*

What was night life like at Great Zimbabwe? While this question excites imagination in numerous ways, in fact and myth, not much is known about nocturnal life in this ancient African urban landscape. Most archaeological reconstructions of urban life at Great Zimbabwe create the erroneous impression that the inhabitants of the town lived during only the day and never at night. Consequently, an unquestioned assumption is that most of the evidence at the site points to daily activities. And yet, the sum of human life combines daily and nightly existence and

quotidian practices. This paper deploys comparative insights from ethnographies and oral history to interrogate the archaeology of Great Zimbabwe to initiate a conversation on life after dark during the flourishing of this multi-building and multi-period settlement. We suggest that sunset at Great Zimbabwe opened the door to subsistence practices, economic pursuits, rituals, games, relaxation, music and other forms of entertainment. Often, these activities were seasonally scheduled and were performed either individually or collectively, cross-cutting gender and class divisions.

Chirinos Ogata, Patricia (University of California, Santa Barbara)

[53] Labor and the Japanese Diaspora: The Archaeology of Issei Workers in Peru's Coastal Haciendas

Between 1899 and 1923, more than 15,000 Japanese men travelled across the Pacific to work in agricultural estates (or "haciendas") along the Peruvian coast. Lack of land and opportunities in large regions of rural Japan pushed people to look for other options abroad, while Peruvian companies required a sizable workforce to sustain the coastal "agricultural revolution" at the beginning of the 20th century. The haciendas constituted the first locus of interaction between the issei workers arriving to the country and the local communities; however, an archaeological approach to these facilities and their surrounding landscapes has been so far neglected. This paper presents preliminary survey and surface collection results from one of these coastal haciendas. Results show that a focus on the materiality of labor in the context of the Japanese immigration to Peru has the potential to connect daily life at the haciendas and the larger social and economic processes, as well as to enrich the study of cultural encounters in the context of the Japanese diaspora.

[53] Chair

Chirinos Ogata, Patricia [287] see Toohey, Jason

Chiu, Scarlett (Academia Sinica, Taiwan), Yu-Yin Su (Academia Sinica, Taiwan), David Killick (University of Arizona) and Christophe Sand (Institute of Archaeology of New Caledonia)

[106] Preliminary Results of Petrographic and Chemical Analyses of Lapita Pottery Assemblage Excavated from Kurin Site, Mare Island, Loyalty Islands, New Caledonia

In this paper, we will illustrate the number of possible pottery-making locations that we have identified so far from the Lapita pottery assemblage excavated at Kurin site, Mare Island, Loyalty Islands, New Caledonia. We first examined the non-plastic inclusions to determine whether minerals and rock fragments identified through a petrographic microscope may occur naturally within a given geological region of New Caledonia, and use index minerals and rock fragments to separate various possible pottery production locations within such large geological regions. We then compare samples from multiple sites that have been assumed to be produced from the same location to determine whether there is a consistency in terms of temper types within a particular production location. In addition, we compared chemical compositional data of these samples in order to better differentiate local vs. non-local samples. We are able to identify multiple possible locations on both northern and southern Grande Terre for the 29 samples that we processed. In the end, we will summarize our preliminary results and discuss possible exchange networks observed.

Chiykowski-Rathke, Tanya (Santa Clara University)

[245] Loss of Color: Pigments in the Trincheras Tradition

Archaeologists have largely defined the Trincheras Tradition by pottery, in particular the distribution of purple painted ceramics. The purple pigment, found in both specular and non-specular forms, was part of a bichrome and polychrome regional tradition that flourished across the Sonoran Desert between 700-1200 AD. Many abrupt changes occurred around 1200 AD, including mass migration and the founding of Cerro de Trincheras. One such change was the de-coloring of Sonoran ceramic traditions. After 1200 AD, Trinchereños (Trincheras Tradition peoples) stopped producing locally decorated pottery. This change does not mean Trinchereños lived in a colorless world. Rather than participate in the proliferation of Salado polychrome ceramics, Trinchereños imported vibrant vessels from Paquimé/Casas Grandes. Colors and symbolism from preceding periods continued to signal important social information, including in the vessels used for secondary cremation burials. The ways in which Trinchereños modified their use of pigments over time shows changing relationships within their natural and cultural worlds.

Choi, Jeong-Heon [32] see Wright, David

Chovanec, Zuzana (Institute of Archaeology - Slovak Academy of Sciences)

[301] Over Land, Sea and the Space Between: Evidence for Multi-Scalar Interactions between Eastern Mediterranean and Central European Communities during the Bronze Age

The Bronze Age in both the Mediterranean and Europe represents a period during which new socio-economic relationships were being forged that inextricably linked far-off communities. Within these discursive social networks, new commodities were traded over long-distances, new markets emerged, and along with novel opportunities for social differentiation reflected in new forms of material culture. The role of metals as the prime mover in these interactions has been much discussed. Such economic transactions likely were highly formalized, occurring with variable levels of reciprocity, and serving as an arena for the negotiation of social and political alliances, smaller-scale exchanges of a range of commodities, as well as the transfer of ideas, news of the world that lay beyond, and technical skill. This paper considers the range of material exchanges and movement of intangible information between communities in the Mediterranean and Central Europe that would have relied upon and reinforced the social networks established by long-distance trade of materials during the Bronze Age.

Christensen, Lauren (The University of Arizona), Frédéric Surmely (DRAC Auvergne-Rhône-Alpes, Clermont-Ferrand), Jay Franklin (East Tennessee State University), Sandrine Costamagno (Université Toulouse Jean-Jaurès) and Maureen Hays (College of Charleston)

[403] New Research at Enval: A Middle Magdalenian Site in the Massif Central of France

We present new research at Enval, a Middle Magdalenian rock shelter site in the Massif Central of France. Lithic materials previously recovered indicate far ranging contacts in multiple directions. Artifacts from our 2018 excavations reflect intensive use of local raw materials, suggesting that use of allochthonous materials was not simply a response to insufficient local resources. We discovered new activity areas, confirming that the site's extent is much larger than previously believed. We have recovered numerous faunal elements in anatomical position, most recently lion and wolf/dog remains. We are pursuing DNA analysis of the wolf/dog remains.

Christensen, Lauren [403] see Franklin, Jay

Christensen Hawks, Diana (Retired Federal BLM) and Craig Harmon (Retired Federal BLM)

[420] Re-examination of the 1975 – 1977 Excavations of the Pueblo I-II Components of Cave Canyon Village, Montezuma Canyon, Utah

Brigham Young University's Archaeology Field School conducted three seasons of fieldwork from 1975 - 1977 on the Basketmaker III and Pueblo 1 – Pueblo II Ancestral Puebloan components of Cave Canyon Village in Montezuma Canyon, southeastern Utah. The excavations provided data, including radiocarbon, archaeomagnetic and dendrochronological dates, on the Basketmaker and Puebloan components of this extensive village. This data is re-examined considering recent studies in and near Montezuma Canyon. East and downhill from the Basketmaker III component, Cave Canyon Village was also extensively occupied during the late Pueblo I – Pueblo II periods. In 1975 an L-shaped above-ground pueblo and three associated pit structures/kivas were excavated. In 1977 a backhoe trench discovered five contiguous pit structures/kivas directly east of the 1975 excavations along an east-west trending ridge. Two of these kivas were excavated in 1977 as well as portions of an above-ground room block adjacent to one of the excavated kivas on the easternmost portion of the Cave Canyon Village ridge. Cave Canyon Village appears to be strategically located in Montezuma Canyon to take advantage of arable land and other resources.

Christensen Hawks, Diana [420] see Nielsen-Grimm, Glenna

Christenson, Allen [304] see Vail, Gabrielle

Christie, Jessica (East Carolina University)

[190] Finding Context for Rock Art Images in the Southwest

This paper will demonstrate how cultural and chronological context for rock art images can be established using Polly Schaafsma's *Indian Rock Art of the Southwest* book. I had photos of rock art from the Navajo Reservation I could not place in any tradition. Number one shows two dark red masked figures from Slim Canyon nearby Canyon de Chelly. A comparison with Schaafsma's rock art styles suggests they may be a late regional variation of the San Juan Anthropomorphic style. Number two is a petroglyph of a bighorn sheep dominating a human and polychrome pictographs of anthropomorphs with zigzagged torsos from Mystery Valley next to Monument Valley. They can be assigned to the Kayenta regional style between c. 1050-1250 A.D. and its cultural context. Number three is a white abstract panel found in an unexplored Ancestral Pueblo shelter between Navajo National Monument and Navajo Mountain, which can be related to blanket designs in Schaafsma's documentation.

I will further interrogate the blanket design, whether it was the representation of a textile or the result of an interaction by its makers with the rock as a social agent who was being dressed. Visual evidence supporting the latter is implied in the design.

Chu, Alejandro

[355] Advances in Mineral Characterization of the Late Horizon Pottery from Incahuasi, Cañete

In this paper I will present preliminary results from the materials excavated of the Incahuasi site located at the middle Cañete valley. Research suggests that this portion of the valley, an area stretching from Caltopa at the low-mid valley to Pacaran at the upper-mid valley, was an Inca province with Incahuasi as its provincial capital. Ceramic materials recovered from excavation at different site sectors show a relatively low proportion of Inca style pottery, with a complete lack of specimens of Cusco Imperial style, and the prevalence of the local Guarco style in jars and cooking pots. Stylistic variation and compositional analysis done with Mössbauer spectroscopy and x ray fluorescence (XRF) will be presented in a discussion about the relationship between Inca and local Guarco ceramics, a very different phenomenon that is being found at the Incas coastal sites of the Cañete valley.

[355] Chair

Chuipka, Jason (Woods Canyon Archaeological Consultants)

[313] *Cultural Landscapes, Past and Present: Cultural Resource Management Perspectives From Recent Work in Southeastern Utah*

The spectacular prehistoric ruins and natural environment of southeastern Utah comprise elements of multiple, overlapping cultural landscapes. Archaeologists focus on past cultural landscapes and seek to understand broader cultural processes by studying the many well-preserved locations of prehistoric activity. But the region is not locked in the past; it is a dynamic modern cultural landscape important to a variety of groups including descendant Native American communities, recreationalists, and extraction industries that seek resources such as gas or coal. Recent cultural resource management projects in the region provide perspectives on how the cultural landscape of the present is affecting the irreplaceable landscapes of the past.

Chun, Yu [78] see Tang, Liya

Church, Elizabeth [112] see Jones, Christine

Church, Minette [198] see Kray, Christine

Churchill, Shere [254] see Laurila, Erick

Ciacco, Robert [208] see Diehl, Michael

Cianciosi, Alessandra [347] see Seetah, Krish

Cibrian Jaramillo, Angélica [307] see Englehardt, Joshua

Ciofalo, Andy [37] see LeFebvre, Michelle

Ciofalo, Andy (Leiden University) and Corinne L. Hofman (Leiden University)

[37] *Culinary Contributions: What's Cooking on Griddles in the Northern Caribbean*

Precolonial foodways in the northern Caribbean have received restricted investigations. This paper is a synopsis of microrobotanical residues extracted from clay griddles (flat cooking plates) excavated from three archaeological sites: El Flaco, La Luperona, and Palmetto Junction. Social identities are strongly linked to cultural practices surrounding culinary habits. Thus, we aim to untangle some of the life-ways maintained within and between cacicazgos of the Greater Antilles and a habitation in the southern Bahamas, which adds to holistic interpretations of patterned interactions within this area. The archaeological sites of La Luperona and El Flaco are located in northwestern Dominican Republic (8 km distance from each other, and 18 km from the coastal zone), and have been interpreted as interacting and permanent habitation sites occupied during the 13th to 15th centuries. The comparison of foodways is with the coastal site of Palmetto Junction, located in Providenciales, Turks & Caicos Islands, which appears to have been consistently utilized for 200 years contemporaneously with the other sites. This research adds another dimension to previous general archaeological comparisons between the Greater Antilles and The Bahamas. The survey of foodways amongst sites located in contrasting ecological niches exposes different adaptation strategies and likely transported landscapes.

Ciolek-Torello, Richard (Statistical Research, Inc.)

[246] *Platform Mounds and Pueblos: A Focus on Diversity and Function*

A unique set of architectural forms, known as platform mounds, emerged in the Phoenix Basin during the early Classic period, presumably evolving from older Hohokam dance mounds. Usually surrounded by walls enclosing compounds, platform mounds initially served as the focal points of dispersed rancheria-style villages composed of clusters of smaller residential compounds. By the late Classic period, platform mounds had developed into much larger residential structures that presumably housed the elite members of hierarchically organized communities. The emergence of these platform mound communities in the Phoenix Basin was closely tied to the expansion of irrigation systems, and probably represented the organizational development required for the management of these systems. Similar platform mound-village agricultural systems developed in surrounding areas such as the Lower Verde Valley, Tonto Basin, Tucson Basin, and San Pedro Valley. The term platform mound and its associated model of hierarchical settlement, however, has been applied to a much greater diversity of architectural forms and settlements in these surrounding areas where Hohokam and Puebloan cultures commingled. This presentation explores the diverse form, construction history, and function of these structures and their social and economic implications.

Ciomek, Katarzyna [190] see Palonka, Radoslaw

Ciren, Zhaxi [78] see Tang, Liya

Cisar, Amelia [207] see Carlson, Kristen

Ciugudean, Horia [58] see Dorr, Lana

Civitello, Jamie (Bandelier National Monument, NPS) and Anastasia Steffen (Valles Caldera National Preserve, NPS)

[90] *Just Up the Hill and Not Down the Line: Ancestral Pueblo Obsidian Use at the Source*

The rich obsidian deposits found in the Jemez Mountains were utilized by all peoples in prehistory, including the Ancestral Pueblo groups who called the mountains home. For most of the geochemically-distinct geologic deposits of obsidian originating in the Jemez, raw materials can be found in secondary gravel deposits far away from the primary locations. However, one of the major geological sources of artifact-quality obsidian, Cerro del Medio (Valles Rhyolite), is geographically limited to a relatively small area within the caldera at the very center of the Jemez Mountains. Presence of this obsidian at sites close to the center can demonstrate direct access and use of this area by Ancestral Pueblo groups. We use geochemical sourcing methods to trace obsidian artifacts found at sites across the eastern flank of the Jemez Mountains (the Pajarito Plateau) to their geological sources. We also compile published sourcing data from the last few decades of archaeological work in the area. Adding current results from portable XRF instrumentation to legacy datasets enriches the picture of obsidian utilization patterns during the Ancestral Pueblo period in the Jemez Mountains.

Claassen, Cheryl (Appalachian State University)

[76] *Discussant*

Clark, Amy (University of Oklahoma)

[186] *Built Environments in the Middle and Early Upper Paleolithic*

Hunter-gatherers are mobile because their resources shift based on season or by ecological zone. This mobility means that their built environments are ephemeral and their mark on the land is light. Many of the traces of structures or land modifications are therefore invisible within the archaeological record. This invisibility only increases as we go back in time as preservation diminishes. We do have a few sites where the remains of the built environment of Middle and Upper Paleolithic foragers is preserved. These sites suggest that there are major differences in the elaboration of living spaces between these two time periods. However, these differences could be explained by many factors, including duration of occupation, group size, site preservation, and, of course, cultural or cognitive differences between Neanderthals and anatomically modern humans. In this paper, I will present the current state of research and the explanations for why these differences may have existed.

Clark, Bonnie (University of Denver)

[316] *A Barrack, a Stone, and Families in Exile: A Case Study of Historic Obsidian Sourcing*

The sourcing of lithic raw material often challenges preconceived notions of the relationships between people, places, and objects for time periods prior to written records. But what of historic obsidian? What can sourcing reveal about the more recent past? This paper presents the case study of a most amazing historical mystery involving exile, incarceration, and the healing power of stone. In 2014, archaeologists on the High Plains of Colorado discovered a roughly shaped piece of obsidian in a most unlikely site, a WWII-era Japanese American internment camp, called Amache. XRF analysis by Fryxell winner Steven Shackley suggested the raw material likely derives from Glass Mountain, Siskiyou County, California. Glass Mountain rises above Tule Lake, another of the 10 primary camps where Japanese Americans were confined during of the war. This artifact's journey to Colorado has sparked the imagination of those beyond the archaeological community. A former internee of a third camp and her grandchildren chose this artifact for inclusion in an exhibit of objects from Amache. In addition to presenting the XRF and archaeological data, this paper also explores how science can be translated into a public conversation about people, places, objects, and our shared, if troubled, past.

[228] *Discussant*

Clark, Brian (W.F. Ramsey Unit)

[395] *Archaeology for the Incarcerated*

Anthropologists have long defended the social value of their work beyond the immediate acquisition of new knowledge. In archaeology, community engagement and public outreach are now common and desirable. In general education, we tout the powers of archaeology classes to inform students of where we have come from, to appreciate diversity, and to be more compassionate. A form of outreach we rarely talk about, however, is to the incarcerated. Despite the overwhelming evidence of the benefits of offering higher education to inmates, fewer college programs are offered to prisoners today than there were 25 years ago. In this paper I present observations of my time teaching

archaeology courses in a Texas prison, supported with research, and the unique effects it has on my students. Though it poses many unique challenges, I argue that teaching our discipline in a prison setting can help dismantle racist beliefs, build strong, positive identities, and inform people of pressing contemporary issues through references to the past. In conclusion, I argue that we should advocate for more prison education as part of our outreach efforts, and that it is equal in value to the public engagement we promote among the un-incarcerated.

[395] *Chair*

Clark, Caitlin and Linda Scott Cummings (PaleoResearch Institute)

[110] *Archaeological Maize: Does It Vary across Space and Time?*

Recovery of maize cobs as part of the archaeological record yields a rich potential for discerning connections between people, places, and through time. Started almost three decades ago, the study of maize cob phytolith morphometrics has now produced a sufficient dataset for comparison of phytoliths from reference cobs spanning ancient varieties and more recent maize populations from living tribes with archaeological cobs. Some relationships are surprising, while others are expected. This paper delves into the explanation of the best phytolith “face” to measure, the meaning of shape versus size measurements, and statistical comparisons that show regional relationships between Fremont cobs and suggest the possibility that remote granaries contained different types of maize. Similarities between cobs from southeastern Colorado and eastern Utah were surprising. This study, which started in the Southwest, has now expanded onto the Great Plains with the addition of tribal maize as references.

Clark, Desiree [128] see Stow, Evelyn

Clark, Dylan (University of North Carolina at Chapel Hill)

[244] *Braiding Knowledge: Opportunities and Challenges for Collaborative Approaches to Archaeological Heritage and Conservation*

Recently, archaeologists have turned to more collaborative and participatory approaches and are considering more centrally the impact and relevance of archaeology to the contemporary world. The past is deeply rooted in communities, and integrating local understandings and interests in cultural heritage with archaeological interpretation and presentation is essential to cultivating meaningful partnerships with Indigenous and local communities. Such methodological innovation requires an expansion of explanatory spaces to accommodate epistemologies and worldviews that can be radically different. Relying on Anishinabe traditional knowledge, Sonya Atalay has developed and productively applied the concept of “braided knowledge” to community archaeology and brought to the foreground the challenges of cross-threading distinct ways of knowing and doing in engaging with the past, and the critical need for structural changes in the discipline to reflect these practices. In this paper, we provide an orientation to diverse methods of knowledge production and sharing in archaeological research and conservation, considering both successful synergies and epistemological incommensurabilities. We start with a discussion of “braided knowledge” and contextualize the challenges at hand, reviewing recent approaches and interpretive frameworks. We then share examples of attempts to braid knowledge through collaborative cultural heritage projects organized by InHerit in the Maya region.

[244] *Chair*

Clark, Geoffrey [212] see Napolitano, Matthew

Clark, Geoffrey (Arizona State University)

[366] *The Old Stone Age in the Shammakh-to-Ayl Archaeological Survey Area, West-central Jordan*

Chipped stone artifacts are nearly ubiquitous throughout the Middle East, and Jordan is no exception. Virtually indestructible, they testify to a human presence that extends back as far as 1.5 million years. They are commonly found on the deflated uplands of the west-central Jordan horst, an up-thrust block where ancient sediments and soils have been stripped away by millennia of aeolian erosion. Difficult to date and to determine site compositional integrity, a quasi-Bayesian methodology is deployed here to survey data from which 108 250 x 250 m squares were selected randomly with an overall sampling fraction of 1.2%. The total area surveyed (c. 590 km²) was divided into three zones corresponding to natural phytogeographic, altitudinal and precipitation boundaries. Ten analytical units were defined and artifacts collected were cross-classified by zone and by weathering, density and retouch indices. The work showed that, on average, there was relatively good correspondence between the three indices and fair-to-good segregation amongst the analytical units by zone. Lower Paleolithic collections were confined to the northern part of Zone 3. Middle Paleolithic collections dominated overall while Epipaleolithic collections were virtually non-existent. Implications for forager mobility and factors related to sampling error are discussed.

Clark, Jamie (University of Alaska Fairbanks)

[415] *Can HBE Help Explain Variation in the Presence of Blue Duiker (*Philantomba monticola*) throughout the Middle Stone Age at Sibudu Cave (South Africa)?*

Blue duiker (*Philantomba monticola*) is a small, forest dwelling bovid present throughout Central and southern Africa. The species remains an important source of bushmeat in Central Africa, and in southern Africa, its exploitation dates at least as far back as 77,000 years ago. At the Middle Stone Age site of Sibudu Cave (South Africa), blue duiker is variably present throughout the sequence—its frequency increases from 17% of the total number of identifiable specimens (NISP) in the pre-Still Bay (~77 ka) to 41% in the Still Bay (~71 ka); it begins to decline thereafter, and by the late and final MSA (~48ka and ~38 ka, respectively) it accounts for <2% of the NISP. Under traditional optimal

foraging models, blue duiker (~5 kg) would typically be low-ranked prey. In this paper, I will explore whether the evidenced variation in blue duiker at Sibudu fits the expectations of optimal foraging theory. In so doing, I will also address how (and if!) we can parse apart the relative impacts of variation in 1) the local environment, 2) human occupation intensity, 3) human mobility patterns/landscape use, 4) weaponry systems, and 5) non-human predator activity.

Clark, Jeffery [246] see Borck, Lewis

Clark, Jeffery [259] see Mills, Barbara

Clark, Jeffery (Archaeology Southwest)

[316] *Looking through the Glass: How Large-Scale XRF Obsidian Sourcing Has Expanded Our View of Late Pre-Hispanic Regional Networks in the U.S. Southwest*

Over the past three decades, the Geoarchaeological XRF Lab, founded and directed by Steve Shackley, has defined and established unique chemical fingerprints for nearly all of the obsidian sources used by Native Americans in the pre-Hispanic U.S. Southwest. Sources and sub-source localities can be reliably identified using XRF spectroscopy, a precise and replicable analytical technique when properly utilized and standardized. XRF analysis is inexpensive allowing the sourcing of large sample sizes, especially considering Steve's well-known generosity in reducing rates for underfunded archaeologists. This paper highlights one important contribution of Steve's research: obsidian procurement and exchange during the late pre-Hispanic period (1300-1450 CE), when there was a dramatic increase in the use of this raw material. Over 10,000 obsidian artifacts from nearly 200 settlements dating to this interval have been sourced allowing us to reconstruct socioeconomic networks at a regional scale. We compare terrain-adjusted "catchment zones" for each widely used source with the dominant source utilized by each settlement from which we have data. This analysis allows for easy visualization of conformity and deviation from closest source use expectations. Catchment zones for underutilized sources are then removed for larger regional comparisons of primary use sources.

[263] *Chair*

Clark, John (Brigham Young University)

[255] *Experiments in Replicating Eccentric Workshop Debris*

Elaborate Maya eccentrics were made from two kinds of blanks: large pieces of tabular flint and large flakes harvested from thick, roundish nodules. Preforms from these blanks were made by direct or indirect percussion, probably with wooden tools that allowed for the removal of super-flat, wide, long flakes. I describe experiments of making obsidian eccentrics with tropical hardwood tools from different forms of blanks. One goal of the experiments was to determine whether different beginning forms would generate different kinds of flakes, or different relative percentages of flakes of different kinds. Tabular blanks require a preliminary step of converting squared edges into acute ones. The thinness of tabular pieces constrains how much additional thinning can occur. Blanks of thick flakes lack these constraints. I describe flake removed from blanks of different forms that may be debris diagnostic of the manufacture of large eccentrics and bifaces in an effort to establish debitage signatures of their production.

[309] *Discussant*

Clark, Jorie (USFS)

[12] *Hot Spots: A Proposed Strategy for Reducing the Risk of Wildfire to Cultural Resources*

Climate change during the 21st century presents a significant challenge to the mandated protection of cultural resources. In interior continental areas such as the Northern Rockies, increased wildfire activity due to longer fire seasons has the potential to damage if not destroy sites. Here we propose a strategy that will take proactive measures to reduce risk to cultural resources from wildfire, thus increasing efficiency in using heritage and fire resources for protecting sites at risk. The strategy proposes to use the best available science to prepare in advance for heritage sites that are most at-risk from wildfire. We present an example of applying wildfire projections for the 2040s and 2080s that quantify the change in area burned at the scale of Bailey's ecosections, allowing the identification of areas of future high-fire risk under climate change. We then would use GIS to overlay within-ecosection fuel type to refine the risk map of cultural resource sites. We would next prioritize those sites in areas of high-fire risk according to significance, vulnerability, etc. Finally, we would develop management plans to reduce impacts from wildfire. We conclude with a discussion of approaches that can be taken to further downscale wildfire projections.

[12] *Chair*

Clark, Kristine (Arizona State University) and Tia Alquist (Arizona State University)

[411] *From Storage Boxes to Research Options: Cataloging Collections at ASU's Research Lab in Teotihuacan, Mexico*

At Arizona State University's (ASU) Research Lab in Teotihuacan, Mexico, countless boxes represent almost limitless opportunities for research. As the initial director, George Cowgill generously provided archaeologists with free storage space. However, decades have since passed without appropriate oversight, organization, and documentation. This means that before any assessments or analyses can take place, there needs to be a catalog of

the collection. To this end, we (a pair of museum studies graduate students) spent a month during the summer of 2018 working at the lab. Specifically, we worked with a collection of mural fragments excavated in 1984 by René Millon and his team as part of an international collaboration to determine the provenience of the looted murals Harald Wagner bequeathed to the de Young Museum in San Francisco, CA. While Millon successfully determined the murals' site of origin, the fragments remain unanalyzed in storage boxes. In an effort to make them accessible for future research, we lightly cleaned the fragments, established a procedure for describing their appearance and condition, photographed noteworthy pieces, and repackaged the fragments for more appropriate storage. Ultimately, the goal is to create a database that can be accessed online by potential researchers to inspire future studies.

Clark, Lauren (University of Montana), Meradeth Snow (University of Montana) and Mark MacKenzie (Museums of New Mexico - Conservation)

[110] Domestication of the Cochineal

Identifying the specifics of location and time of the cultivation and domestication of the cochineal beetle (*Dactylopius coccus*) in the New World has eluded archaeologists and ecologists for decades. The cochineal's production of red dye from its rich storage of carminic acid has made this insect a notable element in the lives of pre-contact Mesoamerican and South American peoples for dying textiles, cosmetics, and food. The main debate centers around whether the beetle was first domesticated in Mexico and traded into South America, or if the reverse is more accurate. In this study, we will attempt to use mitochondrial and genomic markers among domestic and wild samples of this species from Peru, Oaxaca/Mexico, and New Mexico. The results of our inquiries using these carefully curated samples will yield additional information regarding the effects of domestication on native species in a deep-time context, in addition to revealing data about the current genomic diversity among cochineal stock.

Clark, Scott (Detecting.us)

[343] Discussant

Clark, Terence (University of Saskatchewan)

[118] Using Augmented Reality to Increase Collections Access: Examples from the University of Saskatchewan Archaeological Collections

This poster demonstrates augmented reality as a useful approach for making inaccessible collections accessible to the public. Using the mobile app Augment, highlights of the University of Saskatchewan's archaeological collections will be virtually presented to the public for the first time. Hidden archaeological gems will be given the spotlight they deserve through new technologies.

Clarke, Mary (Boston University), Henry Perez (Proyecto Arqueologico San Bartolo-Xultun), Boris Beltran (Proyecto Arqueologico San Bartolo-Xultun) and Heather Hurst (Skidmore College)

[219] Quarrying, Cutting, and Shaping: A Look into the Lives of Ancient Maya Limestone Producers

The organization of labor in Classic Maya society has long been studied from a top-down approach. The construction of public works is seen as a facet of state economy, while the physical evidence of human effort—monumental constructions—are understood as visible manifestations of labor or service-based taxes. The argument for collective or rotational labor organization—well supported in the cases of public architecture, especially road systems—overlooks the people responsible for quarrying, cutting, shaping, and transporting limestone for monumental art and architecture. Recent excavations into residential groups within and on the edges of quarries at the site of Xultun, Guatemala, however, provide evidence of the social and economic role of the individuals who worked, and potentially managed, local limestone quarries. Xultun offers new possibilities for reevaluating existing models of labor organization focused on energetic analyses and ethnographic analogies by contributing direct archaeological evidence of the raw materials, tools and techniques, and residences of laborers engaged in monumental construction projects.

Clarke, Siobhan [334] see Soto, Maria

Clauss, Lee (San Manuel Band of Mission Indians)

[244] A Weaver's Work: The Concurrent Advancement of Tribal Sovereignty and Archaeological Practice in Southern California

Reflecting on work within a Serrano community and their ancestral territory, in this presentation, I will discuss how community-based conceptions of self and landscape, cultural mores related to the treatment of ancestors and artifacts, and the application of knowledge transmission protocols inform and direct not only the archaeology performed on behalf of the Tribe, but also archaeological praxis and the implementation of environmental, historic preservation, and human rights laws across much of Southern California. Working alongside a native sovereign nation as it participates in, undertakes, and guides the performance of regulatory-based archaeology in the United States requires one to operate in a liminal space where multiple worldviews meet and seek to co-exist. In such a landscape where realities, understandings, and constraints have collided continually for over two decades, much has been learned about how to create a space where a multi-vocal, equitable convergence of knowledge can be encouraged and generated anew. Discernment has also been gained about how to ensure this kind of shared understanding does not devolve into "value-added" Western science or an anesthetized form of data transmission and integration that does injustice, if not outright harm, to original thoughts and unique values that must be honored.

Claypatch, Hunter (Binghamton University)

[202] *Mesoamerica en la frontera: Understanding Large-Scale Connectivity Using Hohokam and Trincheras Pottery Designs*

More than merely a physical barrier, the international border between the United States and Mexico has become an ideological boundary that shapes modern perceptions of prehistoric cultures and limits the transfer of academic knowledge. Such is the case in the study of the prehistoric Hohokam and Trincheras traditions. Archaeologists have argued for nearly a century that the Hohokam tradition of southern Arizona is more closely related to Mesoamerica than to the Ancestral Puebloan culture further north. These assertions are made despite little comparative work between Hohokam material culture and the Trincheras tradition of northern Sonora. In the spirit of “crossing boundaries,” this presentation compares Hohokam pottery designs with those produced by the Trincheras tradition. I will argue that similarities in pottery designs demonstrate deep social connectivity within the two groups. Despite these similarities, many Mesoamerican-influenced design elements found on Hohokam pottery are lacking on Trincheras pottery. These differences provide important evidence for reconstructing trade routes from central Mexico to the modern border region.

Clayton, Darci (Trent University)

[66] *Tools of the Trade: An Analysis of Lithic Biface Variability in South Central Ontario*

This presentation will discuss the results and conclusions of my Master's thesis research, which addresses cultural interaction patterns and corresponding lithic hafted biface manufacturing traditions in the south-central portion of Ontario. It focuses on the analysis of morphometric and raw material variability in lithic hafted bifaces from the Middle Archaic (7000 – 5000 B.P.) through the Late Woodland (1300 – 500 B.P.) temporal periods in Kawartha Lakes and Trent River Drainage region. Informed by Cultural Transmission Theory (Boyd and Richerson 1985; Shennan 2000), I will show how raw material and the degree of morphological variation that is associated with each temporal phase can contribute information towards the extent to which lithic hafted biface variability is linked to interactions with the surrounding areas of New York, Quebec, Northern Ontario, and SW Ontario, and how these social networks may have changed through time.

Clayton, Sarah (University of Wisconsin-Madison) and Michelle Elliott (Université Paris 1, Panthéon-Sorbonne)

[38] *Urban Growth and Land Use at Chicoapan, an Epiclassic Town in the Southern Basin of Mexico*

The extensive surveys of the 1960s that culminated in Sanders, Parsons, and Santley's pivotal 1979 volume put numerous archaeological sites on the map and advanced knowledge of the changing sociopolitical landscape of the Basin of Mexico through time. Data resulting from this work, including estimates of site size, spatial organization, and environmental context, have been fundamental for reconstructing the rise and fall of states in a region that is among the world's key 'laboratories' for the study of long-term social change. In this paper, we discuss current research in the Chicoapan-Coatepec valley of the southeastern Basin. Here, sprawling Epiclassic towns, documented by Parsons as part of the Basin of Mexico regional settlement surveys, developed in the years surrounding the decline of Teotihuacan. By the early 600s CE, the settlement at Chicoapan had grown from a small village of a few hundred people to an urban community of several thousand, featuring civic architecture and new forms of leadership. Drawing from archaeological, geophysical, and paleoethnobotanical data, we consider how local residents modified the surrounding landscape to accommodate rapid population growth and to innovate new modes of sociopolitical interaction.

Cleghorn, Naomi (University of Texas Arlington)

[247] *Discussant*

Cleghorn, Naomi [390] see Butts, Clancey

Clifton, Julia

[89] *Duck. Duck. Goose? A Ceramic Survey Grows into a Primer on Variability*

A systematic survey of archaeological vessels in the collections of the Museum of Indian Arts & Culture in Santa Fe revealed almost 100 bird form jars, frequently referred to as duck pots or shoe jars, from New Mexico and its border environs. The survey found, among other things, that not all of the Museum's "duck pots" represent ducks. Dove-shaped jars were identified, along with at least one example of a swallow or swift. A preliminary assessment indicates that production, beginning by at least 700 AD, has shifted back and forth between utility wares and painted wares, and suggests that peak periods of manufacture may have occurred during the PII period in northwestern New Mexico (primarily painted wares) and during the PIV period along the upper Rio Grande (primarily plain wares). The study demonstrates the advantages museum collections provide for a broad overview of the persistence and variability of certain vessel forms and iconography through time and across space within a geographic region.

Clindaniel, Jon (Harvard University)

[98] Colors of the Inka Khipu: Demonstrating a Link to Textile Production

Deciphering the meaning of khipu cord colors has long been a topic of debate amongst scholars of the Inka khipu. Were colors used to signify information that could have been interpreted generally (and thus be deciphered today)? Or were color signs primarily used as mnemonic, logical structuring devices that were specific to the individual who produced them and the khipu they were employed on? Such questions have broad implications for understanding non-numerical Inka khipu signs and determining whether or not it is even possible for modern scholars to decipher color signs. Analyzing artifacts collected by Samuel Lothrop in 1941 from a Late Horizon Nazca province grave (now in the Peabody Museum at Harvard University), I find a close link between the colors of khipu cords, textiles, and textile production tools from the grave. Extrapolating from this finding and my additional research into khipu cord colors from across the Inka empire, I suggest that khipu color signs were part of a broader universe of color signs than were contained in any particular khipu or individual mnemonic code. Furthermore, I discuss the implications of my findings for deciphering Inka khipu color signs and better understanding Andean color semiosis as a whole.

Cloud, Michael [220] see Janes, Stephen

Clowater, Victoria [87] see Blair, Susan

Cmielewski, Bartlomiej [233] see Ziolkowski, Mariusz

Cobb, Allan**[360] Breathless in the Underworld: The Effects of Low Oxygen, High Carbon Dioxide, and High Carbon Monoxide on Cave Ritual**

The Maya explored caves with torches and burned copal with wood fires during ceremonies. These activities, in a confined space such as a cave, used up oxygen and produced carbon dioxide and carbon monoxide. The effects of high carbon monoxide and carbon dioxide on the human body are well studied by OSHA and documented in environmental and medical research. These effects include shortness of breath, dizziness, mental confusion, blurred vision, and weakness, producing a trance-like state. Studies show the effects of high carbon dioxide have been compared to the effects of alcohol and the presence of carbon dioxide increases the uptake rate of alcohol by the body. The decreasing oxygen levels during ceremonies would also set a time limit on rituals, as torches would cease to burn when oxygen levels reached about 18%.

The air in caves is already higher in carbon dioxide than outdoors. The mild effects of it are immediately noticeable and could have been part of the experience the Maya were looking for during ceremonies. Caves with carbon dioxide levels that were too high would prevent use due to torches not burning but caves with slightly lower carbon dioxide levels would speed the process of reaching an altered state of consciousness.

Cobb, Charles [162] see Ethridge, Robbie

Cobb, Charles (Florida Museum of Natural History)**[245] Discussant****[162] Chair****Cobos, Rafael (Universidad Autónoma de Yucatán)****[307] Mapping the Ancient City of Chichen Itza, Yucatan, Mexico**

A systematic mapping program conducted at Chichen Itza, Yucatan, Mexico, revealed a considerable amount of archaeological as well as non-archaeological features distributed over the surface of several areas located in the site's periphery. This program relied upon the traditional mapping method consisting in clearing the vegetation in the area selected to be mapped, a detailed record of the archaeological evidence using sketch-maps, and upon an extensive and detailed mapping program utilizing total stations theodolites and the Cartesian coordinate system. The details achieved at Chichen Itza using the traditional mapping method indicate that the use of LiDAR technology will definitely assist at the very onset of the research project before the mapping teams begin their activities in the field. In other words, LiDAR technology could provide excellent information on the presence and spatial distribution of archaeological and non-archaeological features in areas that still need to be surveyed and mapped. In Chichen's case, LiDAR cannot deliver detailed surface information related to features such as cisterns, metates, causeways, wall widths, and accesses associated with ancient structures.

[227] Discussant**Cochrane, Ethan (University of Auckland), Timothy Rieth (International Archaeological Research Institute) and Darby Filimoehala (International Archaeological Research Institute)****[29] Getting the Chronology Correct: Bayesian Chronological Analysis of Initial Ceramic Deposits in Island Southeast Asia**

Throughout his career Steve Athens has been concerned with generating archaeological chronologies that, because of their precision and validity, add to our understanding of the past. Steve was never one to generate dates of

dubious quality simply to produce a table in a report. In this spirit, and dovetailing with Steve's chronological work in the Bismarck Archipelago (Rieth & Athens 2017) we present a Bayesian chronological analysis of initial ceramic deposits in Island Southeast Asia to generate chronologies of maximum validity and identify any spatial directionality in the chronological deposition of ceramics. Our results have significant implications for understanding the movement of Neolithic populations in the region, the origins of Lapita groups that would ultimately colonize the southwest Pacific, and population interaction within ISEA-Near Oceania generally.

Cochrane, Ethan [408] see Prebble, Matthew

Codd, Ellis [371] see Richards-Rissetto, Heather

Codding, Brian [8] see Parker, Ashley

Codding, Brian (University of Utah)

[35] *Socioecological Dynamics of Forager to Farmer Transitions in Southern Utah*

The specific ecological and social processes that structure the spread of agriculture into regions occupied by hunter-gatherers remain elusive. Drawing on ideal distribution models from population ecology, we evaluate whether the spread of agriculture in southern Utah was driven by free, despotic, or some other dispersion mechanism. Specifically, we conduct a geospatial analysis of radiocarbon-dated components to evaluate the rate at which agricultural land use patterns spread across varying levels of environmental suitability and resident population density. Results elucidate the dynamics underlying the Archaic to Formative transition in the Basin-Plateau region of North America, and offer general insights into the patterns structuring agricultural dispersal.

[35] Chair

Codding, Brian [65] see Wilson, Kurt

Cody, Tia and Shelby Anderson (Portland State University)

[47] *Eroding Chances: Planning for the Impacts of Climate Change on Vulnerable Coastal Sites in the Arctic*

The impact of climate change on archaeological and other heritage sites continues to grow. Arctic regions are particularly threatened, given the remote, vast, and ecologically diverse nature of the region coupled with the pace of Arctic climate change. Furthermore, archaeologists must grapple with many unknowns in the Arctic, as many regions are only minimally investigated for archaeological sites. Possible approaches to these problems include developing desk-based predictive models to inform targeted field investigations and undertaking site level assessments to identify potential climate change threats. Working with the National Park Service in northwest Alaska, we developed and tested methods for: a) identifying the most vulnerable coastal archaeological sites, and b) standardizing site level assessments of present and future climate change impacts. We present initial outcomes of our site prioritization effort and discuss how lessons learned from this effort can inform future climate change planning and assessment activities both in the Arctic and more broadly.

Coffey, Grant (Crow Canyon Archaeological Center), Mark Varien (Crow Canyon Archaeological Center) and Kyle Bocinsky (Crow Canyon Archaeological Center)

[86] *Basketmaker III in the Central Mesa Verde Region: Transitions, Social Dynamics, and Population Growth*

The Basketmaker III period (A.D. 500 to 725) in southwestern Colorado was a time of fundamental social and demographic change. The area witnessed dramatic population growth after A.D. 600 that was due to immigration and increases in fertility. This growth was accompanied by changes in settlement patterns and social dynamics. This paper examines this dramatic demographic transition and the associated social dynamics by analyzing site distributions and the size of sites present in the area during this period. These data are then evaluated against fertility estimates, tree-ring data, and other lines of evidence to model when the initial migration took place, what numbers of people were involved, and the role migration may have played in the process of population growth. These results provide new insights into how this pivotal period shaped the broader trajectory of ancestral Pueblo cultural development.

Coffey, Grant [122] see Ermigotti, Paul

Cohen, Anna (Utah State University)

[192] *Urban Landscapes in Late Postclassic Western Mesoamerica: A View from Angamuco, Michoacán*

When Cristóbal de Olid arrived in Tzintzuntzan, Michoacán c. 1522 CE, he encountered the powerful king (irecha) of the Purépecha (Tarascan) Empire who controlled approximately 75,000 km² of western and central western Mesoamerica. Never defeated by the Mexica, the Late Postclassic (1350-1530 CE) Purépecha Empire may have been one of the most politically and economically consolidated empires at that time in Mesoamerica. Previous

research has examined imperial control of resources and trade within the Lake Pátzcuaro Basin heartland, and yet comparatively little is known about Purépecha urbanism and daily life. How were communities living on urban landscapes? How did settlement and consumption patterns change before and after imperial consolidation c. 1350 CE? This paper addresses these questions by discussing urban landscapes in Purépecha western Mesoamerica, some of which have only been documented recently. I focus on the site of Angamuco, a 26 km² urban landscape that provides important insight into local socioeconomic and political practices during the Postclassic period. Increased understanding of pre-Hispanic complexity in this part of Mesoamerica is critical for assessing the impacts of colonial encounters throughout the Americas.

Coil, Reed [57] see Yezzi-Woodley, Katrina

Colaninno-Meeks, Carol (Southern Illinois University Edwardsville) and John Chick (Illinois Natural History Survey, University of Illinois)

[184] *Can the Field School Be Improved? Lessons Learned through Education Research of an NSF Research Experiences for Undergraduates*

For many undergraduate anthropology majors, participation in an archaeological field school is the entry point to a professional career in the discipline. Despite the importance of field schools, few scholars have investigated the learning outcomes students gain or lasting impacts, either negative or positive, from participation in field-based research. We report on the educational design, learning objectives, and results of two years of formative and summative assessments for an interdisciplinary, archaeology and ecology, research program. Our learning objectives include promoting scientific literacy and communication, critical thinking and STEM skills, and capacities in archaeological and ecological interdisciplinarity. Using developed rubrics that account for both critical thinking and STEM understanding, self-administered competency surveys, and items from the National Assessment of Education Progress and the American Association for Advancement of Science, we found significant gains in nearly all identified learning objectives. Students had growth in program specific content, STEM skills and discipline specific skills, STEM critical thinking skills, and scientific communication skills. We hope to expand upon these quantitative assessments to develop future qualitative research on student field school experiences.

Colburn, Mona [34] see Styles, Bonnie

Colclasure, Cayla (University of Alabama)

[319] *Missionization and Indigenous Foodways: Analyzing Mission-Era Shell Middens on St. Catherines Island, GA*

In the 17th century the Mission de Santa Catalina de Guale was established on St. Catherines Island, GA, creating a pluralistic community of aggregated indigenous populations and Spanish missionaries. Previous discussions of the effects of Guale-Spanish interaction and the resulting redirection of indigenous labor upon traditional foodways on St. Catherines Island have lacked data regarding the invertebrate component of Guale diets during the Mission era (ca. 1565-1680 CE). This paper presents zooarchaeological analysis of invertebrate fauna recently collected from shell middens in five Mission-era pueblo neighborhoods on St. Catherines and discusses the significance of intra-community variation in molluscan collection and consumption. Stable isotope analysis conducted on oyster samples from the Mission-era will provide another avenue for examining the variation in collection practices between neighborhoods. The paper will also compare the summed Mission-era results to similar data from the Irene Period (ca. 1300-1580 CE) to assess the temporal change and continuity in indigenous subsistence strategies during missionization. This paper aims to look at what the maintenance and alteration of traditional Guale foodways reflects about the effects of colonization on their daily practices, identity, and social landscape.

Cole, Kasey (Dept. of Anthropology, University of Utah) and Peter Yaworsky (Department of Anthropology, University of Utah)

[128] *Application of a Novel Machine Learning Methodology to the Study of Dipodomys spp. Response to El Niño Southern Oscillation Events throughout the Holocene*

El Niño Southern Oscillation (ENSO) events influence climatic variation on a global scale, considerably impacting modern human and animal populations. There is, however, a dearth of literature regarding the long-term effects of ENSO variation on prehistoric vertebrate populations. Here we examine how kangaroo rat (*Dipodomys* spp.) species abundance from Abrigo de los Escorpiones, a trans-Holocene rockshelter located on the Pacific coast of Northern Baja California, vary as a function of wet El Niño events. This study uses a Random Forest algorithm machine learning methodology to establish species level identification of *Dipodomys* spp. remains based on variation in cranial morphometrics. This novel technique to zooarchaeological research significantly improves upon more traditional statistical techniques, such as linear discriminant function analysis and principal components analysis, by more accurately predicting species identifications and by interpolating missing data more effectively. Through the use of open source statistical software, this study demonstrates the utility of machine learning techniques to perform archaeofaunal species identifications, which may serve as an invaluable addition to the zooarchaeologist's toolkit. Moreover, as future ENSO strength and frequency is projected to vary with changing global climatic regimes, this study has important implications for understanding vertebrate population responses to these changing climatic events.

Coleman, Caitlin (ASI)

[104] *The Evolution of Public Communications in the Ontario CRM Industry*

In Ontario's Cultural Resource Management industry, we are experiencing a profound change in how we communicate with the public. Where once we relied on newspapers, academic journals, and museums to disseminate our knowledge, we can now communicate directly with the public through social media. This change has led to new questions about what information we should be sharing with the public, while also balancing the needs of descendant communities, our clients and government frameworks. Social media is democratizing heritage, and creating a more complex landscape for the CRM industry to navigate. Descendant communities and the wider public have been given a greater voice about their own cultural history, while critical heritage theory has questioned the importance of the expert in the process of heritage evaluation and management. I will trace how these changes to our public communications have evolved in Ontario's CRM industry, and look ahead to where these changes may lead us in the future.

Coleman, Julie

[62] *Moderator*

Collard, Mark [2] see McCauley, Brea

Collard, Mark (Simon Fraser University)

[247] *Niche Construction and Cultural Complexity in Small-Scale Societies*

Identifying the factors that influence variation in cultural complexity among groups is an important task for archaeologists. In this paper, I argue that niche construction may be one of these factors. I begin by showing that empirical work on the drivers of technological complexity in small-scale societies suggests that there is a marked difference between hunter-gatherers and food-producers. For hunter-gatherers the primary driver of technological variation appears to be environmental risk, whereas for food-producers the primary driver seems to be population size. In the second part of the paper, I suggest that this pattern makes sense if cultural complexity in small-scale societies is affected by both environmental risk and population size but their relative importance is dependent on the amount of niche construction the members of a society engage in. When niche construction is limited, environmental risk dominates, whereas when niche construction is extensive, population size dominates. In this part of the paper, I also show that the results of recent modelling work suggest that this hypothesis is plausible. In the final section of the paper, I discuss the implications of the niche construction hypothesis for the interpretation of the archaeological record.

Collazo López, Julissa (University of Puerto Rico, Rio Piedras Campus)

[418] *Material Culture Associated to Elite Females in 16th Century Puerto Rico*

This paper presents a case study on how to approach the study of elite women in Puerto Rico during the 16th century using primary sources and archaeological evidence. The main objective of the research was to reconstruct aspects of the daily life of women through their cultural assemblages, as recorded during the early colonization of Puerto Rico. Primary documentation produced by the Royal Treasury of Puerto Rico, one of the first colonial institutions in the Island, was incorporated as a key source for establishing the types of objects associated to women. Two types of documents were consulted: registries of vessels and passengers for the first half of 16th century (1510-1545), and litigation documents for the later part (1573-1599). These sources permit answers to questions related to the types of objects associated to women, and how these in turn can be used to identify status, occupations, and household related activities. The interpretation of this data was compared to existing archaeological collections from 16th century Spanish Caribbean sites and used to characterize a "female elite material culture".

Collins, Benjamin (University of Manitoba)

[15] *Who Let the Beads Out? The Importance of Bead Manufacture and Exchange at Grassridge Rockshelter, South Africa, and Implications for Understanding Holocene Social Networks in Southern Africa*

Ostrich eggshell and marine shell beads have been linked to the establishment and maintenance of hunter-gatherer social networks in southern Africa, but studies focusing on the methods of their manufacture and especially the social contexts surrounding their manufacture are often overlooked. This research presents a detailed technological study of the ostrich eggshell and marine shell beads from the Holocene occupations at Grassridge Rockshelter, located in the understudied interior grasslands region of South Africa.

Ostrich eggshell beads are ubiquitous at Grassridge, and marine shell beads are also present. The density of ostrich eggshell beads at Grassridge suggests that bead manufacture was an important activity at the site and necessitates a discussion of the social implications and gender roles inherent in bead making. Moreover, the presence of marine shell beads indicates connections to the coast, which was at least 200 km away. In this regard, and considering the other artifact assemblages present, Grassridge and the surrounding area are suggested to represent an important social nexus between hunter-gatherer groups located in coastal, montane, and other interior region.

[15] *Chair*

Collins, Benjamin [32] see Wilkins, Jayne

Collins, Michael [326] see Slade, Alan

Collins, Paul [48] see Ceniceros-Rodríguez, Santos

Collins, Paul [240] see Vellanoweth, Rene

Collins, Renee (Northern Arizona University), Sasha Collins (Northern Arizona University) and Rafael Guerra (University of New Mexico)

[373] *What Once Was Lost, Now Is Found: Investigating the Relationships of Lower Dover in the Belize River Valley*

Located on the Belize River across from Barton Ramie, preliminary investigations of the recently discovered site of Lower Dover began in 2010. The primary foci of excavations were to situate Lower Dover in the sociopolitical landscape of the Belize River Valley. Initially, investigations focused on the monumental architecture of the site's epicenter, as well as the plazuela groups adjacent to the site core. Lower Dover is uniquely oriented north to south unlike other sites in the Valley, reflecting its rapid construction in the Late Classic period. The ceremonial center consists of four courtyards and two open access plaza groups surrounded by a set of smaller plazuela groups whose relationship to the center has yet to be established. Most recently, continuing excavations have centered not only on the site core, but also on periphery settlement groups. This poster presents an overview of the ongoing research being conducted at Lower Dover.

Collins, Sasha [373] see Collins, Renee

Collins-Elliott, Stephen [35] see Jazwa, Christopher

Colon, Justin, Adam Benfer (University of Calgary) and Carrie Dennett (Red Deer College)

[191] *Intersocietal Trade and Exchange Networks in Greater Nicoya*

Forty years of geochemical sourcing studies on obsidian artifacts and ceramic sherds from archaeological contexts throughout Pacific Nicaragua and northwestern Costa Rica demonstrate more than 1,300 years of shifting intersocietal trade and exchange dynamics. In the present analysis we mapped the distribution of 3,902 obsidian artifacts from 47 sites and 559 ceramic sherds from 50 sites dispersed across the study area. All data were then interpreted in relation to their respective procurement and manufacture sources. Diachronically calculating the network of least-cost paths—on land and water—that interconnected these sites with known obsidian and ceramic sources produced probable simulations of the travel infrastructures (e.g., footpaths) that facilitated the regional movement of trade goods. To test and refine these simulations, the total documented distribution of key diagnostic ceramic types and obsidian from sites within the study area were added to the database. The resulting simulations include data from approximately 540 archaeological sites and maps out a partial pattern of intersocietal trade and exchange relationships for each of the following time intervals: AD 1-300, 300-500, 500-800, and 800-1250. The final model demonstrates the ability for GIS modeling to significantly enhance our understanding of pre-Columbian economic exchange at multiple scales of analysis.

Colonna-Preti, Kusi [39] see Eeckhout, Peter

Colten, Roger (Peabody Museum of Natural History, Yale University) and Brian Worthington (U.S. National Parks Service)

[89] *Caribbean Archaic Faunal Exploitation: Analysis of Museum Collections*

The Yale Peabody Museum curates one of the world's largest and most comprehensive archaeological collections from the greater Caribbean region. These collections were acquired during a multi-decade research program on the culture history of the region. While the focus of that research was chronology and artifact analysis, the collections contain unmodified faunal remains, both vertebrate and invertebrate, that can provide data on a variety of research topics. This poster describes the history of recovery of collections from Cuba, quantified vertebrate faunal data, and radiocarbon dates. Because of relatively limited access to archaeological sites in Cuba during the past 50 years, the data from museum collections help fill gaps in our knowledge of Caribbean prehistory.

Coltman, Jeremy (University of California, Riverside) and Karl Taube (University of California, Riverside)

[28] *From Chichen Itza to Tulum: The Late Postclassic Maya Feathered Serpent of the Northern Maya Lowlands*

Most representations of the feathered serpent at Chichen Itza depict a plumed rattlesnake, a being of wind and carrier of rain, with Central Mexican origins dating back to Early Classic Teotihuacan. In Classic Maya art, feathered serpents are not rattlesnakes and lack plumage aside from a quetzal crest, an attribute which continues into Late Postclassic representations but is unusual for Chichen Itza. Following the decline of Chichen Itza, feathered serpents in the Maya area do not appear with quetzal plumes covering their bodies but continue to appear in unique and striking ways. This paper will explore the Late Postclassic Maya feathered serpent through stone sculpture, murals, graffiti, and codices.

[28] *Chair*

Coltman, Jeremy [113] see Stanton, Travis

Coltrain, Joan [286] see McCool, Weston

Coltrain, Joan [381] see Lewis, Michael D.

Colwell, Robert (University of Connecticut)

[365] *Discussant*

Cominiello, Leigh A. R. [86] see Hughes, Katherine

Commendador, Amy S. (Idaho Museum of Natural History) and Bruce Finney (Idaho State University)

[66] *Small Mammal Isotopes as Proxies for Climate over the Holocene Period on the Eastern Snake River Plain, Idaho*

Reconstructing the prehistoric environment is vital to our understanding of past human use and occupation of a landscape. While many reconstructions, typically based on chemical and biological signatures found in sediment and ice cores, are available, we currently lack suitable records for Idaho's eastern Snake River Plain. This is mainly due to the scarcity of suitable sedimentary archives in this region. To overcome this problem, we explore the utility of stable-isotope-ratio analysis of small mammal bone from cave sites as a proxy for climate and vegetation change. We present C, N, H, and O isotopic data from bone collagen and C and O from bone apatite from two sites representing the last 10,000 years. The results highlight the potential for small mammal isotopes in evaluating environmental change, providing support for additional research into this arena.

Commendador, Amy S. [370] see McKenna, Morgan

Commoner, Lucy [39] see Phipps, Elena

Compton, Anne M. [110] see Harris, Samuel

Compton, Mary (University of Western Ontario)

[87] *Archaeological and Digital Ethics as a Critical Component of Digital Literacy*

While digital literacy typically refers to one's ability to utilize and navigate various digital platforms, recent literature demonstrates a need to broaden our framing beyond the development of practical skills to include understanding the impact of those technologies in contemporary society. This is of increasing importance as digital media become part of the standard archaeological toolkit and as we venture into largely unknown territory with emerging platforms/technologies (social media, drones, 3D modelling, 3D printing). Pulling from literature on "critical making" in the digital humanities and reflecting on scholarship on digital literacy in archaeological and heritage contexts, I frame digital and archaeological ethics as a critical component of digital literacy. This would have significant implications for digital archaeological pedagogy/curriculum and could also reframe how we evaluate competencies with various technologies. It will also likely impact conceptions of capacity building and collaboration with various archaeological stakeholders, particularly as more community-engaged projects advocate for co-production. Being digitally literate, as I frame it, would prioritize identifying the purpose, intent, and impacts of using digital technologies prior to digitization as well as knowing when digitization may not be appropriate at all.

[177] *Discussant*

Compton, Matthew [70] see Pluckhahn, Thomas

Comstock, Aaron [348] see Cook, Robert

Comstock, Aaron (Ohio State University)

[348] *Chair*

Comstock, Jana (Santa Fe National Forest)

[90] Preserving Cultural Resources on the Santa Fe National Forest: a Collaboration between Federal Archaeologists and Volunteers

The Santa Fe National Forest manages 1.6 million acres of public land in northern New Mexico, and a large portion of the forest encompasses the Jemez Mountains. Archaeologists have surveyed approximately 16% of the forest and documented roughly 10,000 archaeological sites within the forest boundary. The Santa Fe National Forest employs eight permanent archaeologists to ensure the cultural resources on the forest are inventoried and protected. The forest also relies on the efforts of volunteers to assist with this monumental task. The Santa Fe National Forest Site Stewards, a non-profit volunteer organization, and other valuable volunteers help to monitor priority sites, assist with identification and documentation, and research these irreplaceable cultural resources. The collaboration of professional archaeologists and volunteers improves the preservation of cultural resources and exemplifies a shared responsibility for our collective past.

Comstock, Jana [213] see Healy, Alissa

Conard, Nicholas [15] see Dutkiewicz, Ewa

Conard, Nicholas [48] see Wong, Gillian

Condic, Natalija [386] see Woodworth, Anna

Conger, Megan (University of Georgia)

[73] Telling Localized Indigenous Histories of Trade through AMS Dating and Bayesian Chronological Modeling in Southern Ontario, Canada

Late sixteenth-century chronology of Indigenous sites in Southern Ontario has, until recently, relied upon relative means such as ceramic seriation and trade good chronologies. Bayesian chronological modeling of high-precision AMS radiocarbon dates is increasingly being applied to sites believed to date to this time period. The results are forcing archaeologists to reconsider the timing and tempo of the cultural and sociopolitical processes which define our accepted narratives. In this paper, I present modeled AMS dates for sites in Wendat, Tionontate, and Attiawandaron community relocation sequences demonstrated to date to ca AD 1580-1600. I compare the assemblages of European-manufactured goods between these sites with those expected from Glass Bead Period I (ca 1580-1600) sites, and suggest that the differences I find relate to issues of both access to European goods as well as differing Indigenous attitudes toward engagement with European-manufactured materials and people. I also compare assemblages of Indigenous-manufactured goods between sites to further assess the degree to which the Indigenous communities in question were interacting with one another. I conclude by considering the benefits of employing intensive radiocarbon-dating programs on protohistoric and early historic-era Iroquoian archaeological sites, in terms of testing existing chronologies and telling more accurate Indigenous histories.

[73] Chair

Conkey, Margaret (UC-Berkeley)

[312] From the Worm to the World: A Legacy of Julie Stein

In the scholarly contributions of Julie Stein, her key paper on the impact of worms on archaeological sites is among several that have been foundational to not just geoarchaeology but to those of us dealing with the bioturbation of archaeological sites. In this, she is a direct descendant of Charles Darwin. From this, and subsequent geoarchaeological observations and analyses, Julie has more recently turned from the worm's-eye view to an outward facing engagement with the public as the Director of the Burke Museum, where she has spearheaded and directed the creation of a new museum, which will open in 2019 to a wide, diverse and enthralled public. In this paper, I will comment on this unusual and impactful trajectory of someone who can look at both the small and the wide in the world.

[1] Discussant

Conlee, Christina (Texas State University), Bryan Heisinger (Texas State University) and Nora Berry

[211] Prehistoric and Historic Settlement in the Pine Creek Drainage, North-Central Oregon

Located between the Great Basin and the Columbia Plateau region, north-central Oregon is a region of cultural and geographic boundaries. Full coverage pedestrian survey was conducted in the eastern Pine Creek drainage basin to record prehistoric and historic sites in order to understand how past people used, and lived on, the landscape. Several sites and isolates were recorded that span a period from the Late Archaic (3000 BP) to the mid-20th century, although settlement of the area likely occurred much earlier. Documented sites include locations for harvesting biscuitroot (*Lomatium cous*) and for quarrying chert.

Conley, Daniel and Rissa Trachman (Elon University)

[371] Investigating Market Activity at the Ancient Maya Site of Dos Hombres, Belize

Finding evidence of an ancient Maya marketplace is difficult due to the perishability of telltale materials such as food, textiles, and wooden stalls in the tropical environment of northwestern Belize. Therefore, multiple lines of evidence including material culture, stratigraphy, soil chemistry, and spatial analysis are essential in identifying possible market activity areas. An area hypothesized to be an area of market activity at Dos Hombres was tested through analysis of landscape features, systematic excavation, and phosphorus testing of soils. In a 20 by 20 meter area adjacent to the large and publicly accessible Plaza A, six 1 X 1 meter units were excavated systematically. Stratigraphic analysis revealed a shallow clay matrix that evened the ancient activity surface over bedrock and a very high density of ceramic sherds, lithic debitage, obsidian flakes, faunal items, and tools. The present data suggest heavy foot traffic indicated by trampled ceramics, high quantities of small lithic flakes related to frequent re-sharpening of tools possibly for producing items for market sale, and finally, indicators of imported items, such as marine shell. This data indicates a strong correlation with the hypothesis, that this area did serve as a locus of market activity at the site.

Connell, Samuel [224] see Cearley, Daniel

Connell, Samuel (Foothill College), Niall Brady (Archaeological Diving Company), Kathryn Maurer (Foothill College) and Daniel Cearley (Las Positas College)

[224] *Castle Ballintober, County Roscommon, Ireland: The Castles in Communities Project*

The Castles in Communities program at Ballintober Castle in County Roscommon, Ireland has been studying the construction sequence of the castle and the newly discovered deserted medieval village in the hinterlands. As we work with the community of Ballintober we are faced with a conundrum of how best to present our results as they conflict with the locally promoted idea that the castle was constructed by the Irish O'Conor clan in the 13th Century rather than the Anglo-Norman baron Richard DeBurgh. However, we do argue that by re-taking the castle from the Anglo-Norman invaders the Irish were mounting a formidable resistance to colonial rule. Results show a vibrant community and intensive Irish re-building efforts well beyond the Pale. This paper addresses questions of heritage construction and working with communities to research important aspects of resistance to colonial power.

[256] *Chair*

Connolly, Rory (Universidad de La Laguna), Margarita Jambrina-Enríquez (Instituto Universitario de Bio-Organica Antonio Go), Antonio V. Herrera-Herrera (Instituto Universitario de Bio-Organica Antonio Go) and Carolina Mallol (Instituto Universitario de Bio-Organica Antonio Go)

[417] *Molecular and Isotopic Analyses of Charred and Uncharred Sediments: Investigating Environmental Signatures at the Middle Palaeolithic Rock Shelter of Abric del Pastor (Alcoy, Spain)*

Our understanding of Late Pleistocene Neanderthal habitats is largely based on anthracological and palynological reconstructions set within broader global climatic frameworks. This approach has yielded important environmental information, however, so far it has not been possible to identify fluctuations in climate or vegetation at less than a millennial scale. At this resolution it is difficult to investigate localised microclimates or econiches which could have been favourable to human occupation during periods of global climatic downturn. This represents a considerable drawback to the study of Neanderthal environmental interactions and the role of climate in Neanderthal social and cultural evolution. Molecular and isotopic analyses of sedimentary organic matter, in particular charred sediments from archaeological combustion features, represents a promising avenue of research for investigating palaeoenvironmental dynamics at a high spatial and temporal resolution. Here we present preliminary results from Abric del Pastor, a rock shelter in the Alcoy region of Spain which has yielded evidence for multiple Neanderthal occupations. Molecular and isotopic analyses of both charred and unaltered sediments, is coupled with soil micromorphology to provide high resolution palaeoenvironmental signatures framed within a broader reconstruction of site formation processes.

Connor, Kimberley (Stanford University)

[83] *Immigrant Diets and the Making of Australia*

In Australia, Casella and Fredericksen have argued, places of confinement have a disproportionate importance in the national mythology because they are material representations of classic Australian heroes: the convict, the outlaw, and the larrikin. Criminal or mischievous acts are recast as rejecting an unjust social system or an imperial oppressor. By differentiating themselves from their English antecedents, Australians are able to create a unique identity. That institutions of immigration are now part of the commemoration process is somewhat ironic, since in the nineteenth century they were designed to promote, and even enforce, the reproduction of English norms in the colonies. Using the case study of the Female Immigrant Depot (1848-1886) housed in Hyde Park Barracks, Sydney, this paper discusses attempts to shape and condition the diet of the emigrant working classes through institutions of immigration. In the depot, the inmates' diet became a reflection of ruling class imaginaries for what the labouring masses should eat and, by extension, how they should behave. At the same time, faunal analysis suggests the limited success that the authorities had in controlling diet within the institution and highlights the strategies inmates used to resist the regulations imposed upon their food and their lives.

Conolly, James (Trent University) and Daniel Smith (Trent University)

[73] *An Updated Radiocarbon Chronology of the Middle to Late Woodland Transition in Southern Ontario: Regional Variation in the Dynamics of Cultural Change*

The Middle to Late Woodland transition in southern Ontario extends over approximately 500 years and encompasses several changes in subsistence and settlement patterns, ritual practices, and ceramic and lithic

crafting traditions. The last major review of the radiocarbon chronology related to these changes was over 20 years ago. New data combined with methodological advances in analytical modelling of radiocarbon dates encourages the revisiting of the chronology of this period to build on our understanding of patterns of change. In this paper I update the radiocarbon chronology of the transition, identify regional variation in the timing of key elements of cultural change, and discuss how the patterning informs understanding of the emergence of Late Woodland village communities during the twelfth century.

Conrad, Cyler [9] see DeSilva, Upuli

Conrad, Cyler (Los Alamos National Laboratory)

[419] Ancestral Pueblo Turkey Management on the Pajarito Plateau (C.E. 1150-1600)

In this paper we use bone apatite and collagen stable isotope analysis to examine long-term Ancestral Pueblo turkey management strategies on the Pajarito Plateau in the northern Rio Grande of New Mexico. Since previous preliminary research within this region identified the presence of domesticated turkeys (aHap1) consuming C4-based diets (presumably maize) during the Coalition period (C.E. 1150-1300) at the multi-room pueblo site of LA 4618 (Rawlings and Driver 2010; Speller et al. 2010), our analysis takes a diachronic approach by investigating three main questions: 1) Do Coalition Period turkey diets from additional sites on the Pajarito Plateau match the pattern found at LA 4618?, 2) Do turkey diets change overtime between the Coalition to Classic Period (C.E. 1150-1600)?, and 3) Do turkey diets shift in tandem with known periods of variability in precipitation within the prehispanic northern Rio Grande? Our results suggest that turkey diets shift over time, possibly due to variability in rainfall and thus the ability to feed turkeys maize, but equifinality and the history of zooarchaeological research within this region continue to influence these results and interpretations.

[419] Chair

Constan, Connie (University of New Mexico)

[44] Ceramic Resource Selection and Social Violence in the Gallina Area of the American Southwest

This research examines the relationship between social violence and ceramic resource procurement. Do people in middle-range societies alter resource use in response to conflict? Specifically, does social strife influence the distance to which potters in middle-range societies will travel to collect ceramic resources? Distance and quality are primary elements in clay selection. Pottery production occurred throughout the American Southwest under conditions of pervasive conflict in the 13th century A.D. Conflict in the Gallina area is evidenced by defensive architecture, such as towers and cliff houses, burned structures with human remains, and human remains with embedded projectile points and skull trauma. Two sites in the Gallina area were chosen, one with a defensive setting and architecture the other with an open site plan and no defensive structures. Ceramics from each of the sites and the clay resources in proximity to the sites were examined to see if conflict affected resource selection. Numerous field and laboratory analyses provided information about the mineralogy, chemistry, and performance characteristics of the available clays and the ceramics themselves. The combined results of the laboratory tests, mineralogical studies, and chemical comparisons indicate that Gallina potters did not alter their resource selection in response to social violence.

Contreras, Daniel [154] see Grillo, Katherine

Contreras, Daniel (University of Maryland)

[315] Is 'Dates as Data' Just a Zombie? Breathing New Life into Radiocarbon Summaries by Assessing Local Landscape Taphonomy

A rapidly growing corpus of examples demonstrate that the 'dates as data' approach to archaeological radiocarbon assemblages that John Rick pioneered still shambles around the intellectual landscape of archaeology. It has belatedly spawned a variety of attempts to grapple with prehistoric demography, confronting to varying degrees some of the methodological and conceptual difficulties that John pointed out three decades ago. This paper examines one of those difficulties: the effects of taphonomic processes on use of radiocarbon dates as a population proxy. We show that the widely used global correction can be misleading, and demonstrate an improved spatially-explicit method that synthesizes local geomorphic data to weight dates by the relative frequencies of landforms of varying ages.

[315] Chair

Cook, Anita (Catholic University of America)

[250] Discussant

Cook, Emma

[124] A Brief History of Apache Occupation at Chiricahua National Monument

Chiricahua National Monument, located in southeastern Arizona near Willcox, holds evidence for thousands of years of Native American occupation. Relatively recent in this timeline is occupation by the Chiricahua Apache. Up through the 19th century, the Chiricahua Apache ranged over a significant part of the Southwest, including northern Mexico, southwestern New Mexico, and southeastern Arizona. Chiricahua National Monument, as well as the surrounding Chiricahua and Dragoon mountains, are strongly associated with the Chiricahua Apache. This importance was recognized by the US government, and a Chiricahua Apache reservation was formed in 1872 near the monument, lasting until 1877 when the Chiricahua Apache were forcibly relocated to the San Carlos Reservation in east-central Arizona. This poster presents the archaeological evidence of Chiricahua Apache occupation, along with historical records and oral histories, within and around Chiricahua National Monument. Recent archaeological investigations focusing on the Chiricahua Apache have uncovered artifacts pertaining to subsistence, material wealth, raiding, and warfare. The National Park Service, along with archaeologists, historians, and indigenous scholars, has worked to rediscover the material details of Chiricahua Apache life during the 18th and 19th centuries.

Cook, Gordon [111] see Hamilton, Derek

Cook, Katherine**[87] Digital Communities of Learning: Bridging Technology, Pedagogy, and Community-Engaged Practice**

At the junction of contemporary approaches to digital and community-engaged scholarship, there is an augmented spirit of openness and collaboration that has the potential to reconfigure authority, ownership and power in connecting with the past by transforming digital training and capacity building. However, the complexities of ethics, digital literacies, protection and inequity also raise difficult questions about what learning archaeology should look like in the 21st century, for students, professionals, and communities alike. This paper will use case studies developing hybrid interventions in public archaeology through collaborations between students, museums and descendant communities to draw inspiration from the ways in which maker culture(s), hackathons, and coding communities can be deployed in combination with critical inter-community dialogue, digital literacy training, and community outreach to disrupt traditional archaeological practice, education and dissemination. These experiences demonstrate the value of the process of doing collaborative digital archaeology as dynamic and meaningful opportunities for collective and inclusive teaching and learning. A critical assessment of the practicalities, infrastructure, and disciplinary structures that create both opportunities and barriers to building diverse and inclusive communities of learning is pivotal to re-envisioning publicness, openness and collaboration to decolonize the digital and make contemporary archaeology innovative but sustainable.

[177] Discussant**[87] Chair****Cook, Michael (Michigan State University) and Kurt Rademaker (Michigan State University)****[285] Raw Material Sourcing of Two Terminal Pleistocene Sites in Southern Peru**

I present a raw materials analysis from two terminal Pleistocene-aged sites in southern Peru: Quebrada Jaguay 280 (QJ-280) and Cuncaicha. Each site's debitage assemblage contains multiple lithic raw material types, including obsidian, chalcedony, petrified wood, jasper, and andesite. While the obsidian has been sourced to the highland Alca volcanic field, no formal provenance studies have been previously undertaken for the non-obsidian raw materials. Our team carried out field survey of the mid-altitude Pampas region between the coast and highlands, and discovered a vast lithic landscape with primary reduction and workshop sites. We identified and sampled over 20 different types of silica rocks naturally cropping out. I then classified the raw materials comprising both the QJ-280 and Cuncaicha debitage assemblages. When compared with geologic hand specimens from the Pampa outcrops, a majority of the identified raw materials appear at one or both sites indicating that both highland and coastal populations were utilizing the mid-altitude region for lithic procurement. This poster summarizes the non-obsidian raw materials at both sites and suggests their likely source locations. The combination of newly identified sites and raw material sources allows for improved regional path modeling and strengthens our understanding of the Terminal Pleistocene coastal-highland connection.

Cook, Robert [168] see Hinkelman, Sarah

Cook, Robert (Ohio State University)**[348] Migration and Ethnic Hybridity: Examining the Middle Ohio Valley Mississippian Periphery**

Recent research on the Fort Ancient culture of the Middle Ohio Valley has considerably improved our understanding of the motivation for and subsequent role of Mississippian migrations along a Mississippian periphery. A plethora of new radiocarbon dates on multiple media, strontium and biodistance analyses of human bone, and PDSI reconstructions of climate change have allowed for new insights into the origins of Fort Ancient culture in southwest Ohio and southeast Indiana. In short, Mississippian migrants appear at the onset of the cultural tradition in this area, around the time when prolonged droughts were occurring in neighboring Mississippian regions. The migrants (identified biologically) are accompanied by clear examples of Mississippian pottery (plain, shell tempered, Ramey) and housing forms (wall trenches). Moreover, closely following these events, we see the development of hybrid pottery forms that blend aspects of the new and old (Woodland) traditions into what we have long recognized to be

Fort Ancient.

[348] *Chair*

Cook Hale, Jessica (University of Georgia)

[240] “...As the Waves Make Towards the Pebbled Shore”: Site Formation Processes on Drowned Coastal Sites and Implications for Preservation, Discovery, and Interpretation

Submerged prehistoric sites left behind by coastal groups have the potential to answer multiple critical questions concerning human activities, but locating, excavating, and interpreting such sites brings with it challenges unlike those encountered in coastal settings that remain (for now) terrestrial. Without a firm grasp of estuarine and marine sedimentological processes, archaeological investigations will lack interpretive rigor. Just as we extend the paleolandscapes onto the continental shelf, so we must also extend geoarchaeological methodologies. To illustrate this point, I present here two case studies that demonstrate how these aquatic processes act on features and artifacts: one sedimentological in nature, and the other geochemical. The first case study examines the effects of two hurricanes on features within a submerged, formerly coastal site; the second addresses geochemical corrosion on lithics deposited in fresh, brackish, and saltwater contexts. Each case study also highlight potentials for additional datasets associated with relative sea level changes and climate changes.

Cool, Autumn (PaleoWest Archaeology) and Rebecca Schwendler (PaleoWest Archaeology)

[400] Civilian Conservation Corps Archaeology and Preservation Near Castle Rock, Colorado

In 1934, Civilian Conservation Corps (CCC) Camp DPE-203-C/SCS-7-C was established along McMurdo Gulch near Castle Rock, Colorado. Over the next seven years, CCC enrollees dramatically transformed the surrounding landscape with diverse water and erosion control features. The conservation techniques the CCC shared with local farmers and ranchers overhauled agricultural practices and reinvigorated the Depression-era economy. Today, suburban housing developments are encroaching on this historic vernacular landscape. Since 2014, PaleoWest Archaeology has worked with SLV Castle Oaks, LLC (SLV), the U.S. Army Corps of Engineers, and the State Historic Preservation Officer to record and preserve the remains and legacy of CCC Camp DPE-203-C/SCS-7-C. Combining archaeological inventory, historical research, engineering drawings, and public education, PaleoWest has identified the camp and dozens of features and guided preservation and interpretation efforts. Extensive and complex, these CCC features should not be considered mere remnants of the past, but integral elements of the modern landscape.

Cooley, Delaney (University of Oklahoma)

[80] Athapaskans on the Plains: A Glimpse of Dismal River Lithic Technology

Recent interest in early Athapaskan population movements has led to the reconsideration of Dismal River sites on the Central Plains during the mid-16th to 18th centuries. Although most archaeologists recognize Dismal River people as ancestral Apache, an unclear archaeological record and outdated evidence has led to continued debate. New syntheses of Dismal River chronology, ceramic technology, architecture, and subsistence supports an Athapaskan affiliation. However, lithic data are missing from recent discussions. I examine evidence for lithic procurement and production at three Dismal River sites in Scott County, Kansas, and relate my findings to broader discussions of Dismal River identity and Athapaskan communities across North America.

Cooney, Kathryn

[142] Do Women Rule Differently? Lessons from the Ancient Egyptian Patriarchy

Historians often make blanket assumptions that female kings of Egypt ruled differently from men. Hatshepsut is often said to have been a pacifist, not leading her country into invasions abroad. Cleopatra's rule has been characterized as drama-seeking, manipulative, not to mention hormonally imbalanced in the writings of countless Classicists and historians. Nefertiti is remembered as nothing more than a pretty face, but if recent Egyptological investigations are correct, she was much more than that. But did (and do) women really rule differently from men? Is it sexist to even ask this question? And what should we expect from these rulers who are only placeholders and stopgaps in an authoritarian, patriarchal system like ancient Egypt?

Cooper, Aspen (University of Minnesota-Twin Cities), Gilliane Monnier (University of Minnesota-Twin Cities), Elisabetta Boaretto (Weizmann Institute of Science), Carolina Mallol (Universidad de La Laguna) and Gilbert Tostevin (University of Minnesota - Twin Cities)

[321] Fire or Stone? Applications of Infrared Spectroscopy and the Grinding Curve Procedure to Differentiate between Pyrogenic and Geogenic Calcites at Crvena Stijena Paleolithic Rock Shelter, Montenegro

It is becoming ever more clear that cooperative efforts amongst researchers trained in a wide variety of archaeological and geoarchaeological specialties during the planning, excavation, and interpretation of an archaeological site are crucial to a successful study. Middle Paleolithic deposits in Level XXIV of the rock shelter at Crvena Stijena, Montenegro are the focus of such a team-based approach, which includes new microarchaeological methods to understanding site formation processes and hominin pyrotechnology. The idiosyncratic nature of cave and rock shelter sites can make their history, structure, and functions difficult to reconstruct. This is especially true when interpreting the evidence for pyrotechnological activities, which has been subject to diagenetic processes. Application of the grinding curve methodology to Fourier-Transform Infrared (FTIR) spectra of calcitic sediments (Regev et al. 2010) and analyses of sediment samples from micromorphology blocks have yielded encouraging results, enabling the differentiation between geogenic and pyrogenic calcites. This is particularly useful when trying

to reconstruct site formation processes, in addition to providing information on site use patterns and offering insight into Neanderthal behavior.

Cooper, Jason (WSDOT)

[366] Neolithic Tales from the Eastern Mediterranean Basin: A Graduate Student's Experience under Dr. Alan H. Simmons at the University of Nevada Las Vegas in the 1990s

The Las Vegas Valley in southern Nevada experienced unprecedented growth in the 1990's. The University of Nevada, Las Vegas (UNLV) was not immune to this progress and as a result began to attract the attention of top researchers, professors, and graduate students out west. The moment I arrived at UNLV in January 1994, through my graduation in 1997 and subsequent participation on several fieldwork efforts that crossed Y2K, Dr. Alan H. Simmons generously afforded me countless opportunities to better myself as an archaeologist and anthropologist. From the Hashemite Kingdom of Jordan (Wadi Shu'eib and Ghwair I) to the island nation of Cyprus (Kholetria Ortos), evidence of a complex Neolithic package emerged across the Eastern Mediterranean Basin in various ecological landscapes. Dr. Simmons taught me many things in both the classroom setting and in the field, but no more important than not to drink his cognac when he wasn't looking even though it was Christmas. And the other important life lesson I learned from Alan, don't ever house sit for a professor on sabbatical.

Cooper, Leslie [362] see Bollwerk, Elizabeth

Cooper, Zachary, Damien Marken (Bloomsburg University of Pennsylvania) and Douglas Perez (Universidad de San Carlos, Guatemala)

[113] Woot There It Is: Ground-Truthing LiDAR Survey Results at El Peru-Waka', Petén, Guatemala

In 2016, a 91 square kilometer lidar survey was completed of the region surrounding the Classic Maya center of El Peru-Waka', as part of the PACUNAM LiDAR Initiative. Visual analysis was then conducted from 2017-2018 by members of the Waka' Archaeological Project (PAW) to identify new and previously recorded structures and other settlement features visible in the LiDAR DEM. During the 2018 PAW field season, pedestrian ground-truthing of a 30 km section of the LiDAR DEM was carried out to confirm the earlier visual analysis. Over the course of the field season, the ground-truthing team was able to visit 126 groups to the west and south of the El Peru-Waka' site core. Although many features were clearly visible in the LiDAR data, the survey team also recorded numerous false positives and false negatives. This poster will present the preliminary results of this research and the impact of false positives and false negatives on evaluating structure density estimates based on LiDAR surveys in the Maya lowlands.

Cooper, Zachary (University of Colorado, Boulder)

[311] Fields, Shrines, and Paths—Ancestral Tewa Landscape Usage at Cuyamunge

Over the past five years, collaborative work between the Pueblo of Pojoaque and the University of Colorado, Boulder at the ancestral Tewa site of Cuyamunge has revealed a network of agricultural fields, shrines, and paths. Studies suggest that shrines have been used as a centerpiece of Puebloan ritual observances for at least 4,000 years. Given the richness and complexity of the Tewa shrine system, this paper addresses only the archaeologically identifiable shrines located within the boundaries of Cuyamunge. I use ethnographic knowledge derived from many years of collaboration with members of the Pueblo of Pojoaque as a basis for interpreting the relationship between agricultural fields, shrines, and paths. More specifically, I identify patterns in the archaeological record that reflect explanations rooted in Tewa ethnography for both shrine selection and placement within the village itself.

Copeland, Sandi [419] see Conrad, Cyler

Copeland, Steve (Crow Canyon Archaeological Center) and Shanna Diederichs (Crow Canyon Archaeological Center)

[86] The Indian Camp Ranch Community: a Two Hundred Year-Long History of a Basketmaker III Community in Southwest Colorado

Basketmaker III is a formative period in Ancestral Pueblo history but has rarely been researched at the settlement level. Crow Canyon Archaeological Center's Basketmaker Communities Project investigated a concentration of 79 Basketmaker III sites in a square kilometer area of southwest Colorado and found evidence of an intentionally organized community. Results suggest this community was founded by immigrants and integrated by group ritual at a central great kiva. This paper presents the history of the Indian Camp Ranch (ICR) community from its inception in the late sixth century A.D. to its fluorescence in the early eighth century A.D.

Coppinger, Raymond [352] see Lord, Kathryn

Corbett, Debra [269] see Funk, Caroline

Corcoran Tadd, Noa (Harvard University)

[143] Continuity and Hiatus in the Archaeology of Mobility: A Case Study from Southern Peru/Northern Chile

Despite excellent work in the field over the past two decades, the tensions between continuity and rupture in archaeological accounts of the colonial 'transition' in the Andes have tended to remain under-theorized. Drawing on recent fieldwork in Tacna (southern Peru) and Arica (northern Chile), I explore a case study focused on the Inca tambo (waystation) and its afterlife during the colonial period. As a key Inca institution that would be adopted and remade as part of new colonial regimes of mobility, the tambo offers interesting possibilities for exploring the transition. Yet the tambos in the research area were primarily built in the 15th and 19th centuries and apparently separated by a substantial hiatus of several centuries. This absence drove methodological changes towards a wider spatial scale of analysis and a refinement of survey resolution to pick up other traces of the early colonial period. This discussion raises wider questions in turn both about the ways we engage with multiple temporalities and about our relationships with other disciplinary perspectives on the Inca and colonial periods.

Corcoran Tadd, Noa [315] see Zori, Colleen

Cordell, Ann S. [298] see Duke, C. Trevor

Cordell, John [89] see Doershuk, John

Cordero, Maria-Auxiliadora (University of Pittsburgh)**[29] Looking for Sites in All the Wrong Places: Finding Evidence of Preceramic Occupations in Northern Highland Ecuador**

J.S. Athens and colleagues recently published evidence of early maize (6,600 CAL BP) from a lake core in northern highland Ecuador. Deposits with maize phytoliths and pollen were interspersed with ash layers from volcanic eruptions. The various geological processes that have shaped the environment would have had a great impact on the people growing corn in the region, and on their dwellings or campsites. Thus early sites are difficult to find. The usual reconnaissance and survey methodologies rarely turn up evidence of preceramic materials, which would be deeply buried or obliterated by landslides, volcanic ash, and other volcanic debris. The identification of the earliest remains in the region usually happens by serendipity. J.S. Athens's work inspired me to embark on a project (assisted by a geologist) designed to identify possible sites that may reveal the presence of those early horticulturalists. My recent fieldwork, which aimed at finding those kinds of remains, has uncovered lithic materials not associated with ceramics that may be an indication of early sites.

[350] Chair

Cordero, Robin (Office of Contract Archeology, Univ. of New Mexico)**[20] The Effects of Sedentism and Increased Agricultural Production on Migratory Bird Flyways: A Case Study from the American Southwest**

Recent studies in avian biology have highlighted the plasticity of avian migratory flyways and location of wintering grounds for a range of taxa in response to agricultural production. This research provides a test of these studies to assess if pre-contact migrations in the American Southwest could have caused a shift in the wintering grounds of migratory birds along the Rio Grande Flyway. Prior to the 13th century, Puebloan farmers residing along in the Middle Rio Grande Valley of New Mexico resided in small, dispersed hamlets. Crop production appears to have been limited primarily to gardens. Towards the end of the 13th century, the Middle Rio Grande Valley saw a significant increase in Puebloan farmers migrating into the Albuquerque valley and settling on the Rio Grande floodplain in communal structures with up to 1,200 rooms. This shift in settlement patterns resulted in one of the densest concentrations of people and agricultural fields in the Eastern Pueblo region. This research will demonstrate how this change in settlement patterns resulted in a significant shift in the wintering grounds of birds long the Rio Grande Flyway.

Cordova, Carlos**[38] Long and Short-term Lacustrine and Fluviolacustrine Dynamics in Relation to Prehistoric Settlements: The Case of Lake Texcoco**

Despite the existence of archaeological data from surface surveys and excavations, the extent and dynamics of the lake and its shores over time are poorly known. Archaeological works often refer to a model of distribution of the Basin of Mexico's lakes that is to a large extent fixed the time of the conquest (1519-1521) on or models that are erroneous. Geomorphological, sedimentological, archaeological, and historical data reveal that the levels of the lake were highly variable on a seasonal, decadal, and centennial basis. This paper examines some lacustrine and perlacustrine localities that reveal several problems often ignored such as low lacustrine sedimentation rates, recent advance of deltaic lobes, and a very low topographic gradient that hinders the definition of features such as paleoshores and paleobeaches.

[38] Chair

Cordova, Carlos [320] see Vyazov, Leonid

Cordova, James (University of Colorado, Boulder)**[243] Flowers and Floral Imagery in New Spain's Visual Production and Religious Spaces**

Colonial Mexican portraits of priests, nuns, and children donning elaborate floral trappings indicate their subjects' holiness and connect Euro-Christian and Mesoamerican ideas of sacredness, nobility, and a propitious afterlife. Their rich visual display explicitly highlights the virtuousness and unblemished souls of their subjects, and, in the case of funeral portraits, they must have signified a heavenly afterlife. Similarly, many murals in early colonial Mexican churches and convents highlight floral imagery and conjure a paradisiacal garden that links Euro-Christian and Mesoamerican ideas of an afterlife set in a garden or flower world. This paper examines these connections and argues that indigenous painters (*tlacuilos*) and flower artists (*xochimanque*) worked with priests and nuns to create these cross-cultural works. Furthermore, taking a cross-cultural perspective allows us to consider colonial-era flowery trappings and floral murals as more than simple representations of religious individuals and paradisiacal settings, but also as visual devices that could activate the sacredness of individuals and religious settings. In these cases, some key aspects of the indigenous Flower World overlapped in a visually harmonious manner with Euro-Christian concepts of flowers, the "odor of sanctity," and the heavenly afterlife.

Coren, Sophia [58] see Dorr, Lana

Corl, Kristin [263] see DeBry, Robert

Corl, Kristin (University of Texas at San Antonio)**[413] Community Identity in the Jornada: Untangling Patterns of Aggregation and Abandonment at Cottonwood Spring Pueblo (LA 175), an El Paso Phase Village**

Ongoing excavations at Cottonwood Spring Pueblo (LA 175) suggest population aggregation within the El Paso Phase (A.D. 1300-1450) Jornada Cultural Region may have consisted of distinct self-identified groups integrated into one multi-ethnic community. Comparing the excavations at Area A, a large plaza orientated pueblo, and Area E, a series of linear pueblo room blocks, a number of significant differences in construction, use, and abandonment activities have become apparent using room comparisons. I explore these identifying differences through the case study of Room 3 Area A and Room 1 Area E at Cottonwood Spring Pueblo. Many differences seen within Cottonwood Spring Pueblo such as layout, wall and room construction, frequencies of ceramic types, depositional artifacts associated with room closure and structural abandonment can be seen on a larger scale between El Paso Phase Pueblos located on either side of the San Andres/Organ Mountain divide. Cottonwood Spring Pueblos' location, straddling a cultural boundary between the Jornada and Mimbres branches of the Mogollon, indicates differences within this multi-ethnic aggregated community will be important to understanding population aggregation and social identity during this late Pueblo period across the region.

Cornelison, John [325] see Carmody, Stephen B.

Corona-Martínez, Eduardo [56] see Arroyo-Cabral, Joaquín

Corona-Martínez, Eduardo [88] see Aguilar, Felisa

Corrales-Ulloa, Francisco (Museo Nacional de Costa Rica)**[314] Long-Distance Contacts along the Coast of Greater Chiriquí**

The location of the Greater Chiriquí archeological region in southern Central America and the available and valuable resources in it (gold, coastal resources) were favorable for the emergence of a complex society that interacted with long-distance contacts for the acquisition of exotic goods. I highlight several places within Greater Chiriquí that were important for navigating along the Pacific coast and that could have been points of reference for longer distance movement. Among these are: Caño Island, Burica Peninsula, and the islands of the Gulf of Chiriquí. The role of islands as a "port of trade" where exchanges between different ethnic communities were made without entering the main centers of power on the mainland have been considered as a possibility. Likewise, our current data from the two proposed subregions of the Greater Chiriquí (Chiriquí and Diquís) indicates two different preferences regarding the origin of extraregional ceramics: Chiriquí with Gran Coclé in Central Panama and Diquís with Guanacaste in northwestern Costa Rica. While it is true that there is relatively little evidence of long-distance contacts in Greater Chiriquí, the examination of its geographical location and extraregional contacts can contribute to the understanding of those.

Corrales-Ulloa, Francisco [330] see Núñez-Cortés, Yajaira

Correa, Glauco Constantino [268] see Correa, Letícia

Correa, Letícia (University of São Paulo), Glauco Constantino Correa (University of São Paulo) and Astolfo Araujo (University of São Paulo)

[268] *Archaeological GIS Approaches to a Regional Analysis in São Paulo State, Southeastern Brazil*

Being a science that intends to understand the past through artifacts, Archaeology tends to make inferences about human behavior assessing historical events with reference with time and space. Considering that the results of archaeological studies are rich in spatial information, the use of Geographic Information Systems (GIS) seems to be an excellent combination between technology and archaeological data. This presentation seeks to explore some of the resources of GIS applied in archaeological sites located in São Paulo State, in southeastern Brazil, as a powerful analytical tool for understanding the occupation of groups in a potentially promising area, but still little considered in Brazilian Archeology. Fully aware that these constructs are purely theoretical, those tests of empirically data can be used to verify if the patterns in the simulation match the patterns in the data, and that can be helpful to support explanatory hypotheses.

Cortegoso, Valeria [364] see Barberena, Ramiro

Cortes-Rincon, Marisol (Humboldt State University), Jeremy McFarland (Humboldt State University), Jonathan Roldan (Humboldt State University), Cady Rutherford (University of Texas at San Antonio) and Spencer Mitchell (University of Santa Barbara)

[30] *Ancient Maya Mobility: Hinterlands Sacbe Systems*

This paper will discuss investigations of two sacbeob in the hinterlands in northwestern Belize. These features connect ancient Maya household groups, aguadas, quarries, terraces and ritual features. The study of ancient causeway systems is crucial to the understanding of mobility, sociopolitical, and economic networks in the hinterlands. The dataset was analyzed in ArcMap 10.5.1 to evaluate the placement of these cultural features on the landscape. The use of LiDAR and photogrammetry technology allowed for classification and post-processing of data that revealed a massively modified landscape and enhanced our research capabilities. The analysis included spatial relationship between nearby settlements, hydrological innovations, landscape modifications, and energetic breakdown of construction methodology and labor estimates.

Cortes-Rincon, Marisol [113] see Morse, Stanton

Cortes-Rincon, Marisol [371] see Rutherford, Cady

Cortez, Carmen [146] see Pacheco-Cobos, Luis

Cory, Mackenzie [49] see Herrmann, Edward

Cory, Mackenzie (Indiana University)

[216] *Modeling Diachronic Paleoindian Landscape Use in Indiana: A Spatial Analysis of State-Level Data*

In this paper, we expand upon our analysis of all recorded early Paleoindian sites in Indiana by incorporating spatial data from middle and late Paleoindian sites. Our analysis of both site locations and least cost paths between tool stone resources and sites with identified raw material types indicates that temporal differences exist for where Paleoindians placed themselves on the landscape. Due to changes in professional reporting standards through time, our site data often require individual evaluation to determine landform location, artifact typologies, and raw material types. Where applicable, we make use of gray literature to provide additional data and site context or to check that the provided data are correct. Our findings are part of a long-term project to construct a Geographic Information Systems database of Paleoindian sites that can be queried for data relevant to a better understanding of the Paleoindian presence in Indiana. We hope that the project can collaborate with similar projects in surrounding states.

[216] *Chair*

Cosgriff-Hernandez, Meghan-Tomasita (Defense POW/MIA Accounting Agency), Dane Magoon (Defense POW/MIA Accounting Agency) and Ryan Taira (Defense POW/MIA Accounting Agency)

[129] *Getting the Job Done: Case Resolution in the Field, from Investigation through Recovery, at Site GM-05585, a Low-Angle B-17G Crash Site in Sachsen-Anhalt, Germany*

The DPAA case resolution process involves a number of important steps that occur before a recovery team is sent into the field to excavate an incident site, and typically includes a combination of historic research, witness interviews, field investigations, and archaeological survey. The goal of this process is to identify and formally evaluate each potential recovery target, which serves to establish well-defined excavation objectives. In addition, the specific attributes of each site are continually revealed in more detail with every successive field effort. The sustained investigation and recovery work conducted at Site GM-05585, associated with the loss of a B-17G bomber over Germany in November of 1944, provides an excellent example of this iterative process, during which the site was transformed from a simple dot on a map to a well-defined archaeological entity, detailed through the integration of high-resolution field data and historic aerial imagery. Following field investigation work conducted in

2010 and 2011, which led to the initial identification of the low-angle site, Site GM-05585 was successfully excavated and closed during the course of three recovery missions conducted during 2015 and 2016. These efforts led to the subsequent identification of several missing U.S. service members.

Cossin, Zev, Ariel Charro (Universidad San Francisco de Quito), Jane Poss (Columbia University) and Siobhan Boyd (Gardiner Museum)

[350] Working toward Collective Benefit? Reflections on Community Based Participatory Research in Cangahua, Ecuador

The Pambamarca Archaeological Project (PAP) has conducted research in the Cayambe region of Ecuador for nearly two decades. In that time, PAP has trained scores of national and international students and actively incorporated local community stakeholders in efforts like the development of small-scale heritage tourism projects. It became clear that these efforts could be re-framed to accomplish the goals of a “community based participatory research” (CBPR) program that conducts research “with, by and for” local communities. In 2018 we laid the groundwork for a CBPR program in Cangahua to more effectively work toward those goals. From the perspectives of both project and community members, this paper reflects on the steps taken and considers the messy process that often results when attempting to push CBPR from theory into practice. In particular, we discuss the opportunities of community-driven research plans, building capacity through archaeological training of community partners, and the rich exchanges between international field school students and local organizations. Other questions remain: How does one balance the diverse perspectives, constituencies and social circumstances of local communities that are never monolithic? How do archaeologists balance methodological rigor with multivocal knowledge sets and community-driven agendas toward a practice that provides collective benefit?

Costa, Angelica (University of Central Florida), Lane Fargher (Centro de Investigación y de Estudios Avanzados de) and Aurelio López Corral (Instituto Nacional de Antropología e Historia)

[68] Embodying Collective Identity: Analysis of Late Postclassic Facial Ornamentation Practices in Tlaxcallan, Mexico

In pre-Hispanic central Mexico, communities practiced various forms of embodying social identity through the use of facial adornments. Ornaments were placed in the ears, nose, and lips to materialize aspects of both self and collective identity, such as age, gender, status, kinship, and ethnicity. Recent research at the Late Postclassic (AD 1420-1521) city of Tlaxcallan has provided insight into how facial ornamentation varied within the central highlands of Mexico. Typological analysis of ornaments and figurines recovered at Tlaxcallan and comparative examinations between Tlaxcalteca and Aztec historical documents has provided evidence to support varying embodiment practices between these groups. Despite their shared Nahua identity and close proximity, the Tlaxcalteca and the Aztecs chose to emphasize significantly different aspects of identity within their own social hierarchies. The persistent conflict and varying political organization between these communities is reflected in their embodiment practices. Thus, these objects have the potential to reveal how larger sociopolitical interactions can affect local collective identities. Additionally, it highlights specific concepts of inclusivity and exclusivity within these two societies. Through this comparative analysis, we hope to provide a better understanding of how the Tlaxcalteca and the Aztecs chose to distinguish themselves within this relatively small region in central Mexico.

Costa, August [108] see Evans, Amanda

Costamagno, Sandrine [403] see Christensen, Lauren

Costello, Andrew

[271] Wicked Problems in Archaeology: Applying a Social Impact Framework and Entrepreneurship Mindset to Cultural Heritage Management

Archaeologists operate within a conflicted position in the commercial business of cultural heritage management. As collaborators with industry and as players within a state bureaucracy, they are beholden to regulations and complicit in the destruction of sites. While archaeologists aim to produce practical benefits for society in general, or at the very least, minimise the impacts on heritage and communities, commercial archaeologists must recognise their position in the neoliberal framework and leverage their role to produce economic outcomes for Indigenous communities involved in commercial archaeological engagements. Archaeologists must seek alternatives to the wicked problems of inequality and disadvantage in Indigenous communities. Applying a social impact framework and an entrepreneurial mindset to cultural heritage management can produce social outcomes and systemic change, rather than focus on single-issue activities and projects. By advocating for collaborative, holistic and adaptive problem solving approaches which emphasise empathy and a more compassionate form of capitalism, archaeologists can pursue innovative solutions which close the gap on social inequality while achieving the commercial outcomes expected of them.

Costin, Cathy (California State University, Northridge)

[363] Post-Fire Incising as a Means of Controlling Esoteric Knowledge in the Andean Formative

Post-fire incision as method of surface “decoration” is extremely rare in the Central Andean region. This technique was used almost exclusively by the Cupisnique culture on the Peruvian North Coast during the Formative Period, primarily on ritual pottery. The technique was much more commonly used further north, in what is today Ecuador, where it was used on a wide variety of ceramic object types over many hundreds of years. Several Ecuadorian ritual materials and practices appear to have been adopted by the Cupisnique at the same time we begin to see other

evidence for incipient social stratification on the Peruvian North Coast. I argue that the adoption of post-fire incision – almost always overlooked by Cupisnique scholars, who focus their attention on the iconographic and formal aspects of ritual pottery – actually provides a fundamental clue about sociopolitical dynamics during the development of complex societies in the Peruvian Formative. In this paper, I show how shallow post-fire incising could have been used by Cupisnique ritual specialists to control access to esoteric knowledge related to community well-being and claims to power, privileging a small group of incipient elites in this enigmatic society.

Coupal, Isabelle (University of Montreal)

[359] Modelling the Skeleton of Future Bioarchaeological Research in Georgia

In recent years, the Republic of Georgia has fostered a growing interest for archaeological research in the Southern Caucasus region. This trend has been stimulated both by a strong local contingent of archaeologists, of two generations and of two different systems, and the increasing participation of foreign scientists. This active academic scenario is witness to a welcoming atmosphere to researchers since the fall of the Soviet Union. While collaborative international research is successful in Georgia, allowing for an unprecedented level of cutting-edge archaeological research, its current role as a meeting place for Western- and Soviet-educated scholars in the various disciplines for skeletal analysis, hinders research. In this presentation, I will outline the main research themes and methodologies specific to each intellectual tradition which has tackled skeletal and mortuary analysis in an attempt to understand how this divide was created. I will then present an assessment of the current state in the fields of bioarchaeology and physical anthropology, with examples from recent excavations. I wish to offer avenues for more thorough collaborations using decolonizing methodologies.

[359] Chair

Coutros, Peter (University of Puget Sound)

[82] Bone Tool Technology in West Africa: Contributions from the Diallowali Site System, Senegal

Worked bone has a long history across the African continent, occurring as early as the Middle Stone Age in eastern and southern Africa. However, since the beginning of the Holocene, barbed and un-barbed points – associated with the so-called 'African Aqualithic' peaking at 9,000 BP – have likewise been recovered from sites within Sahelian and Saharan zones of West Africa. Despite the ubiquity of bone implements throughout the region, the majority of documented examples occur in the central Sahara, Mauritania, and northern Mali. This has lead, unfairly, to their designation as a Saharan phenomenon. Indeed, Senegal has produced an impressive, although somewhat limited, assemblage of worked bone, most notably from the coastal shell midden of Khant. However, recent excavations at the Senegalese site of Diallowali (c. 3000 BP), have yielded an extensive assemblage of worked bone implements (n=159). In this paper, we present the analysis of the Diallowali assemblage, placing it within the broader context of trade, migration, technological developments, and shifting environmental conditions across the region.

[82] Chair

Covarrubias, Miguel [71] see Alvarez Estrada, José

Covert, Alexandra (Northern Arizona University)

[117] Some Like It Hot: Prehistoric Heat Treatment of Petrified Wood

Prehistoric petrified wood artifacts found at the Rainbow Forest Site at Petrified Forest National Park often exhibit heat treatment. Prehistoric heat treatment of petrified wood has shown significant changes in color, texture, and workability. This experimental archaeology project focused on heating petrified wood flakes in a ceramic kiln at different temperatures to determine the effects of heat treatment on color, texture, and workability. Ultimately, this project aimed to determine a temperature range and time range to heat treat petrified wood that would allow the workability to improve.

Covey, R. Alan [200] see Aland, Amanda

Covey, R. Alan (University of Texas at Austin), Robert Selden (Stephen F. Austin State University), Astrid Runggaldier (University of Texas at Austin) and Nicole Payntar (University of Texas at Austin)

[355] Geometric Morphometric Perspectives on Vessel Shape Hybridity in Inka-Chimú Ceramics

The Inka conquest of the Chimú Empire on what is today the north coast of Peru brought a region with well-established economic and political practices under the rule of a highland polity that developed under distinct social and ecological conditions. Many aspects of Inka rule in Chimú territory were adapted to the existing imperial order, and this paper discusses the aesthetic articulation of Inka ceramic shapes and decoration in pottery that was produced in existing north coast workshops. Chimú-Inka pottery has long been understood as a hybrid style that combines north coast potting traditions with Inka stylistic features, although the degree of continuity and change has never been formally described. Using data from high-resolution 3D scans of Chimú, Inka, and Chimú-Inka vessels in publicly-held museum collections, we present data from a geometric morphometric analysis to consider how selected vessel categories evolved following the Inka conquest of the north coast. Quantitative evidence of continuity and change in production practices, aesthetic features, and vessel shapes reveal new perspectives on the impact of Inka rule on ceramic production, as well as the social practices in which decorated pottery communicated status and identity.

Coward, Erin [46] see Maigret, MaryAnne

Cowell, Shannon [88] see Markle, Elizabeth

Cowell, Shannon [122] see Ferrales, Esmeralda

Cowell, Shannon (New Mexico State University)

[264] Exploring Gender, Trade, and Heirloom Micaceous Ceramics at Los Ojitos, New Mexico

Hispanic homesteaders brought Sangre de Cristo Micaceous ollas to their new homes at Los Ojitos (LA 98907), a village site occupied between 1865 and 1950 on the Pecos River in east-central New Mexico. A subset of these ceramics resembled previously identified historic-period micaceous types from northern New Mexico. However, many sherds deviated significantly from established type descriptions, reflecting local or regional trade and manufacture. The relatively low frequencies of micaceous ceramics recovered in excavations at Los Ojitos, including sherds painted with store-bought tempera paint or found in stratigraphic context with 20th-century artifacts, suggest these ceramics became harder to replace in the late 19th century on the periphery of the Hispanic New Mexican homeland. As curated heirlooms, micaceous ceramics may have taken on new meanings for women in the Hispanic New Mexican diaspora as reminders of intergenerational relationships and cultural identity, while performing as tools crucial to the maintenance of familiar domestic practices.

Cowie, Ellen [400] see Hudgell, Gemma-Jayne

Cowling, Richard [368] see Marean, Curtis

Cox, Eric (Northland Research, Inc.) and Douglas Craig (Northland Research, Inc.)

[36] Traditions and Community: Hornos and Communal Feasting among the Hohokam

Earth ovens (horns) have been documented at many sites across the Hohokam region of south-central Arizona. These features were commonly used to cook large amounts of food at public gatherings. They were part of a long-standing tradition of communal feasting that served, among other things, to promote social solidarity. Excavations by Northland Research at two Hohokam village sites in the Phoenix Basin contribute to a fuller understanding of the role of communal feasting in the emergence of the regional ballcourt system. We examine horno usage at these two sites just before the appearance of ballcourts, ca. A.D. 700-800, and just after, ca. A.D. 800-900. Similarities between Hohokam communal feasting and the living tradition of communal feasting among members of the Salt River Pima-Maricopa Indian Community are also discussed.

Cox, Kim and Whitney Cox (Rowan University)

[43] Rock Art, Cyclical Time, and Native American Religion: How Mesoamerican Concepts of Death and Rebirth Permeate the Rock Art of the American Southwest

There has been a long-running debate over the function of rock art. The authors provide a definition of prehistoric Southwest Native American religion relating to cyclical time and the cosmos and show how certain aspects of rock art in the American Southwest operate within a greater Mesoamerican ideological and religious worldview.

Cox, Randall [99] see Morrow, Juliet

Cox, Whitney [43] see Cox, Kim

Crable, Barbara (R. Christopher Goodwin & Associates) and Jack Hofman (University of Kansas)

[322] Paleoindian Intercept Hunting in the Bethel Locality, Western Oklahoma

The narrow divide between the Canadian and Washita rivers in west central Oklahoma is the location of multiple historic transportation routes. The Rock Island Railroad, U.S. Highway 66 and Interstate Highway 40 all parallel the route of the early historic California Road. These routes followed a game trail which was a focus for prehistoric hunting. Prominent buttes provide overlooks while spring-fed and wooded canyons offered protected camping and hunting opportunities. This combination of landscape features along the narrow Bethel divide made the locality ideal for pedestrian bison hunting. We argue that this locality was used intensively from early prehistory through the contact period for intercept bison hunting. Here we summarize the Paleoindian evidence representing a wide variety of point types and including more than 500 specimens. Point types and lithic materials in the Bethel locality are documented as are typological classification challenges for this sample.

Crabtree, Pam [196] see Campana, Douglas

Crabtree, Pam (New York University)

- [310] *Using Zooarchaeology to Study Urban Origins in Antwerp, Belgium: Evidence from the Burcht and Gorterstraat Sites*

The development of urbanism in northwestern Europe has been of interest to medieval archaeologists and historians since the days of Henry Pirenne, and these questions have been central to anthropological archaeology throughout the 20th and 21st centuries. One of the critical features of early cities is that they are home to craft specialists and others who are not primarily engaged in farming, fishing, and other methods of food procurement. Recent archaeological research in the city of Antwerp has shed light on the earliest periods of urbanism within the city. Animal bone remains from the 8th-to-10th-century Burcht sites and the 10th-century Gorterstraat site can be used to identify the roles of animal husbandry, hunting, and fishing in the subsistence economy early medieval Antwerp. Our data suggest that hunting of animals such as red deer, roe deer, beaver and wild boar played a greater role in the earlier Burcht assemblages, and that animal husbandry and fishing played a larger role in the somewhat later Gorterstraat economy.

- [50] *Discussant*

Craig, Alexander (University of Wyoming) and Robert L. Kelly (University of Wyoming)

- [207] *Alm Shelter: A Preliminary Report on a Deeply Stratified Rockshelter in the Bighorn Mountains of Wyoming*

Alm rockshelter, located at the mouth of Paintrock Canyon in the Bighorn Mountains of Wyoming, contains a well-stratified cultural sequence spanning roughly 11,000 years (Late Paleoindian through the Late Prehistoric). Preliminary analyses demonstrate that the site was occupied and used variably over this time, particularly in periods of population growth and decline that are associated with periods of increasing and decreasing aridity. Here we present a preliminary report on the excavations, completed in summer, 2018. The focus of the research is on how use of the site changed over time in relation to changes in climate and regional population density. Increased aridity in the Early Holocene appears to have resulted in increased site use while decreased aridity resulted in a decline in activity. The current research presents the preliminary analysis of lithic materials recovered from 2014-2018 excavations.

Craig, Douglas [36] see Cox, Eric

Craig, Shiloh (University of New Mexico)

- [263] *The Cultural Importance of Obsidian in the Upper Gila Area*

Obsidian is a common flaked stone raw material in archaeological sites in the Upper Gila area of southwest New Mexico. Recent excavations at the Cliff phase Salado (AD 1300-1450+) site of Gila River Farm recovered numerous examples of flaked stone tools, projectile points, and debitage, including many obsidian examples. Previous studies have examined reasons obsidian was favored for tool making, including its relatively easy workability and the proximity of an important obsidian source area (Mule Creek) to Upper Gila Cliff phase villages. This project goes beyond these important economic considerations to more deeply examine the cultural contexts influencing why people choose to use obsidian. Drawing on ethnographic materials, historical records, and unrestricted versions of the oral histories of modern pueblo groups and other indigenous people of the region (including Apachean people) reveals a clearer picture of why obsidian was and is used in the Southwest. This approach allows us to gain a more nuanced understanding of the importance of obsidian, including developing the idea of "sacred sites" or traditional cultural properties related to raw material gathering and former ancestral ranges.

Craig-Atkins, Elizabeth [351] see Sykes, Naomi

Cramb, Justin (University of Georgia)

- [354] *Coral Islands, High Islands: A Case of Continued Contact and Cultural Divergence in East Polynesia*

Polynesian atolls are often viewed as outlying provinces or "outer Islands" as compared to larger high islands. These often remote and diminutive coral islands are, and were, home to relatively small populations. Many coral island groups trace ancestry to, and had sustained contact with, high islands. These past connections and modern sociopolitical ties make it easy to view coral islands as off shoots of larger polities, and to project the social, political, and economic forms found on high islands onto them. Manihiki and Rakahanga, in the northern Cook Islands, are coral atolls with modern sociopolitical, linguistic, ancestral, and oral-historic ties to the high island of Rarotonga in the southern Cook Islands. However, recent excavations and zooarchaeological analysis on Manihiki and Rakahanga support and further contact-era ethnohistoric accounts that suggest the in-situ development of novel sociopolitical structures, as well as innovative resource management strategies. This is manifest in the importation, differential management, and extirpation of multiple domestic taxa, as well as the cycling habitation, subsistence, and political forms that developed as the coral islanders culturally diverged from, yet appear to have remained in contact with, high island groups.

- [34] *Chair*

Crandall, James (University of Florida) and Anna Guengerich (Vanderbilt University)**[98] Spatial Temporalities and the Ritualized Remodeling of Chachapoya Architectural Space**

How social space is produced in archaeological contexts is often studied as the result of the gradual accumulation of social practices. However, as a complement to these generative processes, sudden events also have radical impacts on how space is signified, expressed, and experienced. This paper addresses recent research in the Chachapoyas region of the eastern Andes. We discuss the widespread practice of periodic remodeling within Chachapoya architectural spaces as a part of socially significant ritualized events. These events include the deposition of human remains, offerings, and the termination of floor use within architecture often identified as households, in some cases possibly with the aim of de-animating powerful household objects. These practices are discussed via recent evidence from the sites of Bovéda, La Joya, and Purun Llacta de Soloco, three of the largest Chachapoya communities. The changing nature of social space at these sites is suggestive that the eventful remodeling within Chachapoya architecture was often attuned to particular cultural temporalities and notions of value.

Crass, Barbara [10] see Wygal, Brian

Crater Gershtein, Kathryn, Reuven Yeshurun (Zinman Institute, University of Haifa) and Yossi Zaidner (Zinman Institute, University of Haifa)**[402] Zooarchaeology and Taphonomy of Unit III in the Middle Paleolithic Site of Nesher Ramla**

The Levantine Middle Paleolithic period plays a crucial role in human origins research, encompassing vast cognitive and technological developments. Faunal remains are an important source of knowledge regarding hunting patterns, reflecting both human behavior and subsistence strategies. This paper addresses questions of hunting, transport, butchery patterns and use of space as they occurred at the Middle Paleolithic open-air site of Nesher Ramla in central Israel. The site consists of a well preserved 8 m thick sequence yielding rich lithic and faunal assemblages, combustion features, manuports, and ochre. Detailed taphonomic and zooarchaeological analyses of a sample from Unit III (OSL dated ~130ka years ago) revealed an anthropogenic accumulation dominated by ungulate and chelonian taxa, associated with various combustion and other features. Prey species include mostly spur-thighed tortoise (*Testudo graeca*) and aurochs (*Bos primigenius*). Other species represented include wild equids (*Equus* sp.), and mountain gazelle (*Gazella gazella*), Mesopotamian fallow deer (*Dama mesopotamica*), wild boar (*Sus scrofa*). The new data from Nesher Ramla Unit III conforms with taxonomic patterns of Middle Paleolithic open-air sites, where large ungulates dominate. However, bone material is better preserved and more abundant than what has been observed at other open air sites in the Levant.

Crawford, Dawn (Southern Methodist University), Brigitte Kovacevich (University of Central Florida) and Zachary Hruby (Northern Kentucky University)**[255] Domestic Contexts for Chipped Stone Eccentrics in the Maya World**

While most ceremonial lithic items, or eccentrics, are found in elite burial and ritual caches, others are found in more mundane contexts, such as fill and household middens. We examine artifacts recovered from households at the sites of Cancuen, Piedras Negras, Ucanal, Tikal, among others, and explore the possible meanings of chipped stone eccentrics outside of civic-ceremonial contexts. Elaborately flaked stone implements found in domestic spaces are often formally similar to eccentrics found in public offerings, but they also differ in some key ways. A detailed technological and iconographic analysis may determine whether those found in residences can be classified as eccentrics, or perhaps should be interpreted differently depending on form and context. Diverse household contexts across the Maya region suggest that there may not be a single use or meaning of eccentric flints in domestic spaces.

Crawford, Gary (University of Toronto) and John Whitman (Cornell University)**[74] New Research Directions in the Archaeology and Linguistic History of the Hokkaido Ainu**

Research in Hokkaido since the 1980s has amassed a body of data related to ancestral Ainu material culture, settlement, chronology, and subsistence. Palaeoethnobotanical data have been instrumental in conceptualizing the Satsumon and Ainu as populations with a complex history that included dry-field (rain-fed) agriculture rather than hunting-gathering alone or the diverse mix of wet-rice and dry-field production elsewhere in Japan. This complex history, partially revealed by the history of agriculture and the dispersion of crops to and within NE Japan, involved long term, continued involvement and interactions with the rest of Japan. Furthermore, significant discontinuity marks the transition from Epi-Jomon to Satsumon so the Ainu are no longer considered an isolate of remnant Jomon (from a cultural perspective) in the Northeast. This raises issues pertaining to indigeneity, language, identity, historical ecology, and agricultural history among others. We examine the congruence of the formation of Ainu culture from the perspective of recent linguistic research with archaeological developments. Dialect comparative research indicates that the Ainu language family is relatively young, perhaps no more than 1K years. Rather than simply a surviving Jomon language, Ainu has features of a contact language or lingua franca, consistent with the non-Jomon origins of Ainu culture.

Creager, Brooke (University of Minnesota)**[50] The Key to It All: Anglo-Saxon Female Identity**

Keys are made to open locks: they are practical and necessary, so why were they deposited in Anglo-Saxon female

burials? Anglo-Saxon female identity has been tied to domesticity and family, which has been interpreted based on grave goods. Recent reevaluations of 10th c AD Scandinavian culture has revealed a more complicated gender role for women than previously imagined. The females of the early Anglo-Saxon period should be similarly reassessed. Female adult burials are found with keys deposited that pose a mystery as to their function and purpose. The interpretation generally consists of a symbolic association with the home and their role within it, thus explaining why keys are found only within adult female burials as keepers of the home and caretakers. The simple explanation of keys should be reassessed in light of their common association with amulet bundles and richer burials. This paper will challenge this traditional view with an new perspective tying the key burial phenomenon to the larger changes in female identity over two centuries.

[50] Chair

Creasmen, Pearce Paul [125] see Montoya, Daniel

Creekmore, Andrew (University of Northern Colorado)

[388] *High-Density Urban Living at Middle Bronze Age Kurd Qaburstan, Iraq*

In Upper Mesopotamia the Middle Bronze Age (2000 – 1600 B.C.E.) marked the regrowth of cities following the decline or collapse of cities at the end of the Early Bronze Age. Researchers question the degree of continuity in urban space across these periods and some have suggested that Middle Bronze Age cities were “hollow,” containing relatively small built-up areas alongside large areas of unbuilt space. In this model, powerful rulers with great aspirations built city walls around vast areas but urban growth failed to fill the space. The present study tested this model with a magnetometer survey at Middle Bronze Age Kurd Qaburstan near Erbil, Iraq. The results reveal a high density built environment with a semi-structured street plan, systematic fortifications, and a range of public and private, small-scale and monumental structures scattered throughout the city. These spatial characteristics echo Early Bronze Age urban planning, and suggest that there was socio-political, economic, and demographic continuity across time in the Bronze Age. This poster offers a tour of the Kurd Qaburstan magnetometry data that illustrates urban form, planning principles, and selected structures.

Creel, Andrea (University of California, Berkeley)

[399] *Ritual and Community on the Edge of Empire: Roadside Traditions in the Sinai*

Roadside ritual in marginal landscapes is rarely considered in archaeological literature. Yet, roadside ritual played a fundamental role in facilitating travel and constituting communities in the past. The rise of imperial hegemony bounded and funneled flows of people and material in new ways, which intensified interaction at roadside ritual sites. This talk explores the 8th century BCE site of Kuntillet 'Ajrud in the northeastern Sinai as a case study in understanding the complexities of roadside ritual in marginal landscapes under the shadow of encroaching empire. I model Kuntillet 'Ajrud as a ritual node in a potent meshwork of pilgrimage, liminality, and the suprahuman, specific to its local context in an arid and marginal landscape. My analysis traces how visibility, movement, and accessibility generated an atmosphere of ritual power and constituted community. This discussion includes the site's topography, architectural allusions to fortresses and city gates, and images and inscriptions that evoke notions of divinity, royalty, authority, music, prayer, dancing, fertility, water, life, birth, masculinity, femininity, tradition, and protection. Rather than treat rural roadside ritual as peripheral to constitutions of identity, community, and empire, I demonstrate that this phenomenon generated and sustained innovation and connectivity for local and non-local communities

Creel, Darrell [263] see Barkwill Love, Lori

Crema, Enrico (University of Cambridge), Anne Kandler (Max Planck Institute for Evolutionary Anthropology) and Clémentine Straub (ENSTA ParisTech)

[175] *An R Package for a Generative-Inference Based Cultural Evolutionary Analysis*

Since the seminal works by Neiman (1995) and Shennan & Wilkinson (2001), evolutionary archaeologists and anthropologists have been trying to infer social learning strategies by analysing the temporal frequency of different cultural variants in a population. These early applications directly employed methods developed in population genetics to test whether observed frequency distributions deviate from those expected under neutral evolution, regarded as functionally equivalent to unbiased learning. Instances of significant deviations were then regarded as evidence of alternative modes of social learning, most commonly conformist or anti-conformist biases. Recent research, however, highlighted the problem of equifinality in such cultural evolutionary studies, i.e. situations where various learning processes can result in very similar population-level characteristics. This R package implements a generative inference framework aimed at analysing which of the social learning strategies considered are consistent with the available data and which are not.

Cressler, Alan [252] see Simek, Jan

Crews, Christopher (Museum of Indian Arts and Culture) and Emily Opack (Bernice Pauahi Bishop Museum)

[89] *Na Ko'i O Wai'ahukini: Adze Size and Sources of Toolstone at Wai'ahukini Rockshelter*

The Wai'ahukini Rockshelter (H8/50-Ha-B21-006), located near South Point on the Island of Hawai'i, was initially

investigated by K. P. Emory, W. Bonk, and Y. Sinoto in the 1950s. The collection has since been curated at the Bernice Pauahi Bishop Museum in Honolulu, HI. Excavation recovered as many as 18 complete ko'i, or adzes, and many fragments. Three of the complete ko'i are small (<5 cm long), possibly intended for finish carving, or ko'i kikoni, as opposed to the larger adzes used to fell trees, till fields, or hollow out canoes. The ko'i and other stone tools and debris have been studied for their geochemical source by Lunblad et al. (2014), which determined nine sources of toolstone for the site. This research takes a closer look at the geochemical test results to determine if there are differing source localities for the small ko'i versus the large ko'i. This research is part of a collaborative project, the Kamehameha Schools Archaeological Collections Curation Program, between the Bishop Museum and Kamehameha Schools that involves interns from Hawaii curating and researching existing collections from Kamehameha Schools lands.

Crider, Destiny (Luther College)

[56] Advances in the Study Archaeological Ceramics of the Epiclassic-Early Postclassic Basin of Mexico

The Basin of Mexico survey and related archaeological projects in the region provided not only a ceramic chronology, but also a legacy of archaeological materials available for continued research. Two key goals of the Basin of Mexico survey focused on relations among settlement clusters and the character of human relations with the natural environment. With an emphasis on Epiclassic-Early Postclassic periods (Second Intermediate Phases One and Two), I evaluate some key propositions reported by Sanders, Parsons, and Santley (1979) and provide discussion from my two decades of studies of utilizing ceramic materials from Basin survey and other related projects. I provide discussion on how attribute-based study of archaeological ceramics, when combined with spatial and temporal associations, can provide a robust approach to address economic, political, and social relations among communities. Compositional studies have been developed and new methods and approaches continue to refine interpretation of production and exchange, however the complexity of Basin geological patterns require continual assessment and innovation in using sourcing data. Ceramics can inform on a range of issues from population migration, changes in cuisine, innovation and emulation in technology and crafting, and local access to clay and mineral resources on the landscape.

Crisà, Antonino (University of Warwick, Department of Classics and Ancient History)

[321] Erotic Tokens for Sex and 'Special' Services: New Spintriae from Archaeological Contexts

The project "Token Communities in the Ancient Mediterranean", held at the University of Warwick, is currently examining token production on a wide scale, assessing new finds from European museums. Roman "tesserae" (tokens) may be defined as monetiform objects produced and used instead of money in specific civic contexts. As a Research Fellow in the on-going project, I am now analyzing token circulation in Roman Sicily and exploring collections in local museums. The scope of my paper is to present the production and spread of a specific class of materials, the so-called "spintriae," or erotic tokens. Each token shows a Latin numeral on the obverse and a sex scene on the reverse, similar to those shown on Pompeii's brothels paintings. Thus, scholars interpret spintriae as tickets for admission to brothels and to obtain specific sex services. First, I will examine a record of finds from European collections, which will allow us to identify specific series and dies of spintriae. Then, I will assess some new archaeological finds from Italy and Sicily, which are extremely rare discoveries. Finally, such tokens represent a vital insight into the daily-life of the Romans, offering many data on numismatics, history, the arts, and social studies.

Crist, Walter (American Museum of Natural History)

[301] Social Approaches to Board Games in Mediterranean Archaeology

Board games in the archaeological record have only recently begun to be examined with reference to social aspects of play. When approached from an anthropologically informed perspective, board games can provide information on social change and human interaction that is otherwise not available to archaeologists. Because games function as a type of social lubricant, they help people to bridge social distance in order to build relationships that are necessary for economic, social, and political transactions. This has implications for the study of social complexity, intercultural interaction, long distance trade, and social networks that are only beginning to be understood.

The ancient Mediterranean world and its adjacent regions have produced some of the richest evidence for ancient games, but they are only beginning to be explored in this light. This paper serves as a summary of some of the work that has been done up to now and gives a social framework to the study of ancient games, ranging from Algeria to Azerbaijan and from the Bronze Age to the Byzantine Empire.

Critchley, Zachary (Binghamton University)

[250] A Decorated Bone Pendant from Patipampa

The 2018 Patipampa excavations at Huari resulted in the discovery of a wealth of remarkable artifacts with potentially far-reaching implications for our understanding of Middle Horizon iconography, including a small bone pendant from a possible gallery space. This bone pendant was noted for a carving representing the Rayed Head, an important icon which was one of the three principal figures of the Southern Andean Iconographic Series, or SAIS. This depiction has a number of notable characteristics, including stylistic variations in the rays and surface coloration made from copper and cinnabar. This paper will be an element-by-element iconographic deep dive into this depiction, tying this piece of non-ceramic art into the greater SAIS landscape and determining what insights this can provide into Patipampa's place in the greater Huari sphere of influence and beyond, including stylistic influences as well as material procurement.

Crock, John (University of Vermont)**[33] Maritime to the Max: The Keys to Success for Small Island Populations in the Caribbean**

The land-sea dichotomy has structured many historic debates surrounding coastal populations in the pre-Columbian Caribbean. Settlement, subsistence, exchange and cultural affiliation have all been measured on a terrestrial versus marine continuum which often undervalues the primacy of the sea in supporting and motivating the colonization, migration and expansion of island populations. Particularly for small island populations in the Lesser Antilles, the productivity of local marine environments is argued to have been essential for attracting and sustaining coastal populations and a highly specialized maritime adaptation is argued to have mitigated risks, including those associated with limited terrestrial resources.

Croes, Dale (Washington State University) and Ed Carriere (Suquamish Elder and Master Basketmaker)**[95] Generationally-Linked Archaeology: Northwest Coast of North America Example**

Ed Carriere and I have spent the last four years doing what is often called experimental archaeology, replicating 2,000 year old baskets from the Biderbost wet/waterlogged archaeological site east of Seattle, Washington and reporting this in our new book: *Re-awakening Ancient Salish Sea Basketry*. After pondering what and why we were doing this, Ed as a cultural expert and myself as an archaeological scientist, decided our approach was more than experimental archaeology, and beyond ethnoarchaeology and the direct historical approach. Through our lives we approached the artifacts of basketry from different perspectives and temporal directions. I focused from deep-time forward, statistically tracing ancient traditions over the course of more than 3,000 years, while Ed worked from the present backwards, initially from what he learned from relatives and museum examples and now through archaeological examples from over 200 generations of his ancestors/grandparents. After viewing ancient baskets in museums, Ed created what he calls his "Archaeology" baskets, with rows/"layers" of weaves starting with those from 4,500 to 3,000, to 2,000 to 1,000 years ago. Our work tests my hypotheses explaining on-going cultural continuity in three regions of the Pacific Northwest, and especially in Ed's inner Salish Sea region. We will show replicas.

Crosby, Hunter**[180] From Monument to Park: Early Infrastructure and Tourism at Petrified Forest National Park**

On December 6th, 1906, Petrified Forest National Monument was created under the Antiquities Act, based on President Theodore Roosevelt's recommendation that, "...the mineralized remains of Mesozoic forests...are of the greatest scientific interest and value and...that the public good would be promoted by reserving these deposits of fossilized wood as a National monument with as much land as may be necessary for the proper protection thereof." Petrified Forest would hold National Monument status until December 9th, 1962, when it would be established as a National Park. I will attempt to identify building foundations and scatters associated with early Monument and Park infrastructure through geospatial analysis, survey and historical records. I will then assign a date range to each location, associating each with the National Monument period, the National Park period, or both. Finally, geospatially situating each location within current and past Park and Monument boundaries as well as in relation to historic roads, railways and towns will allow for an analysis of the ways in which Monument and Park personnel managed the lands they were responsible for. Additionally, this analysis will shed light on how early visitors experienced the phenomenon of tourism in the Painted Desert.

Cross, Austin (Department of Anthropology, Florida State University)**[171] At What Expense? An Expended Utility Study of Bolen Projectile Points in Northern Florida**

Schott and Ballenger's (2007) work analyzing the expended utility of Dalton bifaces looked at the difference between the potential utility of an artifact and its residual utility to understand the use-wear and resharpening processes that shaped the artifact, and applied their findings to reconstructing the population-level use of the artifacts. This research applies these same methodologies to a sample of Bolen projectile points from northern Florida. I utilize various metrics of lithic analysis to study the points from a region of northern Florida where artifacts with similar temporal contexts are abundant, but actual archaeological contexts are oftentimes unable to be discerned. The goal of this study is to apply geometric morphometrics to these Late Paleoindian and Early Archaic projectile points, in order to understand larger-scale cultural behavior, potentially at the regional level, if not at least across multiple sites within the study area. Methods of analysis such as expended utility, principal components analysis (PCA), multivariate analysis of variance (MANOVA), and other similar ways of analyzing stone tool assemblages through geometric morphometrics are all applied to the Bolen assemblage used in this study.

Cross, Kathryn (Southern Methodist University)**[9] The Archaeology of Late-19th and Early-20th Century Freedman's Towns in Dallas, Texas**

In Texas, emancipation of slaves was formally announced in Galveston on June 19, 1865. In the decades that followed "Juneteenth," freed men and women established hundreds of communities across the state in search of land, loved ones, opportunity, and freedom. Such rural settlements have been the focus of both historical and archaeological research. Yet some families chose to settle the margins of cities. Dallas was once home to several Freedman's Towns. The most famous, established ca. 1869, is known only as Freedman's Town/North Dallas. This community, located in what is now the Uptown district, was largely destroyed by urban redevelopment in the 1970s and 1980s. Much like this community, the physical reminders and collective memory of many other Dallas Freedman's Towns are rendered invisible by city growth, gentrification, and displacement. For stakeholders, a multi-dimensional approach that includes archaeology, archival research, and oral history is key to understanding the lives and experiences of Freedman's Town inhabitants and their descendants, as well as the recent history of African

American groups in Dallas.

Cross, Kathryn [187] see Parfitt, Anne

Crossland, Zoë (Columbia University)

[161] Rice Cultivation and the Craft of the State

19th century oral histories from the highlands of Madagascar traced a history of sovereignty and governance through a narrative of major landscape transformation. The construction of dikes, canals and rice fields around the capital city was figured as part of the work of building the kingdom. This was an expansive and expanding craftwork that in remaking the landscape also remade relationships between its inhabitants, human and nonhuman alike. In this presentation I reflect on how this narrative sits with other formulations that have explored the development of sociopolitical complexity in relation to the construction of large irrigation works. How might attending to the craft of rice agriculture open alternate avenues for thinking through these complex relationships?

Crothers, George (University of Kentucky), Justin Carlson (University of Kentucky), Karen Stevens (University of Kentucky), Alexander Metz (University of Kentucky) and Katharine Alexander (University of Kentucky)

[312] Beyond the Big Bend: Julie Stein's Geoarchaeological Legacy in the Green River of Kentucky

Although it has been 40 years since Julie Stein's dissertation research in Kentucky, her geoarchaeological work laid the foundation for and inspired much of the interdisciplinary work that continues in the Green River today. This research includes new excavations of shell midden sites in both the lower and upper Green River, measurement of isotopic and environmental proxies as they relate to fluctuations in riverine habitats, the spatial and temporal dimensions of changing Archaic landscapes, and evidence of anthropogenic land management practices before the advent of agriculture. Julie taught us that it all starts with dirt. Assessing site formation processes through sedimentological and soil geomorphological approaches is a routine component of our current work that is Julie's legacy.

Crowley, Brooke [248] see Hixon, Sean

Crowley, Erin (University of Minnesota)

[266] A Model for Mobility in the Irish Iron Age

The Irish Iron Age (~700 BC – AD 500) has been a point of consternation for archaeologists, with large ceremonial centers but scanty settlement evidence. While, during this period, more densely populated and proto-urban settlements emerged in Britain and the European Continent, settlements in Ireland diminished in scale. It was initially proposed that the dispersed and ephemeral nature of Irish settlement was the result of demographic and/or climatic decline. New studies, however, suggest that Iron Age settlement was characterized by nomadic pastoralism rather than by collapse. In order to understand how mobility shaped Iron Age archaeology and society, this paper compares ethnographic and archaeological studies of other agropastoral and pastoral-nomadic societies, including those from the Eurasian Steppe and the highland Andes. Where comparisons to contemporary European societies have constrained our understanding of Irish communities, a broader theoretical and geographic perspective may highlight aspects of the archaeological record that have previously been overlooked. This paper, therefore, assesses and compares theoretical definitions of an archaeology of mobility and examines what features we might identify in the Irish landscape that would clarify our understanding of Iron Age settlement and socio-political organization.

[266] Chair

Crowley, Erin [289] see Dahl, Ellen

Crown, Patricia (University of New Mexico)

[245] Flying Colors: Local and Non-local Birds in Chaco Canyon Archaeological Sites

Bird species found in archaeological contexts throughout Chaco Canyon, New Mexico, include a range of local and non-local birds, as well as game and non-game birds. We analyzed the set of 5,350 identified bird bones and compared species composition to the local and regional avifaunas that we expect to have occurred ~1000 years ago in Chaco Canyon and nearby riparian and montane habitats. Species composition differed strikingly from the surrounding avifauna. For example, some abundant local birds are not present in archaeological contexts, and some rare non-local birds are present. These differences persisted after controlling for body size and local abundance, and excluding raptors, fowl, and exotic imported species. We examined the possible importance of feather color and pattern in explaining the non-randomly selected set of birds in the recovered sample. Comparison with ethnographic accounts suggests long-term continuity in species selection, likely related to feather use.

[40] Discussant

Cruz Quiñones, Jhon Percy [98] see Earle, Julia

Crume, Kierson [17] see Smith, J. Gregory

Crumley, Carole (Dept of Archaeology and Ancient History, Uppsala University)

[58] Taking Research into Action

Historical ecology offers a wide variety of resources for better contemporary management and increased well-being in the future. These can be applied at all spatial scales, from that of the planet to regions, bio-climatic zones, landscapes, and specific places. Historical ecology can help safeguard natural resources management; environmental and cultural heritage; aesthetic and spiritual values; the preservation of archives; and the stimulation of innovation.

[353] Discussant

Cruz, Heleinna (Quinnipiac University), Réka Péter (Eötvös Loránd University), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)

[126] Burning beyond Color: Analysis of Bone Calcination in Cremated Burials from Bronze Age Hungary

Trade and movement may have been great factors in the changing societal landscape of Bronze Age Hungary, leading to possible inequalities among the people. Examination of burials can help us get to know the relation between a community and their dead which may reflect social connections within the living community. The Békés 103 site located in southeastern Hungary was in use as a cremation cemetery from the Early Bronze Age through the Late Bronze Age. This study focuses on the bone color analysis of 20 human burials with differing ages and sexes. Munsell Soil Color Charts were used to objectively score the color of the bone fragments which may be able to indicate the temperature of the funeral pyre. Preliminary results suggest that subadults and females had a higher calcination percentage than adults or males, respectively. The amount of calcination amongst groups may indicate differences between mortuary practices in the Békés 103 cemetery which may reflect similar differences within society.

Cruz, Jazriel [396] see Gonzalez, Kerry

Cruz, Krysten [387] see Herrmann, Nicholas

Cruz, Patrick (University of Colorado)

[311] Survey of a Coalition Site at Pojoaque Pueblo

The area surrounding the current village of Pojoaque Pueblo has been inhabited in a series of population surges and wanings since at least the Developmental period. During this history the immediate area has been occupied by at least 4 Pueblo villages (including the modern village of Pojoaque Pueblo) all in close proximity to each other. This area has been tied by Tewa tradition to migration processes which coincide with archaeological evidence depicting the interaction of different peoples coming together. During the summer of 2017 I conducted a survey of a Coalition era village located on Pojoaque tribal lands and next to the current village of Pojoaque as part of my thesis project. This village (LA 12271) provides evidence for cultural changes taking place right at a crucial time when possible immigrants from the Four Corners were arriving and interacting with local Rio Grande peoples. The survey conducted demonstrates a Pueblo community in transition.

Cruz Antillón, Rafael [296] see Maxwell, Timothy

Cruzado Carranza, Elizabeth (Louisiana State University)

[236] The Middle Horizon Occupation of Pan de Azúcar de Nivín, Middle Casma Valley, Peru

Since 2017, the Proyecto de Investigación Arqueológica Nivín has conducted architectural mapping, limited test excavations, surface collection, and analysis of associated materials from sites located in the middle Casma Valley. The research goals are to clarify the cultural affiliation of the groups that occupied the Nivín region, examine the material expressions of cultural identity in the area, and to focus on the ways local groups articulated their material culture with broader sociopolitical phenomena in the region. Stylistic analysis of pottery fragments combined with the architectural layout indicates the presence of Middle Horizon and early Late Intermediate components at Pan de Azúcar de Nivín. Radiocarbon measurements preliminarily place the occupation of the site between 950 and 1150 CE. In this paper, I will introduce the study region, the work conducted during the last two years, and discuss preliminary results. These results are based on the attribute analysis and distribution of the ceramic fragments collected from the surface and excavations at different architectural features within Pan de Azúcar de Nivín. Finally, this research provides an opportunity to define and compare Pan de Azúcar de Nivín with other neighboring Middle Horizon and Late Intermediate Period groups, in particular the Casma.

Cruzado Carranza, Elizabeth [289] see Warner, Jacob

Csoba DeHass, Medea**[177]** *Discussant***Cua, Zaakiyah (Indiana University of Pennsylvania, Department of Anthropology)****[61]** *Discussant*

Cuba, Matthew [187] see Fenerty, Brendan

Cucina, Andrea (Universidad Autonoma de Yucatan)**[192]** *Implications of the Spanish Colonization in the Evolution of Dental Morphological Structure in Maya Populations from Yucatan*

Dental morphology among the Prehispanic Maya population has been characterized by a certain degree of stability. Isolation-by-distance models do not fit well into Mesoamerican populations, due to a relatively homogeneous dental structure. This was true also in the Yucatan peninsula, despite the fact that it did not represent a region of passage of migratory waves. Population movement and dynamics were fairly intense as a consequence of trade and political relationships. However, the entry of foreigners from different parts of the world since the Spanish colonization has slowly led to changes in the morphological structure of the dentition. Here, data on dental morphology and anatomical variants from Prehispanic, colonial and modern populations from the northern Lowlands are presented. Prehispanic collections are representative of local people; the colonial sample shows the presence of non-locals from the Old World. The modern collections are from individuals of Maya origins, so they provide the direct evidence of the effect of admixture on dental morphology. Results indicate a chronologically-related distribution, witnessing the morphological and orthodontic changes that characterize the modern population; yet only few traits seem to clearly discriminate groups, among which stand shovel shape, microdontia and cusp number of mandibular first molars.

Cuellar, Andrea (University of Lethbridge)**[197]** *Discussant***Cuevas, Mauricio (Universidad Veracruzana) and Lourdes Budar (Universidad Veracruzana)****[158]** *El contexto arqueológico del Complejo Escultórico de La Victoria-Matacanela, Los Tuxtlas, Veracruz*

En 1907 Eduard y Caecilia Seler, visitaron la Finca de Matacanela, ubicada en la porción sureste de la orilla del Lago de Catemaco en Los Tuxtlas, Veracruz. En los terrenos de esta finca, la pareja de alemanes recuperó una serie de monumentos que fueron trasladados a la entrada de la finca, lugar donde Frans Blom los observó y describió en 1925. En el año 2014, basándose en los trabajos de Gursney y en la búsqueda de patrones culturales relacionados a la función de los monumentos, Budar propuso que se trataba de un conjunto escultórico que posiblemente estuvo ubicado al NW del conjunto central investigado por Venter. En 2017, cercano al lugar propuesto, pobladores de la zona realizaron el hallazgo fortuito de un monumento que guarda similitud con los recuperados por Seler y fue creado el proyecto La Victoria-Matacanela para la investigación de su contexto. En esta ponencia se proporciona información acerca de la investigación sistemática del contexto del monumento y se explica cómo se integra y se asocia a los demás elementos del complejo escultórico, recuperando de esta manera información que ayuda a comprender la dinámica política de la región de Los Tuxtlas.

Cui, Jianfeng and Rui Min**[130]** *Scientific Analysis of Metals from the Yinsuodao Site, Yunnan Province*

Up to now, the Yinsuodao site is one of the earliest Bronze Age sites known in Yunnan Province. This work will present the results of metallographic and lead isotope analyses of a number of metals discovered at this site. The metallographic studies suggest that the metal technology at Yinsuodao represents an incipient stage in the evolutionary course of its copper-base industry; the lead isotope studies point to the possibility that the raw materials used to extract copper for bronze making at Yinsuodao may have shared the same source(s) with the metals discovered at Haimenkou, an early Bronze Age site in a nearby region.

Cui, Jianfeng [242] see Shao, Lei

Cui, Xiaodong [389] see Chen, Liang

Cullen, Sara (University of Colorado Boulder)

[45] Identifying Archaeological Dacite and Andesite Sources in Southeastern Colorado

Widely utilized raw stone material common in archaeological sites in southeastern Colorado has been determined to be a combination of dacite and andesite. Samples from two Sopris phase (1000-1200 CE) sites in southeastern Colorado were submitted for pXRF analysis to determine the mineralogical composition of the material. Archaeological dacite and its sources have been identified in areas west of the study area near the Taos Plateau; however, the material from both Sopris phase sites is from an unidentified source. This poster presents possible sources for the material as well as explores the importance of dacite as a raw stone material source in the region.

Cullen Cobb, Kim (Research Associate, Smithsonian Museum Conservation Institute), Emily Kaplan (Smithsonian Institution, National Museum of the Americas), Michele Austin Dennehy (Research Associate, Smithsonian Institution) and Christopher Beekman (Faculty, University of Colorado, Denver)

[314] Axe-Monies in the Smithsonian Collections

A technical study of pre-Columbian copper-alloy axe-monies from the collections of the Smithsonian Institution's National Museum of the American Indian and National Museum of Natural History. Research activities include stereo microscopy, digital photography (macro and micro), portable X-ray fluorescence (pXRF) spectroscopy, and reflectance transformation imaging (RTI).

Cummings, Jim [104] see Mather, David

Cummings, Linda Scott [397] see Brown, Kaitlin

Cunningham, Doug [400] see Hurst, Stance

Cunningham, Jerimy (The University of Lethbridge)**[296] Assemblages and Power in the Casas Grandes Region**

Archaeologists working in the Casas Grandes region generally acknowledge that sites such as Paquimé reflect a social system defined by systemic inequality. Yet, to date little work has been done to document exactly what "inequality" likely meant for people living in the region during the late Medio Period. In this paper, I draw on historical materialist approaches in exploitation and recent posthumanist understandings of how assemblages of humans and their objects create potentials for social transformation to offer a perspective on Casas Grandes sociocultural evolution. In particular, my focus is to explore variations between the regional system centred at Paquimé and sites in the south such as La Raspadura and Ciénega el Apache.

Cunningham-Smith, Petra [197] see Barber, Sarah

Curatola-Petrocchi, Marco**[143] Discussant****Curet, L. Antonio (National Museum of the American Indian, Smithsonian Institution)****[159] Food in Caribbean Archaeology**

The study of food has been part of modern Caribbean archaeology almost from its inception. While few researchers have tried to go beyond the material aspect of food, most of the studies have been materialist in nature emphasizing aspects such as diet, production, and ecology. This paper serves as an introduction to frame the rest of the presentations of the symposium. The presentation includes an introduction to this symposium, a revision of the ethnohistoric and archaeological evidence available, and a review of studies on food throughout the Greater Antilles.

[418] Discussant**[159] Chair**

Curet, L. Antonio [312] see Green, Debra

Cureton, Travis (Logan Simpson), John Southard (City of Tempe), Erik Steinbach (Logan Simpson) and Jacqueline Fox (Logan Simpson)**[194] Rediscovering the Platform Mounds of AZ U:9:165(ASM)**

AZ U:9:165(ASM) comprises the remains of an extensive Hohokam village on the south side of the Salt River in Arizona. Late 19th to 20th century urbanization obscured the overwhelming majority of this site, stunting our understanding of its extent and structure. This paper presents the results of recent archival research and archaeological work within AZ U:9:165(ASM), which confirmed the location of three platform mounds within AZ U:9:165(ASM). We describe how the rediscovery of these platform mound locations adds to our understanding of

structuring principles determining village layout and how landscape features such as platform mounds, river terraces, and irrigation canals reflect certain aspects of Hohokam political-economic organization within AZ U:9:165(ASM).

Cureton, Travis [194] see Garraty, Christopher

Curran, Joseph [151] see Willis, William

Currie, Elizabeth (Department of Archaeology, University of York, UK) and John Schofield (Department of Archaeology, University of York, UK)

[271] Runa: Indigenous Identity and Heritage in the 21st Century

The right of indigenous peoples to define their identities and to lobby for national policies that respect their views and lifeways, highlights the need for national curricula in schools and colleges globally to include more inclusive approaches to the teaching of subjects like history and archaeology. In many countries with significant indigenous populations such as Ecuador, indigenous children learn little or nothing about their own cultures or histories in the formal educational system. Results from a recent survey of three indigenous communities in the Ecuadorian Andes demonstrate that less than 10% of respondents had learned anything about their culture, what constituted their ethnicity, or received any understanding of their archaeological and historical background through the formal educational system. The overwhelming majority had learned what it meant to be 'indigenous' - 'Runa' through their family and community traditions. Results from the survey also demonstrate the destructive impacts of global culture, technology, medicine, tourism, and evangelisation campaigns to ancestral indigenous belief systems and traditions, which had, until recently, survived nearly intact over the course of 500 years.

Curry, Anne

[272] Indicators of Athabaskan Presence in Rio Grande Del Norte National Monument

Recent archaeological survey conducted within Rio Grande del Norte National Monument indicates the use of the area by Paleoindian, Archaic, and Pueblo groups. However, evidence has been found which may also indicate an Athabaskan presence at Cerro del Aire and Guadalupe Mountain. Though Athabaskan groups began arriving in the area near Taos Pueblo in the late 1400s or early 1500s, their impression on Cerro del Aire has seemed ephemeral at best. This paper will explore the evidence which suggests the presence of Athabaskan or other Plains Nomad groups at Cerro del Aire and the surrounding area. The evidence was collected during recent survey in the area and includes lithic tools and metal tinklers. Remains of tipi rings have also been found at nearby sites that had been recorded previously. Considering the presence of an Athabaskan or other Plains Nomad group extends our understanding of the use of this area in the prehistoric and historic past.

Curry, Benjamin (ESA), Heather Atherton (ESA) and Scott Baxter (ESA/Other)

[336] Notorious and Profitable: Exploring Fresno's China Alley

Brought to California's Central Valley by the opportunity to mine for gold and the construction of the railroad, Chinese immigrants created a fast-growing and prosperous Chinatown in Fresno. So infamous was this neighborhood in the late 19th and early 20th centuries that journalist and researcher Schyler Rehart stated "[t]he Chinese gambling dens of West Fresno were considered the most notorious and profitable of any in the nation." However, historical and archaeological research conducted on a recently unearthed feature in the commercial center of Fresno's Chinatown reveal a more complicated picture of these Overseas Chinese, who were inexorably tied to the burgeoning agricultural industry of the region.

Curta, Florin

[351] The (Missing) Archaeology of the Early Medieval Nomads

The goal of this paper is to take a fresh, critical look at the work done on medieval nomads, especially in Eastern Europe, over the last three decades or so. It will focus on three crucial aspects. First, the relation between pastoralism (a separate problem for medieval archaeology) and nomadism, and the question of how medieval pastoralism can or cannot be used for "tracking" nomads. Second, the archaeology of campsites and nomadic settlements, and the serious problems of identification raised by the archaeology of the steppe lands north of the Black and Caspian Seas. Third, the over-emphasis on burial sites, particularly on the secondary burials in prehistoric mounds has effectively obscured the symbolic meaning of those sites, to the point where nomadism is now associated only with burials of humans and/or horses in "kurgans" in the steppe. Without necessarily offering solutions, the intention is to raise those problems as directions of future research on the early medieval nomads.

Curteman, Jessica (The Confederated Tribes of Grand Ronde), Cheryl Pouley (The Confederated Tribes of Grand Ronde), Daniel Snyder (Natural Resources Conservation Service), Chris Bailey (The Confederated Tribes of Grand Ronde) and Briece Edwards (The Confederated Tribes of Grand Ronde)

[401] When Good Projects Go Well: A Partnered Project in Southern Oregon between the Confederated Tribes of Grand Ronde, a Private Land Owner, and Associated Federal Agencies

When a private landowner consistently finds artifacts on their property and wants to be open to outside research opportunities, it can be difficult to find the funds necessary for a thorough cultural resource inventory when there is no development project associated. Encouraging education as a tool to promote advocates for the cultural resources, developing trusting relationships are needed. A partnership with cultural resource staff from the Confederated Tribes of Grand Ronde, federal agency archaeologists, and technical specialists strengthened with an ongoing dialog with the landowner provides the resources needed to study a complex precontact site spanning across a landscape that continues to support culturally significant natural resources. Integrating low-impact archaeological methodology, such as using data recovery tools with minimal impacts, the Tribe's heritage is integrated into archaeological practice to ensure a long-term protection of cultural resources. Focusing the discussion around people practicing on the landscape brings Tribal cultural knowledge to archaeological study for a private landowner to be a cultural resource advocate and further encourage the growth of cultural awareness.

Curtis, Jason [398] see Lofaro, Ellen

Cuthrell, Rob [231] see Grone, Michael

Cuthrell, Rob (UC Berkeley)

[231] *Archaeobotanical Data from Middle to Late Holocene Sites on the Central California Coast: Implications for Resource Use and Prescribed Burning*

Our research team's ongoing work on the Central Coast of California explores spatial and temporal changes in the use of natural resources by Native peoples and considers how archaeobiological data can be used to understand the history of traditional resource stewardship practices such as prescribed burning. This paper presents results of macrobotanical, wood charcoal, and/or phytolith analysis from nine sites ranging in age from ca. 4800 BCE – 1700 CE in coastal areas west of the Santa Cruz Mountains on the Central Coast of California. Archaeobotanical data from these sites clarify activities carried out on site and, in some cases, provide information about changes in ecology and fire regimes.

Cutright, Robyn (Centre College)

[200] *A Worm's Eye View of Chimú Domestic Practice*

Andean household archaeologists have sometimes been slow to adopt a range of specialized methodologies that have become commonplace in regions such as Europe and the Near East. Dr. Bradley Parker's recent work brought microartifact studies to the attention of archaeologists working in the Andes. In this paper, I reconsider household assemblages from Pedregal, a Chimú farming community in the Jequetepeque Valley, Perú, from a microartifact perspective. I compare spatial patterns revealed by >1mm microartifact assemblages from soil samples to macroartifacts recovered from the same excavation contexts to evaluate a microartifactual methodological approach for reconstructing Chimú domestic practice.

Cutrone, Daniel (California State University, Dominguez Hills) and Madalyn Bills (Edge of Cedars State Park)

[220] *The Enshrined Pueblos of Montezuma Canyon*

A long-standing goal of Southwestern archaeology is to understand the reason behind settlement location and why some locations seem to be given elevated status. The Spirit Bird Cave Model presented at the 2003 SAA Annual Meeting pointed to the fact that sacred geography incorporating features of the physical geography played an important role in settlement planning and location. Recent fieldwork suggests settlement location in and around Montezuma Canyon in southeast Utah followed a similar pattern related to physical landscape and sacred space. It is suggested here that several large pueblos within the Montezuma Canyon system are "enshrined" and marked by the physical landscape following modern Puebloan cosmological ideology.

Czerniak, Lech

[275] *The Early Neolithic LBK Communities in the Tusznica River Valley. Social Aspects of Settlement Changes*

A group of LBK settlements located in a valley of the Tusznica river is one of the best recognized settlement complexes in Central Europe. Settlements that are a part of it are characterized by a quite differentiated built-up area arrangement and houses changeability over time, which I will interpret referring to social changes. The more complex interpretation of the phenomenon of changing the built environment requires a different look at what houses and households in the LBK were. To me, a vision of a house inhabited by only one generation by a nuclear family suited the concept of LBK communities as peaceful farmers. Discoveries of objects that testify to armed conflicts within the LBK, and results of the research on diet, finally invalidated this picture. The latest research also showed that the potential reasons for conflict could have been rivalry and inequality between the households relating to access to the most valuable agricultural areas. We gain additional interpretation possibilities of this phenomenon while looking from the above perspective at changeability in the LBK built environment. Therefore, we can look at the changing picture of LBK village built-up areas as an arena of rivalry between households and its changeable effects.

Daehnke, Jon (University of California, Santa Cruz)

[283] *Discussant*

Daggers, Louisa [26] see Plew, Mark

Dahl, Ellen (PIARA Peru), Catriona Semple (PIARA Peru), Erin Crowley (University of Minnesota) and Rebecca Bria (PIARA Peru & University of Minnesota)

[289] *Animals for the Ancestors: Comparing Animal Use in Funerary Rites at Ancient Hualcayán, Peru (AD 1–1000)*

This poster presents recent analysis of faunal materials from three distinct funerary structures at Hualcayán, Ancash, Peru, in order to assess differences in taphonomic environments and funerary practices through interred faunal remains. This study compares species representation, bone modifications, and fragmentation from Early Intermediate Period and Middle Horizon communal and commingled tombs. The contexts examined represent three different ways of treating the dead between AD 1–1000 and include a semi-subterranean tomb and its associated patio, an above ground burial structure (chullpa), and a modified cave (machay). 5,223 fragments of animal bone were identified and examined for modifications and treatments. Of the fragments examined, 66 showed evidence of modifications such as cut marks, burning, and shaping into tools and ornaments, including imported Spondylus shell and processed felid remains. Artiodactyla, specifically llama and alpaca, was the predominant domesticated taxon, particularly in the subterranean tomb. In the more exposed chullpa and the machay tomb environments, there was greater evidence for wild species, some intrusive but others intentionally interred based on the presence of modifications and cut marks. While this may be a result of the open tomb environment, evidence of modifications may also suggest an increased concern for wild fauna and imported materials.

Dahlstedt, Allisen [289] see Santillan Goode, Julianna

Dakovic, Gligor (University of Pittsburgh), Bonnie A.B. Blackwell (RFK Science Research Institute, Glenwood Landing), Bojana Mihailovic (National Museum, Belgrade, Serbia), Senka Plavsic (Department of Archaeology, Belgrade University) and Justin K. Qi (RFK Science Research Institute, Glenwood Landing)

[42] *ESR Dating Herbivore Teeth within the Mousterian Layers at Šalitrena Pećina, Serbia*

Overlooking the Ribnica River near Brežđe in the Dinaric Mountains, central Serbia, Šalitrena Pećina records a continuous Late Pleistocene sedimentary sequence records over the Middle/Upper Paleolithic (MP/UP) transition. In the cave entrance, six sediment layers reach ~ 1.5 m thick. Layer 2's Neolithic artefacts overlie Layers 3-4's Gravettian artefacts. Layer 5 yielded distinctive Aurignacian artefacts. Layers 6a-e contains reddish brown sandy silt with 20-40% éboulis, hearths, and a Levallois industry having déjeté and transversal sidescrapers in the upper zones and bifacial artefacts at the bottom. AMS 14C has dated Layers 3-4 at ~ 24-25 ka, Layer 5 at ~ 31 ka, but most of Layer 6 exceeds the 14C dating limit. Since ESR can date tooth enamel from ~ 5 ka to > 2 Ma, with ~ 2-5% precision, five herbivore teeth from Layer 6 have been dated by standard and isochron ESR. For the volumetrically averaged sedimentary dose rates, > 30 sediment samples from 10 horizons within 30 cm of the teeth were analyzed by NAA. Cosmic dose rates were calculated by ramped box averaging, using geologic data about its sedimentary cover. Ten independent ESR dates for teeth from Layer 6d-e correlated with MIS 5b to early MIS 4.

Dale, Emily (Northern Arizona University)

[189] *In Small Things Collected: Domesticity in World War Two Era Flagstaff*

From the 1980s to 1990s, Northern Arizona University ethnomusicologist Joann Kealiinohomoku collected artifacts she found in the backyard of her Flagstaff home and kept them in a variety of food jars. While Dr. Kealiinohomoku had no discernible methodology in collecting the artifacts and left behind no notes or evidence of their original context, the collection still conveys meaningful information about mid-century Flagstaff. The majority of the artifacts date to the original 1940s and 1950s occupation of the house, and contains myriad artifacts related to the domestic aspects of Flagstaff life during this period. This paper explores how disconnected artifacts can tell a connected story of childhood, foodways, and other domestic activities.

[189] *Chair*

Dale, Jedidiah [63] see Doyle, Colin

Dalmas, Daniel and Matthew G. Hill (Iowa State University)

[322] *Assessment of Late Quaternary Bison Diminution Using Linear Discriminant Analysis*

The proximate cause of reduction in the overall size of late Quaternary bison is the focus of continued debate. Some researchers contend that size reduction did not occur despite well-documented changes in climate and vegetation, while others link directional change in body size to changes in forage quality and availability or human predation. Historically, assessments of bison size have used standard measurements, ratio diagrams, univariate and bivariate plots, and summary statistics to 1) distinguish males and females, and; 2) generate mean body size data. Application of Linear Discriminant Analysis to 1,000+ calcanea from 30+ localities is used to eliminate the subjectivity of sex determination and, in turn, supply a refined understanding of spatio-temporal patterns in bison body size. Results confirm that late Pleistocene animals were substantially larger than their late Holocene

counterparts.

D'Alpoim Guedes, Jade [156] see Lee, Rachel

Dalpra, Cody

[180] Flakes Everywhere: Lithic Analysis Results from the Petrified Forest Boundary Expansion Project 2013-2017

During the Boundary Expansion Survey Project in Petrified Forest National Park of Northeastern Arizona the most common artifacts were the much maligned flake and stone tools. These are not surprising given the area is a large stone tool source in the remains of one of the largest deposits of petrified wood in the world. Petrified Forest was a magnet for its plentiful, high quality petrified wood in addition to being a migration corridor. This study will present analysis on the field data collected as part of the project from the 284 sites. The survey by design covered many different landscape settings allowing for a comparison of lithic toolkit variation. Similarly, sites were recorded from Early Archaic to Pueblo IV facilitating a different view of the lithic production and use. The unique opportunity afforded with this multi-year study offers these types of large scale comparisons that will only add to our understanding of the prehistoric use of Petrified Forest National Park.

Dalton, Jordan [182] see Larios, Jennifer

Dalton, Jordan

[182] The Chincha Valley, Peru: Analyzing Its Settlement Patterns and Urban Centers

The study of settlement systems is an important component in archaeologists' efforts to understand how valley-wide or multi-valley polities change over time. Settlement studies often rely on site size, site location, site layout, and site chronologies to determine the changing relationships among sites and to explore changes to political and socioeconomic organization. This presentation discusses (1) the degree of centralization of the Chincha polity through time and (2) the changes that occurred during the Late Horizon (AD 1470-1532, the time period of Inca occupation). The Chincha Valley provides a rich opportunity to explore settlement systems due to its history of archaeological surveys and excavations. In addition to utilizing the data from those surveys and excavations, I draw on other cases throughout the world and my own excavations at the site of Las Huacas in the Chincha Valley. Data from Las Huacas' Complex N1 demonstrate that large-scale changes occurred in the economic organization and activities conducted there during the Late Horizon. The presentation concludes by comparing the Chincha case to the north coast of Peru.

Daltroy, Terence (Columbia University)

[233] Discussant

Damick, Alison (Columbia University) and Arlene Rosen (University of Texas-Austin)

[311] Agriculture and Landscape Change in the Tesuque Valley

The relationships of people with their land over time leaves visible and invisible traces. As archaeologists we are confronted with landscapes that are the resulting accumulation of these traces over time, such that they may no longer resemble the place that people of the past interacted with. Place is not just a geographic location but a complex network of human and non-human actors coming together to constitute a set of geomorphological, ecological, and social relationships. To better understand those relationships and past land use choices, we must first reconstruct what the past landscape looked like.

This paper presents preliminary results of a geoarchaeological and microbotanical study to address this problem in the Tesuque Valley in northern New Mexico. The Tesuque Valley hosted the ancestral settlement at Cuyumungue and the ancestral and current settlements at Pojoaque. In cooperation with Pojoaque Pueblo and the Cuyumungue project, samples were taken from geological sections in Tesuque Creek and its tributaries to reconstruct the environmental history of the area in relation to varied historic agricultural and land use practices over time. This paper presents the preliminary analysis of those samples.

Damitio, William (Washington State University), Shannon Tushingham (Washington State University), Korey Brownstein (Washington State University) and David Gang (Washington State University)

[211] Tobacco Smoking in Northwestern North America: Synthesizing the Results of Organic Chemical Residue Analyses

The past several years have seen a number of studies—largely based at Washington State University—incorporating organic chemical residue analytical methods to address questions regarding past smoking practices in Northwest North America. In this poster we summarize the results of these studies, which cover a geographic range from northern California to southern British Columbia, and synthesize them, presenting the current understanding of smoking practices in the region's past. Of particular interest is the northern limit of tobacco (*genus Nicotiana*) use, given its limited natural range and importance in the beliefs and practices of many present-day Native people in the Northwest. Evidence of past tobacco use at several locations in the region is contrasted with the current natural distribution of the genus.

Damp, Jonathan**[320] *Real Alto and the Origins of Valdivia***

Recent geomorphological analysis of shoreline deposits in Manabí and Santa Elena provinces (Ecuador) provides evidence of significant mid-Holocene marine transgression. Newly obtained radiocarbon dates from relict coastal features places these changes to the Valdivia Phase (4400 to 1500 cal BC). Arguments for and against this phenomenon are reviewed with regard to the role of Real Alto in Early Formative settlement. Finally, ramifications of mid-Holocene shoreline change are discussed with regard to the origins of Valdivia in Southwest Ecuador.

Dancey, William**[257] *Discussant***

Danella, Erika (Quinnipiac University), Kylie Williamson (University of Florida), Jaime Ullinger (Quinnipiac University), Julia Giblin (Quinnipiac University) and László Paja (University of Szeged)

[126] *Distribution of Cranial and Postcranial Elements in Bronze Age Cremation Urns from Eastern Hungary*

Located in the Kőros region of Hungary, the site of Békés 103 contains a Bronze Age cemetery in which the majority of burials are cremations deposited in ceramic funerary urns. Previous literature suggests that the measurement of skeletal weight across microstratigraphic levels within an urn can shed light on the process of how the bones were placed in the vessel. In this study, we investigated the correlation between cranial and postcranial weight throughout micro-excavated levels in order to examine skeletal element distribution within the vessels (n=25). Instead of concentrating the cranial elements at the top or bottom of the urn, our analysis indicates that the cranial and postcranial elements were scattered throughout the vessel. Therefore, our results suggest that there was not a systematic arrangement of cranial versus postcranial elements within the urn. Overall, this study aids in enhancing the understanding of Bronze Age cremation practices in southeastern Hungary, which can ultimately contribute to the study of social complexity and inequality in prehistory.

Danis, Ann (University of California, Berkeley)**[83] “But We Are Not Broken”: Practices of Home in San Francisco Bay Area Homeless Encampments**

In January 2018 United Nations Special Rapporteur on Adequate Housing Leilani Farha visited Oakland, CA homeless encampments. Farha reportedly remarked, “every person I spoke to today has told me, ‘we are human beings.’ But if you need to assert to a UN representative that you are a human, well, something is seriously wrong.” The conditions of camps in California, which can range in size from a few to hundreds of tents and shelters in alleyways, underpasses, and other undesirable locations, are “systemically cruel.” US law, local policy, and police practices criminalize sitting, lying, and even sharing food in public spaces, and creates challenges to even the most basic of human rights for people experiencing homelessness in the San Francisco Bay area. Decades of encampment at the Albany Bulb, however, complicate conventional assumptions about the livability and precariousness of self-designed shelter and self-organizing communities. This paper discusses archaeological work documenting the 2014 eviction of the Albany Bulb, as well as the process and building of a recently completed tiny-home village in West Oakland, to argue for material attention as a method to support the humanity of people living as refugees in their own homes.

Dardeniz Arıkan, Gonca (SUNY Buffalo)**[242] *Salt of the North-Central Anatolia (Turkey)***

Salt, which is a very important dietary component for humans and animals, occurs in Anatolia (Turkey) in beds and masses of rock salt or as evaporate. It has a practical value for activities like food preparation, tanning, drying meat, or pickling as well as bearing a symbolic value and magical attributions. Research has focused on locations and various procurement methods at certain locales of Anatolia (ex. Salt Lake, Turkey) mostly from a perspective of human interaction with salt via archaeological and ethnoarchaeological evidence. This paper will extend value of salt to animals at highland communities in the north-central Anatolia and will focus both the economic and symbolic significance of salt at the region. By using archaeological, ethnoarchaeological and textual evidence, I will reassess the use of salt at the region by particularly concentrating on the Bronze Ages.

[242] *Chair*

Darhling, Andrew [114] see Stewart, Caitlin

Darling, J. Andrew [8] see Steinbach, Erik

Darras, Véronique (CNRS - University Paris 1 Pantheon-Sorbonne), Alejandra Castañeda (ArchAm_CNRS - University Paris 1 Pantheon-Sorbonne) and Laure Déodat (CReAAH_CNRS Nantes)

[307] A Methodological Challenge: Understanding the Population Dynamics in the Lerma Floodplain through the Case of Tres Mezquites, Michoacan

Alluvial plains in Mexico are still little explored. At first glance their archaeological potential is difficult to appreciate because they are areas of both sedimentary accumulation and destruction caused by intensive agriculture. To compensate these limitations in the Lerma alluvial plain (Michoacan, Guanajuato), we combined several survey (satellite imagery, informant, systematic and geophysical prospection) and registration methods (entity, structures, artifacts densities). The complementarity of these methods allowed to produce an archaeological map that was sufficiently relevant to provide a reasonable idea of the settlement pattern and the chronology of occupation in the alluvial plain. Although the geo-archaeological study showed intrasites succession of rapid sedimentary accretion during prehispanic and later occupations, the fieldwork seasons conducted between 2014 and 2018 highlighted a dense network of settlements on the riverbanks, in various areas of the plain, and at the foothills. This map is not intended to be representative of true occupational intensity and to reflect with exactitude the privileged areas of settlement through time, but it shows that the taphonomic limitations did not prevent the detection of a sufficient number of prehispanic sites to suggest that the floodplain had been very densely populated at least since the beginning of our millennium.

Darvill, Timothy (Bournemouth University, UK)

[155] Woodhenges in Northwest Europe

Circles, variously of wood and stone, are a major feature of the ceremonial centres dating to the third and early second millennia BC in northwest Europe. Some, such as Stonehenge, are very well known and complicated in their design and layout. Many others are more modest in scale and form. Geophysical surveys and development led archaeology have revealed the existence of many more timber circles than once thought, complementing the distribution of the more durable stone circles. Here we investigate the range of structures represented and their place within extended ceremonial centres in Britain and beyond.

[155] Discussant

[155] Chair

Darvill, Timothy [155] see Ruby, Bret

Darwent, Christyann [10] see Ebel, Erika

Darwent, Christyann (University of California, Davis), Genevieve LeMoine (Peary-MacMillan Arctic Museum, Bowdoin College), John Darwent (University of California, Davis) and Hans Lange (Nunatta Katersugaasivia Allagaateqarfialu)

[251] The Inglefield Land Archaeology Project in NW Greenland, 2004-16: Mitigating Cultural Resources in the Era of Climate Change

With support of the NSF Arctic Social Sciences program, we undertook seven field seasons (2004-2016) investigating the 4000-year history of human habitation of Inglefield Land, with particular attention to the Inughuit and their interactions with Euro-American Arctic explorers in the mid-19th to early 20th centuries. We recorded over 2350 new archaeological features, excavated a dozen house structures across the region, and provided field experience for 20 Greenlandic and US students. The focus of our most recent field seasons has been on recovery of the rapidly eroding site of lita; a location that is unique in the High Arctic for its buried stratified deposits recording the last 1000 years from Late Dorset, through Thule/Inughuit. It is this recent history that is the most vulnerable to declining permafrost and erosion, and thus we propose a model for mitigation of cultural resources in this region from the perspective of cultural heritage management.

Darwent, John [10] see Ebel, Erika

Darwent, John [251] see Darwent, Christyann

Daunais, Jacob [11] see Watson, Caroline

Dávalos Navarro, Dolores

[258] Status Differentiation in the Mortuary Practices and Architecture of Paquimé, Chihuahua, Mexico

The site of Paquimé in Chihuahua, Mexico, is part of the debate of social organization of prehistoric pueblos. Using statistical and Geographic Information Systems this research attempts to determine the degree of status differentiation and intra-site organization of the site by revisiting published archaeological data and using a revised classification and seriation of mortuary patterns and architecture. Furthermore, this study considers the variation in the funerary practices in Paquimé and the spatial correlation of the data with architectural features to see if the burial furniture, grave goods, architecture and artifacts showed variation within spatial units that can be related to status differentiation. The study also compares the site of Paquimé with Grasshopper Pueblo in east-central Arizona. Previous studies suggested that the population at this site had a similar organization to the historic Puebloan communities in the north of Arizona and New Mexico of organized in kinship groups with distinctions based in age,

gender and some ceremonial statuses. Preceding architectural comparisons between both sites showed differences in activity areas, group storage and communal or integrative areas. Does Paquimé share similarities with contemporary Puebloan communities like Grasshopper Pueblo or were there diverse social organizations in the Southwest/Northwest during the Late Pueblo period?

Davenport, James (University of New Mexico) and Marie-Claude Boileau (University of Pennsylvania)

- [355] *Reconstructing the Chaîne Opératoire of Inka and Local Pottery from Pachacamac, Peru Using Compositional Analyses and X-Radiography*

In the Inka Empire (Tawantinsuyu), Inka polychrome pottery was used for state-sponsored purposes. This pottery was not produced solely in the imperial core and distributed to provincial contexts, but rather was produced by a diverse range of potters recruited from subject populations across the empire, working both part- and full-time for the state. These potters made pottery in their traditional and imperial styles, as well as hybrids between the two. Despite being made by a variety of producers, Inka Polychrome Pottery was highly standardized in form and decoration. This project investigates the production of both Inka polychrome and local pottery from the regional center of Pachacamac, the political center of the Ychsma polity and an oracle and pilgrimage center that was subjugated and expanded by the Inka during the Late Horizon (CE 1400 – 1532). Using compositional analysis of pastes and pigments with Neutron Activation Analysis and Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry, morphometric analyses of form, and analysis of forming technique and sequence through X-radiography, this research attempts to reconstruct the chaîne opératoire (operational chain) of this pottery, which in turn reveals information about who these potters were and what their relationship was with the empire.

Davies, Benjamin [247] see Braun, David

Davies, Benjamin (The University of Auckland)

- [378] *The Highways and Byways of the Winds: Exploring Sailing Capability and Climate Variability in Pacific Interaction*

Current debates over migration and mobility in Pacific prehistory hinge on the capacity of mariners to sail to windward. With this ability, voyages between any two points were possible, with ease of travel conditioned on the favorability of winds. Without it, movement in any given direction was dependent on winds traveling along a similar path, a coincidence that would have been variably predictable over space and time. These factors, played out on the physical geography of the Pacific, would have made some routes more accessible than others and contributed to greater or lesser possibility of sustained interaction between islands. In this study, the capacity to make use of the winds on different paths between islands is modeled under a range of climate conditions. Large global climate datasets of daily are selectively sampled to capture winds under different kinds and phases of the El Niño Southern Oscillation, and model calculations are made for angled passages between islands. From these models, networks emerge illustrating how assumptions about the capacity to sail to windward (or lack thereof) can influence connectivity. Implications of these networks for explaining patterns of migration and interaction in Pacific prehistory are considered in terms of contemporary archaeological data.

Davies, Gareth [37] see Pouncett, John

Davies, Gavin (University of Kentucky)

- [303] *A Ruler Stela in San Pedro La Laguna? Preclassic Stone Monuments of the Lake Atitlan Basin, Guatemala*

Ruler stelae are a well-known class of monument in the Southern Maya region but have so far been recovered only from only the largest sites, such as Kaminaljuyu, Takalik Abaj, and Chocola, all of which are considered to have been regional capitals. The recovery of a basal fragment of one of these monuments near the small tourist town of San Pedro La Laguna is therefore surprising. However, the presence of three other monuments of probable Late Preclassic date in the vicinity and others just around the corner in Finca Chacayal, suggests that this monument does belong here. In the current paper, I explore the contexts and meaning of these monuments and their significance for our understanding of the Late Preclassic period in the southwestern highlands.

Davis, Allison [289] see Bélisle, Véronique

Davis, Dylan (The Pennsylvania State University), Matthew Sanger (Binghamton University) and Carl Lipo (Binghamton University)

- [325] *Shell Rings and Settlement Organization in the Coastal American Southeast: New Insights from Remotely Sensed Data*

In 2018, we identified over 50 new potential shell rings in Beaufort County, SC using LiDAR and automated feature extraction algorithms. Further analysis of this data has confirmed the archaeological nature of several of these deposits. This poster details further analysis of these features. We find that the majority of these rings are significantly smaller than previously identified rings in South Carolina and the spatial patterning of these features paints a picture of clustered settlement distribution. Areas with the highest density of shell rings are located in closer proximity to water and in higher elevations than rings located in lower density areas. Additionally rings that are in close proximity to other rings have higher volumes of shell per unit of area than rings that are further away from other rings. Overall, this information suggests that where shell rings are clustered together, their overall size is

smaller but their volume of shells is greater, whereas rings that are more dispersed are larger but contain a smaller volume of shells per unit of area.

Davis, Earl [58] see Antoniou, Anna

Davis, Jera (New South Association, Inc.), Stephen B. Carmody (Troy University) and Jon Russ (Rhodes College)

[97] Not Just Blowing Smoke: Tobacco and Society at Ancient Moundville

In the Southeastern United States and elsewhere, indirect evidence of tobacco use is all too often inferred when archaeologists recover smoking pipes. Thanks to the combined efforts of archaeologists and chemists, we have recently begun using gas chromatography/mass spectrometry (GC/MS) analysis of residues scraped from the bowls of sooty pipes to make the connection directly. This paper is a spin-off of that larger effort to plot tobacco use in the Pre-Columbian Southeast through space and time. It focuses specifically on the dozens of pipes recovered from the Mississippian period Moundville site of west-central Alabama. Pipes are not common at Moundville, but they have been found in nearly all areas of the site – from household contexts in its crowded low-status neighborhoods, to its more sequestered precincts on and around mounds on the north side of the site. Their distribution, the varied contexts of their recovery, and their array of forms add detail to our understanding of tobacco's important role in the social, political, and religious lives of the Moundville people.

Davis, Kaitlyn E. (University of Colorado, Boulder)

[311] New Information from Old Collections: The Wendorf and Ellis Collections from Cuyamungue and Pojoaque Pueblos

Over the past five years, the University of Colorado, along with the Pueblo of Pojoaque and the Colorado Archaeological Society, have been analyzing the ceramics collected by Fred Wendorf at *Cuyamungue* Pueblo (LA38) and Florence Hawley Ellis at Pojoaque Pueblo (LA61) in the 1950s. Just through visual macroscopic analyses and measurements, we have been able to learn about changes in occupation of these two pueblos, changes in standards of living or household wealth, incorporation of Spanish foods and products, food preparation and cooking practices, and changes in style over time. Specifically, we have been able to quantitatively assess changes in material conditions of life through tabulating changes in the ratio of fine-wares to cooking-wares, as well as identifying and tabulating trade wares. With regards to incorporation of Spanish products, we have been able to track the adoption and incorporation of wheat and other Spanish foods into the Pueblo diet, through analyzing and quantifying changes in vessel form and use-wear through time. This paper will present the methods and findings from these analyses, highlighting the potentials for gaining new knowledge by re-visiting and re-analyzing old collections with new questions.

Davis, Kara (DPAA) and Jeneva Wright (DPAA)

[129] Sustainable Archaeology: Accelerating DPAA's Mission through Technological Advancement, Partnerships and Collaboration, and Meaningful Public Engagement

Fielding new capabilities and leveraging untapped resources for the acceleration of operational mission tempo has become a central imperative for the Defense POW/MIA Accounting Agency's (DPAA) fullest possible accounting mission. Since 2015, DPAA's Partnerships and Innovations Directorate has been a key enabler in addressing this priority, bridging technology and resource gaps, and building a broad network of partnerships across all fields of competency. By joining forces with partners, DPAA can leverage innovative resources and expertise to promote DPAA's ideals and values, achieve mutually aligned goals, and strengthen visibility and impact of call to action. This poster showcases key DPAA partnerships, and highlights lessons learned in locating aircraft crash sites, conducting excavations, and building collaborations towards ongoing mission sustainability.

Davis, Mary A. (UW-Madison)

[152] Defining and Exploring Local Production in the Indus Civilization: A Focus on Gradation and Value

The Indus Civilization of Bronze Age Pakistan and Northwest India (c. 3800-1900 BCE) had a complex system of productions, consumption, and exchange at local, regional, and interregional scales. I join my recent research of intra-site production patterns and regional GIS analysis material exchange with the current body of research concerning craft production, based upon experimental and ethnographic studies, and geologic and other provenance studies. The resulting picture indicates that there are many degrees of products "localness", resulting from complex chaîne opératoires and communities both bounded and unbounded by geography and polities. Moreover, the geographic origin of raw materials does not always correlate with artifact frequency or valuation, challenging narratives of the local and exotic dichotomy.

Davis, Steve (University College Dublin) and Knut Rasmann (Romano-Germanic Commission)

[266] Beyond Newgrange: The Late Neolithic Complex at Brú na Bóinne, Co. Meath in Light of Recent Discoveries

The Brú na Bóinne World Heritage Site is known globally for its middle Neolithic passage tombs, in particular the 'megatombs' of Knowth, Dowth and Newgrange. However, the area also possesses one of the highest densities of late Neolithic monuments in the henge tradition anywhere in the world. These comprise a variety of forms, from timber avenues to '4-poster' structures, palisaded enclosures and conventional henge-like monuments. The remarkable summer of 2018 has provided stunning new detail on some of these sites, alongside a longstanding research programme focused on remote sensing in Brú na Bóinne using lidar and large-scale geophysical surveys.

This paper will review our current understanding of the late Neolithic complex at Brú na Bóinne in light of recent discoveries, and attempt to contextualise some of this extraordinary variety in a more regional framework.

Davis, Thomas (Tandy Institute of Archaeology SWBTS)

[366] *Hippos, Cows and CAARI: Alan Simmons' impact on Cypriot Archaeology*

When Alan Simmons first arrived on Cyprus in 1985, the Cypriot Neolithic was considered a poorly understood and uninteresting backwater lagging behind the developments of the Levant mainland. IN the mid-1908s, The Khirokitia Culture (KC) was thought to be the first PPN occupation on Cyprus. First identified in the 1930s by the Cypriot archaeologist P. Dikaios, the KC (8000 BP) lacked island precedents and was thought to have been imported wholesale from the Levant. Alan Simmons pioneering work at Akrotiri Aetokremnoss definitively demonstrated a robust occupation on the island nearly 12,000 years BP. Prof. Simmons impacts on Cypriot archaeology go far beyond his highly significant scholarship on the Neolithic. His scholarly work deals with the data of the entire island, despite the modern political differences. He has reached across the communal divide and included Greek and Turkish Cypriot students and colleagues on his excavation teams. He is a strong voice for prehistoric research in the large world of ASOR, a group not uniformly open to prehistorians. Finally, he has made invaluable contributions to the growth and health of the Cyprus American Archaeological Research Institute (CAARI) for whom he currently serves as a trustee.

Dawson, Emily (University of Texas at Austin)

[193] *A Global Taste: Rethinking Foodways in Colonial New Mexico*

"I was a global creature before globalization became a buzzword; I am a Heinz 57, a mestizo with my taste buds on several continents" (Arellano 2014: 10).

Previous research on colonial-era foodways in New Mexico has often focused on the arrival and use of Old World foods as a way to maintain a distinct Spanish identity. Yet, many of the earliest colonists, despite claiming a peninsular identity, were born in Mexico and had mixed ethnic heritage. Later settlers continued to have highly diverse ethnic backgrounds, including indigenous Mexican, Native American, African and European, further complicating our notion of what "Spanish" meant during the colonial period. This paper considers what moving beyond the traditional Spanish versus Indigenous notion of foodways in New Mexico would mean for developing a Chicano Archaeology of a Spanish land grant community. I present preliminary phytolith data from an ongoing study that offers insights into the ways that members of the community utilized both native and foreign plant species in their daily lives.

Dawson, Tom [251] see Lees, William

Day, James [363] see Liss, Brady

Day, Peter

[152] *Discussant*

De Armond, Thea [149] see Der, Lindsay

De Armond, Thea

[149] *Drawing the Line: Does Sexual Harassment Training Work?*

Training is a favored weapon in the arsenal of those attempting to combat workplace harassment. Every year, university employees across the United States numbly click through sexual harassment training modules; after the March 2018 resignation of Forest Service Chief Tony Tooke due to allegations of sexual misconduct, the Forest Service modified its harassment training; in 2017, after revelations of a culture of harassment in the National Park Service, the NPS committed to improving its harassment training programs. Given that harassment training is deployed as both a prophylactic against and a cure for harassment, its usefulness merits consideration. Is sexual harassment training effective in addressing workplace cultures of harassment? This paper examines three sexual harassment trainings for archaeologists—one from a government agency, one from a university, and one used by a private CRM company—with the aim of assessing the adequacy of those trainings in addressing the root causes of sexual harassment.

[149] *Chair*

De Boer, Deanna (Seminole Tribe of Florida Tribal Historic Preservation Office) and Samantha Wade (Seminole Tribe of Florida Tribal Historic Preservation Office)

[362] *Who Tells Your Story? Utilizing Legacy Collections to Serve a Living Culture*

Unlike most archaeological collections, those held and curated by the Seminole Tribe of Florida (STOF) represent a living culture, and tribal understanding of those archaeological collections is a fluid, dynamic entity. The unique

relationship between the Tribal Historic Preservation Office (THPO) and STOF requires an adherence to and respect of cultural traditions and viewpoints. As the key stakeholder, the Tribe's needs are the most fundamental aspect when sharing the Seminole story and voice. Reexamining legacy collections within the framework of serving the tribe works to not only shed light on history, but also to further our understanding of how to mitigate current preservation issues. Within the last ten years, the tribe has aimed its focus towards understanding and managing the damage created by climate change. For the THPO, this means reorienting our research and analytical focus to look forward, asking how we can utilize legacy collections to shape a knowledge base for the future. We seek to explore how revisiting legacy collections within our own holdings works to serve the best interests of the tribe, as well as give service to the past in order to challenge our own perception of archaeology in reference to a living culture.

De Carteret, Alyce (LACMA)

[162] *The Colonial Petén: An Ethnohistory of Indigenous Sovereignty and a Failed Spanish Colonial Project*

Colonialism—to speak generally—can be characterized as endeavors that aim not just to entangle, but to wholly incorporate, disparate regions under the control of a foreign body. Indigenous disentanglement from these exploitative projects has taken many forms—daily negotiations, subtle refusals, outright rebellions. In the Petén, Guatemala, strategies of resistance to Spanish Colonialism meant disengaging completely from it and asserting indigenous sovereignty. The Itzá and Kowoj Maya, who made their home in the Petén, famously fell to the Spanish in 1697, 172 years after Hernán Cortés first visited the region. This date marks the siege of the Itzá capital of Nojpetén by conquistador Martín de Ursúa y Arizmendi, an event that titled Grant Jones's landmark volume, *The Conquest of the Last Maya Kingdom*. Yet, even after this date, the Kowoj and Itzá Maya continued to assert their sovereignty and resisted Spanish control. Spaniards faced rebellion in sparsely populated mission towns that they could not keep settled. The Petén, at the edges of empire, remained in many ways outside of Spanish dominion. This paper recounts the colonial history of the Petén, telling the story of enduring indigenous sovereignty and a failed colonial project.

De Koning, Sarah (University of Western Australia) and Peter Jeffries (Murujuga Aboriginal Corporation)

[305] *Murujuga Dynamics of the Data*

Current archaeological research projects are creating ever-larger quantities of data which needs to be analysed, and stored for long periods. Murujuga: Dynamics of the dreaming has moved to paperless collection techniques to enable the rapid collection of field data and the seamless transfer of this to data repositories. This paper addresses the current standards of data collection, analysis, and long term archival storage developed by the Centre for Rock Art Research and Management Database (CRAR+M). As the digital repository for ongoing research projects by a variety of CRAR+M researchers, the CRAR+M Database contains the largest collection of rock art and related data in Australia. Researchers store their data, with information accessible to relevant staff and students, as well as collaborating Aboriginal communities and research partners. The development of protocols is vital to ensure the cultural safety of partner Aboriginal community members accessing this information. This paper examines the workflow employed when collecting, analysing, and archiving archaeologically gathered cultural information, and the partnership with the Murujuga Aboriginal Corporation (MAC) rangers in repatriating this data in a culturally appropriate manner for their use in managing the extraordinary rock art in Murujuga National Park.

De La Fuente, Guillermo

[298] *Chaîne Opératoires and Technical Identity in Aguada Portezuelo Pottery: An Approach through Ceramic Petrography (Catamarca, Argentina)*

The Aguada Portezuelo ceramic style (ca. AD 600 – AD 900) from Northwestern Argentine region, presents a highly stylistic variation and complexity in the forming techniques used by ancient potters, concerning surface treatments and the decoration applied to ceramic vessels. One of the most important features in these ceramics, is its highly marked polychromy. Here, we present the results obtained through an extensive ceramic petrography study of surveyed materials from La Viñita archaeological site (Dept. Capital, Catamarca, Argentine). Special attention is paid to the reconstruction of the chaines opératoires involved in the elaboration process (ceramic pastes, primary and secondary forming techniques, firing temperatures) of this pottery. Additionally, we explore the concept of technical identity and its relationship to the different technical gestures and technical actions performed by ancient potters.

De La Rosa-Díaz, Jesús (University of Zacatecas, México) and Ciprian Ardelean (University of Zacatecas, Mexico)

[374] *Valle de Bonanza (Zacatecas, Mexico): Desert Varnish and Technology in a Surface Lithic Assemblage*

Valle de Bonanza (northeast of the Mexican state of Zacatecas) is a surface-only archaeological site located in a highly eroded desert landscape on the edges of a vast endorheic basin in Concepcion del Oro county. The site consists of a sand-and-dust surface affected by intensive deflation that caused the formation of a palimpsest of crudely made flaked stone artifacts belonging to a diversity of epochs and traditions. This study focuses on two lines of research: i) the technological analysis of the specimens in order to define the technical approaches and possible cultural affiliations; ii) the study of patinas present on the exterior of a large percentage of the sample. We observe at least two types of patina or desert varnish, which were presumably generated under different environmental and depositional conditions. Considering that all lithic specimens belonging to more recent recognizable traditions lack any sort of patina, we worked from the hypothesis that the varnish-covered specimens belonged to older periods presenting considerable differences between them both. In order to achieve these goals we employed certain microscopic and archaeometric techniques presented in this poster.

De Leon, Jason (University of Michigan)

- [157] *Old Methods and Theories in the Ethnographic Present: Why We Need An Archaeological Sensibility in the 21st Century*

Archaeologists often look to sociocultural anthropology for either ethnographic data that support interpretations of the ancient past or for the latest “cutting edge” theory that can be directly grafted onto a data set. In essence, archaeologists excel at mining the ethnographic literature for analogies or new social theories. However, few ethnographers dare to venture into the archaeological literature or attempt to explore the potential of that subdiscipline’s methods or theories for understanding the contemporary moment. This is surprising given the growing sociocultural interests in actants, landscapes, materiality, and corpses. Using data from the Undocumented Migration Project, a long-term interdisciplinary research endeavor focused on understanding the violent social process of clandestine migration from Latin America to the United States, I argue that traditional archaeological methods and theories can provide new insight into modern sociocultural phenomenon. Moreover, I posit that an “archaeological sensibility” (i.e., an analytical viewpoint that takes a rigorous approach to both the physical and sociopolitical aspects of materiality) helps to erase the stifling borders that often exist between subdisciplines while pushing for new and organic forms of interdisciplinary research.

- [340] *Moderator*

- [83] *Discussant*

De Leon, Jason [83] see Gokee, Cameron

De Leon Antillon, Monica [384] see Beliaev, Dmitri

De Lucia, Kristin (Colgate University)

- [38] *Household Lake Exploitation and Aquatic Lifeways in Pre-Aztec Central Mexico*

Lake exploitation was central to ways of life and culture in the Basin of Mexico. Evidence of lake exploitation, however, is often difficult to document archaeologically. Thus, discussions of production and exchange in pre-Aztec times usually focus on more durable goods such as ceramics or obsidian. In this paper, I explore archaeological evidence for the exploitation of lake resources in the island site of Xaltocan in the northern Basin. Xaltocan’s island location provided abundant locally available resources including waterfowl, fish, reeds, and insects. People would have been attracted to the site because of the wealth of resources offered by its lacustrine setting, enabling Xaltocan to grow into an important regional center controlling much of the northern lake bed in pre-Aztec times. Evidence suggests that Xaltocan’s commoners were actively processing lake resources during the Early Postclassic (AD 900-1200). However, as a result of political, social, and environmental changes, patterns of lake exploitation shift over time.

De Marigny, Elizabeth (Department of Anthropology, The University of Texas at Austin)

- [386] *Applications of Behavioral Economics: Understanding the Effects of Roman Conquest on Late Iron Age Castro Culture Ceramic Production*

Through a comparative analysis of ceramic materials from three archaeological sites, including Bracara Augusta, the Cítânia de Bríteiros, and the Cidade de Bagunte, this research explores the effects of Romanization on the production and use of ceramic materials from the Castro Culture of northwest Portugal. This research applies several principles from Behavioral Economics to study the possible mechanisms that influenced consumer decision making as well as the risk tolerance of a producer’s willingness to engage in production-related activities whose outcome is uncertain (Cosgel 2009:85). As imported Roman wares were introduced, there was a growing demand by local groups to obtain these items. As these ceramic forms became esteemed, social preference for them would have increased. A potter’s choice to begin producing imitation wares carried a low risk tolerance because the demand for low cost imitations likely would have been profitable. Thus, the production of imitation wares indicates that local potters were adapting to a changing economy as well as changing social preferences. This research aims to demonstrate how the effects on production and use of pottery within this region derived from both social and economic demands.

de Oliveira Freitas, Fabio [302] see Kistler, Logan

De Pol-Holz, Ricardo [248] see Latorre, Claudio

de Smet, Timothy [213] see Schaefer, Jonathan

De Tomassi, Mirko (Universidad de California, Merced)

- [396] *Maya Funerary Practices and Their Significance in Reproducing and Maintaining Social Status and Identity: Evidence from Copan, Honduras, and Palenque, Mexico*

Susan Gillespie remarked the importance of human body and funerary ritual in the process of transmission of

memory and legitimization of social status among Maya royalty. Would this process be visible in domestic contexts, too? To answer this question, I chose to study domestic funerary record, context where an archaeologist can find the reflection of collective ideas and individual attributes of deceased. Thorough the analysis of several pre-Hispanic Maya burials I will try to demonstrate that funerary activities were, in part, a means to mark or re-define social status; this was possible by merging collective ideas and individual characteristics of deceased considered important to living people. Evidence from Copan Valley shows Late Classic period Maya seem to have been mainly concerned with question of family membership and age, related to social status. Therefore, the Maya used bodies of specified individuals as a means to convey messages. Kings or members of royal families were persons whose bodies were charged with symbols representing dynasty properties and memories. In domestic burials, individuals holding social positions or presenting peculiar biological characteristics were treated in specific ways. Ostentation of such attributes allowed members of their social groups to legitimate their position in the social continuum.

de Vera, Caterina R. [417] see Herrera-Herrera, Antonio V.

de Vera, Caterina R. [417] see Lambrecht, Glenn

de Vera, Caterina R. (Archaeological Micromorphology and Biomarker Lab, ULL, Tenerife, Spain), Antonio V. Herrera-Herrera (Archaeological Micromorphology and Biomarker Lab.,) , Carla Hernández-Gaspar, Acarelys M. Cabrera-Rodríguez and Carolina Mallol

[417] Lipid Biomarkers Analysis in Cueva Pintada de Gáldar (Gran Canaria, Spain): A Study of Possibly Charred Organic Sediments

Cueva Pintada de Gáldar is a pre-european archaeological complex in Gran Canaria that was discovered in 1873 and nowadays is an Archaeological Park and Museum. It comprises a hillslope with numerous dwellings, some of them partially carved into the hill, and "Cueva Pintada", a ritual cave at the core of the settlement. The complex constitutes a referential archaeological monument in Gran Canaria and in aboriginal times, it was possibly of importance to the island's pre-European society. Although the site's material record has been extensively studied, including pottery, lithics and faunal and shell remains, the anthropogenic sedimentary record remains unexplored. Our team is currently carrying out integrated microscopic and biomolecular studies to gain further behavioral information. As part of this research program, we analyzed two samples of black, apparently charred sediment from one of the dwelling. Here, we present the results from lipid biomarker analyses of these two samples.

De Vicente Chab, Esteban (Departamento Municipal) and José Trinidad Escalante Kuk (Departamento municipal)

[71] La gestión del patrimonio arqueológico desde el modelo municipal de Mérida, Yucatán: Análisis y perspectivas

La gestión del patrimonio cultural en México y particularmente el arqueológico, representa retos diversos para lo cual la participación de todos los niveles de gobierno y sociedad civil es crucial, más ahora en la que el estado sociopolítico y económico nacional plantea grandes disyuntivas. Crear y generar estructuras e instrumentos que permitan el fortalecimiento y coadyuvancia para la protección, conservación, difusión y divulgación del patrimonio arqueológico, es decir, su puesta en valor, debe ser una vía a tomar en cuenta con más fuerza. En el municipio de Mérida, Yucatán, desde 1998 se han creado y fortalecido áreas con el fin de coadyuvar en tareas que aporten en la gestión del Patrimonio Cultural. En el caso del patrimonio arqueológico, y en el contexto de la normativa federal, se han explorado instrumentos y acciones encaminadas a la visibilización de dicho patrimonio en los programas de desarrollo urbano y el crecimiento de las manchas urbanas, así como la puesta en valor de sus ejemplos edificados, resultando en un modelo a considerar, con sus ventajas y desventajas.

De Vore, Steve [262] see Blakeslee, Donald

Deadly, Tucker

[46] Ancestral Puebloan Settlement Patterns of Redwood Llama Ranch: Analysis of GIS and Fieldwalking Survey

Archaeological survey of 800 acres at Redwood Llama Ranch in southwest Colorado documented over 50 previously unrecorded archaeological sites. A 2016 survey, completed as a settlement pattern study using a landscape archaeology framework, explored the extent of Ancestral Puebloan habitation and activity within this property situated in a canyon and on the above mesa. The results of this study, as determined through pedestrian survey and GIS analysis, revealed three main phases of occupation between the late Pueblo I and early Pueblo III periods. These three phases saw a general trend of expansion from habitation mainly surrounding the canyon rim to a final movement both outward onto the rolling mesa top and into the depths of the canyon before its abandonment in the AD mid-1200s. The evidence for these trends was provided through diagnostic ceramic and lithic material as well as architectural remains. This progression reflects regional tendencies and provides a basis for a dialogue on effects of climate, aggregation of communities, transfer of knowledge, and contact throughout the Four Corners region.

Dean, Emily (Southern Utah University)

[223] Involve Me and I Learn: Archaeology, Experiential Education, and Collaborative Research with SUU Undergrads

By partnering with federal land agencies, local landowners and developers, regional non-profit organizations, state museums, and county libraries, Southern Utah University (SUU) archaeology students gain access to valuable

experiential learning opportunities, build their professional resumes, practice service learning, and help educate the public about the importance of preserving the past. This presentation focuses on SUU's forays into community archaeology and public-private partnerships in the Colorado Plateau region, specifically discussing our past archaeological field schools in Kanab and New Harmony, Utah, and our ongoing collaborative work with the Colorado Plateau Archaeological Alliance in the Vermillion Cliffs Wilderness Area, Grand Staircase Escalante National Monument, and Nine Mile Canyon. In addition to conducting fieldwork, our undergraduate students help design and serve as docents for local exhibits on archaeology and anthropology. Beyond contributing to our understanding of the ancient inhabitants of the region and providing professional development opportunities for our students, we find that these projects help foster friendly cooperation between 'the public' and academic and government researchers in a region where local distrust of 'government' is all too common.

Dean, Jeffrey (University of Arizona)

[194] *Discussant*

DeAntoni, GeorgeAnn [294] see Schneider, Tsim

Deaver, William (WestLand Resources, Inc.) and Mark Chenault (WestLand Resources, Inc.)

[194] *Archaeomagnetism and Hohokam Platform Mounds: Reframing the Classic Period Chronology*

In this paper, we present an overview of changes during the Hohokam Classic period relative to the platform mound developmental sequence as documented during the 1968 and 1984 excavations at Las Colinas Mound 8 and the 1973 excavations at Escalante Ruin Group. Using the archaeomagnetic data collected from Las Colinas Mound 8 and the Escalante platform mound, we establish chronological mileposts during the Classic period corresponding to the mound construction sequence. We then propose a working chronology for the Hohokam Classic period framed relative to the platform mound developments: Pre-Mound, Mound 1 (Soho), Mound 2 (Civano), and Post-Mound. Turning next to the large body of archaeomagnetic data from Classic period contexts in the Phoenix basin, we link individual contexts to this working chronology and explore trends and developments in architecture and material culture over the course of the Classic period.

DeBlasis, Paulo (Museu de Arqueologia-USP) and Maria Dulce Gaspar (Museu nacional UFRJ)

[33] *The People of the Lagoon: Sambaquis and Ecological Management on the Southern Brazilian Coast*

Sambaquis (shellmounds) are conspicuous structures at ecologically productive and diversified coastal settings along the Brazilian extended seashore. We have studied one of those hot spots in some detail. At Santa Marta lagoon area, on the southern coast, mound builders have long occupied this dynamic Holocene setting (circa 8 to 1 ky BP), thriving into dense and territorially stable social organizational structures. This long and apparently undisturbed convivial with an ever-changing environment and its ecology seems to have led to technological refinement and resource management and intensification. We consider some evidence in this regard, and a few exploratory ethnographic proxies.

Debowksi, Sharon and David Doyel (Arizona State Museum)

[366] *The World as His Oyster: Our Journey with Alan Simmons*

Our journey with Alan Simmons began in Tucson, Arizona as graduate students at different institutions working for the Arizona State Museum. Through time we grew together personally and professionally and maintained contact even though often separated by space. Alan recognized early on that to get ahead he had to act on opportunities that came his way, a characteristic that would help define career. We worked together for the Navajo Nation Archaeology Program located on the Colorado Plateau, an arid region of striking beauty with a splendid archaeological record and still-living Native peoples. Here, Alan was able to pursue his interests in the Southwestern Archaic period and the origins of agriculture; among his contributions was the discovery of maize pollen in an early temporal context that was reported in American Antiquity. Subsequent opportunities took him to Kansas and Nevada. For years he worked in both the New and Old Worlds, but eventually the sway of the Old World won out and by the time he joined the faculty at UNLV in the early 1990s he had returned full time to his interests in the Near East and the Mediterranean. It has been a journey of places, people, work and fun.

DeBry, Robert [260] see Semanko, Amanda

DeBry, Robert (New Mexico State University) and Kristin Corl (University of Texas San Antonio)

[263] *An Alternative Explanation for a Modified Rabbit Innominate Spatulate Tool*

Bone tools are not always recognized in a zooarchaeological analysis, and often once identified, the function or use is even more difficult to define. A modified rabbit innominate found by the authors in two Jornada-Mogollon sites presented here is one such example. The authors aim to both increase awareness of these tools, and present an alternative functional use than currently proposed. The form of identified tools fit well with Shaffer's (1990) description of a modified rabbit innominate spatulate tool identified in the NAN Ranch and Pottery Mound assemblages. Use-wear analysis, suggested that these tools may have been used to process animal hides or

scrape food from inside a ceramic vessel. We suggest an alternative function for this tool type; using experimental and observational techniques, we show if slightly modified, the transverse profile of the iliac blade is a perfect fit to the rim flair on several types of pottery prevalent in the Mimbres/Jornada-Mogollon region. Suggesting this tool, uncommonly, is not only representative of a manufacture process, but can also be seen as an extension of a cultural tradition selectively expressed by members of the larger population.

Decker, Jeremy (US Army Corps of Engineers)

- [241] *The Cerrito Site Monitoring Study: Adaptive Management of Recreation within a Significant Archaeological Site*

In an effort to better understand the impacts of opening recreational hiking trails near significant archaeological sites, the US Army Corps of Engineers, Albuquerque District, has initiated a study to monitor visitor access to the Cerrito Site, an early historic Ancestral Puebloan site at Abiquiu Lake in northern New Mexico. The study uses trail cameras and repeated monitoring of artifact distributions across the site to determine impacts from hikers, and to provide insight into future adaptive management practices to preserve and protect this important archaeological site. The data from this project will be used to inform future management decisions related to the preservation of archaeological sites in heavily-trafficked recreation areas.

Dedrick, Maia (University of North Carolina at Chapel Hill)

- [227] *Moderator*

Deen, Georganne and John Pohl

- [243] *The Cult of Xochipilli*

Xochipilli, the Flower Prince, was widely revered through various manifestations as the patron god of the noble classes throughout southern Mexico. As such he was credited with patronage over palaces, royal marriages, feasts, wealth finance, and belief in an exclusive elite afterlife and ancestor cults for confederations of Eastern Nahuas, Mixtecs, and Zapotecs together with those they dominated throughout southern Mexico

deFrance, Susan (University of Florida) and Elizabeth J. Olson (University of Northern Illinois)

- [290] *Tiwanaku Pastoralism, Highland Bofedales, and Grasslands in Far Southern Peru: Creating a Strontium Baseline and Isoscape to Understand Cultural Connections*

Camelid pastoralism was an economic mainstay of the Tiwanaku Empire (~AD 600-1000). Communities of colonists in Moquegua, Peru were connected to their Tiwanaku capital near Lake Titicaca through an informal trade route traversing the altiplano. One component of Tiwanaku hegemony involved the movement of goods via llama caravans between the capital and the colonies. If Tiwanaku pastoralism was focused in the highlands, then camelid herding was part of an economic system integrating disparate, but interdependent, communities. Alternatively, pastoralism focused at lower elevations would suggest the colonists created economic autonomy. The analysis of carbon, nitrogen, oxygen, lead, and strontium isotopic signatures in animal bone is useful for discerning animal origins and movement. Radiogenic strontium isotopes are particularly useful markers of animal provenance. To determine the origin of archaeological animals, the strontium signature of local habitats and the spatial and temporal variability of strontium is needed. To establish a strontium isoscape for the trade route, we surveyed over 27,000 square kilometers and variably sampled water, sediment, plants, animal bone and dung from thirty-one highland bofedales and grasslands. We report the results of the strontium isotopic analyses of these materials and their implications for Tiwanaku pastoralism, culture contact, and use of environmental habitats.

deFrance, Susan [306] see Moseley, Michael

DeGayner, Jacob (National Park Service) and Iraida Rodriguez (National Park Service)

- [85] *Repeat Laser Scanning for Deformation Analysis in Prehistoric Earthen Architecture Rockshelter Sites: A Case Study at Tonto National Monument*

Terrestrial laser scanning has emerged as a versatile tool and standard practice for the documentation, analysis, and storage of spatial information related to cultural resource management. While laser scanning surveys are completed with multiple outcomes in mind, cultural resource managers often maintain the expectation that the data collected can be readily compared to previous or subsequent surveys to assess spatial dynamics within the site. This presentation explores a case study at the cliff dwellings of Tonto National Monument, using two sets of data collected at an approximate interval of 13 years. The presentation discusses the advantages and challenges of performing data comparison in a rockshelter context, including registration and georeferencing techniques, error budget calculation and verification, and the effects of significant changes to instrument specifications between data collection epochs.

DeGeorgey, Alex [401] see Newland, Michael

Degryse, Patrick (KU Leuven), Sarah Dillis (KU Leuven), Alicia Van Ham-Meert (KU Leuven) and Andrew Shortland (Cranfield University)

[363] *The Origin and Spread of Antimony as a Raw Material in Metal and Vitreous Materials Making: From the Bronze Age to the Roman Period*

Antimony has a long history of use in metallurgy and glass making. The first attestation of Cu-Sb alloys dates to the 5th millennium BC (e.g. Nahal Mhismar), while its widespread adoption started around 3500 BC. Metallic antimony objects are reported in Mesopotamia (e.g. Tello, Tell Leilan, Assur, Hasanlu, Carchemish) and more abundantly in the southern Caucasus (e.g. Chambarak) from 3000 BC onwards. Sb was also commonly used as an opacifier and colourant in glass made in late Bronze Age Egypt and Mesopotamia. From the Greco-Roman period onwards, antimony is used as a decolourant in the large-scale glass industry, while its occurrence in metallurgy is much more rare.

Many questions pertain on the geographical location and nature of Sb extraction and on the nature of its adoption in several technological processes. This paper identifies the primary origin of the Sb raw materials used, tracing sources through a mineralogical and chemical characterisation of different Sb-rich ores from various regions. It compares the origin of the mineral resources used for the glass craft with the development of metallurgy, in order to reveal the interrelation of these two industries.

DeLance, Lisa (University of La Verne)

[411] *Multi-Sited Field Curation Methods: The Belize Valley Archaeological Reconnaissance Digital Archive Project*

Since 1988, the Belize Valley Archaeological Reconnaissance Project has actively excavated archaeological sites throughout the Belize River Valley, resulting in a plethora of archaeological material elucidating nearly 3,000 years of human occupation. Beginning during the 2017 field season, the BVAR Digital Archive Project aims to curate, consolidate, and centralize 30 years of archaeological material and artifact analyses into a single database. Field curation methods include: assigning site specific accession numbers and object identification numbers to each special find, photographing, and entering provenience information for each artifact into a centralized database using the PastPerfect® Museum Software platform. This approach allows researchers to examine regional trends in the creation and usage of artifacts while also making the information readily accessible to researchers. Although in its infancy, the BVAR Digital Archive Project has already elucidated artifactual connections between archaeological sites and time periods within the Belize River Valley, providing researchers with a more holistic, regional picture of Ancient Maya lifeways.

Delgado Espinoza, Florencio and Josefina Vasquez Pazmino (University of Florida / Universidad San Francisco)

[350] *Community Archaeology in Coastal Ecuador: Balancing Interests*

More than 20 years ago, research in Agua Blanca, Manabí, changed the way in which archaeology in Ecuador was performed. Local community involvement in archaeology research took an active role. Since then, both Indigenous and peasant communities have called upon archaeologists that can collaborate with them on studying the past they consider as theirs. In many instances, results are perceived as key on land claims and identity building. The archaeology faculty at the Universidad San Francisco de Quito created the program "Arqueología Comunitaria" in 2012 which basically engages in collaborative efforts that are above all the result of community initiatives. Here we present three cases to show how academic interest on archaeological research and community interests can be negotiated from the beginning to the end of the projects.

Delgado González, Carlos [289] see Bélisle, Véronique

D'Elia, Ashley [125] see Pearson, John

Dello-Russo, Robert and Vance Holliday (University of Arizona)

[187] *Paleoindians Beyond the Edge of the Great Plains: The Water Canyon Site in Western New Mexico*

Preserved in the complex cut-and-fill stratigraphy of an alluvial fan, the Water Canyon site represents one of the most notable and rare Paleoindian sites in the American Southwest west of the Pecos River for having an in situ, stratified multi-component Paleoindian record. Paleoindian cultures currently represented at the site include Clovis, Folsom, Cody-Eden, probable Allen-Frederick, and an unnamed Late Paleoindian. In addition, the preservation at the site of an extensive buried wetland deposit provides a robust proxy archive for the reconstruction of the paleoenvironment over the terminal Pleistocene-to-early-Holocene transition (~13,100 - ~8300 cal yr BP).

Archaeological remains within this deposit currently include two Cody-Eden *Bison antiquus* bone-beds – one the remnants of a kill with an associated in situ Eden point and the second an open-air processing locale – and an Allen-Frederick era *Bison antiquus* bone bed (processing area) with associated flaked and ground stone artifacts and an ephemeral hearth. Research challenges include accurate determination of age for Eden kill bone-bed in Locus 5 and nature and extent of Clovis processing area in Locus 6.

Dello-Russo, Robert [413] see Kurota, Alexander

Delsol, Nicolas (University of Florida)

- [153]** *Maya Butchers in Santiago de Guatemala: A Technological Analysis of the Disassembling of Cattle in Colonial Guatemala*

In colonial Guatemala, cattle constituted a vital element of Hispanic lifestyles through the supply of meat but also by providing basic materials necessary to a multitude of crafts. By the mid-sixteenth century, this flowering industry was thriving thanks to the rapid growth of herds. While the butchering techniques were likely to have been imported from the Old World together with the livestock, the historical documentation suggests that Native wage laborers provided the bulk of slaughterhouse workforces. In this paper, I will explore the extent to which butchery practices differed from the pre-Columbian ways of disassembling the animals and what the likely consequences of colonization were on the Maya butchers. I use technological approaches (*chaîne opératoire*) combined with zooarchaeological (butchery marks), ethnographic, and historical evidence to investigate how these new practical constraints and rules concretely affected the gestures and even the body techniques of the workers. This paper will also highlight how a detailed analysis of the butchery marks and the reconstruction of the gestures and implements are likely to provide information on several aspects of the craft such as the settings of the butchering facilities and the rate of work.

DeLuca, Anthony (University of Texas at San Antonio)

- [221]** *Tying Sacred Places to the Landscape in Jalisco, Mexico*

People in the Tequila valleys region of Jalisco, Mexico constructed unique circular, ceremonial, monumental architecture. The public architecture has been previously argued to represent the Mesoamerican cosmos with the central altar representing a sacred mountain. I explore whether this public architecture shared in the Mesoamerican tradition of tying sacred spaces to sacred places on the landscape through the construction of sightlines towards prominent elevations on the landscape. I conduct a series of GIS viewshed analyses to look for common mountain features shared by two or more sites located in different areas of the Tequila valleys. I then tested the results of my analyses to look for statistically significant patterns in the direction of orientations towards mountains, distance from mountains to sites, and number of orientations per site. The aim of this study is to provide a preliminary assessment of whether certain alignments predicted by evidence elsewhere in Mesoamerica may be ruled out in this region of Jalisco.

- [221] Chair**

Delvaux, Thomas [37] see O'Mansky, Matt

Demarest, Arthur (Vanderbilt University)

- [303]** *All Roads Lead to the Verapaz: The Northern Highlands as a Nexus of Classic Period Exchange*

Prior to the Vanderbilt projects the Alta Verapaz was one of the least explored regions of the highlands with previous research limited to some test pits and cave explorations. With few known impressive constructions or monuments, the Alta Verapaz was assumed to be peripheral to both highland polities and the lowland Classic Maya cities. Vanderbilt excavations and cave explorations along the Verapaz corridors, however, demonstrated that important exchange routes with the Central Highlands, Baja Verapaz, Quiche, and lowlands passed through the Alta Verapaz. Abundant imitation Tzakol ceramics in caves on principal routes suggest lowland cultural, not political, dominance of Early Classic period Verapaz routes. In contrast, 2017-2018 investigations of Verapaz sites revealed that in the Late Classic period Alta Verapaz sites exercised control of the routes, as well as production and interregional distribution of figurines and ceramics and exchange of jade, obsidian, and pyrite with ethnohistorical evidence suggesting probable production and exchange of cotton, cacao and quetzal feathers. These explorations, projects, and compositional analyses show that the southwestern Late Classic lowland Maya border region was culturally in the shadow of the Verapaz highlands. Ongoing investigations in terra incognita are changing models of economic power in the highlands and beyond.

- [165] Discussant**

Dempsey, Anna (University of Nebraska-Lincoln) and Leigh A. R. Cominiello (Crow Canyon Archaeological Center)

- [261]** *Laying the Groundwork: A Preliminary Analysis of Manos from the Basketmaker Communities Project*

The data potential of grinding tools has been neglected by archaeologists since the beginning of research in the American Southwest. The study of ground stone provides an excellent opportunity to examine important aspects of life in the Pueblo past, including food production and gender, and therefore should not be overlooked. This paper uses methodology adapted from Jenny L. Adams's Ground Stone Analysis: A Technological Approach (2014) to analyze manos collected by the Crow Canyon Archaeological Center during their Basketmaker Communities Project. Artifact attributes such as increased coarseness, design, use-life, and efficiency were examined. Comparisons were made between the mano assemblages from six sites within a 1,200-acre project area. These consist of three Pueblo II period sites and three Basketmaker III sites, including the Dillard site, which is a large, multi-habitation site with a great kiva. The results not only show a diachronic change in mano forms and use-life but reveal a difference in grinding needs between an atypically large site and more average-sized sites.

DeMuth, Robert (Indiana University - Bloomington), Joshua J. Wells (Indiana University – South Bend), Kelsey Noack Meyers (LG2 Environmental Solutions, Inc.), Eric Kansa (Open Context) and Stephen Yerka (Eastern Band of Cherokee Indians THPO)

[77] Examining Archaeology, Society, and the Promise of Integrating 'Big' Data from Archaeological and Non-archaeological Sources

In order for digitally published data to be useful it has to be useable, and in the case of big-data, interoperable with other data sources. This paper explores one way in which this can be accomplished through an examination of how archaeological site densities across the eastern and midwestern United States relate to social factors such as poverty, income, racial demographics, and historically disadvantaged regions over the past five decades. These analysis was accomplished through the use of data gleaned from county level summary statistics from past United States Decennial Censuses from 1960 to 2010 and the Digital Index of North American Archaeology (DINAA). (DINAA is a collaborative, multi-state effort to create an open, secure, queryable database of archaeological site data/densities across North America). Combining these datasets, while seemingly straightforward, was particularly difficult due to issues of standardization across DINAA's various partner states. Through this analysis, we hope to demonstrate the ways in which archaeology as a discipline is a reflection of American society, and identify potential biases in archaeological practice. Additionally, this paper illustrates the need for data publishers to utilize common identifiers in the structure of their published data.

DeMuth, Robert [87] see Wells, Joshua J.

Dennehy, Timothy, Christopher Merriman (UNM) and Keith M. Prufer (UNM)

[219] Preparing for Life on the Move: Lithic Platform Characteristics and Forager Mobility

Lithicists use various attributes of chipped stone tools to characterize hunter-gatherer technological organization, which is thought to be partly determined by mobility patterns of these groups; thus, lithic attributes serve as proxies for the amount and type of mobility practiced. In particular, lithic platform preparation has received attention as an important, reliable indicator of extra care taken to better utilize lithic cores for the production of stone tools. Greater preparation is indicated by increasingly complex platform types: cortical, simple (or plain), complex (or faceted/rounded), and abraded (or ground). In this study, we examine lithic assemblages from three rockshelters in southern Belize, each of which contain cultural materials dating from the Late Paleoindian/Early Archaic transition (~10,000BP) through Late Archaic (5000-2900 BP) time period. This era witnessed a transition from a foraging lifestyle to a horticultural one, and saw the first stratified societies emerge from otherwise egalitarian roots. Because mobility plays such a crucial role in these processes, a clearer picture of both can be gained by assessing the changes to mobility that accompanied them. By analyzing platform types in each assemblage, we trace changes in lithic technological organization and mobility through time over the course of a dynamic 7000-year period.

Dennett, Carrie [191] see Werner, Patrick

Dennett, Carrie (National Museum of Natural History, Smithsonian Institution, Washington, DC)

[191] On the Shoulders of a Giant: Unpacking the Ceramic Economy of Greater Nicoya

All important things are built 'on the shoulders of giants,' and in Greater Nicoya our giant is Frederick W. Lange. Over the years Fred has broken a lot of ground, likely an equal number of quills, architected our principal paths of inquiry, and inspired more than one generation of archaeologists. Through our own narrow lens, however, his greatest contribution came the day he conceived of the Greater Nicoya Ceramic Project (GNCP). We begin with a brief historical overview of Fred's many contributions to ceramic studies, with an emphasis on the ways in which the GNCP has set the stage for and guides our own compositional research. As a complement to instrumental neutron activation analysis (INAA), ceramic petrography helps to visually characterize or 'make real' the abstract, intangible data generated by the GNCP. Using case studies from Nicoya, Costa Rica, and Granada, Nicaragua, we unpack the evolution of pre-Columbian ceramic economy research in Greater Nicoya. From sherds to neutrons to volcanic debris, we have moved from once viewing the ceramic archaeological record as a sea of somewhat homogeneous ceramic debris to a nuanced appreciation of major ceramic-producing zones, centers, and individual communities, and how they interacted with one another across time.

[191] Chair

Dennison, Meagan (University of Tennessee, Knoxville)

[34] Stable-Isotope Analysis and Dental Micro-Wear Texture Analysis of Domestic Dogs from the Tennessee River Valley

In the Southeastern United States, the relationship between indigenous peoples and their domestic dogs is known to be long and complicated. Dog burials and dog skeletal remains are ubiquitous from archaeological sites in the region from as early as 7,000 years ago through the Historic Period. A previous paleopathology study of Archaic, Woodland and Mississippian dogs from the Southeast (Warren 2004) revealed lifestyle changes of dogs through time, perhaps related to changing human settlement patterns. In general, these past dogs likely served an integral role in foraging and hunting, and as social companions, garbage disposers, and alarms/guards. Dietary analyses of archaeological dogs can reveal a more nuanced understanding past dog-human interactions by detailing the management practices of dogs (Guiry 2012). This paper presents the results of dental micro-wear texture analysis and stable-isotope analysis of more than 50 individual dogs from the Tennessee River Valley and the Etowah Mound Site in Georgia. Each dog was recovered as a burial, therefore skeletal and mortuary data are also used here to explore the treatment and management of dogs during the Archaic, Woodland and Mississippian Periods.

[281] Moderator

Dennison, Rory (University of Illinois at Chicago)

[300] Kilns, Chiefs, and Trade: Precolonial Tradeware from the Philippines and Fujian examined through LA-ICP-MS

Before the expansion of European interests into East Asia, a maritime network was established between imperial powers and Southeast Asian polities that connected artisans, merchants, chiefs, farmers, foragers, and others. This Early Historic period was a time of important developments that set the stage for later exchange systems. Given the size and complexity of this system, a scalar approach that examines local, regional, and interregional systems, can help to explain the process involved. This presentation will consider both production and distribution by examining polities in the Philippines and Kiln locations in Fujian, China through the comparison of tradeware chemical signatures obtained through Laser Ablation Inductively Coupled Plasma Mass Spectroscopy (LA-ICP-MS).

Contrasting how tradeware vessels were obtained, distributed, and used within and between three Philippine polities (Manila, Cebu, and Tanjay) will highlight the different political structures and means by which individuals could have engaged with the system. Secondly, this research will examine the differentiation and overlap of kiln sites from southern China (Dehua, Lulin, Gou Tou Shan, and Zhangzhou wares). This research highlights the potential of a chemical approach and produces results which show the interaction of local kilns and polities within a larger regional and interregional framework.

Déodat, Laure [307] see Darras, Véronique

Der, Lindsay (The University of British Columbia)

[149] From Margin to Center: Bias and Discrimination in Archaeology

That archaeology is welcoming to only a narrow subset of society -- that is, cisgender, heterosexual, able-bodied, white men -- and far less so to most of us is an open secret. #MeToo stories; the blinding whiteness of the academy, the field, and the museum; and the prohibitive costs of many field schools exemplify archaeology's culture of discrimination. This paper seeks to flesh out our anecdotal experiences with data. In what ways, forms, and under what conditions does archaeology discriminate against underrepresented groups? How does bias affect career pathways? What interventions might we, as archaeologists, make to address inequity? This paper will provide an overview of the state of North American archaeology for marginalized people. By understanding the scale and structural factors of the systemic discrimination that is pervasive in our discipline, we can take the first steps toward concrete solutions.

[149] Chair

Dering, Philip [36] see Hanselka, Kevin

d'Errico, Francesco [338] see Stratford, Dominic

Dersam, Scott (University of Wyoming)

[46] Dynamic Cultural Landscapes: Testing an Alpine Archaeological Probability Model for Efficacy in the Northern Absaroka-Beartooth Wilderness of Wyoming and Montana

This study tests the efficacy of an established alpine archaeological site probability model by applying it to the alpine regions of the Northern Absaroka-Beartooth Wilderness (NABW) of Wyoming and Montana. Created by Paul Burnett and Lawrence Todd, the model was specifically designed for the southern portions of the greater alpine region of the Greater Yellowstone Ecosystem (GYE). Testing the model in a new location aids in verifying the model's utility and potential to discover additional variables that improve the model's efficacy at predicting site locations. The variables used in the model presumably help track differences in landscape use over time and account for the ways evidence of prehistoric human activities is distributed in the alpine region. This model and its variables have proven effective in predicting the occurrence of archaeological materials in the alpine.

DeSantis, Larisa R.G. [80] see Burtt, Amanda

Desilets, Michael [129] see Toney, Joshua

DeSilva, Upuli (University of Oklahoma), Brittany Bingham (University of Oklahoma), Kenneth Gobalet (California State University), Cyler Conrad (Los Alamos National Laboratory) and Brian Kemp (University of Oklahoma)

[9] Importation of Salted Atlantic Cod (*Gadus morhua*) into San Francisco, California during the Gold Rush-Era (ca. 1849-1855)

Records from the Gold Rush San Francisco Bay Area indicate that food items were imported to offset the depletion of once abundant wild food sources. Fish were a large part of human diets during the Gold Rush, and while we know that Pacific cod (*Gadus macrocephalus*) were fished later in the 19th century, it is unclear whether they were fished during the Gold Rush era due to difficulty in commercially capturing these fish at the depths at which they reside. We analyzed vertebrae recovered from this era to determine whether Atlantic cod (*Gadus morhua*) were important to offset food scarcity. Ancient DNA methods were used to extract and analyze DNA from five vertebrae. A region of

the mitochondrial genome known to distinguish Pacific cod from Atlantic cod was then amplified, and the products were sequenced. Four of the five samples were identified as Atlantic Cod, while the fifth sample was only identifiable to the genus level (*Gadus* spp.), suggesting that this species of fish was, in fact, imported to the San Francisco Bay Area during the Gold Rush era.

Deskaj, Sylvia [42] see Galaty, Michael

Desrosiers, Dianne

[7] *Discussant*

Deter-Wolf, Aaron [97] see Moore, Michael

Deter-Wolf, Aaron [415] see Peres, Tanya

Dewan, Eve (Brown University)

[107] *Mission to Survive: Catholic Education, Childhood, and Community on the Grand Ronde Reservation*

One of the treaty rights guaranteed by the United States government to the more than two dozen Tribes and Bands that were removed to Grande Ronde, Oregon, in the nineteenth century was a formal education. Over the years, that education has taken many forms as children from Grand Ronde have attended several different schools, both on and off the Reservation. These included Chemawa Indian Boarding School, the Government-run Agency school, and multiple iterations of a Catholic school. This presentation will address new and ongoing research on the schooling that took place at St Michael's Parish from the 1860s through the early twentieth century. Remote sensing and geophysical survey have revealed new information about the different structures that were part of the early Catholic community and historical Reservation landscape. These are complemented by archival documents, which illuminate the perspectives of some of the first priests and nuns who came to Grand Ronde. Together with oral histories and community members' stories, these sources offer a fuller understanding of the history and legacy of education at Grand Ronde.

[107] *Chair*

Dewar, Genevieve [32] see Stewart, Brian

Dewar, Genevieve (University of Toronto) and Brian Stewart (University of Michigan)

[33] *Foragers, Herders and Harvesters: Modeling Shifts in Late Holocene Subsistence Strategies on South Africa's West Coast*

The Western Cape coastline of South Africa has been inhabited by hunter-gatherers for over 120,000 years, making it an excellent place to test models of human behavioural ecology. Of particular interest is the transition at 2000 years ago from a sedentary maritime strategy focused on intensive mussel exploitation (Megamidden Period) to three concurrent approaches using high levels of mobility: a generalist foraging strategy (wide diet breadth); the introduction of herding; and mass harvesting coastal and terrestrial resources. Each of these strategies has various social implications including ownership and storage versus sharing, and yet to date there is very little evidence for competition for resources or boundaries. Populations maintained opportunistic immediate-return strategies rather than reverting back to the logistical strategies of the Megamidden period. After decades of research on this arid coastline, it remains uncertain if these represent one, two, or even three different cultural groups. What is clear is that the greatest focus on marine resources occurs during periods that are cooler and wetter than today (high productivity) and yet they are expressed in very different forms: the Megamidden period occurs during the Neoglacial and mass harvesting during the Little Ice Age.

DeWitte, Sharon (University of South Carolina)

[310] *Sex-Specific Patterns of Survival in the Context of Urbanization and Environmental Change in Medieval and Post-medieval London, England*

Medieval and post-medieval populations in England experienced several crises, including famines and plague epidemics. These occurred at a time of increasing social inequality, urbanization, and shifting climatic conditions. This study examines temporal trends in survivorship (as a proxy for health) by sex from 1000-1739 AD using a sample of 1250 adult skeletons from London cemeteries dated to the following periods: 1000-1200 AD (n = 275), 1200-1250 AD (n = 271), 1350-1540 AD (n = 310), 1569-1670 AD (n = 212), and 1670-1739 AD (n = 182). There is significant variation in mean survival time for both sexes across these periods. Estimated survivorship declined prior to the Black Death. Survivorship is highest just after the Black Death, c. 1350 - 1540. Survivorship drops in 1569-1670 but appears to improve for males, but not females, thereafter. These results suggest that improvements in health, which could have occurred because of improvements in standards of living following the Black Death, might have been lost as the population and available resources achieved a new equilibrium from 1569-1670. The apparent upward trend in male survivorship in 1670-1739 might reflect gendered differences in access to resources or exposures to stressors at this time.

Dhanoa, Purdeep [270] see Garcia-Des Lauriers, Claudia

Dhody, Anna [131] see Leader, George

Dhody, Anna (Mütter Museum of The College of Physicians of Philadelphia), Jennifer Klunk (McMaster University, Ontario, Canada), George Leader (The College of New Jersey, Ewing NJ), Kimberlee Moran (Rutgers University, Camden, NJ) and Nicholas Bonneau (Rutgers University, Camden, NJ)

[131] Searching for Biomarkers in Dental Calculus in the Arch Street Project Skeletal Remains

The human remains from the Arch Street assemblage offer a unique opportunity to use nondestructive sampling techniques to study the population from the later 18th to early 19th century of Philadelphia. Many of the human remains contain at least partial dentition with calculus deposits present. The calculus is sampled and pathogenic biomarkers identified. Pathologies that are typically retained for a longer during illness such as tuberculosis and syphilis may have manifested in the calculus deposits. These results can help provide us with an idea of the overall health of the population of the cemetery during its active span (ca. 1702-1859) and perhaps provide insights into the rise and fall of certain pathologies as America approached the industrial revolution. This paper presents procedural methods of sampling as well as preliminary results from the analysis.

Di Naso, Steven (Indiana State University), David Dove, Winston Hurst and William Lucius

[420] San Juan Redware Economy: Tracking the Pottery of Montezuma Canyon to the Great Sage Plain

Montezuma Canyon, in extreme southeast Utah, was home to large populations during the Basketmaker III through PIII period (AD 500-1300). Potters located throughout this deeply-incised, 73 km long north-south running canyon, produced San Juan Redware pottery in abundance well-beyond the needs of the village. Archaeometric evidence indicates that locally produced pottery at some sites moved in all directions and vessels were being carried out of the canyon as far as 75km away. Through analysis of pottery and clay found proximal to major sites, we traced the pathways of hundreds of sherds from producer to consumer. Population centers in southwestern Colorado imported large numbers of redware vessels from southeastern Utah, including those found in Montezuma Canyon. Although previous research may have identified patterns of interaction between villages through identification of geochemically-similar pottery recovered from sites in southeastern Utah and elsewhere, this research established provenience between the cultural landscape (ceramics) and the geographic landscape (clay). Thus, we identified villages that produced San Juan Redware and villages that consumed it within, and outside of, the canyon. By establishing the geochemical fingerprints of sherds and clay we continue to illuminate patterns of prehistoric exchange and social interaction among the Anasazi.

Di Rienzo, Anna [253] see Lindo, John

Diaz, Abigail

[69] The Case for Radical Inclusivity in Museums

Museums were created for educated, wealthy, able-bodied white men. This legacy of exclusion is one that museums find difficult to accept and then rectify. As museum goers begin to expect more and incoming museum professionals demand change, these institutions have gradually begun to shift elitist paradigms into one of accessibility and inclusion. With one in four Americans having a disability, museums can no longer afford to ignore this vibrant and intersectional community. I will share case studies of museums that are working to welcome visitors with disabilities into their spaces and engaging them cognitively, socially and intellectually. I will show that as programs become inclusive to the disabled community, they also become better for all visitors. Both practical and institution-wide examples will be shared to show that access is for everyone and can be obtainable at institutions of any size, budget and type. I will also present what the future of museums could be if we embrace radical inclusion in our programs, exhibits, building and attitudes.

Diaz, Nicole [118] see Skaggs, Sheldon

Diaz Garcia, Mauricio, Cameron L. McNeil, Walter Burgos, Agapito Carballo and Samuel Pinto

[103] The Beginning of a New Epoch: The Transition to Post-dynastic Life in Río Amarillo, Copán Valley, Honduras

Contrary to what is reported for post-dynastic Copan, where evidence supports abandonment and reoccupation of the area by a new population, in the Río Amarillo area of the eastern section of the Copan Valley ceramic evidence supports a continual occupation that clearly displays an overlap of types and modes from both Late Classic and Early Postclassic periods. Outside of Río Amarillo's Central Area and in many of the nearby Quebrada Piedras Negras domestic groups, we have found the coexistence of Copan's ceramic assemblages with some local ceramic expressions, especially of a domestic ware that has not been reported in Copan. This type appears to have been produced in the area during the Late Classic period, persisting into the Postclassic with some modal changes. We also have some examples of vessels with a typical Late Classic Copan ceramic paste, which was used in Postclassic-produced vessels. In this paper, we will review all the ceramic data collected after seven seasons of

research and propose a pattern for the transition between different social organizations in the Rio Amarillo section of the valley.

Diaz Garcia, Mauricio [103] see Barrios, Edy

Diaz-Andreu, Margarita [105] see Picas, Mathieu

Diaz-Andreu, Margarita, María de la Luz Gutiérrez Martínez (INAH, Baja California Sur), Tommaso Mattioli (Universitat de Barcelona), César Villalobos (UNAM) and Zubieta Leslie (Universitat de Barcelona)

[369] *The Soundscapes of Baja California Sur: Preliminary Results of the Arroyo de San Pablo Rock Art Canyon*

When the first Spaniards arrived in the Baja California Sur the area of the Arroyo de San Pablo in the Sierra de San Francisco was populated by the Cochimi people. It has been argued that at least for the latest Holocene the archaeological record is connected with the groups that inhabited the area. It is possible, therefore, that the rock art that was painted in the many canyons in the Sierra de San Francisco was created by them. Yet, radiocarbon dates have produced dates as early as the 6th millennium BCE. In this paper we would like to reflect on whether the ethnohistorical information about the communities living in the area when Spaniards arrived can inform us about the religious world in which the paintings were produced. Through this analysis we particularly would like to understand the way in which sounds may have helped Cochimi people to enhance the effect of the paintings and compare this with the results obtained by our archaeoacoustic tests in the Arroyo de San Pablo undertaken in March/April 2018.

DiBenedetto, Katelyn (University of Nevada Las Vegas)

[366] *Landscape and Super-Regional Scale Interaction within the Aceramic Neolithic of Cyprus*

Over the course of Dr. Alan Simmons' career, his work has challenged us to reconsider the Pre-Pottery Neolithic (PPN) time and time again. His early work on subsistence among the PPNB peoples of the Negev helped researchers to consider a PPNB without farming or villages. Throughout the late 1980s and 1990s, his work with Dr. Gary Rollefson at 'Ain Ghazal led to greater considerations for both larger villages and divergent lifeways during the Aceramic Neolithic. In light of megasites like 'Ain Ghazal, Dr. Simmons' work at Ghwair I contributed to scholars considering the complexity of smaller, remote sites. Finally, his more recent work on the island of Cyprus has helped us to better understand domestication, village life, land and water management, and regionalism within the PPN and earlier times. Inspired by the legacy of our mentor, in this paper we briefly consider how our recent dissertations on the Pre-Pottery Neolithic of Cyprus challenge our understanding of human interaction on the landscape within Cyprus as well as the nature of interaction between the PPN peoples of Cyprus and the mainland over time.

[366] *Chair*

Dickson, Catherine and Shawn Steinmetz (Confederated Tribes of the Umatilla Indian Reservation)

[19] *On the Rez, It's All Our History*

Tribal members understand history, perhaps better than most communities. It's the concept of prehistory that brings blank stares. As a non-tribal member archaeologist working for a tribe, it's my job to ensure places in the tribes' past (both distant and recent) are adequately addressed under cultural resource laws. This effort often requires reminding agencies and project proponents that not only do tribes have a pre-contact history (Of course!), but they also have a contact-era history (Hmm, maybe) and a post-contact history (Certainly not!), as well as a present (Sure!). In this paper I'll discuss places known to have been used by tribal members in the historic era, places that without the proper context archaeologists would definitely interpret as "historic" and therefore of no concern to tribes. Examples include homesteads, railroad construction, agricultural sites, and CCC projects. The discussion will raise questions about the usefulness and consequences of assigning sites to these categories.

Diederichs, Shanna [86] see Copeland, Steve

Diederichs, Shanna (Crow Canyon Archaeological Center)

[86] *Ancestral Pueblo Essentials: Evidence for Layered Social Institutions during the Basketmaker III Period in the Northern Southwest*

A range of evidence suggests that the Ancestral Pueblo tradition of the northern Southwest crystallized during the Basketmaker III period in the sixth and seventh centuries A.D. As farming was adopted and populations expanded, social problems related to conflict mitigation, land tenure, and private property required new social institutions, the invention of which are reflected in the settlement distribution and public and household architecture of the period. This paper summarizes patterns from studies across the region which, together, reveal a layered landscape of practices operating at the household, lineage, community, and ideological scales. Social institutions resulting from these Basketmaker III period practices become essential elements of Ancestral Pueblo tradition and history over the next six hundred years.

[86] *Chair*

Diehl, Michael (Desert Archaeology, Inc. Tucson), Deil Lundin (Aztec Engineering Group, Inc.), Homer Thiel (Desert Archaeology Inc, Tucson) and Robert Ciaccio (Desert Archaeology, Inc. Tucson)

[208] Two Recently-Discovered Early Historic Examples of Chili (*Capsicum annuum*) from Arizona

Specimens of chili (*Capsicum annuum*) are absent from prehistoric sites in the southwestern United States, but they are common in Spanish Colonial contexts. Building on a relatively recent review of northern Mexican prehistoric chili cultivation by Paul Minnis and Michael Whalen, we examine two recent chili finds in Arizona. The two finds may provide hints of the way chili use was transmitted from colonizing Spaniards to indigenous cooks, resulting in the emergence of a new aesthetic of cooking. By the mid-nineteenth century, an emergent “southwestern” style of food preparation involving the combination chilis with Iberian foods and native North American foods is evident.

Diffey, Charlotte [102] see Bogaard, Amy

Dillehay, Tom**[162] Anti-colonialism, State Development, and Araucanian Resilience in the South-Central Andes**

This presentation centers on indigenous proto-state or polity formation in the early Spanish period in the south-central Andes and the sociocultural conditions that shaped a specific type of archaeological record, an unostentatious material culture for a polity-level of society. The historical focus is on the Araucanians or Mapuche in the sixteenth to early eighteenth centuries, when they successfully resisted nearly all engagement with the Spanish for more than 250 years. The Araucanian polity is an interesting case for several reasons: it was comprised of locally and regionally hierarchically nested parts made up of patriarchal elite and non-elite grassroot levels and complementary sacred and domestic areas; it employed a dynamic telescopic patrilineal structure to politically managed its administrative growth and development; and it manufactured standardized and generally unostentatious architecture, symbols, and material goods to effectively manage the rapid incorporation of fragmented groups into a new indigenous state. The new state required explicit social interactions and engagement with ideological, ceremonial, and warring worlds, a process that not only “made” individual subjects, but “made” the society and its reconstituted communities, and eventually “made” the polity.

Dillehay, Tom [222] see Adovasio, J. M.

Dillian, Carolyn [17] see Bello, Charles

Dillian, Carolyn (Coastal Carolina University)**[316] Obsidian Characterization in East Africa**

Steve Shackley's wide-reaching research includes X-ray fluorescence analyses of obsidian from East Africa. He and co-authors explored sources of obsidian from sites in Ethiopia, providing data that informed many later studies in a relatively unknown region for obsidian studies. Our work on obsidian from mid-Holocene sites in the vicinity of Koobi Fora in northern Kenya has yielded evidence of regional interactions that at least partially relied on watercraft, raising questions about use of lacustrine resources more broadly for hunting-fishing-gathering peoples. These data broadly inform our understanding of the transition from hunting-gathering-fishing to pastoral economies throughout the mid-Holocene in East Africa.

[17] Discussant

Dillis, Sarah [363] see Degryse, Patrick

Dimitroff, Braeden [313] see Arakawa, Fumi

Dimopoulos, Evangelos (PalaeoBarn, RLAHA, University of Oxford), Irina Velsko (Department of Biological Sciences, Clemson University), Evan Irving Pease (Palaeobarn, RLAHA, University of Oxford, Oxford), Laurent Frantz (School of Biological and Chemical Sciences, Queen) and Greger Larson (Palaeobarn, RLAHA, University of Oxford, Oxford)

[20] The Significance of Robustly Identifying Microbes in Archaeological Samples of Humans and Domesticated Animals

Genetic species identification of archaeological specimens is difficult due to low DNA content and degradation. Yet specific and accurate identification of microbes is essential not only for identifying how diseases affect human health, but also the health of domesticated animals. Therefore, we created a method for identifying microbes via aDNA, that quantifies the confidence of the performed identification. We present two case studies to highlight the utility of our pipeline in archaeological studies of microbiomes.

By using ancient dental calculus samples from an English Victorian-era population, we have attempted to identify bacterial species within the sequences generated from the substrate. Thus far, we have detected positive signatures for the causative agents of diphtheria and pertussis. Our findings highlight the potential of ancient dental calculus to act as a reservoir for respiratory pathogens, that can be indicative of the health status of past human societies.

In search for ancient animal pathogens, examining the non-endogenous DNA of ancient chicken, pig and dog

samples allowed us to identify the causative agents of diseases, that became prevalent in a post industrial revolution world. These findings are indicative of how human activity can reshape the landscape of animal diseases, through altering the natural environment.

DiNapoli, Robert J. (University of Oregon), Scott Fitzpatrick (University of Oregon), Christina Giovas (Simon Fraser University), Matthew Napolitano (University of Oregon) and Jessica Stone (University of Oregon)

[35] Revisiting the Ideal-Free Settlement of the Caribbean islands

The settlement of the Caribbean Islands represents one of the most expansive and significant overwater population dispersal events in the history of the New World. While it is generally accepted that the Caribbean was settled from northern South America beginning in the mid-Holocene and involved a series of episodic voyaging events, more precise aspects of the timing, patterns, and causes of this island colonization process remain unresolved. Here, we build on previous applications of the Ideal-Free Distribution model to help explain island-scale geographic patterns in settlement. Our approach combines a newly created large radiocarbon dataset of over 2,000 radiocarbon dates with Bayesian chronological and spatial modeling to explore the relationship between habitat suitability and patterns of initial colonization and temporal lags in settlement (i.e., Alee effects). Results provide greater insight into how and when the Antillean chain of islands were settled prior to European contact in the 15th century and help to resolve some longstanding chronological disparities of when some islands were colonized at different points in time, but not others.

DiNapoli, Robert J. [212] see Napolitano, Matthew

Dine, Harper

[398] Classic Maya Food Systems and the Sociality of Diet in the Usumacinta Region

The ancient Maya utilized a range of landscape modifications for agricultural production, including terraces and raised fields. These agricultural strategies were tied into food systems that also included taxation and tribute, all significant components of a political economy that may have reflected autonomy, exploitation, or both. Using a paleoethnobotanical approach, here I investigate evidence of agricultural production in the Usumacinta region. I also focus on social aspects of food practices, and the ways in which such practices may have been altered as smaller sites became subject to the rule of Piedras Negras. This results in a contribution to current understandings of Classic Maya agricultural production and food systems. I frame my research relative to contemporary and historical data on farming, diet, and food plants, including present-day discussions of food sovereignty.

Diserens Morgan, Kasey (University of Pennsylvania)

[105] Building a Façade: When Political Involvement Changes the Narrative, Fabric, and Value of Historic Sites

This paper explores the ways in which local government involvement in the restoration of historic structures and archaeological sites can change the ways in which they are valued and used by local communities. How do opinions surrounding heritage change when people are confronted with differing actors imposing differing values on historic properties? How do tourism and heritage managers contribute to the continued othering of narratives that run counter to a nationalized and standardized view of indigenous histories? I focus on a recent government restoration program of ten historic structures located in Tihosuco, Quintana Roo, Mexico. The program was initiated without significant input from those that live in the houses, and even less input was garnered from other members of the community. For the government actors, this project was a political tool, with the potential economic benefit of creating a small-scale tourist attraction in town. I documented both the changes made to the buildings, but also the changes in the attitudes about the government, the houses, tourism, and the legacy of their history.

[105] Chair

Dixon, Anna

[22] Excited about Archaeology: Opportunities for Students at a 4-Year University

Despite rising tuition costs and decreasing budgets, students at 4-year public institutions still seek out opportunities to engage in archaeological fieldwork, laboratory and museum research, regardless of whether they plan to go on to graduate school in anthropology or to pursue careers outside of academia. An appreciation of cultural resources and environmental change over time serves students in good stead in a variety of career paths related to sustainability, environmental protection and cultural heritage. Students at 4-year undergraduate schools may have a difficult time finding the money and time to travel far for field school or internships, but offering projects close to home serves the dual purpose of gaining valuable experience attainable but also in helping to educate students about the cultural resources found in their immediate area. These experiences make the students more competitive if they plan to go to graduate school, but are also applicable outside of academia. The multidisciplinary nature of archaeological fieldwork and research coordinates with STEM, social sciences and humanities in a way that has the potential to enrich both the students as well as local communities, wherever they are located.

Dixon, Boyd (Cardno GS Inc)

[13] Discussant

Dixon, Neil [85] see Shaum, Katherine

Dixon, Neil (Independent Researcher), M. Kathryn Brown (University of Texas San Antonio) and Leah McCurdy (University of Texas Arlington)

[92] RTI Photography Part of a Greater Whole in Archaeological Documentation Methodology

Digital photography has ushered in many new methods of documenting archaeological resources in the past 15 years. Many of these new methods have been flawed because of a misunderstanding of the potential of the digital technologies and the analog methods they replace. Reflective Transformation Imaging (RTI) photography is a relatively new technique to document geometric surface textures and gather high resolution dynamically lit surfaces of archaeological resources but it is not a replacement for onsite drawing and mapping. Nor is photogrammetry a replacement for mapping; these are all components in a greater strategy of archaeological documentation, blending analog (traditional) methods with digital technologies to enhance our understanding and public accessibility to the archaeological resources we all share. Digital file management and migration is a concern regarding these new techniques and recognition of redundancy is necessary. A greater discussion of traditional methodologies and emerging technologies and practices is needed to ensure a complete, accurate, and archival record of the resources documented by archaeologists today. In this paper we will highlight a case study of traditional and digital documentation from Xunantunich, Belize.

Dobney, Keith [20] see Zona, Margherita

Dobrez, Livio (Australian National University, retired) and Patricia Dobrez

[190] The Uses of Stylistic Analysis in Rock Art Studies

Polly Schaafsma has made a major contribution to rock art studies with her detailed analysis of rock art styles in the American Southwest. The joint authors wish to investigate the concept of style, with its roots in art history and application in archaeology and anthropology. In so doing, we consider the general nature of stylistic taxonomies worldwide and the theoretical issues raised by such taxonomies, all of this with an eye to Schaafsma's own treatment of style in a number of her works.

Dobrez, Patricia (AURA/ARARA)

[190] Chair

Dobrez, Patricia [190] see Dobrez, Livio

Dockrill, Steve [251] see Maher, Ruth

Dodd, Lynn (USC) and Ran Boytner

[200] The Politics of Archaeology: Reflections on the Early Decades of the 21st Century

In 2003, Bradley Parker co-organized a workshop at the University of Utah exploring the politics of archaeology, with emphasis on the Middle East. Both at the workshop and in the resulting edited volume, *Controlling the Past, Owning the Future: The Political Uses of Archaeology in the Middle East*, contributors considered the actors who were appropriating and managing archaeology with a predominant focus on nation states or nationalistic movements representing emerging new states (e.g., the Palestinian Liberation Organization). Since then, many new, non-state actors have come to the fore and are taking leadership positions that influence the politics of archaeology. Operating in many arenas, such actors are appropriating ownership, management, preservation and investigation of the archaeological record at all scales. In this paper, we will explore the changes these actors are making in three different operational areas: cyberspace, research funding and advocacy. Our goal is to reflect on the work done at the University of Utah workshop and to provide an updated perspective on the intermingling of archaeology and politics of the 21st century.

[177] Moderator

Dodd, Walter (California State University, Fresno) and Roger LaJeunesse (California State University, Fresno)

[210] Implications of Stable Isotope Values from the Skyrocket Site (CA-Cal-629/630)

This poster summarizes the analysis of 60 AMS 14C dates, including the associated stable isotopes of delta 13C, delta 15N, and delta 34S for human burials from the Skyrocket archaeological site (CA-Cal-629/630). Located 40 miles east of Stockton, California, these burials span a period in which there was a change in subsistence, as evidenced by material culture, macro-botanicals, and pollen. The change detected here began 2,500 years BP and, in particular, delta 34S values suggest a reduced reliance on acorns and development of a more diversified economy.

Dodge, Robyn (The University of Texas at Austin) and David M. Hyde (Western State Colorado University)

[30] *Ongoing Research at Hun Tun and Medicinal Trail Community: The Ancient Maya Hinterland of Northwestern Belize*

This paper discusses features and material culture from two hinterland settlements located in northwestern Belize, Hun Tun and the Medicinal Trail Community, east of the ancient Maya urban center of La Milpa. Residential groups include formal courtyards with “expensive” structures at one end of the continuum to numerous informal clusters of mounds at the other end. Also present at these two settlements are numerous cultural landscape modifications such as terraces, depressions, chultuns, chich mounds and linear berms. The ancient residents of these communities were non-elite agriculturalists and crafts people. Archaeological evidence shows that substantial internal social stratification occurred throughout both sites indicating a complex social structure among ancient Maya commoners in the hinterlands. The function and interpretation of these two hinterland settlements will be discussed, and the role they played in contributing to the larger, regional influence of the La Milpa polity.

Dods, Melissa, Olivia Navarro-Farr (The College of Wooster) and Karen Alley (The College of Wooster)

[373] *Staying Afloat: A Comparative Case Study of Angkor Wat and Tikal's Management of Water*

This presentation is a large-scale comparative case study of two distinct regions to see how their use and control of water was similar given their environments but different from social, political, and cultural perspectives. Specifically, I examine the sociopolitical nature of Angkor Wat as an expression of ancient Khmer culture and the Classic Maya city of Tikal, Guatemala. These two elaborate polities emerged in similarly challenging environmental settings, which impacted the way they utilized and manipulated water as a natural resource, vital to the success of their civilizations. Both societies had advanced hydraulic infrastructures for managing water for domestic and ritualistic purposes, and they were both located in semitropical regions with dense rainforest. By utilizing GIS and remote sensing, I incorporate geological principles of spatial analysis to examine water control from a remote perspective. I discuss how advancements such as LiDAR have impacted our understanding of these societies in a holistic sense, with specific reference to water control. I discuss the iconography intrinsic to public architecture at both polities to explore how the idea of water was presented in a religious manner.

Dodson, Timothy (Arkansas Historic Preservation Program)

[22] *A State Agency's Perspective*

I offer a perspective of why archaeology should be a part of all students' educational journey as a way to cultivate critical skills and educate well-rounded, successful members of society. As an individual in charge of assessing the effect of local, state and federal undertakings on cultural resources, I continually stress that valuing, protecting and studying cultural heritage does not impede progress but enrich it.

In this paper, I offer examples of how archaeology engages the public and the hiring of individuals with archaeological education by government agencies, not only increases their ability to assess heritage sites, but allows them to better represent their constituents. This better representation, leads to better designed, more meaningful undertakings.

[292] *Discussant*

Doelle, William (Archaeology Southwest) and Josh Ewing (Friends of Cedar Mesa)

[313] *Protecting Cultural Landscapes, Famous and Not, as the Threats Increase*

Far beyond the “Instagram ready” cliff dwellings of Bears Ears, southeastern Utah holds cultural landscapes of immense value for Native American tribes, scientific study, and heritage tourism. The sheer number of archaeological sites, combined with an incredible degree of preservation, makes this one of the most important archaeological areas on earth. At risk from over-visitation, energy development, looting and vandalism, irresponsible motorists, and other threats, these understudied and often unrecorded sites present a major challenge for conservationists and land managers. The “cowboys versus Indians” dynamic and political battles certainly don’t help. This paper discusses what two non-profit organizations - Archaeology Southwest and Friends of Cedar Mesa - are learning as they work to protect cultural resources, advocate with land managers, educate the public, and engage the scientific community.

Doering, Briana [10] see Catenacci, Senna

Doering, Briana (University of Michigan)

[13] *Discussant*

Doershuk, John (University of Iowa), John Cordell (University of Iowa), Teresa Rucker (University of Iowa) and Stephen Lensink (University of Iowa)

[89] *Using the State Archaeological Repository of Iowa: Collections Long Held Re-examined and Application of New Technologies*

The University of Iowa (UI) Office of the State Archaeologist has maintained the State Archaeological Repository of Iowa since 1959. During its 60-year history, the repository's curation strategy has modernized from strictly housing UI-generated collections to meeting the multifaceted needs of (1) cultural resource management research, (2)

extensive outreach activities, (3) diverse research collections, (4) student degree requirements, (5) greater statewide public interest, (6) digitally accessible collections, and (7) increasing American Indian involvement in their history. The Repository collections include materials from government agencies, private firms and individuals, and from OSA research. This poster presents details on who we are, what we have, and how it is used, including several recent examples of collections use involving Mill Creek Culture and related ceramic assemblages from Northwest Iowa.

[343] *Discussant*

Doherty, Caitlin [249] see Goebel, Ted

Doherty, Caitlin (Texas A&M University) and Ted Goebel (Texas A&M University)

[323] *Discerning Paleoindian Mobility in the Eastern Great Basin: A Geochemical Analysis of Lithic Artifacts from Bonneville Estates Rockshelter and Smith Creek Cave*

Lithic technological organization studies and geochemical analyses provide a useful way for archaeologists to examine prehistoric forager mobility. In the Great Basin, these methods, when applied to assemblages from multi-component sites, have revealed diachronic changes in lithic raw material procurement patterns between the Paleoindian and Early Archaic periods; less often, however, has there been an opportunity to explore variation in raw material procurement in coeval Paleoindian assemblages from buried and dated contexts in the same region. In the current study, new and existing geochemical data are compiled from the lithic artifacts from the Paleoindian components of two sites in eastern Nevada, Bonneville Estates Rockshelter and Smith Creek Cave. Both of these assemblages contain Western Stemmed bifacial points and associated debitage, and both are associated with hearth features dating in excess of 12,000 calendar years ago. The results provide important information regarding variability in Paleoindian mobility in the eastern Great Basin - not just the differential conveyance of the various kinds of lithic materials transported to the shelters, but also the duration of occupation at the shelters and the organization of Paleoindian technology.

Dolan, Brennan [120] see Noldner, Lara

Dolan, Rebecca [168] see Kassabaum, Megan

Dolan, Sean [194] see Miltimore, Derek

Dolan, Sean (N3B Los Alamos)

[316] *Translucent but Opaque: Obsidian in the American Southwest and the Mesoamerican (dis)Connection*

The movement of people, objects, and ideas between the American Southwest/Northwest Mexico (SW/NW) and Mesoamerica is one of the most enduring and debated research topics in American archaeology. Pueblo and Mesoamerican groups prominently used obsidian for hunting, warfare, and ceremony, but is there Mesoamerican obsidian in the SW/NW and in what contexts? Steve Shackley has geochemically characterized thousands of obsidian artifacts using XRF spectrometry to connect people to places to things, but interestingly, groups in the SW/NW did not use obsidian from Mesoamerica or West Mexico. If leaders in Chaco Canyon, Hohokam, Mimbres, and Casas Grandes needed macaws, cacao, copper, and Mesoamerican-like iconography and architecture, why did they not need obsidian prismatic blades and anthropomorphic eccentrics? To thank and to honor Steve for his extensive and prolific career, I present new data, showing Pachuca obsidian was used in northern New Mexico, but during the sixteenth century by the Spanish. I discuss why Mesoamerican obsidian was not used or needed in the prehispanic SW/NW. I address why the absence is significant for evaluating models of interaction and circulation of goods between two of the most studied regions in obsidian studies.

Dolinar, Liz [327] see Herzog, Nicole

Dollarhide, Eli (New York University)

[252] *Prehistoric Pointillism: Rock Art Near 'Amlah, Oman*

Rock art is one of the most ubiquitous archaeological features in southeastern Arabia, yet it remains one of the most poorly understood aspects of the region's prehistory. Re-occurring motifs of people, weapons, camels, horses, and other animal figures appear in similar forms across the UAE and Oman, and many were produced utilizing similar methods. Though they offer a unique gateway into the symbolic worlds of Arabia's ancient inhabitants, the study of Arabian rock art is complicated by issues of dating and documentation.

This paper explores the discovery of over two-hundred petroglyphs in the Omani interior near the UNESCO World Heritage Site of Bat. Documented during a winter 2017 survey, these examples of ancient art are spread over five limestone boulders located near the modern settlement of 'Amlah, Oman. The various images were impressed on limestone with percussion, in a fashion resembling a prehistoric form of pointillism. Although interpreting these complex and temporally-dynamic features remains difficult, the proximity of these petroglyphs to a nearby Iron Age cemetery offers new insight into their meaning and connections to other rock art sites in the region. The paper concludes by examining new outreach-based strategies for preserving this open-air site.

Dombrosky, Jonathan [174] see Besser, Alexi

Dombrosky, Jonathan (Department of Anthropology, University of New Mexico)

[415] Why Pursue Fish in Small Quantities? The Case of Ancestral Puebloan Fishing in the PIV Middle Rio Grande

In prehispanic central New Mexico, small numbers of disarticulated fish remains—such as catfish, sucker, and gar—are frequently recovered from Pueblo IV (AD 1350–1600) sites in the Middle Rio Grande basin, but they are rare during earlier agricultural time periods. Increased aquatic habitat quality brought on by the end of the Medieval Warm period could have impacted the foraging goals of energy maximization and risk minimization for Ancestral Puebloans in the region. The energy obtained by Ancestral Puebloan fishers could have been maximized because fishes provided more calories due to increased fish body size. In addition, fishes could have been more successfully harvested per fishing episode, making fishing less risky, because the stability of fish communities was greater than it was previously. However, the intersection of risk minimization and energy maximization foraging strategies regarding Pueblo IV fishing is speculative and should be tested. Here, I estimate the body size of Middle Rio Grande fishes and analyze the stable carbon and nitrogen isotopes of fish bones recovered from archaeological sites in the region to begin to tackle this problem.

Domeischel, Jenna (Eastern New Mexico University)

[297] Deaccessioning for Education: It's Not a Four Letter Word

Archaeological curators struggle with the growing number of collections in our repositories, a phenomenon commonly referred to as the 'curation crisis.' Yet 'crisis' is an acute term, when the problem is instead chronic. The discipline of archaeology marches on, and so must repositories, even as the quantities of collections increase every year. We must find increasingly effective ways to make collections work for us, rather than against us as drains on space, time, finances, or manpower. At Blackwater Draw, deaccessioning is viewed as revitalization, not inherent loss. Collections are re-imagined as ambassadors of knowledge, bringing the stories of past peoples out of the repositories and into the present day. Through selective deaccessioning we redistribute collections more appropriately for their size, item quantity, or classification, while simultaneously reinvigorating community programming, STEAM education, or specialized university curricula. Through education initiatives at Blackwater Draw and elsewhere around the nation we hope to see a growing understanding of the benefits of deaccessioning change to a willingness to incorporate it into our archaeological toolkit.

[297] Chair

Domenici, Davide (University of Bologna, Italy)

[243] Colors and Chants of the Flower World: The Use of Organic Colors in Pre-Hispanic Mesoamerican Codex Painting Traditions

The performance of non-destructive chemical analyses on Mesoamerican codices has provided an unprecedented understanding of the technological diversity of pre-Hispanic codex-painting traditions, as well as of their patterns of change in early colonial times. One of the most striking results has been the recognition that pre-colonial Central Mexican and Mixtec codex painting practices – in contrast with genres such as mural painting – clearly privileged the use of organic colors, mostly extracted from flowers.

This paper argues that this preference – which also required the development of complex techniques for the production of lakes and hybrids – depended on a deep-rooted, culturally established link among color, brilliance, flowers, and speech. Indeed, organic colors infused the manuscripts' pages with a brilliance that was arguably seen as the manifestation of the creative power of speech, a power that Mesoamericans used to express through the flowery visual and linguistic metaphors of sprouting, bursting, or emitting fragrance and dew. The conjoining of the results of scientific analyses with visual and textual sources illuminates the link between color materiality and Mesoamerican esthetics, and shows how painting practices and technologies were conceived as meaningful ways to express the generative power of the Flower World.

[39] Discussant

Domett, Kate [27] see Tayles, Nancy

Domínguez, Miriam (Florida Museum of Natural History)

[181] Combustion as a Process of Reconfiguration of the Historical Space: The Potrero Mendieta Context in Southwestern Ecuador (~3000 BCE)

In this presentation, the historical processes of the Formative Period in the Ecuadorian Andes are evaluated through the material renderings of fire from the site Potrero Mendieta. In this context, they are associated with a swift restructuring in the use of the circular architectural structures identified at the site and immediately precede the interment of the structures and the possible abandonment of complex during the 9th century BCE. The site may have been occupied as early as 3,500 BCE and this shift, associated with a well-used hearth, occurred at the end of the culture-history placement of the Initial Period. This event coincides with the rapid reconfigurations in settlement patterns seen in the region. Moreover, burning and interment events would have reconfigured the experience of time and place for the inhabitants, who had connections that spanned the central Jubones River Basin (Ecuador) and extended to the Amazonian cloud forest to the east and to the Pacific coast to the west. The event associated with this hearth would have altered their social interaction processes and their shared experience of the historical landscape.

Domínguez Acosta, Miguel [346] see Kita, Yuko

Domínguez Aguilar, Luis Daniel [71] see Martín Medina, Geiser

Domínguez Pérez, Cuauhtémoc [406] see Carino Anaya, Tanya

Donaldson, Tyler, William Monaghan (Indiana University-Purdue University, Indianapolis) and Timothy Schilling (Midwest Archeological Center, National Park Service)

[45] *Taphonomy and Chronology of Mounds A and B at the Quapaw Village of Osotouy (Menard-Hodges Site; 3AR4)*

Menard-Hodges (3AR4), also known as the Quapaw village of Osotouy, is a Mississippian site along the Arkansas River in southeastern Arkansas. Professional excavations have yielded French trade goods and various diagnostic artifacts that supports a predominantly Mississippian-to-protohistoric origin. The site also includes several mounds, the largest of which, Mound A, is conical and ~10 m high. It adjoins a ~4 m high platform, Mound B. Questions about chronology, construction, and taphonomy of the mounds remained unanswered until 2016 when we initiated geoarchaeological investigations. Using solid-earth cores and electric resistivity profiles, we provided details about when and how the mounds were built. Resistivity profiles between Mounds A and B indicates that their apparent conjoining may have resulted from erosion of Mound A, and is not necessarily purposeful. Radiocarbon ages from cores around the mound bases indicate the mounds were built and used from AD 1400-1550 and apparently stable until the 20th century. After ~AD 1930-1950, large trees, particularly on the sides of Mound A, caused gravity slumps. This project has scientific and methodical value, and provides information to formulate effective management, stabilization, and mitigation plans for the mounds. It also offers details to the Quapaw descendant community about their ancestral village.

Dong, Ya Wei [78] see Yu, Chun

Dong, Yu [361] see Wang, Yifan

Dong, Zhe

[416] *Assemblages of Stone Artifacts in the Region of Shuiyang River, South China: LCTs and Model 2*

Most scholars supported that there were only choppers or chopping tools in East Asia among Paleolithic time, while in the west side of the old continent the innovation of technology is obvious. In China, archaeologists have already found some important regions which are characterized with large cutting tools such as handaxes, cleavers, picks, and knives during recent years, including Bose Basin, Luonan Basin, Danjiangkou Reservoir Region, and Dingcun Site. In the region of Shuiyang River, we have surveyed and excavated several sites which buried on the second or third terrace, such as Chenshan Site, Maozhushan Site, Guanshan Site, Wulipeng Locality and so on. We successfully separate a small amount of large cutting tools from the whole assemblages of stone artifacts buried in vermicular red earth. In this paper, we will analyze these lithics discovered in this region. We will also try to explain why such large cutting tools appeared in this region in Middle Pleistocene.

Dongoske, Kurt E. (Zuni Cultural Resource Enterprise)

[75] *Making Mitigation Meaningful to Descendant Communities: Examples from the Pueblo of Zuni*

Mitigation of adverse impacts to an archaeological resource within cultural resource management is commonly achieved by implementing a data recovery plan. The principal focus of the plan is to recover scientific information that would otherwise be lost. Under this venue, the primary significance of the site is its evaluation under criterion d – information potential. Rarely is commensurate consideration given to the emotional, psychological, perspectival, and spiritual values that descendant Native American communities attribute to these places by considering their importance under criteria a & b. Balanced design of mitigation measures is seriously lacking from putative CRM practice resulting in descendant Native American communities being disenfranchised through the silencing of their voice in the management of their own heritage. This presentation examines past and on-going positive and negative conversations between federal agencies and the Pueblo of Zuni to design mitigative strategies that are meaningful to the Zuni people. Examples are discussed where successful mitigation of an adverse effect to a Zuni traditional cultural property is impossible and in those instances the quantified direct, indirect and cumulative impacts, both emotionally and psychologically, to the Zuni people are left unconsidered.

Dongoske, Kurt E. [244] see Spears, Michael

Donham, Megan (University of Nevada, Reno), Richard Rosencrance and Katelyn McDonough

[323] *A First Look at Western Stemmed Tradition Lithic Reduction and Procurement Strategies at Connley Cave 4, Oregon*

Western Stemmed Tradition lithic assemblages are typically small at buried, Younger-Dryas aged sites throughout the Great Basin. Recent work at the Connley Caves, in the Fort Rock Basin of south-central Oregon, has uncovered

a rich cultural assemblage containing projectile points, scrapers, flake tools, cores, abraders, gravers, and thousands of lithic detritus. This poster presents a debitage analysis of the Western Stemmed Tradition component at Connley Cave 4. Technological strategies are placed within the context of source provenance analysis of both tools and debitage to illuminate broader patterns of lithic reduction, procurement, and landscape use.

Donner, Natalia (Leiden University) and Alexander Geurds (University of Oxford)

[412] Just a Matter of Time: Preliminary Ceramic Chronology Building in Central Nicaragua

The archaeology of central Nicaragua offers a challenging arena for the deconstruction of traditional ceramic chronology discourses in Southern Central America. The 'anthropology of techniques' approach and ethnoarchaeological research have determined that the most stable steps in ceramic manufacture are connected to socially learnt bodily gestures materialized in the shaping of vessels. In contrast, other stages of the production process are more susceptible to synchronic and diachronic changes. Hence, the temporal and societal implications of ceramic decoration variability as the proxy for chronology building requires re-evaluation. In this paper, I present the results of my doctoral research at Leiden University. The project included a systematic surface survey and stratigraphic excavations in the Mayales river subbasin. Ceramic analysis was outlined through a technological approach to manufacturing practices, comprising of macro-fabric, macro-traces, compositional analysis, and formal examinations. Using this methodology, alternative choices in the operational sequence of ceramic production were identified in their specific spatial and temporal context. These choices are interpreted as representing the intersection and interweaving of various processes that may interrelate to other practices, such as foodways and dwelling, with differential temporal rhythms that operated in dissimilar times spans and with different frequencies and amplitude in variability.

Donnermeyer, Christopher, Trent Skinner (Mt. Hood National Forest), Michelle North (Columbia River Gorge National Scenic Area) and Nicholas Guest (Portland State University)

[211] Bridal Veil Lumbering Company: A Glimpse into an Intact Early Logging System in the Columbia River Gorge

Logging was an economic and cultural pillar of the Pacific Northwest. The Bridal Veil Lumbering Company, a logging company operating in the Columbia River Gorge in Oregon State, was the longest continuously operating early lumber mill west of the Mississippi. The company spanned a timeframe that encompassed a wide range of technologies, immigration trends, and safety regulations. Until recently it was thought that the Bridal veil system was not intact--broken up by roads, previous development, and looting. USFS Archaeologists working in the vicinity during the Eagle Creek Fire in 2017 documented previously unknown portions of the system. Later research revealed that LiDAR technology could be used in targeting further documentation. In 2018 a Passport in Time project was coordinated to identify and document more of the system and assess it for integrity. The project is expected to continue for several more field seasons. This poster documents the preliminary results of the project.

Donohue, Michelle [131] see Dudzik, Beatrix

Donta, Christopher (Gray & Pape, Inc.)

[265] Changes along a Native Transportation Corridor in Western Massachusetts: The Fife Brook Sites and the Deerfield River

A cluster of Native American sites was first identified in the early 1970s at the junction of Fife Brook and the Deerfield River in western Massachusetts, and was further examined 15 years ago. Recent additional work has expanded knowledge of site distribution on this portion of the Deerfield and added to the inventory of material culture from sites near Fife Brook. The sites in this cluster range from the Late Archaic to the Woodland Period, and include intact features, fire-cracked rock, lithic tools, and pottery. This paper presents the new data gathered in 2018 in comparison to other known sites along the Deerfield, including the nearby cluster of sites at the junction of the Deerfield with the Cold River. The Fife Brook sites were located along a major transportation corridor between both New York State and southern Vermont and the Connecticut River, which was used for many millennia following glacial retreat. The Fife Brook sites and those along the wider Deerfield River are examined to look at how Native material culture has changed over the past thousands of years.

[265] Chair

Donta, Jaime (POWER Engineers)

[265] Always Changed But Never Gone: A Century of Farming in Southeastern Massachusetts.

The Anthony Farmstead historic site (SOM.HA.4) in Somerset, Bristol County, Massachusetts, was excavated through the data recovery level in anticipation of the construction of an electrical substation on the property. The site included remnants of an eighteenth- and nineteenth-century farmstead, including a cellar hole, well, outbuildings, field system, and burial ground. As a part of the data recovery efforts, extensive documentary research was conducted into the property's ownership and residential history, as well as the family histories of the people who once inhabited the land. This paper will compare evidence of changes in the productive and domestic use of the property to the documentary results, particularly related to how these observable changes correlate with property transfers. The economic and productive histories of the various owners and tenants will be examined through the analysis of recovered cultural materials, and through the lens of Massachusetts' history of pre-Revolutionary European colonization and later waves of immigration connected to the Industrial period, as well as the general trend across the region of a shift from subsistence to commercial farming.

Dore, Christopher (Register of Professional Archaeologists)**[340]** *Discussant*

Dori, Irene [195] see Sparacello, Vitale

Dorr, Lana (Hamilton College), Jada Langston (Hamilton College), Sophia Coren (Hamilton College), Horia Ciugudean (Muzeul National al Unirii-Alba Iulia) and Colin Quinn (Hamilton College)**[58]** *Archaeology as Activism: Cultural Heritage, Identity, and Sustainability in Transylvanian Mining Communities*

Activism through ethical community engagement is now a requirement, rather than an elective, of all scholars. Archaeologists have a responsibility to mobilize our understanding of the past, especially to achieve mutual goals we have with modern community partners with whom we work. As an example, we present a case study that focuses on the cultural heritage of mining communities in southwest Transylvania (Romania). These mining communities are currently in a showdown with a transnational mining company that seeks to strip mine and use cyanide to extract gold from this region, which is home to the largest gold deposits in Europe. The mining project threatens the environment, cultural heritage, and challenges how people create communal identities. Prehistoric mining, prior to the emergence of institutionalized inequality and world systems that marginalized mining communities, may hold a key to understanding how an alternative, more sustainable approach to mining might be organized. We argue that it is necessary for policy makers to consider insights from archaeological research when developing new public policy on sustainable mining.

Dorshow, Wetherbee [120] see Sturm, Jennie

Dortch, Joseph (University of Western Australia), Tom Whitley (Sonoma State University) and Peter Veth (University of Western Australia)**[305]** *Shellfishing Transitions with Sea Level Rise across the Dampier Archipelago*

This paper takes a zooarchaeological approach to the investigation of social and demographic changes that may have influenced Holocene rock art production in the Dampier Archipelago, northwestern Australia. Rising sea levels transformed the former Dampier Ranges into peninsulas by 8 ka, and then mega-islands by 6 ka. In the peninsular phase, Aboriginal people exploited the intertidal gastropod *Terebralia*, leaving compact, dense shell middens on landmasses that are now the outermost islands of the Dampier Archipelago. From 6-4 ka, with continuing sea level rise, Enderby and Rosemary Islands became smaller and the sea crossings between them and the mainland more challenging. Late Holocene Aboriginal use of these outer islands appears to have changed to logistical camps supporting seasonal, targeted hunting of large marine vertebrates. At this time, on the more accessible inner islands and Murujuga (the present-day Burrup Peninsula), Aboriginal people exploited the intertidal bivalve *Anadara*, creating large middens. The early Holocene peninsula and mega-island phases appear to represent dense residential populations – but were they comparable to the Late Holocene populations on Murujuga? Taking into account taphonomic and environmental variables, shellfish species abundances and age profiles in dated midden deposits suggest that zooarchaeological transitions reflect structural changes in regional populations.

Dou, Haifeng [361] see Li, Yue

Doubles, Zoe [176] see Jones, Emma

Doucette, Dianna [46] see Horn, Jessica

Dougherty, Haley [151] see Willis, William

Dougherty, Haley (University of Nevada, Las Vegas)**[258]** *PastPerfect Design Software: Engineering the Virgin Branch Ceramic Typology in a Digital Age*

Currently, there is no single, easily accessible source for researchers studying the Virgin Branch ceramic typology. The absence of such a source makes it difficult for researchers to consistently type ceramic artifacts. One solution to this problem is making access to these typological collections more accessible by utilizing the internet. This research demonstrates the benefits of representing the Virgin Branch typology through the use of a website that includes multiple-vessel images, photogrammetry links, and webpages for type definitions, along with assorted descriptions and explanations for the assemblages from archaeological literature with the use of a PastPerfect database design software.

Douglas, Diane (Applied EarthWorks)**[377]** *Discussant*

Douglas, Michele Toomay [29] see Ikebara-Quebral, Rona

Douglass, John [75] see Manney, Shelby

Douglass, John (Statistical Research, Inc.)**[256]** *The Kenyon-Honduras Program 1988-2019: Learning from the Past About Ourselves*

Since the 1980s, the Kenyon-Honduras Program, under the leadership of Drs. Patricia Urban and Edward Schortman (P&E to us), has engaged students in the study of archaeology, anthropology, and life. Hundreds of students have been a part of the program over the past several decades. Being in the program helped us learn about archaeology from both a theoretical and pragmatic standpoint and, in the process, we learned about ourselves and what trajectories we would like to pursue in life. Our paper introduces the program affectionately known as the "P&E Show," discusses how our Honduras experiences affected us personally and professionally, and explores what we've taken away from it all. This introductory paper provides the background necessary to appreciate the myriad contributions highlighted throughout the session.

[1] *Moderator***[256]** *Chair*

Douglass, Kristina [248] see Hixon, Sean

Douglass, Matthew [247] see Braun, David

Douglass, Matthew [390] see Skosey-LaLonde, Elena

Douka, Katerina [326] see Becerra-Valdivia, Lorena

Dove, David**[398]** *Feasting and Shrine Formation at Mitchell Springs and Champagne Spring*

Although most archaeologists agree that large-scale feasting occurred in the prehistoric Southwest, excavations have produced little direct evidence for it. Villages where feasting has been asserted had large populations, public architecture (monumental buildings, shrines, plazas, etc.), and often deep antiquity. Recent excavations at two such sites in southwest Colorado have revealed some of the clearest direct evidence for feasting. At the Mitchell Springs and Champagne Spring site complexes, large-scale feasts appear to have been hosted by powerful households in plaza-associated buildings where special facilities were used to prepare, cook, and hold large quantities of food at a warm temperature. Over time, some feast venues acquired layers of social memory and ritual associations that reaffirmed links between residents and ancestors and the spaces they both lived upon. Many of the plaza-associated buildings where these feasts were hosted were decommissioned in impressive ritualized events that involved packing structures with important items and burning them, ritually offering meaningful property, sealing important features and structures, and/or sacrificing animals. Some of these buildings became shrines that served as venues for feasting and appear to have acted to venerate space and ancestors who lived on that space.

Dove, David [420] see Di Naso, Steven

Dowd, Anne S. (National Park Service)**[235]** *Discussant***Doyel, David (Arizona State Museum)****[194]** *Early Hohokam Platform Mounds and Social Signaling*

Between A.D. 900 and 1250 major forces of change were operative among the Phoenix Basin Hohokam. These changes include a shift from ball courts to platform mounds as major public architectural features. What is the meaning of these mounds? A diachronic approach is used to investigate the origins and development of platforms as a new architectural feature type and as a new approach to social signaling. Examples of early platforms like those excavated at Snaketown and Gatlin are analyzed to address construction dynamics, as even these small early platforms, which existed at villages in both the Gila and Salt River valleys, exhibit complex architectural patterns. Context is explored to adduce what this Mesoamerican-inspired architectural feature might have represented in terms of belief systems, ideology, social organization, and other factors. The possibility is investigated that among

other functions early Hohokam platforms may have been associated with ancestor veneration as public spectacle within the context of population growth. The more massive platforms of the later Classic period in the Phoenix Basin have remnants of these earlier platforms within their footprints. Did social signals associated with platform mounds remain stable or did they change through time?

Doyel, David [366] see Debowski, Sharon

Doyle, Colin [63] see Luzzadde-Beach, Sheryl

Doyle, Colin (University of Texas at Austin), Timothy Beach (University of Texas at Austin), Sheryl Luzzadde-Beach (University of Texas at Austin) and Jedidiah Dale (University of Texas at Austin)

[63] *Multiproxy and LiDAR Evidence for Intensive Maya Wetland Agriculture along the Rio Bravo River*

We present preliminary results from a newly discovered Maya wetland canal and raised field system found along the Rio Bravo River in Northwest Belize using airborne LiDAR. The LiDAR data reveals canals and raised fields in a very rectilinear pattern that suggest planning and organization for many kilometers down the floodplain near the site of Wari Camp. In fact, these fields may be the most rectilinear and extensive known in the region. In the summer of 2018, we surveyed the canals on the ground and conducted 3 excavations in the raised fields and canals, an excavation of a platform terrace on a hill in the floodplain, and took soil cores from a main feeder canal that still had water. We found a well-developed paleosol about 1.2m below the surface of the raised field, similar to other systems in the region. High gypsum in the soils likely precipitates from the sulfate rich groundwater, posing a challenge for agriculture without proper management in addition to seasonal variation in water levels. Carbon dates and geochemical evidence constrains the timing of creation and abandonment of the canals in the archaeological context, and possible environmental challenges this ecosystem engineering could overcome for intensive agriculture.

Doyle, James (The Metropolitan Museum of Art)

[79] *Stephen D. Houston's Bloody, Courtly, Fiery, and Luxurious Contributions to Exhibitions of Maya Art*

As a graduate student, Stephen Houston contributed references as well as two personal communications to the catalogue for *The Blood of Kings: Dynasty and Ritual in Maya Art*, including drawing Linda Schele and Mary Miller's attention to key details of an exhibition centerpiece: the Kimbell Art Museum's panel with captive presentation. Since then, his contributions to our understanding of the visual culture of Classic Maya artists has shaped major exhibitions, including *Courtly Art of the Ancient Maya* (National Gallery de Young Museum), and *Lords of Creation* (LACMA, Dallas Museum of Art, and The Met). As co-curator of *Fiery Pool: The Maya and the Mythic Sea* (Peabody Essex Museum, Kimbell Art Museum, and St. Louis Museum of Art), he drew scholarly and public attention to a crucial yet overlooked aspect of Maya art: the "influence the oceans, and water generally, had on [the ancient Maya's] perception of the world around them." Recently, as part of the research team for *Golden Kingdoms: Luxury and Legacy in the Ancient Americas* (Getty Museum, The Met), he shaped the checklist of Maya art and underscored that, for the Maya, luxury "materials are not just solid stone or metal but lamenent with spirits."

Dozier, Crystal (Wichita State University)

[204] *Indigenous Grape Wine and Black Drink Production in Pre-Hispanic Texas*

This paper presents the result of microfossil and organic residue analysis from 54 Leon Plain sherds from six Terminal Late pre-Hispanic (Toyah Phase) sites in the American Southern Plain. Small (3-5 cm square), undecorated body sherds were chosen from six Toyah sites with large ceramic collections in central and south Texas. This study combined methods for microfossil (starch and pollen) recovery as well as absorbed organic residue analysis with liquid chromatography coupled mass spectroscopy (LC-MS/MS). Microfossil recovery was successful, but too sparse to accurately reflect use. Absorbed residues were successfully extracted; biomarkers associated with Black Drink (Yaupon Holly tea) and grape wine were identified in several sherds. This study is the first to find evidence chemical residue evidence of Black Drink production in Texas and the first to find evidence for indigenous grape wine production in the Americas.

Drake, B. Lee [316] see Tripcevich, Nicholas

Drake, Eric (Binghamton University/Hiawatha National Forest)

[318] *Learning to Squeeze the Data: Fifteen Years of Archaeological Research within the Grand Island National Recreation Area*

From 2001 until 2015, the Hiawatha National Forest partnered with Illinois State University (ISU) to host a public archaeology program named the Grand Island Archaeological Project. The project involved an archaeological field school operated through ISU, a Youth Archaeology Workshop, and public interpretation and outreach programs. The project was directed by Dr. James Skibo of ISU and Forest Service Archaeologist, Eric Drake. This paper will review the work conducted over this 15 year period, highlight the major findings and accomplishments, and reflect upon the questions that drove the research.

Drake, Stacy [30] see Trein, Debora

Drake, Stacy (The Field Museum)

[30] *Exploring Trends in Mortuary Behavior among the Ancient Maya of Northwestern Belize*

Studies of ancient Maya mortuary patterns have asserted that Maya burials do not adhere to a singular mortuary pattern (Ashmore and Geller 2005, Fitzsimmons 2009, Geller 2004, Ruz Lhuillier 1965, Welsh 1988). However, many of these same studies also suggest that a review of data specific to certain contexts (inter-site, time period, region, and/or social class) may yield new trends that have not yet been identified. Through ongoing excavations and reviews of past-recorded Maya burials, regional, small-scale data sets of mortuary behaviors are available to test these assertions. This presentation explores burial data recovered from 25-years' worth of excavations in northwestern Belize. A total of 123 individuals represent 2000 years of Maya mortuary behavior across 12 archaeological sites of varying sizes and types. Observed patterns are presented with the aim of exploring mortuary variability and commonality, and to spur future investigations into regional interaction and fluidity through time among these geographically and temporally complex culture groups.

[293] *Moderator*

[178] *Discussant*

Draper, Dianne [223] see Freeman, Andrea

Drennan, Robert (University of Pittsburgh)

[364] *Discussant*

Drew, David [306] see Kimbell, Caroline

Driver, Jonathan [57] see Ryan, Susan

Drohobitsky, Danylo (University of California San Diego), Dominique Meyer (University of California San Diego), Julien Riel-Salvatore (Université de Montréal), Jamie Hodgkins (University of Colorado Denver) and Caley Orr (University of Colorado Denver)

[195] *Forensic Methods for the 3D Reconstruction of an Infant Burial in Arma Veirana Cave, Liguria, Italy*

Spatio-temporal models can function as detailed digital surrogates of archaeological sites, providing the context and content needed to enable analytical reasoning by means of interactive visualization. The starting point is often surveying techniques based on light detection and ranging as well as photogrammetry, which have been readily adopted into the digital archaeology toolbox, creating a means to construct a site and artifact specific 3D/4D data scaffold. The data at the source of digital surrogate creation has to be verifiable, accurate and trusted, and the Arma Veirana cave in Liguria, Italy has served as a catalyst for the synthesis of multiple site documentation and analytics techniques, creating a comprehensive cave model and coordinate system, and a catalog for the tracking of all artifacts. For this study, an infant burial was documented using calibrated and spatially referenced camera systems, allowing for camera correction, geometry extraction and alignment as part of the model synthesis workflow. Photogrammetric models of both specific artifacts and broad overviews containing common georeferenced markers are joined to create such a baseline model. The resulting digital surrogate allows for the analysis of the complex arrangement of burial goods, erosional displacement, and the documentation of delicate remains before removal.

Druc, Isabelle [298] see Grávalos, M. Elizabeth

Drucker, Dorothée [48] see Wong, Gillian

Du, Andrew [365] see Faith, Tyler

Duan, Chenggang [78] see Gao, Bo

Dublin, Susan-Alette (Hunter College) and Robert Dublin (independent photographer)

[264] Navajos, Traders, & Tourists: Cultural Patterns in the Architecture of Trading Posts

Spatial organization and architectural form derive (at least in part) from a template that is unique to a given society or culture. This might include ideals of building form, materials, and layout, as well as the direction of movement and behavior into and through a space. Trading posts in Navajo country present an opportunity to explore this question. Initially built by Anglo traders to meet the needs of Navajo customers, posts were later adapted to accommodate a burgeoning tourist trade. A mixed heritage and shifts in function and emphasis should select for traits that reflect Navajo and Anglo building traditions and that changed over time as the tourist trade became more important. This study, drawing from a photographic survey of 30 posts, considers elements of architecture, interior space, and patterns of movement across that space.

Dublin, Robert [264] see Dublin, Susan-Alette

Dubois, Jonathan (Cal State San Bernardino)**[339] One of Many Centers: Evidence for Precolumbian Cosmopolitanisms in the Rock Art of Huánuco, Peru**

How might we better understand interactions between contemporary peoples of the past from different geographic regions with distinct cultural practices? I propose to address this question from the perspective of Precolumbian cosmopolitanisms: a theoretical framework that allows the investigator to examine the interregional interactions evident in material cultural remains, while simultaneously considering how peoples' distinct, autochthonous beliefs and practices distinguish them. Precolumbian cosmopolitanisms offer a lens that enables the viewer to preserve attention to rooted local practices while seeking to investigate the routes of extralocal interactions. I briefly review some of the data that demonstrates that a cosmopolitanism existed prior to the Early Horizon (~800-200 BCE) in Peru that made the spread of Chavín-related materials possible. Recent evidence in the rock art of Huánuco and Satipo, Peru, examined in light of simultaneous discoveries in the Ceja de Selva by Valdez and others, demonstrates that interactions between peoples of the Amazon and the Andes was far more intensive than was previously understood and had a profound influence on Andean cultural development. I explore how local peoples were affected by and affected extralocal ideas and beliefs in the Andes and Western Amazonia with increasing intensity leading into the Early Horizon.

[339] Chair

Dudgeon, John [121] see Blatt, Samantha

Dudgeon, John (Idaho State University - CAMAS), Rebecca Hazard (Idaho State University - CAMAS), Julie Field (Ohio State University), Christopher Roos (Southern Methodist University) and Amy S. Commendador (Idaho Museum of Natural History)**[408] Three-Dimensional Spatial Evidence of the Development of Agriculture in the Sigatoka River System, Viti Levu, Fiji**

The transition from coastal foraging to inland/upland horticulture in Viti Levu, Fiji appears to be marked by the early incorporation (~3000 BP) of fruit arboriculture in the primary tributaries of the Sigatoka River, with later (~2500 BP) evidence for the development of more intensive agriculture involving root and tuber farming and pond field construction. Previously, we documented the evidence for fire and soil chemistry changes associated with human terraforming (2016) and preliminary microfossil evidence for introduced cultigens in the tributary valleys of the Sigatoka River basin (2017). Here, we present a three-dimensional spatial occurrence analysis of multiple classes of sedimentary plant microfossils recovered from core sampling in the Sigatoka drainage to refine the evidence for inland settlement and investment in intensive agricultural subsistence in Fiji.

Dudley, Meghan (University of Oklahoma)**[17] Working Together for the Past: Developing a Stewardship Program for Oklahoma**

For several decades, stewardship programs have proven to be a successful way to engage citizen scientists in the preservation of the archaeological record. From California to Florida, archaeologists have trained members of the public who are passionate about preserving the past to monitor sites, document private collections, and assist at public education events. In Oklahoma, heritage sites suffer from erosion, looting, and other threats, so the Oklahoma Public Archaeology Network has initiated a three-year process to develop our own stewardship program. As we begin our first year of development, we are assessing other programs as potential models and surveying key partners and members of the public to identify the unique needs of the people and heritage in our state. We present our methods and initial feedback in our paper.

[297] Chair

Dudley, Meghan [297] see Luthman, Sarah

Dudzik, Beatrix (Lincoln Memorial University), Taylor Beckmann (Lincoln Memorial University), Michelle Donohue (Lincoln Memorial University), Johnny Cebak (Lincoln Memorial University) and Paul Wood

(Lincoln Memorial University)

[131] Lipidomic Analysis of Arch Street Project Brain Tissue

The Arch Street Project provided desiccated brain tissue recovered from a cemetery uncovered in Philadelphia, PA to the DeBusk College of Osteopathic Medicine Metabolomics Unit. As the Arch Street cemetery burials predate chemical fixation funerary practices, analysis of biological soft tissue samples was possible.

This study examines the potential of lipid analysis of soft tissue remnants in buried remains, and archaeological excavations by presenting evidence of long-term lipid preservation in unfixed brain tissue 200 years postmortem. With further analysis, the identification of signaling lipids and/or disease biomarkers provides broad implications for epidemiological studies of past and present populations.

High-resolution mass spectrometry was used to explore and identify the presence of different lipid molecules present in the brain tissue, which can indicate molecular activity and provide information regarding cellular signaling cascades active during life. Forty separate lipids were observed in significant quantities. Two known phospholipids found in large quantities within cell membranes were identified and validated via MS2 after bombarding each molecule with high energy electrons. With analysis of more brain tissue that predates chemical fixation, lipid degradation patterns may shed light on post-mortem interval estimation techniques as well as provide insight to the pathologies present in these remains.

Duenas-Garcia, Manuel (PhD Student), Miriam Campos (University of California, Merced PhD Student) and Nicola Lercari (University of California, Merced Assistant Profess)

[221] Cerro de En medio, a Hidden Epiclassic Site in the Northern Frontier of Mesoamerica

This paper presents the analysis of the role of violence underlying the settlement pattern at Cerro de En medio, Aguascalientes, Mexico, located in the northern frontier of Mesoamerica. Violence is one of the social forces that shape the decision making involved in selecting a place to settle. This paper focuses on understanding the role of defensibility as a reaction to potential violence using spatial analysis in GIS combined with aerial 3D mapping. This study aims to quantify location-based factors such as visibility, elevation advantage, and accessibility to understand conflict and warfare in this ancient civilization. The site entirely occupies a 34-acre plateau in the middle of a canyon near the modern Plutarco Elias Calles Reservoir in the municipality of San Jose de Gracia. The name Cerro de En medio itself derives from the site's geographical setting. Due to location, its defensiveness seems to be a key factor in shaping the settlement pattern. Additionally, occupation at Cerro de En medio can be traced back to the Epiclassic (600 – 900 A.D.), a period defined in Mesoamerica as a time of intense competition between local elites due to the restructure of power relationships following the fall of Teotihuacan state.

Duff, Andrew [188] see Duff, Andrew

Duff, Andrew (Washington State University), Judith Habicht-Mauche (University of California, Santa Cruz) and Rob Franks (University of California, Santa Cruz) and Andrew Duff

[188] Glaze-Paint Pigmenting Strategies in the Upper Little Colorado and Western Zuni Regions

We report on research that uses LA-ICP-MS to examine glaze-paint pigmenting strategies and lead isotopes to investigate lead sources used during the Pueblo IV period in the Upper Little Colorado and Western Zuni Regions of the American Southwest. Pigment data suggest that glaze-paint recipes were shared across several adjacent regions, attesting to cross-cutting technological communities of practice and the circulation of ideas, production techniques, and (probably) potters during the Pueblo IV period. Additionally, potters in these regions used raw materials that derive from two main sources, Cerrillos and Hansonburg. Many western region potters appear to have regularly mixed materials from both sources in their glaze paints, a contrast from Rio Grande potters who typically utilize a single source. Similarity in glaze recipes applied to both Zuni Glaze Ware and White Mountain Red Ware suggest shared practices at the village, intraregional and interregional scales. These results contribute to the increasingly macroregional exploration of glaze-paint technology and we conclude by situating these data in this larger analytical frame.

Duffy, Paul R. [126] see Godinez, Teresa

Duffy, Paul R. (University of Toronto)

[126] Trial by Fire: Lessons from the 2015-2018 BAKOTA NSF-REU Field School

Over the past four years, the Bronze Age Körös Off-Tell Archaeology (BAKOTA) team has developed an intensive international undergraduate research and training component to the project with financial support from the National Science Foundation, Research Experience for Undergraduates program (NSF-REU) and the Central European Institute (CEI) at Quinnipiac University. In this poster, we reflect on the successes and challenges of our work from 2015 to 2018, and provide suggestions for academics interested in applying for this type of funding.

[126] Chair

Dufton, Andrew (New York University)

[77] Chair

Duke, C. Trevor (University of Florida), Neill Wallis (Florida Museum of Natural History) and Ann S. Cordell (Florida Museum of Natural History)

[298] Pots with Purpose: Examining Mortuary Craft Specialization on the Late Woodland Gulf Coast

Extant models of craft specialization often assume that craft production served to instantiate or reify existing social relationships. By this line of reasoning, pots must have played only a passive role at communal gatherings and mortuary rituals. If pots were merely the accoutrements of specialists, the symbols of lineages, or status markers, pots in and of themselves could not have generated social change. However, archaeologists might reach different conclusions about these relationships by viewing pottery production and exchange as part of a broader suite of efficacious technologies (*sensu* Warnier 2009), which had enduring effects in people's lives. Pots do much more than signify inclusion or membership into lineages and social units; they can also facilitate new types of social interaction in the context of specific events and ceremonies, such as mortuary rituals. Pots themselves then potentially place humans within novel circumstances. We support this position by presenting technological, petrographic, and chemical (NAA) data of mortuary pottery from Late Woodland (AD 600-1000) sites across the Florida Gulf Coast. We use these data to suggest that the types of relationships which emerged between specific activities, pots, and people during this timeframe prompted labor reorganization and craft specialization in the region.

Duke, Daron [36] see Wohlgemuth, Eric

Duke, Daron (Far Western Anthropological Research Group) and Daniel Stueber (University of Victoria)

[249] Haskett and Its Clovis Parallels

Haskett represents an initiating point style in some parts of western North America. Radiocarbon dates suggest the earliest Haskett occupations were within the Clovis era, and Haskett shares several technological and geographic attributes that are more in kind with Clovis than with later stemmed styles. Here we emphasize these similarities—such as high craftsmanship, widespread toolstone conveyance, large spear-knife functionality, and accompanying hunting-based tool forms—to clarify the dialogue about how Haskett fits into the story of North America's interior colonization.

Duke, Guy (The University of Texas Rio Grande Valley)

[232] Making a Meal at the Late Moche (AD 600-850) Site of Wasi Huachuma, Peru

Creating a meal at the Late Moche (AD 600-850) site of Wasi Huachuma was not simply a matter of visiting the pantry and cooking the ingredients. It required the knowledge of whom to acquire ingredients from, when the ingredients were available, and how to process them. The culinary materials recovered from Wasi Huachuma indicate that knowledge of agricultural products such as maize (*Zea mays*), squash (*Cucurbita* sp.), chilli pepper (*Capsicum* sp.), and potato (*Solanum tuberosum*) was combined with that of terrestrial and marine protein sources including camelids (*Lama* sp.), guinea pigs (*Cavia porcellus*), and a variety of fish (*Mugil cephalus*, *Galeichthys peruvianus*, and *Cynoscion* sp.), mollusks (*Donax obesulus*, *Polinices* sp.), and arthropods (*Platyxanthus orbignyi*). The occupants of Wasi Huachuma not only used their knowledge of the cycles of availability of these materials in order to feed themselves, but also knew what tools and utensils were necessary to process them for consumption and the culturally appropriate ways to consume them. This paper discusses how the people of Wasi Huachuma acquired, processed, and consumed their meals through their application of cultural knowledge of the relationships between the physical environment and the various groups of people collecting and producing food in the region.

Duke, Guy [288] see Reger, Brandi

Duke, Hilary (Stony Brook University, New York), Amy Fox (University of Toronto, Toronto), Andrew Riddle (Archaeological Services Incorporated, Toronto) and Sonia Harmand (Stony Brook University, New York)

[127] Shaping Hominin Cognition: A Comparative Three-dimensional Shape Analysis of LCTs and Cores from the Early Acheulean at Kokiselei 4, West Turkana, Kenya

The development of 'shaping' abilities in hominin lithic technology involved increases in higher-order cognition including forward planning, working memory, and spatial reasoning. Longstanding assumptions engrained in lithic typologies claimed that "Long Core Tools" (LCTs), such as "handaxes", were the earliest shaped lithics. LCTs first appear in eastern African contexts after 1.8 Ma alongside *Homo erectus* fossils, the first hominin species with significant increases in areas of the brain important for higher order cognition. Many studies about change in LCT shapes (both 2D and 3D) include cross-regional and diachronic comparisons, both in terms of assemblage-wide variation and typologically-meaningful forms. Few studies compare LCTs with contemporaneous cores to understand how their morphologies differ. This study applies two complementary 3D analyses of interior volume distribution (Riddle and Chazan 2014) and exterior surface (Fox 2016) to the world's earliest known LCTs (1.76 Ma) and cores from Kokiselei 4 in West Turkana, Kenya. Results demonstrate meaningfully distinct artefact clustering. When paired, these analyses challenge long-held assumptions about best practices in lithic shape analysis and the typological classification of artefacts. These results will impact the way archaeologists use morphological variables to interpret variation in lithic assemblages and the evolution of hominin cognition during the Acheulean.

Duke, Trevor [70] see Pluckhahn, Thomas

Dukepoo, Hawthorn [254] see Koyiyumptewa, Stewart

Dunaway, Leslie [76] see Teel, Sarah

Dunbar, James [325] see Feathers, James

Duncan, Neil (University of Central Florida)

[137] *Discussant*

Dungan, Katherine (Center for Archaeology and Society, Arizona State University)

[246] *Mounds, Mounding, and Polychrome Pottery in the Late Prehispanic Tonto Basin*

Both platform mounds and Roosevelt Red Ware (or Salado Polychrome) pottery have been interpreted as tied to religious practice in the late prehispanic southern Southwest, although the relationship between the two traditions is still debated. In the mid-14th-century (Gila phase) Tonto Basin, settlement included not only platform mounds with layouts that show clear connections to earlier platform mounds in the region but also included "syncretic mounds," in which "mounding" was used within what is essentially room-block space. These otherwise diverse sites are united by the use of Roosevelt Red Ware. The ware dominates painted ceramic assemblages at late excavated sites and many whole vessels were recovered from room floors. This paper will explore the role played by the production and use of Roosevelt Red Ware in the diverse social and religious landscape of the Gila phase Tonto Basin through ceramic sourcing, design analysis, and the analysis of intrasite provenience.

Dunn, Stacy (Edinboro University Dept of Criminal Justice, Anthropology, & Forensic Studies) and Abigail Bennett (Edinboro University, Anthropology)

[288] *Analysis of Cuchimilcos from Coastal Peru*

Cuchimilcos are small painted clay figurines and are one of the most recognized artifacts from ancient coastal Peru. They are associated frequently with the Chancay culture (1100-1400 AD) but are found throughout the central and north coast. Although most museums have one, little is certain about their purpose in society. To address the questions of function and meaning, we recorded attributes of figurines from online museum databases to determine if there is any pattern in decoration, sex of figurines, construction techniques, etc. that may aid in interpretation. We classified the figurines into groups based on these features and then compared them to additional information from burials, textiles, and other ceramics. Our analyses determined that the figurines are predominantly female and are not focused on sexual acts or childbirth; this runs counter to regular assumptions that they represent fertility or classic Andean duality. This study also contributes to our understanding of ancient craftsmanship and distribution.

Dunning, Nicholas [79] see Beach, Timothy

Dunning, Nicholas [330] see Milley, David

Dunning, Nicholas (University of Cincinnati), Christopher Carr (University of Cincinnati) and Timothy Beach (University of Texas - Austin)

[372] *Sakwitz'ob: There's Gypsum in Them Thar Hills*

This poster documents the discovery in 2018 of a large ancient Maya gypsum quarry in southern Campeche, Mexico. The quarry extensively mined a regionally prominent hill (witz), likely making it a white beacon within the ancient landscape. Nearby sites appear to include gypsum workshops. Gypsum mines have also been recently discovered near El Zotz, Petén. We discuss the known and possible uses of gypsum by the ancient Maya including for plaster, sculpted vessels, and as an agricultural soil amendment.

Dunshea, Glenn [253] see Smith, Oliver

Dupej, Jan [386] see Veleminska, Jana

Dupras, Toshia [353] see Holder, Sammantha

Dupuy, Paula [196] see Frachetti, Michael

Durand, Kathy (Eastern New Mexico University) and Jeremy Loven (PaleoWest Archaeology)

[296] Casas Grandes Fauna

The prehistoric inhabitants of the Casas Grandes region of northwest Chihuahua, Mexico, exploited a wide range of local and non-local fauna. This paper explores the value of different animal species throughout the prehistory of this region and how various animals were utilized for daily subsistence and utilitarian purposes, as items for trade with other cultural groups, as inspiration for artistic expression, and as objects of significant ceremonial and religious importance. By examining the diverse uses of animal resources from the Paleoindian through the Late Prehistoric periods, we develop a holistic understanding of human-animal interactions throughout time within the Casas Grandes region and explore how these interactions affected and shaped the lives and worldviews of the inhabitants of this cultural area.

Duray, Anne (Stanford University)**[149] Chair**

Duray, Anne [149] see Der, Lindsay

Dussubieux, Laure [106] see Wade, Mariah

Dutkiewicz, Ewa (University Tübingen), Sibylle Wolf (Senckenberg Centre for Human Evolution and Palaeoe) and Nicholas Conard (Senckenberg Centre for Human Evolution and Palaeoe)**[15] Constructing Identity in the Swabian Aurignacian**

The human body plays a significant role in constructing identity. According to Bourdieu (1974, 1976), the habitus, displays the social status and the role of the individual within a society. Group membership manifests itself with symbols like personal ornaments, the choice of emblematic objects, and their compositions. The ornamented body also displays stages in the life circle of individuals. One of the oldest, well-documented assemblages proving such kind of behavior may be the Aurignacian in the Swabian Jura. Personal ornaments are a wide-spread phenomenon in this region from 43.000 to 32.000 cal BP. Typical bead-forms, like the double-perforated bead, show the cultural unity throughout the whole Aurignacian sequence. Other forms prove diversity and change in time. In addition to these, several figurative depictions of humans provide us with a deeper insight into gender- and status-related differences of body adornment. Two female depictions from Hohle Fels bear markings. Here, different zones and probably purposes of the decorations are present. The therianthropes, like the two Lionmen from Hohlenstein-Stadel and Hohle Fels, are very likely male depictions, combined with animal-like features. Their decorative elements might be linked to a special role of these individuals.

Dutton, Hannah [208] see Jenks, Kelly

Dutton, Hannah**[264] Distribution of Artifacts at the Historical Campsite of Paraje San Diego**

The site of Paraje San Diego in south-central New Mexico was used for over three centuries as stopping point on El Camino Real de Tierra Adentro National Historic Trail. While multiple historical sources identify this site as a “paraje” or campsite, we know surprisingly little about what travelers did at the site and where these activities took place. In 1994, the New Mexico State University (NMSU) archaeological field school conducted metal detector survey, surface collection, and test excavation at Paraje San Diego. Students and other researchers analyzed the artifacts collected in this project, but lacked the resources and time to consider the distribution of artifacts across the site. In 2018, I began digitizing maps and artifact inventories produced by the 1994 project in order to explore these data with the more powerful analytical tools available in ArcGIS. In this paper, I examine the spatial distribution of artifacts at Paraje San Diego in an effort to identify and locate specific activities that took place at this historical campsite.

Duwe, Samuel (University of Oklahoma) and Kurt F. Anschuetz (Rio del Oso Anthropological Services, LLC)**[84] Through Tewa Eyes? Exploring the Diversity and Universality of Pueblo Sacred Landscapes**

Pueblo worlds are remarkably similar, yet completely distinct. This paradox has challenged Southwestern anthropologists: how do Pueblo people, from Hopi to Taos, share similar worldviews and beliefs, but maintain unique histories of their paths of becoming? Elsie Clews Parsons and Edward Dozier characterized Pueblo ceremonialism as essentially identical among communities, but it is the emphasis of the elements of belief that distinguish the Pueblos from one another. We argue that this view extends to Pueblo sacred geography through the ways that the people define, remember, and live in their traditional homelands. Pueblo shrines, a major component of these landscapes, have similar morphology across space and time. Nonetheless, it is the context and placement of these places that distinguish and define individual Pueblo worlds. Archaeologists have begun to identify Pueblo shrines in earnest. Investigators have used select ethnography, especially broadly accessible accounts of Tewa landscapes, as guides to interpret past worlds. We laud these efforts, but we caution against overgeneralizing ethnographic accounts. We grapple with the questions that Parsons and Dozier raised: how can we identify crucial elements of Pueblo worlds while accounting for unique historical and cultural difference? We highlight ancestral Tewa and Keres landscapes in our argument.

Dvoracek, Doug [380] see Edwards, Alexandra

Dye, David [348] see Burnette, Dorian

Dye, David (University of Memphis)

[358] *Animal Masters, Guardian Animals, and Masters of Animals in Eastern North American*

In this presentation I discuss beliefs that focus on "supernatural" animals and associated charter myths, regalia, and ceramic effigies. Three forms of transcendental animals are evident in eastern North America: animal masters, guardian animals, and masters of animals. Animal masters control the availability and behavior of their animal "subjects." They are materialized as animal effigy vessels, which are employed as venerated figurines/statuary and as ritual containers for preparing and transforming purifying "medicines." Guardian animals, as the object of human supplications for power, bestow health and protection, and are often visualized as artistic motifs and ritual regalia. Masters of animals may be either tricksters or culture heroes. As protagonists, masters of animals free captive animals for the benefit and welfare of humankind. As antagonists, masters of animals hoard animals, and are often depicted as "other than human persons" in a variety of artistic media, but most commonly as ceramic effigies. These otherworldly agents typically grant health, power, and success to those who establish proper procedures and protocols by performing specific rituals and by adhering to various prescribed practices of supplication and veneration.

Dye, Thomas (University of Hawai'i)

[29] *Event, Process, and Occurrence: A Bayesian View*

Steve Athens' substantive and interpretive contributions provide a firm Bayesian grounding for Hawaiian chronology. This paper offers operational definitions for archaeological events, processes, and occurrences and describes how they can each be investigated in a Bayesian framework with the R software ArchaeoPhases package authored by Anne Philippe and Marie-Anne Vibet at the University of Nantes.

Dyer, Jennifer (Six Rivers National Forest)

[257] *Integrating Traditional Ecological Knowledge into Archaeological Practice*

As Heritage Program Manager for Six Rivers National Forest in Northern California, I have worked closely with the Karuk Tribe and other partners on the Western Klamath Restoration Partnership (WKRP). WKRP is an initiative designed to utilize traditional ecological knowledge (TEK) to restore cultural burning on a landscape at the center of Karuk aboriginal territory. Archaeological surveys for WKRP were conducted by an integrated crew of Karuk tribal practitioners and Forest Service archaeologists. The crew took a holistic approach of recording more than just artifacts and features, to include cultural vegetation characteristics and evidence for how the land was used and managed in the past with a view toward revitalizing those practices in their traditional places. Collecting TEK and archaeological data allowed for an enhanced understanding of the values and resources that make up this cultural landscape. As the surveys took shape it was clear that standard archaeological site recordation forms would not be sufficient. A TEK form was collaboratively developed to identify natural resources showing signs of past or contemporary use/management, associations with the broader landscape (known villages, trails, hunting grounds, old campsites, springs, ridgelines, viewsheds, ceremonial areas), and management recommendations to enhance plant quality for cultural uses.

Dyckowskyj, Deanna [247] see Paige, Jonathan

Ea, Darith [27] see Kealhofer, Lisa

Earl, Dale (U.S. Air Force) and David Reynolds (U.S. Air Force)

[260] *Zooarchaeological Remains and Their Impact on Land Management Decisions: An Example from Kirtland Air Force Base, New Mexico*

In 2008, during geoarchaeological survey of a portion of Tijeras Arroyo located on Kirtland Air Force Base, researchers located remains of bison in four new locations. This includes a *Bison occidentalis* skull which was found in soils that were dated to 5600 to 5700 BP. Using techniques from zooarchaeology these remains are aiding archaeologists and natural resources staff at Kirtland Air Force Base better understand what the natural environment looked like. This in turn is helping Kirtland Air Force base staff better preserve the natural environment of Kirtland Air Force Base as required by the Sikes Act.

Earle, Julia and Jhon Percy Cruz Quiñones (Pontificia Universidad Católica del Perú)

[98] Pre-hispanic Building Stone Quarrying and Selection Near Mt. Coropuna, Perú

Studies of Inka quarries have largely been restricted to the Cusco heartland, such that only a handful of quarries have generally served to describe Inka stoneworking technology, labor organization, and material selection as a whole. This bias has resulted in a dearth of understanding as to how Inka stoneworking varied over time and between geographical contexts. The study of quarrying in Inka provincial contexts stands to add nuance to our understanding of how Inka stoneworking technology developed in the heartland and the extent to which local knowledge might have influenced the construction process elsewhere. In 2017 we conducted an oriented survey within a 30-kilometer radius of Maucallacta, an Inka administrative center of the southern Cuntisuyo province, registering a total of 10 pre-Hispanic quarries. The technological repertoires present at these quarries overlap, but do not completely match, with those that have been described in the Inka heartland. These quarries do attest to a preference for dark-colored andesite that has likewise been noted in the heartland; in some cases this stone was transported over several kilometers to construction sites. In addition, we present our methodological approach to studying building stone quarries in the Andes in the hopes of advancing this sub-field further.

Earley, Caitlin (University of Nevada, Reno)**[303] New Monumental Sculpture from Quen Santo, Guatemala**

Recent archaeological work at the western Guatemalan site of Quen Santo by the Proyecto Arqueológico de la Región de Chaculá (PARCHA) has investigated the chronology of the site and resulted in the discovery of new monuments. In this paper, I present the results of recent study of these monuments. After reviewing the art historical investigation completed in summer 2018, I will introduce three new sculptures from Quen Santo and explore how they add to current archaeological and art historical understanding of the site. These sculptures, I argue, both adhere to and depart from themes in the artistic program of Quen Santo. In addition to presenting new information about the art of a poorly understood site, this presentation provides a new perspective on broader issues in Mesoamerican art history, including rulership, ritual, and the role of sculpture in highland Maya centers.

Earley, Frank Lee [252] see Huffman, Thomas

Ebel, Erika (University of California, Davis), Christyann Darwent (University of California, Davis), Genevieve LeMoine (Peary MacMillan Arctic Museum and Arctic Studies) and John Darwent (University of California, Davis)**[10] 1000 Years of Small Bird Capture in NW Greenland**

Excavations in 2012 and 2016 at lita, located along the North Water Polynya in NW Greenland, revealed unmixed stratified deposits extending from Late Dorset habitation over 1000 years ago through Thule-Inughuit occupation and Inughuit contact with Arctic explorers ca. 1850–1917. lita is unique in that a large dovekie colony breeds in this area annually, thus the faunal assemblage provides a unique opportunity to study the history of bird use. Given rapid climate change in the Arctic, this will likely be the last opportunity to investigate the archaeological record at lita.

Ebert, Claire (Northern Arizona University) and Emily Zavodny (University of Central Florida)**[248] Societal Cycling Influenced by Climatic Variability Among Early Agricultural Communities: Comparative Perspectives from Belize and Croatia**

Archaeological studies continue to highlight the extreme variability in sociopolitical responses to prehistoric fluctuations in climate, from the emergence to complete breakdown of hierarchical societies. These processes were likely more volatile among early farming communities with high degrees of environmental dependency. Using new high-precision AMS 14C dates and regional paleoclimate proxy datasets, we compare the developmental trajectories of early agricultural groups from two disparate world regions: Belize and Croatia. Results suggest that changes in climate regimes correspond to alternating cycles of sociopolitical integration and fragmentation in both regions. Our research provides a framework for understanding the complex relationships between society and environment that promoted resilience or induced vulnerability in response to dramatic climate shifts.

Ebert, Claire [373] see Walden, John

Eberwein, Ann (University of Wisconsin - Milwaukee)**[404] Bread, Apples, and Cereal Grains: Analyzing a Collection of Carbonized Food from Robenhausen, Switzerland**

This paper presents the results of research on a collection of food from Robenhausen, a lake-dwelling site southeast of Zurich. These specimens are part of a larger collection that was recovered in the late 19th century and is housed at the Milwaukee Public Museum. The material includes thirteen bread fragments, seventy-five apple pieces, and thousands of cereal grains. This research focuses on the identification of the grains and the processing methods used at lake dwellings to create a temporal framework based on species present and the way they were manipulated. In addition, many of the bread fragments include visible cereal grains, which may indicate grain preference in bread making, while the convex shape of these pieces indicates the shape of the surface on which they were baked. The size of the apple pieces indicates that they are crab apples, which were harvested and divided longitudinally, then left to dry prior to carbonization. The purpose of this research is to document this material and demonstrate its utility despite the orphaned state of the collection. In addition, this information will contribute to data from modern excavations at circum-Alpine sites and more broadly, to an understanding of food processing in Neolithic Europe.

Eble, Benjamin and Zachary Hruby

- [255] *A Review of Indirect Percussion Techniques in the Americas and Their Possible Applications in the Manufacture of Ceremonial Bifaces and Mesoamerican Eccentrics*

Almost a century of bias in favor of direct percussion in the archaeological modeling of biface manufacture in the New World has obscured the central role of indirect percussion in this process. We examine ethnohistorical and archaeological evidence of indirect percussion in certain stages of biface manufacture, and posit their possible applications in the production of Mesoamerican ceremonial lithic items. A special focus is placed on replication experiments that utilize tools actually found in the ethnohistorical and archaeological record rather than those created by archaeologists and avocational knappers.

Eche Vega, J. Eduardo (Universidad Nacional de Trujillo) and Jose L. Peña (University of South Florida)

- [236] *Estudio de la Arquitectura Monumental Casma en el sitio El Campanario, valle de Huarmey-Perú*

Las construcciones monumentales públicas cobraron un rol importante dentro de la vida social, política, económica e ideológica de las sociedades complejas andinas. Estas sociedades complejas edificaron grandes estructuras de piedra y adobe destinadas a eventos de carácter público. Las recientes excavaciones arqueológicas llevadas a cabo la plataforma 1 en el sitio El Campanario (Valle de Huarmey) han revelado que esta fue construida, ocupada y ampliada desde el Horizonte Medio hasta el periodo Intermedio Tardío. En esta estructura pública de adobe y piedra se han registrado y recuperado fragmentos de cerámica del estilo Casma Moldeado y fragmentos de cerámica policroma asociada al Horizonte Medio. La cerámica Casma moldeada es de acabado fino, y está formando en su mayoría por vasos, cuencos con base y jarras; mientras que los fragmentos de cerámica policroma son parte de un pequeño cuenco y vasos. Ambos estilos alfareros fueron recuperados sobre la base de los muros junto a restos botánicos (corontas de maíz) y malacológicos. Es posible que las diferentes formas y estilos cerámicos hayan sido usados como parte de eventos públicos destinados a reforzar lazos sociales entre los habitantes de El Campanario o para establecer relaciones sociales con otros grupos étnicos.

Eche Vega, J. Eduardo [288] see Valade, Stephan

Echenique, Ester, Florencia Avila (Conicet) and William Gilstrap (Massachusetts Institute of Technology)

- [298] *From Technological Style to Communities of Practice: Defining Yavi-Chicha Sociotechnical Systems in the Río Grande de San Juan Basin (Border of Bolivia and Argentina) during the Period of Regional Developments (ca. AD 900-1450)*

Despite the Yavi-Chicha phenomenon being widely discussed in the Southern Andes, there is a lack of systematic research around the socioeconomic and political implications of production and circulation of the pottery of the Río Grande de San Juan Basin (Chicha Region). From the study of ceramic production and circulation, this paper seeks to contribute to the knowledge of the social dynamics, and, particularly, of the political economy in the Chicha Region during the Period of Regional Developments. We use the concept of technological style, as the main analytical axis, which is defined through the analyses of ceramic operational chains. This study uses a combined approach of macroscopic analyses with petrographic and elemental analysis by INAA and SEM. For this purpose, we have analyzed ceramic assemblages from two representative sites from the Chicha Region. Results suggest that, (1) the site of Chipihuayco was a ceramic production town, supplying ceramics to the town of Finispatria; (2) potters from Chipihuayco organized under one community of practice; (3) people from both sites participated in one or more regional networks; and (4) decentralized polities organized ceramic production and circulation practices.

Echeverría, Susana

- [227] *Discussant*

Eck, Christopher and E. Christian Wells (University of South Florida)

- [160] *A New Tool for Forensic Geoarchaeology: Sediment Fingerprinting with Geochemistry for Homicide Investigations*

Sediment fingerprinting by elemental analysis has been an important analytical tool in the environmental sciences to help explain sediment movement and deposition in water bodies and other catchments. Related techniques have also been used in many archaeological investigations to aid in ancient activity area analysis. However, this technique has only been rarely applied in forensic archaeology. This paper discusses methods and two case studies from Florida that use sediment fingerprinting in homicide investigations. In both cases, sediments from the crime scene and the suspect's vehicle were compared. For the comparison, sediments were digested with strong acids and analyzed with ICP-MS for a range of minor and rare earth elements. The results were analyzed with discriminant function analysis, which provided probabilities for group membership compared to off-site/control samples. This presentation introduces the methods and advocates for the further development and use of this technique in forensic science.

Eck, David [117] see Tsesmeli, Evangelia

Eckerstrom, Kyle (Pima Community College) and Emiliano Walker (Pima Community College)**[125] The Point of the Project: Analysis of Projectile Point Data in the Burro Creek/Pine Creek Wilderness**

During a 15-year-long survey conducted by Pima Community College of the Burro Creek/Pine Creek area, between Bagdad, Arizona and Prescott, Arizona, many different types of diagnostic projectile points were recorded and/or recovered. Based on an analysis of these projectile points, the area was occupied from the Paleoindian Era to the more recent and less known era of the Prescott Culture, which dates as late as AD 1300. This poster presents an in-depth analysis of the projectile point distribution across the landscape including typology, as well as a GIS-based examination of overall trends across more than 100 sites on BLM and private lands. The results seek to clarify chronology of occupation in the area and to refine our understanding of artifact typology within the Prescott Culture.

Eckert, Suzanne [25] see Habicht-Mauche, Judith

Eckert, Suzanne (Arizona State Museum, RPA) and Deborah Huntley (Tetra Tech)**[298] The Struggle within: Effects of Spanish Colonization on Pueblo Pottery Technology Revealed through Petrographic Analysis**

There is no doubt that Spanish contact and colonization, dramatically changed certain aspects of Pueblo life, among the Ancestral Piro of south central New Mexico. In the context of Pueblo history, examining ceramic technology provides a means of recognizing cultural continuity and transformation on the social landscape and of acknowledging the role indigenous agency played in determining the topography of that landscape both prior to and after Spanish contact. In this study, we examine both decorated and undecorated wares for evidence of adopting expedient ceramic technology over time among potters living in the Rio Abajo region. We rely on previous research among pottery producing foragers, as well as on studies of historic expediency, to identify the variables most likely to inform on whether or not expedient ceramic technology was used at some point during the Colonial period. We couch our interpretations within a framework of agency and practice to discuss the active role of material culture in potters' daily attempts to negotiate their place within a changing cultural landscape.

Edgar, Heather [189] see Price, Karen

Edgar, Heather (University of New Mexico)**[192] What the Spanish Brought with Them: Phenetic Complexity of the Spanish Population at Contact**

Colonial contact in Mexico brought together populations from diverse regions of the world – Europe (especially Spain), Mexico, Africa, and eventually, Asia. While much attention has been focused on the contributions of these groups to the admixed population that resulted, this attention has primarily been about quantifying broad patterns of continental ancestry, and so may have missed much by ignoring the diversity that existed within each region. We begin to address this shortfall using evidence from dental morphology, which provides phenetic evidence of population genetic admixture. Data from 10 European countries, 13 African countries, and Mexico (n=3552) from the 9th century to the present were analyzed using Structure, a program that estimates ancestry proportions at the individual level. Results reflect the genetic complexity of the Spanish colonizers. Medieval Spanish samples are more similar to those from Morocco and Tunisia than from other European countries. Historic Mestizos cluster with Europeans, including Spain and Morocco. However, contemporary Mestizo samples cluster together, separated from their European, African, and Native American ancestors. Our results show that including North African samples provides a better understanding of the Old World Origins of admixed populations in North America.

[178] Discussant**Edwards, Alexandra (University of Georgia), Doug Dvoracek (Center for Applied Isotope Studies), Anna Semon (American Museum of Natural History), David Hurst Thomas (American Museum of Natural History) and Robert Speakman (Center for Applied Isotope Studies)****[380] Lead Isotopes and XRF Analyses of Spanish Colonial Bronze Bells from Galisteo Basin, New Mexico**

Few elemental and isotopic studies have been conducted on bronze bells recovered from 16th – 17th century Spanish Colonial missions. Mission bells shaped daily life as they not only provided a call to prayer and daily tasks, but also served to reinforce the power dynamics of colonialism. We recently completed a study of 85+ bronze bell fragments from Pueblo San Lazaro, Pueblo San Marcos, Pueblo San Cristóbal, and other sites in the Galisteo Basin of New Mexico. Surface sampling of lead from these bells, followed by isotopic analyses via multiple collector inductively coupled plasma mass spectrometry (MC-ICP-MS) allowed us to determine the geologic origin of lead used in the production of these bells (e.g., local, Mexico, or Europe). Elemental analysis using X-ray fluorescence (XRF) facilitated identification of different recipes used to cast bronze bells during this era. Unique differences in silver, antimony, and arsenic concentrations in conjunction with isotopic data aided in linking individual bell fragments to the “parent” bell from which they originated. Ultimately, this allows for estimates of the minimum number of individuals (MNI) present within our bell fragment sample. Our results further show that these missions were provisioned with bells produced in North America and Europe.

Edwards, Alysha [239] see Prentiss, Anna

Edwards, Briece (Confederated Tribes of Grand Ronde)

[292] Discussant

Edwards, Briece [401] see Curteman, Jessica

Edwards, Charles**[116] Food and Cooking at Dust Cave: An Experimental and Microarchaeological Approach**

The potential of features to elucidate our understanding of past cultures is often understudied. When they do receive attention, it is often on the macroarchaeological scale, looking at visible morphology and artifacts. Microartifact analysis (MAA), however, has demonstrated the potential to add more information to our understanding of a site than macroartifacts alone. This project will examine microartifacts from features at the archaeological site of Dust Cave, a Late Paleoindian through Middle Archaic site in the Middle Tennessee Valley. Previous research has investigated features using a variety of methods, including micromorphology and geochemistry in addition to morphological analysis of feature shape and size. Such an integrated approach has yielded a more complex understanding of site activity, but recent analysis of microartifacts from feature fill has demonstrated the potential for MAA to further clarify hearth use at Dust Cave and provide a more nuanced understanding of prehistoric cooking technologies and diet. This project will involve experiments designed to test hypotheses generated from the MAA regarding prehistoric cooking, diet, and processing methods at Dust Cave.

Edwards, Emily (East Carolina University) and Megan Perry (East Carolina University)**[391] Cultural Factors of Metabolic Disease in Infants and Young Children from Late Ottoman-Era Jordan**

The site of Tell Hisban in Jordan was seasonally occupied by nomadic agropastoral tribes for over a thousand years. In the latter half of the 1800s, the Ottoman Empire instituted the Tanzimat, a series of reforms intended to solidify control over the region, including a new system of private land ownership. This new land law conflicted with traditional tribal-based land rights and resulted in intensification of agricultural production and diminished pastoralism in the regional economy. During this period of economic change, at least 62 individuals were interred in ruins on Tell Hisban, of which 55% were non-adults. Many long bones and cranial elements of non-adults within these commingled remains display evidence of vitamin C (scurvy) and D (rickets) deficiencies at a greater frequency than pre-Tanzimat or earlier regional cemeteries. Increased sedentism at Hisban resulting in a shift in child-care practices could have resulted in the surprising presence of rickets in this high-ambient UV radiation environment. Additionally, increased agricultural production may have impacted seasonal availability of traditional foods high in ascorbic acid that prevented scurvy in past groups. Together, these biocultural changes contributed to increased frailty in the form of metabolic disease for infants and young children within this population.

Edwards, Matt (SWCA Environmental Consultants)**[200] Discussant**

Edwards, Matthew [368] see Braje, Todd

Edwards, Nicolette (Southern Methodist University)**[10] Croxton Site Faunal Assemblage: Pre- and Post-deposition Disturbance Analysis**

The pre- and post-depositional processes that impacted the faunal assemblage associated with the Ipiutak component at the Croxton site, Alaska, have not been adequately studied/documentated (see Gerlach 1989). This study focuses not only on the pre- and post-depositional disturbances that may have occurred, but also on how the burial environment may have played a role in the preservation of the bones. The underlying causes of the staining present on the bones, the differential levels of weathering, and the presence of warping were analyzed. The potential effects of freeze/thaw processes and the characteristics of the sediment and its associated pH level were tested as well. The results indicate that the previous interpretations of the soil and its effects on the faunal assemblage are well supported, and that the high level of preservation and the presence of warping were most likely caused by characteristics of the surrounding soil. However, the cause behind the staining remains unresolved and requires further testing.

Eeckhout, Peter and Kusi Colonna-Preti (Independent Investigator)**[39] Archaeometric Analysis of Mural Paintings at Pachacamac, Peru**

From 2014 to 2018, we excavated Building B15, a small temple decorated with mural paintings at the archaeological site of Pachacamac. These are the first paintings discovered on the site since 1938. On the walls, as on many fallen adobe bricks, polychrome motifs painted in several layers can be seen on mud plaster or directly on the adobe walls. The archaeological context, absolute dates and iconography suggest a date around the beginning of the sixteenth century, i.e. the end of the Pre-Hispanic Period.

The exceptional value of these paintings led us to carry out an in-depth study of the stratigraphy of the pictorial layers and laboratory analyses: optical microscopy, SEM-EDX, FT-IR and μ -Raman. Preliminary results corroborate studies carried out on other mural paintings of the central coast of Peru but also reveal new data about pigments. In addition to the murals, tools used for the mural decoration were discovered in the same building: a collection of

paintbrushes, bowls, rough pigments, and a grinding stone. We were able to identify the brush bristles with light microscopy.

Eerkens, Jelmer [110] see Hull, Bryna

Egan, Rachel (University of Colorado at Boulder)

[48] *When the Volcano Erupts: Lessons from the Archaeological Record on Human Adaptation to Catastrophic Environments*

How do repeated disasters shape and strengthen communities? The Tilarán-Arenal region of Costa Rica is one of the most volcanically active regions in the world, but despite the risk, from the advent of sedentary villages during the Tronodora phase (2000-500 BC) until the arrival of Spanish in the 16th century, people demonstrated remarkable resilience. Using this region as a case study, this research uses archaeology, tephrochronology, and geographic information system to explore the innovative ways pre-Hispanic people adapted to the hazardous nature of their environment.

Egbers, Vera (Free University Berlin / ANAMED Koç University Istanbul)

[421] *Lived Space of Displaced People: A Comparative Approach to Contested Spaces in Iron Age Northern Mesopotamia and Modern Europe*

Archaeology grapples with the materiality of past subjects' perception and organization of space, as drawn from objects, landscapes, architecture, and pictorial or textual representations. Generally what emerges from these data is a dominant or normative conceptualization of space. However, space is not merely the result of planned ideas from powerful individuals, but also the lived experience of the marginalized or foreign. Marxist philosopher Henri Lefebvre's *La production de l'espace* (1974) asserts that "space" is not a given, but a product. Every society produces its own (social) space that subjectivizes its members. In this paper I use a comparative approach to address the question of hidden forms of lived space. I compare the materiality and possible perception of deportees in the Urartian and Neo-Assyrian empire in Iron Age Northern Mesopotamia with the narratives and experiences of present-day refugees in Europe. Ethnographic data is presented based on experiences teaching German in Berlin in 2017-18 to people mainly from Syria, Iraq, Iran and Afghanistan. I seek to both enhance the study of lived spaces in archaeological contexts and better understand the political impact of this concept on modern cities.

Egeland, Charles P. (UNC-Greensboro, Department of Anthropology), Kyle Pontieri (UNC-Greensboro, Department of Anthropology), Ryan Byerly (Far Western Anthropological Research Group), Cynthia Fadem (Earlham College, Department of Geology) and Andrew Fishback (Earlham College, Department of Geology)

[390] *Neotaphonomy of a "Common Amenity" on the Grasslands of the Ngorongoro Conservation Area, Tanzania*

Identifying the variables that influence the deposition, preservation, and spatial distribution of faunal material across landscapes remains a key goal of taphonomic research. Here, we report on the results of pedestrian surveys for faunal material around a seasonal waterhole surrounded by woodland within the Ngorongoro Conservation Area (NCA). All visible faunal material within a 100 x 100 m area was plotted with a laser total station and collected. Focused analysis of a subassemblage collected under the canopy of a tree reveals a significant co-occurrence of modern human and carnivore taphonomic signatures. We discuss these findings within the context of Glynn Isaac's "common amenity" model for the formation of many early Pleistocene archaeological sites.

Égüez, Natalia [154] see Houle, Jean-Luc

Égüez, Natalia (AMBI Lab University of La Laguna (Spain))

[154] *Investigating Fatty Acid Profiles in Sediments. Household and Activity Areas in Western Mongolia Winter Campsites*

The study of ephemeral traces of mobile pastoralist campsites has its beginning at a local scale. Mongolian basic household units are the spaces where people and animals interact in a very intensive way: from milking and processing dairy products to butchering, consuming and finally disposing of dead animals. All these activities structure campsites, and particularly leave a molecular biosignature that can help archaeologists to identify spatial arrangements and animal exploitation within the domestic space. In order to help lipid profile recognition in archaeological contexts, here we present fatty acid carbon isotope ratios of modern-day adipose fats of terrestrial animals and vegetable oils that are contained in sediments recovered from winter campsites in Züunkhangai, Western Mongolia.

[417] *Discussant*

[154] *Chair*

Egurrola, Stephanie

[125] Land Use in the Burro Creek-Pine Creek Survey Area based on Ceramic Analysis

One hundred and seventy sites were identified during the Burro Creek-Pine Creek (BCPC) Survey conducted by Pima Community College between 2003 and 2018. The BCPC project area is located on BLM land within Yavapai County, Arizona, north and east of the Burro Creek wilderness, in an area now known to have been occupied by the Prescott Culture (AD 300 to 1300). Before Pima College's long-ranging project, the Burro Creek-Pine Creek region was largely unstudied, with no major prehistoric sites - other than the few remaining standing structures - believed to be present in the area. Surface collections conducted during the BCPC project yielded a more complete understanding of the occupational history of the area through time. Ceramic collections, in particular, produced a range of types and densities, including Prescott Gray, Prescott Red, Prescott Black-on-Gray, Tizon Brown Ware and Tusayan White Ware. This poster analyzes the distribution of sites containing ceramics across the BCPC survey area to better understand their spatial distribution and potential prehistoric land use patterns. This study also seeks to compare the density of various ceramic types within the BCPC survey area to sites throughout the greater region to determine if there are any significant spatial patterns.

Ehrich, Richard (UCLA Cotsen Institute of Archaeology)

[214] Chair

Eichner, Katrina (University of Idaho)**[179] Misidentification on the American Frontier: Queer Perspectives on Identity Classification in Historical Archaeology**

As archaeologists we link patterns of performance and daily practice to identity categories. These classifications depend on normalized understandings of idealized behaviors. However, the groupings we use to discuss past actors rarely fully encompass the extent of behaviors in which they engaged. An extremist queer argument challenges that by looking for the patterning of human behaviors as a means of discussing identity groupings, we actually miss the markers of moments of mis/dis-identification in the material record. While we must consider how identity models are unintentionally used to homogenize past experiences, it is also important that archaeologists don't "throw out the baby with the bath water" by concurrently recognizing that identity ideals still shape the large majority of peoples' behaviors. Using a case study focused on the 19th c. American military in the western frontier, this presentation problematizes the complexity of daily behavior and identity construction from a queer perspective.

Eifling, Kurt (Larner College of Medicine at University of Vermont)

[140] Moderator

Einarsson, Arni (University of Iceland)**[35] Old Fences and Archeology**

Fences form distinct patterns and are a prominent feature of most cultural landscapes. Such patterns contain information about people and their relationship with the land. Archeological mapping of extensive Viking Age fences in Iceland highlights the need for a theory of fence construction. How are fences expected to align with topography, soil, and other ecological factors? How are they shaped by purpose, land use, and social interaction? As fences in pastoral settings tend to run along farm boundaries, the collective fence pattern reveals the configuration of farms. The fences in Iceland were built shortly after the colonisation of the island and probably reflect the original land division by the settlers. A settlement process is dynamic, depending on resource level, resource predictability, density of earlier settlers, and topography. Settlement density and property boundaries are determined by costs and benefits leading to strategic behaviours of settlers and produces a settlement pattern which is geometric, equalised, and predictable. Fences also serve seasonal on-farm grazing management, where slope and distance from living quarters are important. The close ties of farm boundaries with population, resource characteristics, and landscape mean that archeological fence patterns hold high potential as a source of information about ancient communities.

Eizalde Mendez, Israel [304] see López Luján, Leonardo

Ek, Jerald (Western Washington University)**[28] In the Path of the Snake: Connecting Myth and Material Culture in the Late Prehistory of Champotón, Campeche**

The personage and deity of Kukulkan/Quetzalcoatl plays a central role in indigenous historical accounts regarding the prehispanic city of Chakanputun (Champotón). However, extensive disturbances resulting from continuous occupation of Champotón from the Preclassic period into modern times has had a major impact on the public precincts of the ancient city. This situation creates unique challenges in connecting ethnohistoric and archaeological evidence, particularly pertaining to the era of major societal upheaval and emergence of pan-Mesoamerican political, social, and economic links during the Terminal Classic/Epiclassic period. The goal of this paper is to create linkages between archaeological (settlement pattern, ceramic, and lithic evidence) and ethnohistoric evidence to understand diachronic processes along the Gulf Coast periphery of the Maya Area. Synthesis of these diverse sets of data provide a unique view of major changes that swept across Mesoamerica starting at the close of the Classic Period and extending to the eve of Spanish Contact.

Eklund, Elizabeth (University of Arizona - School of Anthropology)**[104] Archaeology in the Plaza: Public Display of the Past in Banamichi, Sonora**

Just off the main highway, the Ruta del Río Sonora, in Banámichi, Mexico, is the Plaza de la Piedra Histórica (Plaza of the Historic Rock). Raised upon the shoulders of Opata / Teguima inspired stone figures is a petroglyph originally found in the floodplain below. The imagery on the rock was interpreted by archaeologist William Doolittle in 1984 as "the first map," which he argued depicted the pre-Hispanic canal systems and fields in the floodplain below. The statue is a monument to the heritage of the area, a silent testament of the past clearly visible in the present. The purpose of this project is not to question whether Doolittle was correct in his interpretation of the petroglyph, but rather to look at the links and memory carried in the land and its canals to present day water users. Ethnohistoric reports attest to the agricultural productivity of the river valley. This project draws from published archaeological reports and theory to look at the intersection of public displays and narratives about cultural heritage and the living practices contemporary irrigators. The research provides insights into concepts of "tradition" and the role material manifestations of past cultures play in social memory.

El Guennouni, Khalid [415] see Morin, Eugene

El Safadi, Crystel (University of Southampton) and Fraser Sturt (University of Southampton)**[378] Navigating the Neolithic of the North Western Approaches**

The dynamics behind the development of the Neolithic in Britain and Ireland has been a topic of debate for over one hundred years. At its heart lie a series of different conceptions as to the nature of connectivity across the seaways of North West Europe. Neolithic practices in Britain are evidenced c. 1000 years later than their arrival in north-west France. This delay has at times been explained by seeing the surrounding seaways as a barrier to movement. The material record, however, proves otherwise, with multiple lines of evidence indicating maritime mobility taking place over this period. This paper explores maritime mobility from 5000 – 3500 BC in the north-western seaways of Europe. It takes an ensemble approach, integrating results from agent based, sea-level and palaeotidal modelling to generate new perspectives on old problems. We argue that by adopting an open approach, and not expecting a definitive result, it is possible to be surprised and challenged by the modelling process, forcing a more considered approach to the record as a whole.

Eldridge, Kelly (U.S. Army Corps of Engineers) and Amanda Andraschko (U.S. Army Corps of Engineers)**[241] What's in a Name? Agency Coordination with ANCSA Corporations as Federally Recognized Tribes under Section 106**

Consultation with Indian tribes and Native Hawaiian organizations is an integral part of the Section 106 process of the National Historic Preservation Act of 1966. The Alaska District is unique among other districts within the U.S. Army Corps of Engineers in that, per the regulations, village and regional corporations formed under the Alaska Native Claims Settlement Act of 1971 are included in the definition of "Indian tribe." This paper presents on how treating for-profit corporations as indigenous governments can create complex mitigation efforts.

Eldridge, Kelly [241] see Sparaga, Joseph

Eldridge, Stuart (POWER Engineers)**[265] The More Things Change, the More They Change: Persistence and Evolution in the Gulf of Maine Archaic Tradition**

The Gulf of Maine Archaic Tradition has been defined as a persistent technological pattern that spans the Early to Middle Archaic Periods ca. 9,500-6,000 B.P. in the northeast, although sites containing this component have remained poorly documented. It is possible that human population density in New England was low throughout the early Holocene, and subsequently such sites are expected to be relatively rare. Alternatively, it is probable that Gulf of Maine Archaic Tradition sites have been missed or wrongly interpreted during archaeological surveys in the past because many regional archaeologists committed to a limited number of "diagnostic" bifacially flaked artifact forms for site identification and remain unfamiliar with a techno-complex devoid of recognizable projectile forms. Site ME 7.65 on the lower Saco River in southwestern Maine produced associated lithic and faunal material dating to the late Middle Archaic/early Late Archaic transition. This site provides an opportunity to examine both the pervasiveness and the evolution of the long-standing Gulf of Maine Archaic Tradition and a potential starting point to understand early Holocene interrelations between humans, technology, and resources in a changing landscape.

[265] Chair**Elezi, Gazmend (PhD Candidate)****[275] Manufacture of Late Neolithic Pottery from the Southern Balkans: An Integrative Approach**

Throughout their life, from manufacture to final discard, ceramic vessels participated in different human activities within Neolithic communities throughout the Balkans. As a result, vessels, potters, and users are involved in a relational interaction leading to a continuous negotiation of various aspects of the Neolithic world. The outcome of this relation is also reflected in the technological variation of Late Neolithic ceramics. The study of the manufacture

of ceramic vessels, which is the subject of this presentation, should be set within its context to understand how and why different technological options were chosen. In order to investigate the whole range of the operation sequences, I have used various methods, including typological classification, ceramic petrography, X-ray fluorescence analysis, X-ray analysis, and residue analysis. The first results of these analyses show that although there are significant similarities between different sites as to how the vessels were manufactured and elaborated, there are also technological differences that characterize the ceramic assemblage of each settlement. The variety of technological choices is also evident within each site as the potters have used different clay sources or recipes for making the vessels, while a number of different techniques were used for finishing their surfaces.

[275] *Chair*

Elfström, Petra

[14] *Public Education about Archaeological Practice with...Spaceships?: An Archaeologist Writing a Science Fiction Novel*

Archaeologists have always found popular culture a bit lacking in terms of realistic and ethical representations of their realm of study, from process to ethics to the actual subjects of the archaeological research. Even as modern archaeology progresses through improved technology and increased diversity among archaeologists, a question emerges: how to better represent archaeologists and archaeology to a public, the pop-culture consuming audience. This presentation centers on my experience as an archaeologist and novelist writing a science-fiction story involving archaeology. In my novel I attempt to represent archaeological process and practice realistically and accessibly while maintaining loyalty to the genre, and while also being mindful of the marketability of the novel. In order to do this, I have considered the feedback of my non-archaeologist peers, the existing limited realm of archaeology-based novels and popular culture, and the potential of archaeological technology and abilities in the future. The ultimate goal is to create a vision of archaeology that takes advantage of the already existing adventurous and captivating public view of archaeology, while embracing the exciting future of archaeology, and still maintaining an accessible, accurate, and realistic presentation of archaeological practice, research, and ethics to a non-archaeological audience.

Ellenberger, Kate (Binghamton University)

[87] *Discussant*

Ellens, Samantha (Wayne State University)

[297] *Time Jumpers: Community-Based Approaches to Archaeology in the Classroom*

The Unearthing Detroit Project is a collections-based research and public archaeology initiative focused on the historical collections housed in the Grosscup Museum of Anthropology at Wayne State University. Reflecting on our experiences and integrated feedback has allowed Unearthing Detroit to consider the ways that differences in audience, message, and level of engagement alter our approach for connecting with the public at varying times and places. This paper focuses on the school outreach program, Time Jumpers, which has run as part of the project for the last 4 years. Time Jumpers is designed to introduce archaeology to middle school students in southeast Michigan through hands-on activities, artifact interpretations, and classroom discussions. The portable learning program uses artifacts local to Detroit as a case study for linking students with tangible remnants of their shared regional history and recognizing the value in protecting cultural resources. It is hoped that such local examples create a pathway for fostering an appreciation of history and instilling a sense of stewardship which will hopefully be carried into adulthood.

Ellick, Carol (Archaeological and Cultural Education Consultants)

[139] *Discussant*

Elliott, Michelle [38] see Clayton, Sarah

Elliott, Michelle (Université Paris 1, Panthéon-Sorbonne) and Grégory Pereira (UMR 8096)

[81] *Exploring the Role of Fire in Tarascan Ritual Contexts of the Zacapu Basin, Michoacan, Mexico*

Studies of ritual activities often focus on paraphernalia, architectural structures, and other aspects of performance. While these are all important features, other more subtle elements that are nevertheless crucial to these activities are often not considered in detail. Today we present an overview of our ongoing study of the role of fire and flames in Postclassic Tarascan ritual. Although ethnohistoric sources provide many interesting clues regarding these practices, they have still not been well characterized by archaeologists. Fire was omnipresent in Tarascan society, appearing in domestic and public contexts, and served a variety of needs ranging from the quotidian to more specialized practices. Through a study of charcoal remains, hearths, and other loci of combustion in a variety of contexts at the site of Malpais Prieto, in the Zacapu Basin of northern Michoacán, we demonstrate that a wide range of fire-related activities existed, most (if not all) of which can be linked to ritual practice or beliefs. Our findings indicate that the boundary between ritual and ordinary activities was often quite blurred, and that the sacred qualities of fire permeated Tarascan life, from intricately structured, state-sponsored ceremonies, to basic tasks in daily domestic life.

Elliott, Patrick [46] see Nagaoka, Lisa

Elliott Smith, Emma (Department of Biology, University of New Mexico), Emily Whistler (Department of Anthropology, Washington State University), Rene Vellanoweth (Department of Anthropology, California State University), Todd Braje (Department of Anthropology, California Academy) and Seth Newsome (Department of Biology, University of New Mexico)

[174] Amino Acid d13C Analysis of Ancient Marine Consumers Quantifies Environmental Change in a Nearshore Ecosystem through the Late Holocene

Kelp forests are some of the most biodiverse and ubiquitous temperate marine ecosystems. Here, we employ d13C analysis of individual essential amino acids (EAA) from ancient top consumers to evaluate the dynamics of southern California kelp forests across a period of rapid cultural change and accelerating human impacts (~3500 ybp – present). We analyzed sea otter (*Enhydra lutris*) and sheepshead (*Semicossyphus pulcher*) bone collagen sourced from late Holocene archaeological sites on two southern California islands. We also characterized d13CEAA profiles for modern marine producer groups as baseline values for comparison: kelps, green algae, red algae, and offshore particulate organic matter. We used linear discriminant analysis (LDA) and Bayesian isotope mixing models (MixSIAR) to classify consumers according to their reliance on different producers. Results showed that over 75% of ancient sea otters and sheepshead EAA were derived from kelp, indicating that these consumers were feeding in ecosystems driven by kelp production. In combination with bulk tissue analysis and ongoing d13CEAA analysis of modern samples, these findings suggest that, at these sites, kelp forests were more extensive in the late Holocene than they are today. Our study demonstrates the application of d13CEAA analysis in integrating historical ecological information and modern conservation biology.

Elliott Smith, Emma [174] see Besser, Alexi

Ellis, Grace

[393] Anthropogenic Landscapes of Amazonia: A Spatial Analysis of Landscape Modification and Settlement Organization at Macurany, Brazil

I analyze anthropogenic landscape modification at Macurany, a pre-colonial terra preta site on the Middle Amazon River in Parintins, Brazil, in order to gain insight into settlement formation and organization. Settlement patterns and artificial landscapes are the result of human action, technological innovation and ingenuity. Understanding anthropogenic landscape features can illuminate the relationship among domestic and common areas, leading to a more nuanced understanding of terra preta formation, natural resource management, and routes of movement and communication. This research addresses what processes contributed to the formation of these modified landscapes at Macurany, which feature terra preta, sculpted soilscapes, and anthropogenic ports. Can the spatial patterning of these landscape features reflect social organization? Topographic and soil probe data collected at Macurany in July 2017 were used to detect correlations between surface and subsurface features. Preliminary results suggest site organization at Macurany was decentralized given the frequency and proximity of the ports in relation to the variable depth and distribution of terra preta. This analysis contributes toward an understanding of precolonial landscape modification and settlement organization in Amazonia and, more broadly, of the formation of terras pretas and anthropogenic ports.

Ellis Topsey, Cynthia [58] see Ford, Anabel

Ellison, Leigh Anne [256] see Novotny, Claire

Ellrich, Aaron

[82] Cobbling Material Memory: Kings, Gods, and Shrines in an Old Kingdom with Active Roots – Kanazi Palace, NW Tanzania

Over the last decade, heritage research in Kagera Region of NW Tanzania has responded to community-driven initiatives focused on preservation, tourism, and museum development. This attention to heritage-related programs has fostered several projects that continue to enhance our understanding of appropriate methods for preserving local and regional histories in African contexts, including the challenge of working in settings where projects expand and contract as trust between researchers and informants develop. Recent work at Kanazi Palace — an edifice built by the German colonial government in 1905 for local kings (bakama) of Kihanga kingdom — illustrates how trust, coupled with generational change, can transform an ongoing project. A multi-functional site, Kanazi Palace currently functions as a residence, active shrine complex, and historic museum dedicated to archaeological research conducted on the site in 2011 and 2012. This paper summarizes recent developments at the palace while outlining future plans aimed towards linking its heritage component to the kingdom's spiritual center in Kaibanja, approximately 20 kilometers east near Lake Ikimba.

Ellyson, Laura (Washington State University)

[57] Inequality among Ancestral Pueblo Households and Its Impact on Animal Subsistence

Recent studies of household inequality in the central Mesa Verde region (CMV) and Chaco Canyon indicate that the degree of wealth inequality among ancestral Pueblo households remained relatively low in the CMV, even as it increased dramatically in Chaco from the mid-800s through the early 1000s, based on Gini coefficients calculated on household floor area as a proxy for wealth. Beginning in the late A.D. 1000s, however, Gini coefficients increased among CMV households as well, reaching values as high as those for Chaco Canyon, and above the median for a recently compiled worldwide sample of prehistoric agriculturalists. This study explores the distribution of faunal remains associated with households from CMV sites to understand how the development of inequality (as reflected by Ginis) impacted subsistence strategies and access to faunal resources.

Elquist, Ora (Public Archaeology Laboratory, Inc.)

[72] *Old Site, New Data: Challenges and Success in the Re-analysis of the North Shore Site, Providence Covelands Archaeological District*

The multi-component North Shore site has been frequently cited as a point of comparison in regional subsistence, settlement, and ceramics studies in part because 1980s-era archaeological investigations included marine shell thin section and tooth cementum analyses, and a large number of radiocarbon dates used to address chronological patterning, settlement changes and seasonality. The Public Archaeology Laboratory, Inc. recently undertook a massive effort to re-catalog, re-organize, and re-analyze the North Shore Site assemblage as part of an alternative mitigation project. Several challenges arose including an incomplete artifact inventory during the original cataloging efforts and new information indicating the radiocarbon dates were unreliable. We undertook new analyses including ceramic residues, XRF analysis of lithic materials, re-organization of seasonal data, and a new suite of radiocarbon dates. The resulting data have provided new insights into interpretations of the site. Our re-analysis indicates the site was likely a seasonal village-like settlement most intensively occupied during the terminal Late Woodland to Early Contact Period. Site inhabitants engaged in regional trade and consumed maize, a previously unrecognized material in the assemblage.

Elson, Mark (University of Arizona)

[246] *Platform Mounds and Ethnographic Analogy Revisited: Defining the Functional Universe*

Archaeological data from Southwest U.S. platform mound sites will likely not satisfactorily resolve the question of platform mound function and social organization. This is due to the ambiguities inherent in our data base and in our limited opportunities to excavate these features. Because of this, explanations given for prehistoric mound function vary tremendously, although almost all researchers agree that mounds were constructed by socially complex groups with defined leadership and subsistence surplus. Twenty-three years ago I used ethnographic and ethnohistoric records to characterize extant platform mound-using groups for my dissertation and then applied these findings to a prehistoric mound system in the eastern Tonto Basin of central Arizona. This paper continues this research using new information based on the assumption that human's use platform mounds in a finite set of ways. The range of variation in ethnographic/ethnohistoric platform mound-using groups is investigated and the universe of known behavior defined. New observations are applied to prehistoric mound groups of the Southwest to better understand mound function and the social organization of mound-building groups.

Elston, Robert G. [323] see Martin, Erik

Elston, Sarah

[261] *Lithic Technology in Spanish Colonial Dixon, New Mexico*

In this paper, I explore the lithic technology used in the Spanish colonial outpost of Dixon (or Embudo), New Mexico, before the arrival of the Chili railroad line in 1877. With limited access to metal, the Spanish colonists turned to the native technology of lithic tool production to overcome this absence. By focusing specifically on the obsidian found in Dixon, the community's ties and connections with the surrounding area can be better understood. The use of XRF analysis to determine the original source of the obsidian provides a window into the complex geographic and economic world of the colonial pre-metal community.

Elvir, Wilmer [47] see Reeder-Myers, Leslie

Emerson, Matthew

[140] *Discussant*

Emerson, Thomas (Illinois State Archaeological Survey), Kristin Hedman (Illinois State Archaeological Survey) and Matthew Fort (Illinois State Archaeological Survey)

[348] *Late Precolumbian Subsistence Change, Socio-political Transformation, and Ethnogenesis in the Upper Illinois River Valley*

Post-AD 1000 was a time of tremendous change in the Upper Illinois River valley. The Terminal Late Woodland groups in the region were bordered on the south by emergent Mississippian petty chiefdoms of the Central Illinois River valley, on the north by Oneota and Mississippian societies, and on the east by Fort Ancient groups. Coinciding with this cultural mix was the recent adoption of maize agriculture. First evident isotopically at ca. AD 900, maize became a substantial constituent of Upper Mississippian diet by AD 1100. Archaeologists have proposed that

pressure from surrounding groups, including increased violence and intermittent raiding, may have propelled changes in the lifestyle of Terminal Late Woodland people. By AD 1100, these highly mobile family-sized horticultural bands had transformed into settled villagers who practiced full-time maize agriculture, and buried their dead in large communal mounded cemeteries. The period between the 11th and the 15th century is a time of considerable climatic fluctuation in this area, that likely contributed to social and subsistence stressors facing these Upper Mississippian societies. In this paper we examine the interrelationships of changes in settlement patterns, diet, and culture, within the context of known climate changes.

Emerson, Thomas [348] see Hedman, Kristin

Emerson, Thomas [357] see Betzenhauser, Alleen

Emery, Kitty [352] see Thornton, Erin

Emery, Taylor (University of Oklahoma) and Joseph A. M. Gingerich (Smithsonian Institution, Ohio University)

[324] Skill Variation in the Manufacture of Lithics at the Shawnee-Minisink Paleoindian Site

The Shawnee-Minisink Archaeological Site (ca. 12,900 cal BP) is one of the most well-excavated Clovis sites in North America. The site is interpreted as a single Paleoindian occupation that measures over 4,000 square meters. This poster focuses on the excavations of a 365 square meter area from which over 18,000 artifacts were mapped using 3D coordinates. As part of a broader intra-site spatial analysis, we examine variation in skill through the analysis of lithic artifacts. Differences in lithic reduction, manufacture, and failures thereof are mapped to determine if meaningful spatial patterns exist that may distinguish individual artisans or reflect greater social organization within the site.

Emmerich Kamper, Theresa [20] see Hurcombe, Linda

Eng, Jacqueline (Western Michigan University) and Mark Aldenderfer (University of California at Merced)

[183] Moving On Up: The Promise of Multiple Data Sources in Reconstructing Early Population History of High Altitude Sites in Nepal

Archaeological research in the high elevation regions of Upper Mustang, Nepal, offer insights into population history in this region through multiple data sources including material culture, genomic, isotopic, and bioarchaeological data. Together, these data have enabled us to address questions of migration, patterns of exchange, quality of life, and burial treatments in several valley systems. Here we compare research at two communal mortuary sites each with a rich assemblage of material culture and human burials: Mebrak (400-50 BCE) with a minimum of 42 individuals and Samdzong (400-650 CE) with a minimum of 105 individuals. Bioarchaeological profiles with regard to trauma, stress, and interpersonal violence are broadly similar between the sites, as is genomic similarity. Yet material culture in the form of metal, glass beads, stylistic motifs on metal objects, and fabrics/dyes, as well as mortuary pattern suggests differences in patterns of interaction with surrounding regions. Specifically, Mebrak appears to have had a more "lowland/south facing" cultural orientation, compared to Samdzong, which shows expanded connections that face to the Tibetan Plateau and Central Asia. The use of multiple lines of evidence thus offers significantly greater opportunities for developing insights into continuity and change in these high elevation environments.

Englebert, Lynne [401] see Newland, Michael

Englehardt, Joshua (El Colegio de Michoacan)

[307] Genomics and Archaeological Survey: Elucidating Ancient Mesoamerican Human-Plant Interactions

Archaeogenetics, a term coined by Colin Renfrew in 2000, is a relatively new line of inquiry into the archaeological past. Archaeogenetic techniques use ancient DNA and genomic sequencing to reveal population-level data that may be used to elucidate processes central to archaeological research, such as group migrations and domestication events, among others. This paper explores the potential for genomic data and regional archaeological survey to complement each other. Building on recent collaborative research, it examines interactions between humans and plants—specifically cycads (cycadales) and maize—throughout Mesoamerican history. Genomic evidence, based on genotype covariance of transcriptome-derived microsatellites, reveals patterns in cycad evolutionary dynamics that suggest human-induced dispersal of these plants. When compared with archaeological survey data ranging from Tamaulipas to the Tehuacán valley, several correlations between cycad evolution—particularly *Dioon* spp.—and cultural processes are evident. Dispersal and population split events parallel the spread of certain shared linguistic terms, episodes of demographic migration, the development of specific cultural practices (e.g., nixtamalization), and possibly the domestication of maize. The paper concludes with a discussion of how genomic data may productively inform archaeological survey, in terms of identifying areas or regions in which crucial evidence for specific human activities may be encountered.

[307] Chair

Englehardt, Joshua [307] see Tellez-Nieto, Alba

Enloe, James (University of Iowa)

[26] *Changes and Reactions: Hunting and Gathering by Agriculturalists in the Woodland Period*

In the midcontinent of North America, the transition from the Archaic to the Woodland Period is generally signaled in the archaeological record by the presence of ceramics and the adoption of agriculture, particularly of low yield indigenous plants including barley grass, goosefoot, sunflower, and squash during the Early and Middle Woodland. In contrast, stable isotope analyses from Late Woodland sites indicates a major increase in proportion of maize in the diet. New strains of maize were introduced with much greater productivity, changing the dependence on agriculture from a minor role at 15 to 20% to a major role at 50 to 75% of the calories in the diet. This enormous increase in the agricultural productivity resulted in an explosion of population and a substantial expansion of the number of sites, particularly with increases in smaller secondary river valleys and uplands. Part of the increase is sites includes greater use of rockshelters. Analyses of ceramic, lithic, faunal and spatial data from Woodpecker Cave will investigate the role of seasonal hunting sites within the context of greater agricultural dependence.

Ensor, Bradley (Eastern Michigan University)

[405] *The Late Classic Islas de los Cerros Landscape: A Tapestry of Kinship, Identities, Histories, and Ancestries*

Archaeological studies on cultural landscapes are promising avenues for interpreting the embodiment of meaning to ancient peoples. Within Mesoamerica, most are restricted to elite contexts and centers with monumental architecture. In contrast, this presentation considers residential landscapes across social classes using settlement data and house mound construction sequences from Islas de los Cerros, Tabasco, Mexico to infer the intersection of settlement history, kinship practices, and successor relations to ancestral spaces. Whereas patrilineal elite groups maintained nucleated residential areas at ancestral locations across generations, and adding new lower-ranked subgroup residences at those locations, one class of commoners practicing neolocality expanded and cast bilateral networks across the islands whereby only one descendent (and spouse) of each generation remained residentially affiliated with their ancestral locations. Viewed in this way, the tapestry of space, identities, histories, ancestries, and statuses can be read into Islas de los Cerros' kin-embodied landscape. The case study illustrates the utility of residential features and class differentiation in the interpretation of ancient Mesoamerican cultural landscapes.

[308] *Discussant*

Eppich, Keith [255] see McCormick, David

Eppich, Keith (Collin College)

[410] *City of the Centipede, Part 2: Urban Development and Construction Chronologies at El Perú-Waka', Petén Guatemala*

Part II of II. The Waka' Archaeological Project (PAW) has conducted over a decade of archaeological investigations documenting the modification, layout, use, and chronology of monumental and residential landscapes of the Classic lowland city of El Perú-Waka'. These papers will evaluate current theoretical and methodological perspectives of ancient Classic Maya urbanism based on fifteen years of excavation and survey at El Perú-Waka'. Part II presents the occupational sequences and architectural history as reconstructed through artifactual, ceramic analysis, constructing a model of shifting urban development in this lowland capital. While El Perú-Waka' was a "typical" Classic Maya city in many ways, the PAW and LiDAR settlement and archaeological data reveal a distinctly "local" pattern of urbanization, landscape modification, and political history.

[165] *Discussant*

Eppich, Keith [410] see Marken, Damien

Erb-Satullo, Nathaniel (University of Oxford)

[359] *Elite Stronghold or Communal Defense? Investigating a Late Bronze-Early Iron Age Cyclopean Fortress in Kvemo Kartli, Southern Georgia*

Emerging after a Middle Bronze Age, which is defined by massive kurgan burials and a lack of permanent settlements, cyclopean fortresses of the South Caucasus represent the product of a significant amount of coordinated labor. However, much is unclear about the social order of these fortresses and the communities that built them. Excavations at the site of Dmanisi Gora in Kvemo Kartli have begun to explore the formation, organization, and transformation of one of these fortresses during the Late Bronze and Early Iron Age (LBA-EIA). The site consists of two large fortification walls enclosing an area with low mounds and linear stone structures. Excavations within the fortress uncovered two well-preserved phases of occupation tentatively dated to the LBA-EIA. These two phases have broadly similar pottery but significant differences in the character and orientation of their architecture. Excavation of the inner fortification wall—now shown to be more than 4 m thick and at least 2.5 m high—show that its initial construction dated to the earlier phase of the site's occupation. Evidence of craft production and mortuary activities highlight the potential of the site for investigating the societies living within these cyclopean fortresses.

Eren, Metin [51] see Norris, James

Eren, Metin (Kent State University) and The Eren Lab Graduate Students (Kent State University)

[67] On the Practical Use of Knives Manufactured from Human Feces and Saliva: An Experiment

In 1996, the anthropologist and ethnobotanist Wade Davis recounted in his book "Shadows in the Sun" the tale of an Inuit man who manufactured a knife out of his own feces and saliva as these raw materials froze during the arctic night. With these items he then butchered a dog. Since that time, this story has been told, and retold, on websites, radio interviews, and other media. In this paper, we present an ethnoarchaeological experiment testing the practical use of knives manufactured from frozen human feces and saliva. After acquiring the necessary raw materials, we produce these knives, and then use them in controlled cutting tasks of hide, muscle, and tendons/ligaments. Prehistoric and indigenous people regularly produced ingenious and expedient technologies, and in so doing could survive, and even thrive, in desperate situations and dangerous contexts. However, modern perceptions of prehistoric and indigenous people and their abilities can also be exaggerated or false. Our results have implications for these sorts of perceptions.

[365] Chair

Eren, Metin [67] see Wilson, Michael

Erlstenbeck, Hanna (University of Notre Dame)

[388] The Production and Use of Chipped Stone Tools during the Metal Ages in the Southern Levant – Evidence from Abu Snesleh

The Middle Bronze Age (MBA, c. 2000–1500 BCE) in the southern Levant (modern day Jordan, Israel, Palestine, and southern Syria) is characterized by a re-urbanization, and extended use and specialized production of metal objects which obviated the use of chipped stone tools, of which production has long been considered to have significantly declined after the Chalcolithic period (c. 4800–3600 BCE). Challenging this assumption, this analysis of the chipped stone tool industry paints a fascinating picture of technological knowledge used by the inhabitants of Abu Snesleh in Jordan. The site represents a vibrant local industry of chipped stone tool technology during the MBA, with elements long considered extinct such as burins and tabular scrapers. Based on this evidence we argue that MBA people at the site actively made and used stone tools, and possibly re-used and maybe copied earlier Chalcolithic pieces they found on site. While chipped stone industries after the Chalcolithic period typically receive little attention, the results from Abu Snesleh join a small but important group of post Chalcolithic sites with undisputed evidence for chipped stone technology, teaching, and use.

Erhardt, Andrea [419] see Manzano, Bruce

Erickson, Clark (University of Pennsylvania) and Samantha Seyler (University of Pennsylvania)

[306] Don Lathrap, Precocious Civilization, and the Highland-Lowland Link in Andean Archaeology

The dynamic interaction between culture areas has been and continues to be important. Traditionally, the boundaries or frontiers between culture areas were considered fixed. Many scholars now recognize that these spaces were fluid and their inhabitants played roles in the development of cultures throughout the world. Based on his own and previous archaeological research in the Andes and Amazonia, Donald Lathrap proposed that advanced societies in the Upper Amazon and Northern Andes heavily influenced early civilization in the Andean region. This included early appearance of pottery and other important technological innovations, tropical lowland resources, village life, temple architecture, crops, iconography, standardized styles, and worldview. He proposed a range of processes including migration, diffusion, trade, competition, and proselytization to account for the diverse evidence. His ideas about the origins of Andean civilization were accepted by some scholars and rejected by others. Lathrap later focused on the formation of unique precolumbian cultures that developed in the intermediate zone (montaña) as an important cultural phenomenon. We evaluate Lathrap's diverse ideas using contemporary archaeological research in the Andes and Amazonia and argue that Lathrap's deep tradition approach and continent-wide perspective on the past continues to have relevance.

Erickson, Katrina (National Park Service) and William Reitze (University of Arizona)

[3] A Backcountry Learning Laboratory: Archeology and Internships at Petrified Forest National Park

Beginning in 2012 Petrified Forest National Park developed an archeological internship program designed to bring young professionals into the park for training, education, and outreach with the public. Since then the park has had 31 student interns. The internship program involves students working directly with interdisciplinary teams of park staff and outside researchers to document the current conditions of archaeological sites. This field training is coupled with independent research to help interns apply their skillsets to a specific research question. Research partners have included Northern Arizona University, the University of Arizona, the Museum of Northern Arizona, the Laboratory for Traditional Technology, the UA Geoarchaeology Laboratory, and the Laboratory for Tree Ring Research. There are numerous direct benefits of this program to the park. Interns allow the park to increase the capacity of our limited cultural resources staff allowing us to work more with the general public. Cultural resource

staff and interns can then provide more education and interpretive opportunities for the public. The PEFO internship program has been very successful in promoting the careers of these interns. The bulk of these interns have gone on to further graduate work, careers in Federal land management, or jobs in cultural resource management.

Erickson, Reneé (Independent Researcher)**[168] Exploring Perforated Earspools of the Arkansas River Valley**

Earspools dating from the Mississippi Period are found throughout the Southeast region of North America. Some of these artifacts were recovered from sites in the Arkansas and Red River Valley regions, and share similarities with those from other Mississippian sites in form, material type, size, and decorative motifs. The variability suggests that not all earspools were intended to be identical. The degree of diversity and lack of standardization with regard to the decorative features in the sample of earspools suggest that some of these items of adornment may have been created for specific individuals or for a specific purpose. One of the different types of stylistic attributes present on the artifacts in the assemblage is a perforation. This poster presents results from the analysis of earspools to determine if there is a relationship between the diameters of the perforations and the earspool types in order to further identify diversity in the artifacts and its implication in personal identity.

Erlandson, Jon [240] see Ainis, Amira

Erlandson, Jon (University of Oregon)**[249] Western Stemmed Technology on California's Channel Islands**

Paleocoastal sites on California's Northern Channel Islands have produced hundreds of stemmed points, crescents, foliate points or knives, and other bifaces dated between ~12,250 and 8200 years ago. Although uniquely maritime in nature, these island Paleocoastal assemblages are clearly related to the broader Western Stemmed Technology (WST) of American Far West. The Arlington Man remains from Santa Rosa Island, dated to ~13,000 years ago, show that the islands were settled by humans by Clovis times, but no diagnostic Clovis-like artifacts have been found on them and Clovis-like points are relatively rare in California. In this presentation, I will explore the potential origins and implications of early Paleocoastal WST assemblages on California's Channel Islands.

Erlick, Mary (Utah State University)**[116] Obsidian Sourcing and the Origins of the Black Mountain Redoubt Site, Wyoming**

Projectile points are one of the few artifacts present on the surface of archaeological sites that may also serve as a diagnostic of the site's relative age. A shift in the archaeological record can be seen through changes in projectile point technologies between the Late Archaic and the Historic periods in northwest Wyoming. The exact causes of these changes are unknown. This time period also saw a decrease in the diversity of obsidian found at local sites. The Black Mountain Redoubt site, located in the Washakie Range at 8200 feet, contains diagnostic projectile points including Late Archaic, Rose Springs, and Desert Side Notch indicating the site is multi-component. However, projectile point types like Rose Spring and Desert Side Notch have wide chronological ranges, making it difficult to date archaeological sites where only these types are present. Through experimental archaeological comparison of the obsidian assemblage from the Black Mountain Redoubt site, I answer questions about technology, mobility, exchange, and migration in the Central Rocky Mountains. This poster explores the preliminary data collected using X-ray fluorescence (XRF) to examine similarities and differences between the debitage versus the projectile points via analysis of geochemical composition.

Ermigotti, Paul, Mark Varien (Crow Canyon Archaeological Center), Leigh Kuwanwisiwma (Hopi Cultural Preservation Office) and Grant Coffey (Crow Canyon Archaeological Center)**[122] The Pueblo Farming Project: A Hopi-Crow Canyon Archaeological Center Collaboration**

The Pueblo Farming Project, or PFP, is a collaboration between the Hopi tribe and the Crow Canyon Archaeological Center. The Primary goal of the PFP is to investigate traditional Pueblo farming techniques and assess how they could help us understand ancient farming in The Mesa Verde region. The PFP established 5 experimental garden plots. Traditional Hopi farmers helped select field locations, provided seed stock, and supervised plantings and harvesting from 2008 to the present. Crow Canyon staff collected data on maize growth and yields as well as temperature, precipitation and soil moisture. The PFP conducts research, develops educational programs and pursues Hopi interests in preserving traditional farming practices.

Ernst, Marlieke and Brendan J. M. Weaver (Stanford University)**[170] Towards a Comparative Analysis of African-Influenced Ceramic Motifs in the Spanish Americas: Hispaniola and Peru**

In this poster we present a ceramic phenomenon occurring at two Spanish colonial sites of differing spatial and temporal provenience in the Spanish Americas. The appearance of various African influenced comb-dragged and wavy line motifs in Cotuí and Concepción de la Vega (early colonial Caribbean, 1495-1562) as well as at the haciendas of San Francisco Xavier de la Nasca and San Joseph de la Nasca (middle-to-late colonial Peru, 1619-1767) have raised many questions about the people making these ceramics. Here we present an initial comparative study of the decorative elements, ceramic technologies, and site context of previously undocumented phenomena

related to innovation and cultural confluence in ceramic production. By comparing the material from two disparate Spanish colonial contexts these ceramics offer us indications of how enslaved African actors maintained social memory and expressed social agency.

Ernst, Marlieke [363] see Guzzo Falci, Catarina

Esarey, Duane [348] see Wilson, Jeremy

Escalante, Kirsty (Tulane University)

[116] *Multifunctional Obsidian Blades: Exploring Use-Wear of Maya Blades from the Quiché Basin, Guatemala*

Use-wear analysis is a valuable method for understanding the various functions of stone tools, a central concern in lithic analysis. This poster focuses on the results of a use-wear study of 50 Late Postclassic (AD 1250-1525) prismatic obsidian blades from two Maya sites in the Utatlan/Q'umarkaj region of the Quiché Basin in highland Guatemala: Ismachi and Pakaman. A preliminary analysis of a random sample of ten blades revealed signs of intensive use on all blades as well as microscopic hair or fiber attached to the edge of 40% of the sample. The present study aims to elucidate these initial results by examining a larger sample size at magnifications over 10x. The use-wear patterns from this study will be compared to previous analyses of archaeological use-wear, as well as experimental studies linking certain tool functions to specific obsidian wear patterns. Preliminary conclusions suggest that the Maya employed obsidian blades for a variety of functions, including animal meat and hide processing. By comparing the wear patterns from this previously uninvestigated sample to archaeological and experimental studies of obsidian use-wear, this project will contribute to comparative analyses of wear and tool function in the Maya area.

Escalante Kuk, José Trinidad [71] see Martín Medina, Geiser

Eschbach, Krista (Arizona State University)

[198] *Beyond First Encounters: Mechanisms of Social Transformation at the Colonial Port of Veracruz*

The Port of Veracruz was significant not only as the landing site of Hernán Cortés, but also as a central gateway for European colonists and African slaves entering New Spain. First encounters between immigrants and natives had significant long-term consequences, but initial interactions were only a starting point for centuries of sociocultural change. Historians have identified at least three macroscale shifts in the social structure of colonial Mesoamerica. Colonists initially borrowed Iberian ideals for organizing colonial society. Varied historical settings, local interactions, and reciprocal responses by officials and institutions led to the development of the casta system by the seventeenth century. The casta system, in turn, began to decline a century later. Drawing on the work of sociologists and political scientists, I take a "mechanistic" approach for explaining local changes in social relations and the development of durable social categories as seen at the Port of Veracruz. My focus is on relational mechanisms that modified reoccurring patterns of interaction and concatenated into processes of categorical change. I identify mechanisms that were at work in pluralistic neighborhoods at the port through analyses of census data, use of urban space, and the production and consumption of material culture from archaeological contexts.

Esh, Kelley [129] see Freas, Laurel

Esh, Kelley (DPAA)

[129] *A Tale of Two Bombers: Forensic Recovery of WWII-era Aircraft Crash Sites in the Jungles of Papua New Guinea*

The successful recovery of human remains from aircraft crash sites is significantly impacted by the circumstances of loss, to include how the crash occurred, the size of the aircraft, and taphonomic factors. Two WWII aircraft crashes in the East Sepik and Madang Provinces of Papua New Guinea highlight these variables, and how the archaeological recovery strategies utilized were impacted by the resulting wreckage fields and remains distribution. The first case study involves the loss of twelve U.S. service members aboard a B-24D Liberator, which partially broke up in the air after being struck by anti-aircraft fire, resulting in a crash site spread out over more than a 500-x-500 m area and distribution of remains over more than one loci. In contrast, the second case study focuses on the loss of an A-20G Havoc, a light bomber with two service members on board that failed to return from a bombing run near Wewak, resulting in an extremely compact crash site in which both individuals were recovered primarily within a 2-x-2 m impact area. This poster will review the circumstances that led to these contrasting site types, the impacts to forensic excavation strategies utilized, and the resulting recovery and identification of the service members involved.

[129] *Chair*

Eshleman, Sara (University of Texas at Austin), Timothy Beach (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin), Colin Doyle (University of Texas at Austin) and Fernando

Casal (University of Texas at Austin)**[309] Soil and Water Chemistry: Aguada Fenix, Tabasco and Northern Belize**

Most of the Yucatan has no vestige of rivers; humans and ecosystems rely on rainwater catchment and soil and ground water. Along the southern margins of the Peninsula, however, lie rivers in Belize and Quintana Roo to the southeast and Tabasco and Campeche to the southwest. This paper considers the soil and water chemistry of the Middle Preclassic site of Aguada Fenix, Tabasco based on samples collected in 2018 and ongoing laboratory analysis for elements and minerals, carbon isotopes, and organics. Second, we compare these and other soil and water analyses to water control and wetland fields and canal systems in these regions of river convergence in Tabasco and northern Belize. Alfred Siemens and coauthors studied these wetland systems since the late 1960s across this whole zone from Veracruz to Belize. This oeuvre led to more wetland field studies, some of which presented evidence for early wetland field evolution in the Archaic and Preclassic and others for much later timing in the Late to Postclassic. Here, we provide new imagery from lidar and drones and soil and water evidence for wetland field evolution over Maya history.

Espada, Audree [367] see Barbour, Matthew

Espinosa, Manuel [314] see González, Lissandra

Espinoza Pérez, Edgar [191] see Caro, Carlos

Esteban, Irene [32] see Fisher, Erich

Estrada-Belli, Francisco (Tulane University)**[280] The Importance of Large-Scale Collaborative Lidar Research in the Maya Lowlands of Northern Petén**

Since 2009, lidar technology has been revolutionizing lowland Maya archaeology. Lidar data are most effective, however, when collected broadly and studied collaboratively. Recently, the Pacunam Lidar Initiative adopted this approach, uniting seven different research projects to analyze over 2100 km² of forest cover of the Maya Biosphere Reserve in northern Guatemala. The collective results helped upend long-held notions of urbanism, subsistence strategies, and regional interaction. PLI has since expanded its survey of this area by over 3000 km². Based on preliminary collaborative analyses, we discuss how these data expand our understanding of lowland Maya settlement, agricultural intensification, and landscape modifications.

[280] Chair

Estrada-Belli, Francisco [410] see Quinn, Rhonda

Estrela, Vitória and Rosicler Silva (IGPA/PUC-Goiás)**[395] The Potential of Games, Gamification, and Virtual Reality in Public Archaeology**

Social-cultural changes and the growth of digital media have led to new broadcasting methods in archaeology and public archaeology, using computer games, gamification and virtual reality, as these encourage the user to solve problems and construct social relations that enable personal development and reflections on the past. The purpose of this paper is to examine how these tools can be best applied in educational and public environments to increase understanding and visualization of archaeological contexts.

Ethridge, Robbie (University of Mississippi)**[162] Chicasa and Soto: Toward a Continuum of Disentanglement**

The concept of “entanglement,” when applied to the Native American colonial experience, usually assumes both an inevitability and magnitude that comes with historical hindsight. Such an assumption easily masks the fact that historical players did not act with this in mind and that encounters between Natives and newcomers were intrinsically variable and historically contingent. We argue that disentanglements are likewise variable and contingent and also shaped by the kind of entanglements from which they derive. Scholars often analyze the entrada of conquistadors such as Hernando de Soto as a single event, a single “entanglement,” that resulted in a single kind of impact across the American South. We use archaeological and ethnohistorical evidence to examine and compare a first, short-lived event of contact between Hernando de Soto and the Indians of the Southeastern Mississippian polity known as Chicasa with other of Soto’s encounters in order to highlight the variations of encounters during the expedition and to gauge the degrees and variations of entanglements and disentanglements between Soto’s army and the people they encountered.

[257] Discussant

[162] Chair

Eubanks, Paul (Middle Tennessee State University)

- [242] Economic, Political, and Religious Motivations for Visiting Salt and Mineral Springs in the Late Prehistoric Southeastern United States**

Over the past forty years or so, there has been a marked increase in the number of studies dealing with the archaeology of salt and mineral springs in the southeastern United States. Many of the Southeast's springs contain an abundance of salt production debris, and as a result, much of this recent scholarship has focused on the material and economic facets of the salt-making process. This topic is a worthy anthropological pursuit; however, the ceremonial and spiritual realms of salt's production and use in the Southeast are frequently overlooked. In an effort to shed some light on both the material and non-material aspects of salt, this paper reconsiders the economic and political implications of salt making and offers new insights into the potential ritual importance of salt in the late prehistoric Southeast.

Evans, Amanda (Coastal Environments, Inc.), Richard Weinstein (Coastal Environments, Inc.), August Costa (Moore Archeological Consulting, Inc.,), Louise Tizzard (Wessex Archaeology, Ltd) and Ramie Gougeon (University of West Florida)

- [108] Submerged Prehistoric Archaeology: Tackling the Issues of Scale and Context on the Gulf of Mexico Outer Continental Shelf**

The northwestern Gulf of Mexico outer continental shelf (OCS) includes approximately 38,660,700 acres of submerged land under federal permitting authority, which are in turn subject to Section 106-compliant archaeological survey. Both historic and prehistoric resources must be identified. While historic shipwrecks can occur in any water depth, sea-level curve data correlating with periods of known human occupation in North America suggest that only those portions of the OCS out to the 60m depth contour could have been exposed as dry land and available for human exploitation. Combined with predictive modeling developed over the last 40 years, archaeologists use geophysical data to identify high probability areas for the occurrence and preservation of archaeological sites, however this has not yet resulted in the indisputable identification of a prehistoric site. At issue is the attempt to identify discrete sites from a largely unexplored area; to date, only 0.827 m² (8.901 ft²) of the northwestern OCS has been physically sampled for prehistoric archaeology. The authors will discuss a newly-funded study that will develop baseline characterizations within a 234 square miles area anchored by two identified paleolandscapes at depths of 17m BSL, and associated with the probable shoreline stand at approximately 8,000 BP.

Evans, Susan Toby (Penn State University)

- [24] Night Falls on Tenochtitlan**

Cortes escaped from Tenochtitlan on "La Noche Triste" in the summer of 1520, but many in his entourage did not – a Mexican woman awake in the night saw them heading across the causeway to the mainland and roused the city to pursue them. The intruders had been under siege by the Tenochca, whose daytime prowess as street fighters was not matched by a vigilant presence at night. There are several important reasons why. One was exhaustion after long days of fighting in the weeks since the Toxcatl massacre of Aztec lords in late spring. Furthermore, even under normal circumstances, the Aztecs believed that the night transformed their world into a dangerous place, where the dreaded tzitzimíl spirits of the dead imperiled the living who would venture out. However, palaces and temples represented sanctuaries where fires were kept burning all night, maintained by stewards and novices. And throughout the year festivals involved dancing and feasting that went on all night. This study of how the Aztecs conceptualized the night shows that, as was true of so many cognitive constructs, dualism structured their attitudes and permitted them occasional riotous enjoyment in a nocturnal world that they typically avoided.

Evans, Tomos (The College of William and Mary)

- [82] Archaeology and the End of Empire in Nigeria: Learning from the History of Late Colonial Archaeology at Ile-Ife**

At the city of Ile-Ife (Nigeria) in 1953, three foreign archaeologists (Bernard Fagg, AJH Goodwin, and William Fagg), with the permission of the Oni of Ife, conducted several months of fieldwork in the old city. With the aim of uncovering evidence relating to Ile-Ife's early industries (including exquisite brass and terracotta artworks), they excavated several sacred shrines devoted to specific Orisha across a city that was considered the religious and spiritual centre of the Yoruba people. As a result, the excavations inflamed tensions in the city and exposed the complexities of the relationships between the colonial state, Western archaeologists, traditional authorities and priests, Nigerian fieldworkers and local people. Using archival data from the University of Cape Town and the University of Glasgow including the field diaries of Bernard Fagg and AJH Goodwin, this talk will tell the tumultuous story of the 1953 field season at Ile-Ife, explore the nature of late colonial archaeology in Nigeria at a time when Nigerian independence was looming, and ponder what may be learned from the mistakes of Western archaeologists during this period when approaching discussions relating to the decolonisation of archaeology as a discipline.

Evans, Victoria [44] see Montoya, Joaquin

Evans, Victoria (New Mexico Highlands University) and Linda Gregonis (Ceramic Analyst)

- [258] Connecting Hohokam Art and Iconography**

All cultures use symbols to convey ideas. In archaeological contexts those symbols have become ways to define and differentiate archaeological cultures. But what did the symbols mean to the artisans who created them? The art

that Hohokam craftspeople produced embodied the world (seen and unseen) as they understood it. They were influenced by weather, animals they encountered, plants they grew and used, pilgrimages they made, other people they met, their ancestors. They translated their experiences into art, creating iconic motifs that were shared across a wide region. We explore how these images were shared through time in various media—pottery, shell, carved stone, and rock art—and what these symbols may have meant in the context of Hohokam identity.

Everhart, Jennifer (Washington University St. Louis)

[402] Hunted Deer and Buried Foxes: Fauna from the Middle Epipaleolithic Site of 'Uyun al-Hammam

The Levantine Epipaleolithic (ca. 23,000—11,500 cal BP) saw an explosion of behavioral innovation and diversification in hunter-gatherer groups. One of these new behaviors was the development and spread of repetitively used and reused burial grounds or cemeteries. The Middle Epipaleolithic site of 'Uyun al-Hammam in the Wadi Ziqlab area of Northern Jordan preserves the earliest known evidence for the construction and use of cemeteries. Human mortuary behaviors develop within the broader contexts of subsistence strategies, social networks, and the economy. Here, I focus on the development of cemeteries in the Late Pleistocene Levant in the context of Epipaleolithic subsistence economies as well as hunting modalities. We uncovered an unexpected hunting pattern at the site dominated by local cervid taxa. Interestingly, the faunal remains from mortuary contexts closely mirror those found within habitation areas. Yet, an interred fox alongside humans suggests that Middle Epipaleolithic ritual activities involved modifications as well as echoes of familiar behaviors.

Everhart, Timothy (University of Michigan Museum of Anthropological Archaeology)

[176] A Study of Woodland Ditches

The Woodland societies of the Central Scioto River Valley in Ohio, most notably the Hopewell, have garnered much archaeological distinction from two elements of their ceremonialism: the construction of large, sometimes geometric ditch and embankment enclosures and the production of ornate art, often of exotic materials, utilized in funerary practices. It has been long held, dating back to the many 19th century maps from the region, that Woodland monumentality involved the erection of monuments of various geometric and non-geometric designs. Yet, the variability in composition and architectural complexity has only recently been detailed through modern excavation. The majority of this research has focused upon the extant remnants of embankment walls, while associated ditches have received relatively less study. Given how readily detectable ditches are with geophysical survey and their relatively better preservation, they form useful datasets to explain Woodland monument life histories and to more fully understand these monumental landscapes as a whole. This paper reports the excavation of 5 ditches in comparison to previously excavated ditches, demonstrating the archaeological richness of these features and lending insight into the organization and diversity of Woodland practices of monumentality.

Ewing, Josh [313] see Doelle, William

Fábregas Valcarce, Ramón [190] see Rodriguez-Rellan, Carlos

Fadem, Cynthia (Earlham College) and Shanna Diederichs (Crow Canyon Archaeological Center)

[86] Geoarchaeology of the Basketmaker Communities Project: Informing Past and Present Agricultural Sustainability

Sustainable land-use is critical to the past, present, and future of human occupation of the desert Southwest. Our work on the Basketmaker Communities Project (BCP) and Pueblo Farming Project (PFP) demonstrates that pedogenic mineral accumulation and water stress are likely the limiting factors for agriculture in this region. Overall we find no pattern of nutrient depletion at BCP sites or in PFP gardens. With mineral accumulation limiting crop yield, its impacts on Basketmaker and Pueblo farmers would have been substantial. Settlement strategy and farming technology would have evolved in response to induration, which opens new avenues of archaeological and agricultural inquiry. Though climate conditions do not change substantially at PFP and BCP spatial scales, soil tilth does, giving things like fine-scale geomorphic modeling, check dam surveying, and site-specific paleoenvironmental reconstruction the potential to open new avenues of research for the Southwest Neolithic. The identification of soil and climate refugia, especially if these areas co-locate with check dams or specific geomorphic contexts, would provide greater insight into the productivity, patchiness, and scale of agricultural land-use in times of water stress.

Fadem, Cynthia [390] see Egeland, Charles P.

Fagan, Elizabeth (University of Chicago)

[359] Everything Old Is New Again: Considerations for Re-examining the Previously Excavated Material of Hellenistic- and Roman-Period Armenia

Throughout the twentieth century, archaeological investigations into the Hellenistic and Roman periods in Armenia sought to understand the ancient kingdom's place in the broader Mediterranean sphere. The projects often worked to identify cultures and cultural influences in the material record, disentangling evidence of external influences from the material culture that expressed the identity of the local people. Through examinations of large sites like the ancient capitals of Artashat and Vaghshapat or the settlement and fortress of Garni, scholars debated the degree to which the material data reflected Greco-Roman or Near Eastern influences, and argued about the persistence of

Armenian culture. In the twenty-first century, the question of Armenia's place in the Mediterranean remains an intriguing puzzle, while the further development of archaeology as a discipline allows us to explore the puzzle from different perspectives. This paper will discuss what happens when we ask new questions of previously-excavated material, and how those questions can help place Armenia in the Mediterranean sphere using the lens of the political relationship between Armenia and the Roman Empire.

Fairbairn, Phoebe (The University of Texas at San Antonio), Zachary Stanyard (The University of Texas at Austin), David M. Hyde (Western State Colorado University) and Annie Riegert (Texas Archaeological Research Laboratory)

- [371] *Excavations of a Secondary Burial at Group L of the Medicinal Trail Hinterland Community, Northwestern Belize*

During the 2018 field season, a burial was exposed and recovered during exploratory test-pitting of Group L, a small residential complex within the Medicinal Trail Community located in northwestern Belize. Designated Burial L-1, the burial is secondary in nature as evidenced by the disarticulated remains placed directly on top of bedrock and below a single-phase construction strata near the center of the courtyard. The burial consists of diagnostic long bones fragments and small unidentifiable bone fragments. Additionally, there are sherds from at least two ceramic vessels. This poster will review literature of similar burials in the Maya Lowlands and use these data to inform our findings and interpretations of these remains at Group L.

Fairley, Helen (US Geological Survey)

- [99] *Understanding Dam Effects on Downstream Archaeological Resources: Lessons Learned from Three Decades of Research Downstream from Glen Canyon Dam, Arizona*

The destructive effects of large dams on upstream archaeological sites has been recognized for many decades, resulting in passage of federal legislation and numerous large-scale archaeological salvage projects in the 1940s through 1970s. Considerably less attention has been paid to the effects of large dams on downstream archaeological resources. For the past three decades, U.S. Geological Survey scientists have studied effects of Glen Canyon Dam on the downstream Colorado River corridor in lower Glen Canyon and Grand Canyon, including effects to archaeological site condition. Lessons learned from this research may be applicable to other regulated rivers where the emplacement of large dams results in an unnatural sediment deficit downstream; however, caution must be exercised when attempting to extrapolate findings from the Glen Canyon Dam research program to other river systems because downstream dam effects can vary widely, depending on numerous local environmental factors including topography, pre- and post-dam hydrology, sediment supply, seasonal flow patterns, and a host of other variables. This presentation provides an overview of learning from the Glen Canyon Dam research program, plus examples from several other regulated rivers in the American West, to illustrate the various ways in which dams can and do affect downstream archaeological sites.

Faith, Tyler [247] see Braun, David

Faith, Tyler (University of Utah) and Andrew Du (University of Chicago)

- [365] *Coverage-Based Rarefaction in Zooarchaeology: Potential and Pitfalls*

Zooarchaeologists routinely measure the taxonomic richness of faunal assemblages in order to explore questions related to human subsistence behavior or paleoenvironmental change. A common solution to the well-known sampling issues that attend such analysis is rarefaction, whereby sample size is standardized by rarefying larger assemblages down to a sample size equivalent to that of the smallest assemblage under consideration. A drawback of this approach is that the difference in rarefied richness between any two assemblages varies as a function of the sample size that is used, obscuring ecologically or behaviorally meaningful signals. As demonstrated in the ecological and paleobiological literature, this can be overcome by rarefying assemblages down to an equivalent coverage (a measure of sample completeness) rather than to equivalent sample size. In this presentation, we explore the potential and pitfalls of coverage-based rarefaction (CBR) in zooarchaeology. A key challenge in the implementation of CBR in zooarchaeology is that the units used to quantify taxonomic abundances (NISP versus MNI) can have a considerable influence on the outcome, particularly in poorly sampled assemblages. We explore why this is so, and suggest protocol for implementing CBR in zooarchaeology.

Fan, Wenquan [379] see Miller, Melanie

Faniel, Ixchel [87] see Austin, Anne

Fant, Carly (Anthropology at State University of New York at New Paltz) and Kenneth Nystrom (Anthropology at State University of New York at New Paltz)

- [11] *A Comparison: Two Methods for Timing Linear Enamel Hypoplasia among a 19th Century African American Population from Newburgh, New York*

Linear enamel hypoplasia, also known as LEH, becomes apparent in dental enamel as horizontal indentations from thinner layers of enamel being produced. This defect forms as the dental enamel responds to physiological disturbances from systematic stress attributable to biological, cultural, and environmental factors. LEH has allowed researchers to time the defect formation on human remains and can recover information about a population that was previously unknown. Two commonly used estimation methods are the Goodman (1990) and the Reid and Dean

(2006) methods. With these two methods, we compared and contrast the results of a nineteenth century African American subpopulation ($n=31$) from Newburgh, New York. The results showed a significant difference in the peak ages for LEH formation between the two methods. Through this comparison, we will attempt to reconstruct the roots of why some of the Newburgh population was subjected to early childhood stress producing hypoplastic developments, give insight on the dental health of the subpopulation based off of the prevalence of LEH, consider the history of racism and inequality that took place in the New-York-Newburgh region during the nineteenth century among those of African descent as well as those of poverty, and offer new proposals for future research.

Farah, Kirby (University of Southern California)

[24] Bright Light in the Big City: The Aztec New Fire Ceremony and the Drama of Darkness

Populated by as many as 200,000 people, the Aztec capital of Tenochtitlan—like most cities—was buzzing with activity through the night. Given the dynamism of the city, and especially weighed against our modern understanding of the sounds and lights that keep cities alive during the night, it is significant that one of the most important Aztec ceremonies took place in total darkness. The New Fire Ceremony, a rare but potent ritual, took place every 52 years and required that all the fires across the empire be extinguished. Night became dark in a way that many urban central Mexicans may never have experienced. While archaeological research has helped provide evidence for the range of household and community activities that surrounded the ritual, some of the most compelling information comes from ethnohistorical documents which convey the emotions bound up in the ritual. This paper explores how the total darkness that fell over the city in the days leading up to the ceremony contributed to the anticipation and impact of the event. The New Fire Ceremony reflected some of the core values that helped sustain the empire, and certainly the drama of this ritual helped to create a lasting impression.

Farahani, Alan (University of Nevada, Las Vegas)

[365] Challenges and Prospects of Richness and Diversity Measures in Paleoethnobotany

The measurement of the richness and diversity of archaeological plant remains recovered from sites is an essential, if not always explicitly recognized, aspect of paleoethnobotanical practice and interpretation. The range of different recovered plant taxa can be indicative of routes of taphonomic entry, diet breadth, local responses to social or environmental disturbance, and other aspects of human lifeways. This paper will identify the prospects and challenges of the utilization of existing richness and diversity measures developed in the biological/ecological sciences for paleoethnobotanical inquiry. Discussion is focused on re-sampling methods such as sample- and individual-based rarefaction. The theoretical challenges of identifying the relationship of the measured assemblage to the actual plants that were used or consumed is outlined. The strengths and weaknesses of existing implementations in the open-source statistical programming platform R are discussed. The paper advocates for a more rigorous incorporation of statistical methods developed in the biological/ecological sciences into standard paleoethnobotanical practice, but with consideration of the aspects that are unique to these data and their collection.

[137] Discussant

Fargher, Lane [68] see Martínez Rojo, Iziar

Fargher, Lane (Centro de Investigación y de Estudios Avanzados del IPN)

[238] El Malinche and Tlaxcallan: A Field Guide to Taking Down Democracy

Contact between the Conquistadores and the native peoples of Mexico 500 years ago was a watershed moment in human history. At its heart was the relationship between El Malinche (Hernán Cortés) and the Tlaxcalteca. Although much has been made of the role the resulting alliance played in the Conquest, the impact of incorporation on social and political organization within Tlaxcallan has received comparatively less attention. This is due in part to a near total reliance on Contact and Colonial Period documents. While these documents are important, they reflect a medieval worldview and, consequently, provide limited information on cultural processes prior to the conquest. Therefore, I draw on multiple seasons of systematic mapping and excavation to examine the pre-Hispanic – Colonial Transition in Tlaxcallan. Together with historic documents, these data allow us to shed light on how the Spanish Colonial government took down one of the most highly collective states in human history.

[166] Discussant

Farmer, Reid, Jon Kent (Metropolitan State University Denver) and Allan Koch (Cherokee Ranch Science Institute)

[147] Current Research at Cherokee Mountain Rock Shelter, Douglas County, Colorado

In 1971, excavations were conducted by avocational archaeologists at Cherokee Mountain Rock Shelter (5DA1001) in Douglas County Colorado. A 1973 published report showed an assemblage indicating three Late Prehistoric components. The middle component contained what was interpreted as Shoshonean ceramics likely from outside of the region. The collection was given for storage to the landowner, until their rediscovery in 2014. The authors are reanalyzing the 1971 collection and doing new research on the terrace south of the shelter. The rock shelter and terrace are the result of erosion of the upper Eocene Castle Rock Conglomerate. Radiocarbon assays on charcoal from the 1971 excavations confirm a Protohistoric occupation, no earlier than ca. AD 1700. Ceramics are reinterpreted as Ute. From 2014–2017 shovel tests, test units and auger tests were conducted on the terrace, showing cultural deposits to a minimum of 1.2m and an unusual mollic A horizon, 1.2 – 2.0m thick with a buried A horizon at 2.5-3.5m. The organic-rich A horizons are probably the result of stratigraphically-focused ground water

flow to the terrace surface over thousands of years. An assay on charcoal from this paleosol returned a date of 9890 +/- 25 RCYBP or 11350-11230 cal BP.

Farnsworth, Paul (Temple University)

[295] *Test Excavations at the African Village of Wallblake Estate, Anguilla*

In 2017, archaeological survey and excavations began at the Wallblake Estate on Anguilla, B.W.I., to examine the plantation landscape and the major activity areas of the estate. The research project is focused on understanding the development of African-Anguillan culture from its origins in the boom and bust plantation economies of the seventeenth and eighteenth centuries, through the nineteenth and twentieth centuries. The research in 2017 identified the location of the African village and excavated a small sample of materials from it to compare to samples excavated at both the extant main house and kitchen. In summer 2018, the project continued the archaeological test excavations. The primary goal of the fieldwork was to identify the locations of houses occupied by enslaved African or African-descended people working at the plantation and the associated trash and other archaeological deposits they left behind. A grid of shovel tests were excavated over the village area which identified six artifact concentrations, three of which have been tested so far with 1x1 meter excavation units. Analysis of the recovered artifacts along with their spatial distributions yielded insights on the ways of life of the enslaved African or African-descended population of the plantation.

[295] *Chair*

Faroug Ali, Mohamed [317] see Buzon, Michele

Farquhar, Jennifer (University of Pittsburgh)

[35] *Human-Environment Interactions: The Role of Foragers in the Development of Mobile Pastoralism in Mongolia's Desert-Steppe*

This paper presents a research design to investigate the role of foragers in the evolution of pastoralism in Mongolia's desert-steppe. Past efforts to understand the origins of herding have been stymied by the "steppe and sown" dichotomy that perpetuates long held stereotypes of farmers and herders, and posits agriculture as a precondition for pastoralism. Recent perspectives, however, have revealed more complex evolutionary processes, helping to dismantle outdated views and expand our understanding the role of non-agricultural traditions (e.g., foraging). While studies have generated insights about foraging life in Mongolia, we still have scant information about how foragers contributed to the development of herding. Using archaeological and environmental data from on-going work at the Ikh Nart Nature Reserve in the Dornogovi Provence, the study will focus on land use and mobility patterns across the economic and social transition (ca. 4500 BP) as a way to understand the nature of change and implications for the development of Eurasian pastoralism. Working within the framework of evolutionary ecology and concepts of habitat suitability, the study will compare how foragers and herders distributed themselves within habitats, detecting differences in how, when, and why people moved, illuminating how people make decisions about existing environmental conditions.

Farrell, Sean (Texas State University)

[218] *Geoarchaeological Investigations at Bone Bed 1, Bonfire Shelter: Implications for Evidence of Early Paleoindian Site Use*

In the summer of 2018, Texas State University returned to Bone Bed 1 at Bonfire Shelter, a stratified rockshelter in the Lower Pecos Canyonlands of Val Verde County, Texas. Excavations in 2017 and 2018 confirmed the presence of Pleistocene fauna in the potentially earlier than Clovis deposits of Bone Bed 1. However, evidence of cultural activity was limited to the bone breakage patterns observed in the 1960s and 1980s. Previous investigators speculated that geological processes may have impacted the integrity of Bonfire's archaeological deposits, scouring away cultural material or artificially introducing faunal remains. This paper explores the taphonomic processes associated with Bone Bed 1, reporting the results of intensive geoarchaeological analysis and microartifact sampling conducted during 2017/2018. The results of the 2017 loss on ignition, particle size, and magnetic susceptibility assays have been supplemented with X-ray diffraction, total organic carbon, and stable carbon/nitrogen isotope analyses to deconstruct the depositional environment of Bone Bed 1. Over 80 sediment samples specifically targeting residual lithic debitage associated with large animal butchery and stone tool resharpening were analyzed. This paper contextualizes the presence of faunal remains within Bone Bed 1 and broadly explores the role of rockshelters within Early Paleoindian subsistence strategies.

Farris, Glenn (Santa Barbara Natural History Museum)

[411] *Transforming Orphan Archaeological Collections to Student Theses*

Like many state agencies, California State Parks have been the source of a number of archaeological excavations which generated collections of notes and artifacts. A significant number of these collections were either not fully studied and written up or have material that deserves another look and the preparation of a more formal report. In coordination with various university professors, students have been introduced to various collections to use as source material for senior theses, Master's theses and doctoral dissertations to the mutual benefit of orphan collections and the students.

Fash, Barbara [118] see Carballo, Jennifer

Fash, William [105] see Lacombe, Laura

Faugere, Brigitte (University Paris 1)

[349] *The Sets of Figurines in Western Mesoamerica: Contexts and Possible Interpretations During the Formative*

In Western Mexico, as in Mesoamerica generally, anthropomorphic and zoomorphic figurines are rather often found in groups, either in caches or in funerary context. These particular contexts allow substantial advances in our understanding of their uses and possible meanings, in particular when the data concerning the arrangement of every element inside the group is known. In this presentation, we shall examine the case of the Chupicuaro's tradition figurines, a formative culture of Northwestern Mexico, between 600 and 100 BC. Several scenes can be reconstructed from sets found in context, mainly in children's graves. These examples will be then replaced in the vaster frame of Western Mesoamerica where numerous discoveries took place recently in funerary contexts.

According to the age of the deceased, the eventual presence of containers, the arrangement of the artifacts and the protagonists identified, these groups can be interpreted either as a set of objects referring to a function or an activity exercised by the deceased during his life or as scenes intended to accompany him in the afterlife.

[349] *Chair*

Faught, Michael (SEARCH, Inc & ARCO-OP)

[51] *Some Thoughts on "Clovis": Where Were They From, Where Did They Go, Where Do They Fit in the Peopling of the Western Hemisphere*

This talk will present some opinions I have about Clovis - woven with facts to convince the skeptical. I will define what I mean by "Clovis", show what some others mean by "Clovis", and add some additional ways to think about "Clovis" in both synchronic and diachronic directions. I will present what I think about its origins and about where we might be finding "proto-Clovis" already. This Clovis school of knapping (and the assumed bio-linguistic groups within which it was embedded) was parent to several subsequent archaeological culture groups that evolved into the Holocene in multiple places. How do we know this? How do we trace archaeological culture groups into the Holocene? And let's not forget that Clovis was on landscapes with "others", that is contemporaneous groups such as, Denali/Nenana; Western Stemmed Point/PaleoCoastal; and groups in South America too, where Magellan/Fishtail was "other" to Abriense, Umbu, Itaparica, etc. Where do we see these different groups interacting archaeologically, and what were the outcomes?

Faught, Michael [325] see Smith, Morgan

Faulseit, Ronald (The Field Museum) and Heather Lapham (University of North Carolina at Chapel Hill)

[197] *Cuisine Choices in Mundane and Ceremonial Contexts at a Late Classic Palace Compound in the Valley of Oaxaca, Mexico*

In the Late Classic (CE 500 – 900), elite families in the Oaxaca Valley maintained and reinforced their elevated status through calendrical rites, where they acted as intermediaries between the community and supernatural entities associated with the agricultural cycle. These rituals served as the key components of broader festivals that likely involved well-orchestrated feasts, including special meals served to important participants. In our recent excavations of a palace and adjacent ceremonial complex, we have identified differential patterns of consumption between the residential-private space and ceremonial-public space within the compound. In this paper, we employ spatial analysis of faunal remains and other markers to examine social and political implications behind the cuisine choices made within the household.

Fauvelle, Mikael [70] see Perry, Jennifer

Fauvelle, Mikael (University of California, San Diego)

[270] *Art, Archaeology, and Chronology Building: Recent Investigations at Fracción Mujular*

Located on the Pacific Coast of Chiapas, Mexico, the site of Fracción Mujular is best known for its corpus of carved stone monuments. First investigated by Carlos Navarrete in the 1960's, the site is characterized by multiple stelae and carved altars. Several of Fracción Mujular's stelae contain circular glyphs which seem to associate the site with the nearby Early Classic center of Los Horcones, as well as with artistic traditions from Central Mexico. Additionally, two of the site's stelae display glyphs that have been interpreted as sixth century dates. Recent archaeological investigations at the site, however, have uncovered a much longer history, ranging from the Early through Postclassic periods. Using high-resolution digital models of Fracción Mujular's stelae, this paper will connect the story told by the site's stelae with that revealed by recent excavations. I will discuss the site's long history of connection with distant places, as well as the importance of photogrammetry as a tool for the preservation of poorly preserved monuments.

Favreau, Julien [32] see Mercader, Julio

Fazioli, K. Patrick (Mercy College)**[310] Discussant****[310] Chair**

Feathers, James [122] see Moore, Christopher

Feathers, James (University of Washington), Christopher Moore (University of South Carolina), Mark Brooks (SRARP-SCIAA, USC-Retired) and James Dunbar (Aucilla Research Institute, Inc.)**[325] OSL Dating at the Wakulla Springs Site**

The Wakulla Springs site is a well-known paleoindian site in Florida, which contains abundant Pleistocene megafauna and artifacts including early projectile points. Previous optically stimulated luminescence (OSL) dating at the Wakulla Springs Lodge site (8WA329) suggested occupation older than 11.6 ka but younger than 22.5 ka (W.J. Rink et al. Florida Anthropologist 2012) and raised the possibility of a pre-Clovis presence. This work measured luminescence on small aliquots of quartz. This paper extends this work by measuring luminescence on single grains of quartz on several samples from the same site. Bioturbation is an issue, and single grains provide the best resolution for addressing mixing. Methods for interpreting single-grain age distributions are discussed.

Fecher, Franziska [103] see Otto Mejía, Raquel

Feder, Kenneth**[215] No Shit Sherlock: Sir Arthur Conan Doyle's Use of Archaeological Landscapes**

There are a number of fascinating instances in the Sherlock Holmes canon of four novels and fifty-six published short stories in which Sir Arthur Conan Doyle hints at the presence of malevolent forces embedded in archaeological landscapes. Doyle uses these seemingly eerie, inevitably mist-enshrouded places as a backdrop for stories involving spectral hounds from hell, evil spirits, blood sucking vampires, and inexplicable and ineffable descents into madness. For Doyle, archaeological sites do not just provide an interesting context in the canon; they serve, in a sense, as characters in the stories. Ancient sites are used by Doyle to represent what archaeologist Jeb Card characterizes as a "mythic past," a distant time period quite alien to our modern world, one that is "spooky," and decidedly goosebumpy. The connection between antiquity and the apparently paranormal evil manifested in some of the Holmes stories is explicit even if the precise nature of the connection is opaque. Fortunately, while this may be how Doyle uses archaeological landscapes, Sherlock Holmes is having none of it and explicitly says so, though he's not above collecting arrowheads with his dear friend Dr. Watson.

Fedick, Scott (Anthropology, University of California, Riverside)**[370] When Do We Eat? The Life Cycle of Indigenous Maya Food-Plants and Temporal Implications for Residential Stability**

For Maya agriculture, both ancient and modern, it is known that a wide range of time is needed between planting and harvesting of various plant species. While annual crops require less than a year to reach full productivity, perennial crops, particularly tree-crops, might require many years to begin production, and even longer to reach full productivity. Documents from the Colonial period of the Maya Lowlands describe the significance of orchards and other perennial food plants cultivated in and around Maya villages, and the great distress caused by the destruction of these resources. Annual crops allow for rapid food production under conditions of residential instability such as forced relocation or flight. Perennial crops imply residential stability or long-term tenure over land or rights to harvest specific plants. Working with an inventory of 497 indigenous food-plants of the Maya Lowlands, this presentation will quantify and discuss the social, economic and political implications of time investment and locational stability required by the known range of food-plants available to the Maya.

Fedoroff, Michael (USACE TNTCX)**[6] Discussant****Feeley, Frank (CUNY Graduate Center)****[31] Rescue Excavations at a Medieval Fishing Station in Western Iceland**

In 2008 an eroding midden along Iceland's western coast was discovered to be part of a large 15th century commercial fishing station - the first of its kind to be found in Iceland. The site was clearly endangered by coastal erosion and with support from the National Science Foundation rescue excavations were carried out over the course of the next few summers. While post excavation analysis is still ongoing it's clear that this site is a window in a tumultuous time in Iceland's history. It captures an Iceland that was challenging existing ideologies of isolation as it rebuilt after a catastrophic brush with bubonic plague, and laid the foundation for the modern commercial fishing industry so integral to Iceland's modern economy.

Feely, Cassandra**[217] Game On: Investigations of Ballcourts 1 and 2 at Xunantunich, Belize**

This paper presents the results of recent investigations of the two ballcourts at Xunantunich, Belize. Located on the Mopan branch of the Belize River, Xunantunich is primarily a Late to Terminal Classic regional center. The site's rapid rise to power in the late 8th to 9th centuries is attributed to its political affiliation with the larger site of Naranjo, Guatemala to the west. Investigations of the two ballcourts at Xunantunich identified differences in both architecture and caching traditions. The architecture of Ballcourt 1 is more closely in line with northern (Yucatecan) traditions, while the architecture of Ballcourt 2 demonstrates a more local Belize Valley tradition. In addition, while Ballcourt 2 demonstrates an extensive caching tradition, no caches were found in Ballcourt 2. These differences will be analyzed in light of the political affiliations of the site as well as the cultural changes that were occurring during the Late to Terminal Classic period in the Belize River Valley.

Fehren-Schmitz, Lars [55] see Washburn, Eden

Fehren-Schmitz, Lars (UCSC Anthropology), Kelly Harkins (UCSC Anthropology), John Krigbaum (University of Florida Anthropology), Regulo Jordan (Fundación Augusto N. Wiese) and Jeffrey Quilter (Harvard University Peabody Museum, Anthropology)

[253] Beyond the Big Picture: An integrative Paleogenomic Study to Address Regional Dynamics and Political Organization in the Peruvian Moche Culture

The genomic revolution opened up new dimensions for paleogenomic research, inconceivable only a decade ago. However, with a primary focus on big-picture population genetics like large-scale migration events, paleogenetics also became somewhat removed from problem-based archaeological research questions with a regional focus, addressing issues such as kinship, genealogy, and political organization. With new methods on hand, and sufficient population genomic data frameworks established, it is now possible to re-focus big picture data, and foster fruitful collaboration with archaeologists who are equally interested in smaller-scale population dynamics. As an example we present our study on social and political dynamics of the Moche Culture along the Peruvian North Coast, one of the earliest (ca. 300—850 C.E.) complex societies in South America. We obtained genome wide data from the iconic Señora de Cao, and 15 other high status Moche burials from the Huaca de Cao to examine marriage patterns and family relations. The genome wide data, contextualized with the rich archaeological record, along with new isotopic data, allow us to not only address the reconstruction of genetic genealogies of past Moche royal families, but to understand the population history of the Moche, and the evolution of political systems in ancient Peru.

Feinman, Gary**[225] Discussant****Feliciano-Centeno, Sofia****[418] From Prison to Tourism: Historical Evolution and Population of Presidio de la Princesa**

Presidio de la Princesa is one of the oldest prisons in the city of San Juan, Puerto Rico, currently housing the headquarters of the Puerto Rico Tourism Board. This paper presents an analysis of blueprints and historical documents to chronologically delineate changes to the spatial distribution and activity areas while it served as a prison. In addition, I am looking at data collected in the population census of 1910 and 1920 to trace the demographics of prisoners and staff. Drawing from frameworks proposed in archaeology of confinement studies, looking at existing archaeological data from the surrounding areas and incorporating documentary sources it will be possible to propose new research projects.

Feltz, William, Patrick Mullins (University of Pittsburgh, Department of Anthropol.) and Brian Billman (The University of North Carolina at Chapel Hill)

[120] Ciudad de Dios: An Analysis of Destruction Using Drone Technology

In July of 2018, the archaeological site of Ciudad de Dios, located in the Moche Valley of the north coast of Peru, was surveyed using a drone. The digital map was then used to not only analyze the settlement's organization, but also the natural and unnatural destruction that has affected the preservation of the site. Excavated by MOCHE Inc. in 1998, Ciudad de Dios was drone mapped in 2016 before the El Niño Costero of March 2017; the delayed El Niño resulted in amplified rainfall, bringing floods of liquid mud and large boulders that devastated the country. One year after this event, the resulting drone map, in conjunction with the previous 2016 map, allows for the analysis of the effects left by not only the El Niño, but also site destruction caused by modern settlement expansion. The map data from both 2016 and 2018 can assist in understanding the destruction to global archaeological complexes in environments where such risks are present.

Fenerty, Brendan [51] see Thulman, David

Fenerty, Brendan (Geosciences, The University of Arizona), Vance Holliday (Department of Geosciences, School of Anthropology,), Allison Harvey (Natural Resources Institute, Texas A&M University) and Matthew

Cuba (AmaTerra Environmental, Inc.)**[187] Paleo-lake Otero, Playas, and Paleoindian Land-Use in the Tularosa Basin, New Mexico**

Perennial lakes and wetlands occupied many intermontane basins of the western United States during the last glacial period. Spatio-temporal trends in Paleoindian land-use and subsistence inferred from the distribution of sites relative to paleo-lakes remain speculative for many basins in the Southwest in the absence of well-constrained paleo-lake-level chronologies, limited paleoenvironmental reconstructions, and few systematic attempts to identify and determine the distribution of Paleoindian sites. We present the results of geoarchaeological investigations focused on understanding the distribution of predominately Folsom and later Paleoindian sites in relation to the evolving surficial paleohydrology of the northern Tularosa Basin, south-central New Mexico. Previous work indicates that Paleoindian sites are disproportionately associated with small playa basins and are sparse proximal to paleo-lake Otero. Our radiocarbon assays indicate that paludal deposits accumulated in playas contemporaneous with the initial human occupation of the basin. We speculate that the hypersalinity of paleo-lake Otero rendered water unsuitable for human consumption and, consequently, hypothesize that the distribution of Paleoindian sites in the northern Tularosa Basin reflects the availability of potable freshwater in playa wetlands. Our results contribute to increased understanding of the regional environmental response to hydroclimate changes during the last deglaciation and inform basin-scale models of Paleoindian land-use.

Feng, Li [389] see Zhao, Yu-chao

Fenn, Thomas (Department of Anthropology)**[82] The Appearance, Use, and Production of Glass in Ancient Sub-Saharan West Africa**

One of the commodities heading south across the Saharan Desert over the past 2000+ years was glass. The typical form was as beads, but vessel glass and other forms also have been recorded. Glass not only was imported but at some point in the past also was produced by indigenous populations for local and regional consumption. Advances in recent analytical methods have led to an increased body of compositional and isotopic data on ancient and historic glass in Sub-Saharan West Africa. As a result, these data provide archaeologists and historians a much richer and more robust basis for interpreting the role glass played in trade and exchange networks, and the socio-political, ideological and economic aspects of glass in past cultures. The following paper will review some of the evidence we have for ancient glass in West Africa, present some new and recent results, and synthesis these into a bigger-picture interpretation of the role of glass amongst ancient West African societies.

Ferguson, Haylie (Horrocks Engineers, Inc.) and Scott Ure (Brigham Young University)**[420] Low Altitude Aerial Photography in Montezuma Canyon**

Photogrammetric imagery, spatial modeling, and resulting high-resolution orthomosaics can be used to identify potential excavation areas, previously unrecorded architecture and other archaeological features, and to verify and update existing mapdata and site information. This paper discusses the methods and results from Unmanned Aerial System (UAS) mapping at three Ancestral Puebloan sites Montezuma Canyon. Our use of a UAS in conjunction with Global Positioning Systems (GPS), a high-resolution digital camera, a thermal imaging camera, and computer processing software resulted in the collection of thousands of georeferenced aerial photographs of archaeological sites, structures, and landscapes with centimeter-precision resolution and accuracy. Twenty-seven flights were conducted at two sites in Montezuma Canyon and one site on the adjacent plateau. These sites included Montezuma Village, Coalbed Village, and Site 13. The collected data was processed to produce high-resolution orthomosaics, topographic maps, and 3-Dimensional models of each site. Digital elevation models were created for each site which will allow for further GIS analyses. The sites and their varied landscapes each posed unique challenges, allowing us to refine our general and site-specific UAS reconnaissance methods. The data provide a baseline for future research including additional geospatial analyses, survey, and excavation in Montezuma Canyon.

Ferguson, Haylie [420] see Yoder, David

Ferguson, Jeffrey R. [213] see Schaefer, Jonathan

Ferguson, Jeffrey R. [263] see Barkwill Love, Lori

Ferguson, Jeffrey R. (University of Missouri)**[392] Assessing the Potential for ED-XRF in Archaeometric Studies: A Focus on Data Sharing and Bulk Chemical Analysis**

Over the past few decades, the increasing use of compositional studies of archaeological materials has dramatically enhanced our knowledge of the past, but as the diversity and availability of analytical techniques increases it is necessary to understand all of the variables involved in the choice of analytical method. In this paper I discuss the variables impacting three of the most common analytical techniques (NAA, XRF, and ICP) for two of the most frequently studied materials around the world (obsidian and ceramics). A particular focus is given to XRF as this technique is often employed without proper consideration of its limitations. I will address the potential for data sharing between laboratories as well as problems with the increasingly common attempts to conduct bulk chemical analysis of ceramics. The examples used are primarily from the American Southwest but the issues apply to all

regions.

Ferguson, T. J. [16] see Hopkins, Maren

Ferguson, T. J. (University of Arizona)

[62] *Moderator*

[178] *Discussant*

Ferguson, Terry A. [122] see Moore, Christopher

Fernandez-Lopez De Pablo, Javier and Elodie Brisset (Institut Català de Paleoecologia Humana i Evolució)

[33] *Central Place Foraging Models and Early Holocene Coastal Adaptations in the Western Mediterranean*

In this paper we use a Central Place Foraging Model to evaluate the impact of environmental changes on subsistence and mobility strategies in the Mesolithic period in the Western Mediterranean. We focus on the analysis of the El Collado site because of its position in the interface between a foothill and the Mediterranean coastal plains. Recent geomorphological studies have allowed us to reconstruct the Early Holocene sea shore position and its impact on coastal ecosystems, showing a progressive contraction of lagoon biotopes. In this changing scenario, we use the rich bioarchaeological record of the El Collado site (faunal, mollusk and fish bone assemblages) to test predictions of the Central Place Foraging model. On one hand, we produce prey abundance estimates within the site catchment at three different Mesolithic phases. On the other hand, we compare these estimations with bioarchaeological empirical data. Our results suggest differences in human foraging strategies (in terms of prey rank, acquisition and processing costs of both prey and mollusks) from the Early to the Late Mesolithic. These transformations may be driven by a dramatic drop in environmental carrying capacity, likely forcing a change in the function of the site within the regional settlement system.

Fernandez, Rachel (Center for Digital Antiquity)

[134] *Digital Curation of Photogrammetric Data*

Back in 2003, archaeologists were warned of what Sullivan and Childs coined as the "Curation Crisis." They explained that a set of historical circumstances, "...has contributed to a crisis in curation of archaeological collections." Primarily focused on the curation of physical documents and objects, they argued that the need for long-term curation efforts be emphasized in all stages of archaeological research. A similar alarm was raised in 2015, when Mary Clarke wrote on the issue of digital data curation in what she called the "Digital Dilemma." This call to action still rings true in the present where we see an ever increasing proliferation of digital data stemming from archaeological contexts and projects. While this deluge of information is gladly accepted in advancing the field, the level of curation and preservation is still deficient. Focusing on photogrammetric practices, in this paper I will offer standardization methods that are useful in all stages of the archaeological process in order to ensure proper curation.

Fernandez-Gotz, Manuel (University of Edinburgh)

[23] *Narratives of Rise and Collapse: Fragile Urbanism in Early Iron Age Europe*

While traditional research on early urbanism has focused predominantly on 'successful cities', i.e. urban settlements that show long settlement histories, recently scholarship has also started to pay increasing attention to cases of short-lived agglomerations which only lasted for some decades or generations. In this paper, I will present a case study from Early Iron Age Central Europe: the so-called Fürstensitze ('princely seats') that developed between the late 7th and the late 5th centuries BC. These sites were complex central places with evidence for significant political, economic and sometimes also religious functions. They were part of a wide network of exchanges that connected them with other areas of temperate Europe and also the Mediterranean civilizations. However, their development was a fragile phenomenon, and after some generations all of them were abandoned or experienced a marked decline. How should we interpret their rapid rise, but also rather abrupt end? Are we dealing with a societal collapse, with a resistance to centralized power formations, or with an adaptation to changing exterior circumstances? And what can we infer more generally about non-linear cycles of transformation, and about fragile urbanization processes?

[421] *Discussant*

[23] *Chair*

Fernandez-Gotz, Manuel [50] see Torres-Martínez, Jesús Francisco

Barcelona & Institució Ca)**[358] Supernatural Gamekeepers among the Tsimane' Hunter-Gatherers of Bolivian Amazonia**

We examine the traditional beliefs on supernatural gamekeepers by the Tsimane' hunter-gatherers of Bolivian Amazonia. As other Amazonian Indigenous groups, the Tsimane' believe in the existence of supernatural spirits (known as *a'mo* in Tsimane' language) who own much of the natural world, including wildlife and animal breeding grounds. The Tsimane' traditionally had a number of rules and rituals to regulate their behaviour in relation to wildlife, and particularly hunting and fishing. Some of these rules were in the hands of the shamans (*cocojsi'*), who acted as managers of wildlife stocks in the Tsimane' society. Shamanic rituals provided them with an opportunity to communicate with the supernatural gamekeepers and get first-hand information on all the rules that should be respected. Amongst the many rituals used to show reverence to the spirits are the shamanic songs, locally known as *ferentyé*, a type of songs exclusively performed by shamans to ask supernatural gamekeepers to supply wildlife for the community. In this talk, we draw on a unique pool of 12 ritual songs of the Tsimane' (compiled by J. Riester in the 1970s) to illustrate the powerful bonds of kinship and reciprocity that this society maintained with supernatural gamekeepers to ensure wildlife availability.

Fernandini, Francesca (Pontificia Universidad Católica del Perú) and Stefanie Bautista (University of Rochester)**[315] Reassessing Models of Pre-Incaic Federations and Empires on the Peruvian South Coast**

John Rick's research at the site of Chavín de Huantar reassessed the chronology for the Late Formative and Early Horizon periods in Peru. This example inspired other scholars to reexamine previously accepted chronologies and models of prehispanic Andean cultures. The first half of this presentation will discuss how the archaeological site of Cerro de Oro, located in the Cañete Valley, is just one example of how regional independent settlements, with local political structures that incorporate iconographic elements inspired in the Wari hegemonic style, have been used to construct the idea of an expansionist society that established colonies throughout the Andes, in many ways mimicking models proposed for the later Inca empire. This brief presentation will contextualize Wari-inspired material culture within its local contexts at Cerro de Oro in order to counter-argue its association with the highland Wari state. The second half of this presentation will reassess the models of settlement hierarchy that scholars have proposed for the Early Horizon archaeological culture of Paracas. To this end, the second half of the presentation argues that Paracas was not one archaeological culture but a diverse socio-political society that had an established settlement hierarchy evidenced through the production and spread of pottery.

Fernstrom, Katharine (Towson University)**[190] Can We See Travelers in Rock Art?**

Polly Schaafsma's extraordinary body of rock art publications allows us to return repeatedly to the images to ask different questions as our knowledge expands. Rock art informs my studies of pre-European Native American murals and 3-dimensional human figures because murals are compositions on surfaces that validate culturally defined places. Rock art presents diverse anthropomorphic figures that overlap and broaden the range of visual presentations in other media for example shell, copper, earth, and ceramic. Portable objects can travel hand to hand with minimal human travel. Rock art murals are fixed on the landscape and require that people travel to them; and we know that pre-European people traveled. The Hopi and Aztec migration stories are classics; the Nebraska Osage self-identify as descendants of Ohio Hopewell; and Siouan speakers are in the Southeast and Great Plains. However, we rarely discuss travel evidence in the archaeological record. I propose that it is worthwhile to hypothesize that images in rock art include associations with travelers, and may therefore also relate to conceptual uses of the landscape associated with exploration and shared knowledge of "place".

Ferrales, Esmeralda [88] see Markle, Elizabeth

Ferrales, Esmeralda (New Mexico State University), Kalib Sorenson (New Mexico State University), Shannon Cowell (New Mexico State University) and Kelly Jenkins (New Mexico State University)**[122] Collaborative Research at the 19th-Century Settlement of La Parida, Socorro County, New Mexico**

In March of 2018, New Mexico State University (NMSU) students enrolled in the cultural resource management class re-visited and recorded La Parida, a 19-century Hispanic settlement located on El Camino Real de Tierra Adentro National Historic Trail. The Bureau of Land Management (BLM) funded this project as part of a collaborative agreement with NMSU to support research on the Camino Real. The purpose of this project was to 1) relocate and record habitation and midden features associated with the settlement, and 2) evaluate the potential of the site for future research and public interpretation. Students identified six distinct loci at the site, only two of which showed clear evidence of structural remains. Of these, only one was located on land managed by the BLM. While water erosion, vehicle traffic, and modern development have clearly damaged portions of this site, it has considerable historical significance and some potential for future research. NMSU recommends that surviving portions of the settlement be explored through public archaeology, oral history, and collaboration with private landowners.

Ferriman, Colin**[393] Surface Sites and Surface Pipes Results of the Dead Horse Lateral Pipeline Data Recovery Grand County, Utah**

Environmental studies associated with the Dead Horse Lateral Pipeline project of Grand County Utah afforded archaeologists from Cultural Resource Analysts Inc. an opportunity to intensively study the cultural resources within

and around the pipeline corridor. This multifaceted research examined both micro analyses associated with individual sites, artifacts, and natural resources as well as macro analyses that focused on the use of the landscape by prehistoric peoples. The results of the data recovery from 12 archaeological sites and an encompassing environmental attribute based model are summarized as well as the findings associated with multiple inventories associated with the 24 mile long pipeline project.

Ferring, C. Reid [261] see Younger, Alexandra

Ferris, Jennifer (Cardno) and Kerry Lyste (Stillaguamish Tribe of Indians)

[328] Come Together Over Olcott: Recent Collaborative Investigations

The Olcott Site, 45SN14, was first recorded nearly 60 years ago by Butler, and was fundamental in defining the Old Cordilleran Culture. Situated upstream from two named Stillaguamish villages, the Olcott site was a heavily utilized hunting area for thousands of years. Although the site has been disturbed through the years from farming and domestic use of the land, it remains remarkably intact. Due to recent disturbance, the Stillaguamish Tribe of Indians collaborated with Cardno, DAHP, and the landowner to examine the site more closely. Working together with the landowner, tribal and canoe family members, agencies, college professors, and consultants, a portion of the site was excavated to characterize the site profile and approximately 13 cubic meters of back-dirt were screened to recover cultural materials. Such support exemplifies the collaborative nature of archaeology, and our research furthers understanding of the period and the connection the site has with current generations.

Festa, Marcella (Ca' Foscari University of Venice)

[416] Understanding Early Societies and Investigating Early Interactions: Origin, Significance and Transmission of the Bronze Plaques from the Tianshan Beilu Cemetery, Eastern Xinjiang

The Tianshan Beilu cemetery – the largest and earliest Bronze Age funerary context in Eastern Xinjiang, including 705 graves dating to ca. 2000-1300 BCE – has been widely recognized as a key-point in the early interactions system throughout Eurasia – the ‘Prehistoric Silk Road’. However, due to the failure to publish the excavation report, research has been mostly limited to a small group of painted pottery and bronze weapon-tools, while decorative and ritual objects remain virtually unknown. This paper aims to fill this gap by examining a body of decorated bronze plaques from Tianshan Beilu hosted at the Hami Museum. Evidence is investigated through a multi-disciplinary approach, combining archaeology, ethnography and environmental studies. Specifically, by analysing bronze plaques in light of the unpublished material from the Tianshan Beilu site’s excavator - Prof. Chang Xi'en -, and looking at them from a comparative ethnographic perspective, this study examines their features, archaeological context and function, in order to enhance the knowledge on the community’s cultural developments. Moreover, the analysis of the spatial distribution of these objects over a wider area - including Central and Eastern Asia - allows to explore prehistoric cross-regional interactions, with a special focus on rituals transmission.

Fetterman, Liv (USDA Forest Service)

[135] How Can Archaeologists Better Engage the Public, Tribes, Land Managers, Law Enforcement Officers and Prosecutors Regarding the Importance and Relevance of Heritage Protection?

Planning for active engagement with land managers, law enforcement, tribes and the public during federal archaeological project development can lead to a more comprehensive, reciprocal appreciation of heritage and its protection. To include public engagement and interpretation into project work, especially NHPA Section 110, partnerships and collaboration with interested tribes, publics, and agencies are critical. Archaeologists often appreciate the scientific, objective data archaeology affords; tribes and non-archaeologists (land managers, law enforcement, prosecutors, publics) prefer histories rooted in identifiable cultural values and emotions. Archaeologists benefit from subjective, value based assistance in partnerships and public forums to develop and plan for interpretation and outreach. The Forest Service, Dakota Prairie Grasslands, has one case study currently being implemented through partnerships with Montana State University, a local historical museum, and members of local tribal and ranching communities. This project includes professional historians interviewing local tribal and ranching communities, holding public meetings and publishing notices in social and conventional media outlets. One desired result is publishing a comprehensive story incorporating oral histories and interview research gathered in conjunction with data from NHPA Section 106 projects. The second desired result is creating a long-term interpretative strategy engaging diverse publics through dynamic, subjective, value based, multimedia approaches.

Feucht, Vincent [118] see Smith, Alexander

Fialko, Vilma [199] see Larmon, Jean

Fiedel, Stuart (Louis Berger US)

[196] Leapfrog Migration: Bumppo and Beyond

David Anthony and I coined the concept and term “Leapfrog Migration” for a graduate seminar at the University of Pennsylvania in 1976. We called its first iteration the “Natty Bumppo model” after the frontier scout hero of Cooper’s “Leatherstocking Tales.” We used it to explain the rapid, directional, but punctuated expansion of the earliest pioneer Neolithic farmers in southeastern Europe. Since then, leapfrog models have also been applied to other evidently

rapid migrations, such as those of Paleoindians, Saladoid farmers in the Caribbean, Ontario Iroquoians, and Austronesians. I will review the history of the leapfrog model and assess how well it is holding up in the light of the most recent archaeological and archaeogenomic data from Europe and Anatolia.

Field, Julie [408] see Riordan, Kyle

Field, Julie (Ohio State University), John Dudgeon (Idaho State University), Christopher Roos (Southern Methodist University), Amy S. Commendador (Idaho Museum of Natural History) and Rebecca Hazard (Idaho State University)

[408] *Push and Pull, Part II: Modeling the Inland Exploration and Settlement of Fiji*

Previous GIS-based analyses (2017) by the authors have identified the ranges of several classes of terrestrial fauna that would inhabited the island of Viti Levu in prehistory. The ranges and habits of reptiles (giant tortoises, iguanas, and snakes), flightless birds (megapodes and giant pigeons), and bat and seabird colonies intersect in two major areas of Viti Levu: the Rewa River Valley, the Navua River Valley, and several upland portions of the mountains of the west and north of the island. This presentation evaluates additional modeling of foraging in immediate post-colonization Fiji, with examination of terrain, density of prey, and distances incorporated into potential foraging forays.

Field, Sean (University of Notre Dame)

[84] *Timber Pilgrimage: Timber Importation as Pilgrimage to Chaco Canyon*

Beginning with Neil Judd's early speculations about timber importation, the Chaco road network has been the basis of diverse and often contrasting archaeological interpretations about the use of such unique landscape features. While a wide-array of interpretations have been suggested, recent least cost analyses reiterate Judd's earliest interpretations—that certain roads may have been the most efficient pathways for the movement of construction timbers across the San Juan Basin. Although such utilitarian ideas are enticing on their own, more accurate conceptualizations of Chaco roads may aim to integrate ideas of ecology, optimality, and religion. Here I emphasize a holistic interpretation of Chaco roads and suggest that some roads were simultaneously routes for efficient movement and paths of ceremonial pilgrimage. Doing so requires that these roads and the routes they represent be interpreted on a landscape scale, with an equal emphasis on the places, the path between, and the objects being carried.

Figueroa, Alejandro (Southern Methodist University) and Whitney Goodwin (Southern Methodist University)

[256] *WWPAED?*

Pat Urban and Ed Schortman instilled in us the inability to think small. Their big picture, long-term approach to research, teaching, and mentoring is the greatest of all the many gifts they have shared with us. In research, it means we dig in. We have chosen our research sites carefully, with the understanding that addressing the kinds of questions that Pat and Ed do, means first putting in the time and labor. It means embedding yourself within the community, not to gain points, but to gain the insight and the support of people who will literally move (small, artificial) mountains to help you. When it comes to teaching and mentoring, it means taking a student-centered approach from the beginning. Knowing full well that fostering future academics or archaeologists is only a small part of the goal. It means sharing time, knowledge, and resources without regard to that goal and rejoicing in all of the different kinds of personal and professional growth that results. In these areas, and in most everything that we do, we often ask ourselves: "What Would Pat and Ed Do?"

Filimoehala, Darby [29] see Cochrane, Ethan

Fillios, Melanie (The University of New England)

[352] *Understanding the Interplay between Domesticate Choice and the Environment: The Case of the Humble Australian Sheep*

Domestication could be described as a drawn out, nuanced dance between humans and animals – a dance that shapes not just the animal actors – but the physical, cultural and economic environment of all the players. Recent examples of this effect abound in areas colonized by Europeans, particularly those with drastically different physical environments from the motherland. This paper explores some thoughts on the intricate relationship between people and sheep that shaped Australia's character. In particular, we examine the way in which the behavioral ecology of sheep have altered the physical landscape of Australia. We highlight the need to explore our oft taken for granted relationship with this key animal as an integral step toward understanding the transformative relationship between people, non-native animal domesticates and the environment in early Colonial areas.

[352] *Chair*

Fillios, Melanie [352] see Roberts, James

Fillipone, Colleen [85] see Moss, Jeremy

Filloy, Laura (Museo Nacional de Antropología), María Olvido Moreno Guzmán (INAH-CNME), José Luis Ruvalcaba Sil (IF-UNAM), Edgar Casanova (IF-UNAM) and Cynthia Arellano

[39] *Microscopic and Spectrometric Techniques Applied to Identify Luxury Materials in a Fifteenth-Century Aztec Shield*

In the collections of the world, only six Aztec feathered objects exist: three shields and a headdress in Europe, and two shields in Mexico. Mexico's National Museum of History conserves one shield, made of mammal hide, feathers, plant fiber cords, and a structure of matting. Various Optical Microscopy (OM) and Scanning Electron Microscopy (SEM) techniques were used to analyze the cuticle and medulla scales of various hairs from the shield, as well as the fibers, and the rod elements providing its structure. This enabled the precise identification of the animal and plant species chosen by the fifteenth-century Mexica artisans. Non-invasive spectroscopic techniques, yielded surprising and unexpected results. Fiber Optics Reflectance Spectroscopy (FORS) analysis identified the use of cochineal (*Dactylopius coccus*) to dye the animal hair that adorned the surface and also delineated the sections of hide trimmed by the Mexica artisans. X-Ray Fluorescence (XRF), in turn, revealed that the shield originally was decorated with gold elements that were removed within the last five hundred years of the history of this object. In this work we discuss the archaeometric results of the material findings and their implications concerning the manufacturing technique and original appearance of this unique pre-Hispanic piece.

Fine, Paul (University of California, Berkeley), Beth Shapiro (University of California, Santa Cruz), Diane Gifford-Gonzalez (University of California, Santa Cruz), Gabriel Sanchez (University of California, Berkeley) and Kent Lightfoot (University of California, Berkeley)

[231] *The Use of Ancient DNA to Investigate Change in Vole Populations during the Past 7,000 years: Implications for Past Land Management Practices*

The integration of genetic research on contemporary and ancient organisms into archaeological studies represents a novel approach in the analysis of long-term landscape management practices by small-scale societies. Our project employs methods in genetics (aDNA, phylogeographic research on contemporary populations) that are underutilized in archaeological studies. We analyzed vole aDNA (*Microtus californicus*) from four archaeological sites that date from the mid-Holocene to the contact period. Through the analysis of vole aDNA, we investigate potential shifts in open coast prairie to closed chaparral and forest environments associated with changes in land use practices that began with European colonization. We expect that the change from indigenous to European land use would have caused large effects on rodent population shifts, with closed country species gaining ascendancy over grassland species. By integrating these archaeological aDNA samples into existing large-scale contemporary sampling of voles across their range, we hope to pinpoint population movement and estimate demographics at a high degree of precision. Data produced through this component of the project will improve our understanding of the long-term responses of voles to changes in climate, human use, and landscape disturbance regimes.

Fine-Dare, Kathleen (Fort Lewis College)

[229] *Discussant*

Finley, Judson (Utah State University) and Erick Robinson (University of Wyoming)

[248] *The Socio-ecological Dynamics of the Uinta Fremont Agricultural Transition*

Northeastern Utah's Uinta Basin marks the northernmost extent of maize agriculture diffused from the American Southwest, with as many as a dozen distinct Fremont pithouse communities forming between AD 300-1350. Recent work in the Cub Creek locality of Dinosaur National Monument demonstrates that Fremont societies maintained relatively high mobility and low-level agricultural production within a context of multi-decadal precipitation variability; a semi-sedentary pithouse village emerged during a 300-year period of reduced precipitation variability from AD 750-1050 that increased maize yields. While a summed probability distribution of ~600 radiocarbon ages demonstrates peak regional population levels coincident with the same 300-year window, site-specific radiocarbon age models have not been created to evaluate the tempo and timing of pithouse village formation. Here we test the hypothesis that fluorescence of Uinta Fremont pithouse village formation occurred during the narrow 300-year window of reduced environmental variability, increased agricultural returns, and overall economic intensification. We suggest this event set the stage for the emergence of aggrandizing leaders, inter-community competition, and conflict noted in the regional rock art record. The Uinta Fremont stand as important example of the socio-ecological pathways through the agricultural transition that are critical for understanding variability in this global process.

Finley, Judson [248] see Schiele, Trista

Finney, Bruce [66] see Commendador, Amy S.

Firpo, Marco [195] see Rellini, Ivano

Fish, Paul (Arizona State Museum)

[76] *Following the Fiber: Agave Tools from Cropping to Crafting*

Hohokam farmers of southern Arizona grew agave for food, fiber, and probable alcoholic beverages in distinctive

and widely preserved fields on dry slopes that were dedicated to this major succulent crop. Specialized tools from Hohokam agricultural and residential contexts allow us to track agave fiber production, processing, and craft manufacture, often in terms of quantified parameters. Thin, flat "knives" of tabular-fracturing stone with sharp, uneven edges and steep-edged core tools dominate field assemblages. Farmers used them for severing tough, fibrous leaves during harvest and preparing the plant bases for communal roasting in field-side pits. Tools recovered from excavated structures in nearby villages emphasize another category of tabular-stone knives with smoothed edges that would not tear leaf fibers when scraping away pulp to expose them. Some smooth-edged knives had regular indentations resembling the teeth of a comb that would have served to untangle and separate the fibers. Modalities in knife blade widths appear to indicate agave species with different leaf sizes. Distributions of smooth-edged knives and appropriate spindle whorl types among structures help identify locations of manufacturing activities. Our interpretations of Hohokam agave tools are enhanced by comparison with ethnographic and archaeological counterparts from the western United States and Mesoamerica.

[36] Discussant

Fish, Paul [194] see Fish, Suzanne

Fish, Suzanne [76] see Fish, Paul

Fish, Suzanne (Univ. of Arizona) and Paul Fish (Univ. of Arizona)

[194] Dimensions of Platform Mound Variability: A Tucson Basin Perspective

Tucson area platform mounds are not architecturally uniform but conform to the broader pattern of rectangular configurations as mound distributions expanded across the Hohokam domain. We believe mound forms incorporate a degree of Hohokam awareness and selectivity with regard to West Mexican modes of the time. We focus on platform mounds in two Tucson central settlements, providing new structural, chronological, and organizational information. Construction and active use of the Marana platform mound terminated prior to Late Classic polychromes. It provides a useful chronological contrast with University Indian Ruin, where construction of a large and a small mound likewise began in the Early Classic period but continued through latest Classic times. Each of the three platform mounds in these two centers are distinctive in some aspects while sharing attributes with other mounds in the Tucson, Phoenix, and Tonto Basins. In considering differences and similarities, no singular interpretational framework appears to account for the full range of architectural variability, nor dictates a singular expression of religious, civic, residential, or bureaucratic activities. Rather, we ask how residents of different Hohokam Classic communities may have differentially conceived and constructed their public architecture to materialize a range of social and communal agendas.

Fish, Theresa (University of Cincinnati)

[9] Investigating the Archaeology of Shifting Community Values at Chrisholm Farmstead

Throughout the 19th century, Amish and Mennonite settlers fleeing persecution settled in the United States. In this study, I focus on families who settled in what is now Butler County, Ohio. For these settlers, there is a robust historic record telling a story of the community shifting from conservative Amish to more liberal Mennonites. I investigate to what extent the archaeological remains recovered from the Augspurger family's farmstead, Chrisholm, align with that story. Are the found possessions indicative of changes in identity in the same way that the documents are? I hypothesize that as religious tendencies of these families shifted, so did their personal everyday possessions, which should be seen in the archaeological record through change over time in artifact type. I expect to find positive correlations between my two data sources, archaeological data previously collected by the Cincinnati Museum Center in a preliminary survey of the Chrisholm site and written historical documents from this community. The results can help to understand if, for this group of people, possessions used for daily practices can be linked with known values of intentional communities, or if there are tensions between these data types that need to be considered.

Fishback, Andrew [390] see Egeland, Charles P.

Fisher, Abigail (Southern Methodist University)

[34] Ground-truthing Historic European Accounts of Great Plains Indian Dog Husbandry with Stable Isotopes

Historic journals and early ethnographic accounts have the potential to inform on Native American cultural norms, including interaction with commensals, such as dogs. However, these accounts are imperfect due to biases couched in ethnocentrism and personal interests. This research seeks to test historic accounts related to dog husbandry, training, and diet, and explore the possibility of tracking these behaviors into the past using stable carbon and nitrogen isotope analyses of canid remains from precontact Middle Missouri and Coalescent Tradition Plains Village sites in North Dakota. The combined nitrogen and carbon isotope data indicate early weaning, altered diets distinct from wild canids based largely on maize, and possibly care for sick and pregnant dogs as described in early European accounts at contact.

[281] Discussant

Fisher, Abigail [127] see Jorgeson, Ian

Fisher, Chelsea (University of Michigan)

[58] Celebrity Chefs and the Long View of Sustainable Agriculture in Yaxunah, Yucatán

The ejido (collective agricultural landholding) of Yaxunah, Yucatán, Mexico is known among archaeologists for its pre-Hispanic archaeological sites. But among a growing contingent of food aficionados, Yaxunah is known for its cooking. Having attracted the interest of celebrity chefs like René Redzepi (Noma, Copenhagen), David Chang (Momofuku, New York), and Rick Bayless (Frontera Grill, Chicago), Yaxunah has emerged as an epicenter of Yucatec Maya cuisine. Yet as the town's culinary reputation expands, the accompanying demand for organic, sustainable, and so-called authentic food is changing the way Yaxuneros relate to their local environment. To understand these changes and what they mean for long-term sustainability, we can look to how Maya farmers have interacted with the Yaxunah landscape over the past 2000 years. I draw on archaeological data from the sites of Tzacual and Yaxuná, as well as historical data from the 16th-20th centuries, to situate Yaxunah's current incarnation as a culinary tourism destination into a larger historical narrative of human-environment interaction. I explore the potential of celebrity chefs and "foodie" culture for advancing the goals of agricultural sustainability among the public, both in Yucatán and on an international level – and consider the role archaeology might play in this process.

[340] Discussant

[58] Chair

Fisher, Christopher T. (Colorado State University)

[58] Climate Change, Sustainability, and the Ancient City of Angamuco, Michoacán, Mexico

The societal impact of climate change in Central Mexico during the Postclassic Period is an important question in Mesoamerican archaeology. Here, using archaeological evidence from the ancient city of Angamuco, including LiDAR analysis, I argue that an engineered environment buffered the environment from reduced rainfall events mitigating the impacts of the Medieval Warming Period. Today the region is facing dramatic changes from global earth system change. This ancient case-study can serve as an important example for modern stakeholders and policy makers.

Fisher, Erich (Arizona State University), Hayley Cawthra (South Africa Council for Geoscience), Irene Esteban (University of the Witwatersrand) and Justin Pargeter (Emory University)

[32] Coastal Occupation and Foraging During the Terminal Pleistocene and Early Holocene at Waterfall Bluff, Eastern Pondoland, South Africa

The P5 Project is an international and interdisciplinary team of researchers studying hunter-gatherer adaptations in persistent coastal contexts in the Eastern Cape Province of South Africa. Since 2015, excavations at the site of Waterfall Bluff (A2SE-1) have revealed stratified and well-preserved remains of coastal hunter-gatherer occupations dating from the end of the Pleistocene and the start of the Holocene. These results have provided new insights into the coastal adaptations of hunter-gatherers during the Last Glacial Maximum and the onset of the Holocene. Our research has shown that Pondoland is an extremely important location for studying coastal occupation and resource use during glacial maxima. Here, we describe recent archaeological, sedimentological, paleoenvironmental, and geochronological research at the site and summarize upcoming research activities.

Fisher, Erich [32] see Pargeter, Justin

Fisher, Lynn (Univ of Illinois Springfield), Susan Harris (Independent Scholar), Corina Knipper (Curt-Engelhorn-Centre Archaeometry gGmbH) and Rainer Schreg (University of Bamberg)

[386] Space and Activity on an Upland Neolithic Landscape

Investigations of Neolithic cultural landscapes in Southern Germany raise questions about relationships between clusters of settlements, low-density artifact scatters, and empty space, and call for analysis of individual settlements in the context of broader cultural landscapes. This poster presents results of test excavations on an upland LBK settlement in the context of a regional survey project focused on the Swabian Alb plateau, a significant source of stone raw material. The regional project combines geomagnetic survey, systematic fieldwalking, and analysis of private collections to explore Neolithic activities on the plateau. The Schlaghau LBK site was investigated as a part of this project, with targeted test excavations of settlement features located through geomagnetic survey of an area with dense surface finds. At 670 meters above sea level, Schlaghau is among the highest-elevation LBK settlements known. Excavated assemblages from Schlaghau are examined in the context of regional patterns in surface artifact density, raw material availability, suitability for agriculture, settlement features, and chronological and functional variation in lithic assemblages. Comparisons of raw material attributes, core technology, and chipped stone tools point to intensive use of diverse locally available cherts at the upland margin of a LBK settlement cluster in the upper Danube valley.

Fisher, Philip (Washington State University)

[112] Topographic Morphometrics: Utilizing 3D Scans of Lithic Projectile Points to Look for Similarities and Differences in Flake Scar Patterning

The conceptual basis of this study is that flintknapping knowledge and technique in small, hunter-gatherer groups is passed from generation to generation through a small number of flintknappers. This should result in similar flake scar patterning on projectile points that can be identified using topographic morphometric analysis. Topographic morphometrics is a new digital methodology that utilizes high-resolution three-dimensional imagery to measure variation in flake scar patterns on both faces of a projectile point. The cross-sectioning of projectile points at given heights (much like contour lines on a topographic map) records the morphology and patterning of flake scars that result from the flintknapping knowledge and technique that goes into their manufacture. If the production of discrete archaeological projectile point types is representative of different flintknapping techniques and knowledge, then this methodology has the potential to identify the information required to associate different point types in the archaeological record that share the same flintknapping methods. Using projectile point assemblages from three Late Paleoindian non-fluted point types from the Great Plains and a single Middle Archaic non-fluted point type from Missouri, this study concludes that topographic morphometrics can identify similarities and difference in the flake scar patterning of these four projectile point types.

Fisher, Samuel H. [187] see Tumelaire, Jacob

Fitch, Shelby [403] see Hirniak, Jayde

Fitton, Tom (University of York, UK) and Stephanie Wynne-Jones (University of York)

[87] Recompiling the Archaeology of East Africa: The Swahili GIS Project, and What Comes Next

The East African coast is famous for the stonetowns of the 'maritime trading' culture of the Swahili, but the scale of this region, fractured history of research, and scattered publication of work have until recently prevented macro-scale investigations of settlement patterns and coastal interactions. Furthermore, disparities between the availability of specialist software and training, and access to archives, pay-walled journals and digital resources has hampered both research and international collaborations. The Swahili GIS Project is a recent collaboration between the University of York (UK) and University Dar es Salaam (Tanzania) to digitise the published record of the Swahili Coast in a new GIS database and digital hub at UDSM, with the hope that this becomes a centre for digital archaeological research and education in East Africa. To this end each phase between initial digitisation and final installation has involved training workshops for the benefit of staff, researchers, and students beyond the limits of the project. In this paper we discuss the aims and achievements of the project, lessons learned in the process, and plans for the future of the hub to support its continued expansion as a digital, archaeological, and educational resource for East Africa.

Fitts, Mary (NC Office of State Archaeology)

[94] Adaptive Approaches to the Thingness of Institutional Datasets: A View from North Carolina

The North Carolina Office of State Archaeology has been building a database of standardized information about archaeological sites since 1977. Like most datasets that bridge the analog to digital transition, the North Carolina site file has experienced several distinctive phases of accretional development. Designed for the purposes of predictive modeling, the database initially included many environmental variables but few artifact-specific fields. With the increasing accessibility of Geographic Information Systems and geospatial data, many of the environmental variables are now at best redundant, and it is the artifact data that are of interest for examining large-scale patterns in landscape use through time. In this paper we examine the thingness of the North Carolina Site File database: how does this mass of information resist our efforts to study it, and what potential does it hold? We then discuss our strategies for overcoming some of the challenges associated with institutionally managed archaeological data and the results of our attempts to learn from the four decades of work condensed in the North Carolina site file through a spatial analysis of Archaic Period stone tools.

[94] Chair

Fitzgerald, Curran (Department of Anthropology, University of North Carolina at Greensboro)

[290] The Zooarchaeology of Households at Las Peñas, a Late Intermediate Period Site in the Upper Torata Valley, Peru

The Late Intermediate Period (LIP; ca. 1000CE-1450CE) site of Las Peñas is located in the sierra of the upper Torata valley in southern Peru. Laboratory analyses of faunal remains recovered during the 2016 excavation of households at Las Peñas provide insight into domestic life during the LIP, as well as environmental and subsistence strategies that may have mitigated risk during a turbulent period of Andean prehistory. Differences in skeletal element frequencies and taxonomic breadth suggest intra-site status differences between individual households, as well as household clusters. Taphonomic data provide information about domestic site formation processes and the depositional patterns of daily life at Las Peñas during the LIP. The presence of both oceanic marine and highland taxa attest to spatially extensive relationships of vertical exchange. Life history analysis of camelid remains suggest the possibility of local camelid herding, and may provide evidence for the seasonality of feasting and dietary practices at Las Peñas. Collectively, the results from these initial analyses challenge certain long-held assumptions about subsistence and domestic life during the Late Intermediate Period in the southern Andes.

Fitzgerald-Bernal, Carlos (Universidad Santa María La Antigua), Alvaro Brizuela-Casimir (Anthropo Studio Inc) and Freddy Rodriguez-Saza (ARGE Colombia)

[330] New Phylogenetic Information from Ancient DNA for Central Panamá

New interpretations of Precolumbian Panamanian archaeological sequences and regions are provided. Results from ancient DNA (aDNA) analyses of remains from the site of Panamá Viejo, Panamá, are compared with a multiple burial found in the vicinity of La Pintada in Coclé, Panamá. The Panamá Viejo materials are classified as haplogroup A2 and include sub-haplogroups A2af and A2ad that link them to other "Chibchan" groups in Central (Greater Coclé) and Western (Greater Chiriquí) Panamá. The La Pintada samples date from the AD 750-950, the Conte Style Late Ceramic Period, and are the first genetic assessments for Greater Coclé whereas the Panamá Viejo samples are somewhat later (AD 1300-1500). This allows us to compare the supposed break in the sequence after AD 1000 that has been proposed to account for the less "Central" character of the ceramics of Panamá Viejo and vicinity with what appears to be a genetic continuity. Finally, I present a discussion of the phylogeny of Buglé, Ngäbe and Guna in the context of the aDNA markers found both in the Panamá Viejo and La Pintada samples.

Fitzhugh, Ben (University of Washington), Catherine F. West (Boston University) and Sven Haakanson (University of Washington)

[31] Anna and the Sea: Reflections on Anna Kerttula's Influence on a Generation of North Pacific Archaeology

Archaeological research in Alaska and the broader North Pacific Rim has revealed a long and complex history of human occupation, dynamic human-environmental interactions, and – above all - underscores the relevance of archaeology to people living across the region today. These developments span the nearly two decades of Dr. Kerttula's tenure at the helm of NSF's Arctic Social Sciences Program and reflect how she has engaged us and our colleagues and students in integrative, interdisciplinary, and community-based scholarship. In this paper, and from our unique perspectives, we seek to show how Dr. Kerttula's tenure in NSF's Office of Polar Programs has stimulated us to new scholarship and scientific discovery, paved the way for a new generation of scholars, and promoted Native Science, socially responsible research, and a comparative and collaborative approach to knowledge. Highlights of this narrative include community archaeology in the Kodiak Archipelago, Bering Sea social science planning, and comparative human ecodynamics across and between the subarctic North Pacific and Atlantic.

Fitzhugh, Ben [33] see West, Catherine F.

Fitzpatrick, Leslie (Mercyhurst University)

[160] The Intersection of Bioarchaeology and Forensic Archaeology Methodologies and Theories: A Practical Application

Although often viewed as disparate fields of practice, bioarchaeology and forensic archaeology share a number of commonalities in their approaches to human remains recovery techniques. To address the theoretical and methodological intersection and divergence of these two fields, a case study involving the recovery of remains from a historic cemetery that were displaced via bioturbation processes will be explored. A detailed examination of these methodological commonalities and differences reveals a need for increased communication and coordinated education efforts amongst practitioners from both fields of study. Possible avenues for collaboration will be offered.

Fitzpatrick, Scott [35] see DiNapoli, Robert J.

Fitzpatrick, Scott (University of Oregon)

[157] Discussant

Fitzpatrick, Tony (University of Wyoming)

[329] Chemical Analyses at Hell Gap: Preliminary Results from Blood Residue and Stable Isotopes

Cross-over immunoelectrophoresis (CIEP) analyses from chipped stone artifacts have been completed to provide additional information on faunal procurement and use at Hell Gap. Results include positive reactions to dog and bovine antisera, with canid and bison bones represented in the faunal assemblage at the site. In addition to blood residue, samples from bison bone have been collected for stable carbon isotope analysis. Bison collagen $\delta^{13}\text{C}$ values are expected to be within the range reported by other researchers of around -19‰ to -16‰. Higher values may be indicative of increased C4 grasses during periods of increased temperature and aridity.

Fitzsimons, Chandler (The College of William & Mary) and Danny Sosa Aguilar (University of California, Berkeley)

[381] "How far is that in Bernie Miles?" Landscape and Identity in Abiquiu, New Mexico

Current community-based, diachronic archaeological research in Abiquiu, New Mexico seeks to undertake specific projects that answer stakeholder questions about the past and bring these narratives about the past into conversations about the present. Balancing the diverse requirements and entailments of this kind of partnership and project necessitates thinking with the way that landscape, identity, and the community-based nature of the project are entangled. It also requires recognition of the fact that findings about the past have lives in the present. In

Abiquiú, landscape is a point of both continuity and flux, the site of community livelihoods, identities, aspirations, and anxieties. Furthermore, the positionality of academic archaeologists—in identity, space, and time—has a direct and integral role to play in the way that research is conceptualized, performed, and articulated. Landscape-based archaeological and ethnographic approaches must not only take an emic perspective but also acknowledge the positionality of the archaeologist. Integrating the messiness inherent in these dynamics provides more nuanced and fuller view of not only the archaeological and historical record but the practice of fieldwork itself.

Fitzsimons, Chandler [401] see Sosa Aguilar, Danny

Flad, Rowan (Harvard University)

[242] *Brine Processing Pits at Zhongba, China*

Excavations at the site of Zhongba in the Three Gorges region of Chongqing China from 1997-2002 recovered salt-production debris spanning many millennia of specialized manufacture at the site. The big picture of this development has been discussed extensively in previous publications, but the forthcoming publication of the full monograph of the excavations allows for more detailed analysis of the artifacts and features from different sub-phases of the evolution of this technology. This paper explores one of the enigmatic features characteristic of the earliest phase of salt production at Zhongba - clay-lined pits, often with stones at their base. The paper considers the degree of standardization of shape and size in these features and speculates about their function within this phase of the Zhongba salt production sequence.

[361] *Chair*

Fladd, Samantha (University of Arizona, Crow Canyon Archaeological Center)

[259] *Gendered Identities and Room Conversions at Homol'ovi*

In the Pueblo Southwest, architectural spaces often take on the identities of the groups who own and use them. Gender, in particular, plays an important role in differentiating structures within a site. In this poster, I examine the strength of gendered identities in room use through an examination of the conversion of spaces at the Homol'ovi Settlement Cluster, a group of Ancestral Hopi villages in northeastern Arizona. Room conversion, or when a space is demonstrably changed from one use to another through architectural alterations, occurred in about 10% of the excavated structures at Homol'ovi. Analyses reveal that changes to use rarely involved a switch in the gender associated with a given space. Further investigation of the few cases that do cross this line reveal intermediary stages that served to neutralize potential conflicts prior to the final conversion from male to female or female to male. Continuity in the gender associated with structures speaks to the importance of this identity as an organizing principle at Homol'ovi and suggests further investigation of differences in the treatment of structures associated with each gender in the Pueblo world is warranted.

Fladeboe, Randee (University of Florida), Kitty Emery (Florida Museum of Natural History, University of Florida), Erin Thornton (Washington State University) and Lori Phillips (Washington State University)

[419] *Evaluating Turkey Wellness and Treatment in the Maya World*

As the primary domesticated animal in prehistoric Mesoamerica, the turkey occupied a prominent and multivalent role in society, as a food source, a feather provider, and a subject of ritual sacrifice. The preponderance of turkey remains across the archaeological record of the Maya region references the myriad ways the turkey was utilized, and the various ways its life could play out. This paper presents a health profile of domesticated turkeys based on skeletal remains gathered from various Maya sites, in order to assess and compare differences in turkey treatment and use. The analysis utilizes data on pathology and morphometrics acquired by means of computer tomography (CT) scanning, supplemented by additional data derived from aDNA and isotopic research, to establish general parameters of age, diet, and management, and evaluate the presence and possible causes of illness or trauma and signs of human intervention. The combination of several lines of evidence is beneficial in reconstructing the life histories of Maya turkeys, which may help clarify the different conditions and depositional contexts in which their remains are encountered.

Fleischer, Rob [153] see Przelomska, Natalia

Fleming, Arlene (World Bank)

[377] *Discussant*

Fleming, David (Andean Past)

[306] *Discussant*

Fleming, Edward (Science Museum of Minnesota)

[414] *Saint Croix Oneota and 14th Century Migration into the Saint Croix Valley of Minnesota and Wisconsin*

The Sheffield site is the only known Late Precontact Oneota village along the Saint Croix River of Minnesota and Wisconsin. Additionally, a small collection of Oneota ceramics from a nearby rock shelter site and isolated Oneota sherds point to a slightly more widespread presence in the valley. Still, the general geographic isolation of the Sheffield site and these other finds raises questions of the timing of the spread of Oneota into the valley and the relationships of the site's occupants to other Oneota complexes in the Upper Midwest. This paper summarizes what is known of Oneota in the Saint Croix Valley and reports on the Science Museum of Minnesota's investigations at the Sheffield site between 2013 and 2018. The Sheffield site has long been tied to Blue Earth Oneota of south-central Minnesota, based on excavations from the 1950s. But, more recent studies of Oneota complexes in the Midwest point to more regional identities, challenging that broad assessment. Geophysical survey and renewed excavation, along with examination of unstudied collections has led to new interpretation of the nature of the site and our understanding of the movement of the Oneota tradition into the Saint Croix Valley during the 14th century AD.

Fleming, Robin

[351] *Discussant*

[351] *Chair*

Flensburg, Gustavo [364] see Martinez, Gustavo

Fletcher, Roland (University of Sydney)

[23] *Seasonal, Dispersed and Ephemeral*

By convention urban settlements have been described as densely inhabited, permanently sedentary, and usually protected by barriers. While the latter might be conceded the other two were, until early in the 21st century, assumed to be definitive and fundamental to the functions of urbanism. The definition was a pillar of stage theory. In reality, none of these categories is either necessary or sufficient and indeed a settlement can wholly lack these features and still unambiguously possess the operational functions associated with other conventionally recognised cities. Places like the moving capitals of the Ethiopian Empire in the 16th and the 19th century and the great imperial Mongol ordu of the 12th century operated seasonally on an unambiguous urban scale as imperial capitals with substantial military and mercantile associations. Recognition of these settlements further dissipates the urban category and removes the conventional material, urban classificatory pillar from Stage Theory – which as yet has not been replaced by a viable theoretical alternative. Without a new frame of reference the meaning of urbanism has diffused so far that its ephemeral shadow engulfs the fundamental topic which we urgently need to understand.

[300] *Discussant*

Flexner, James (University of Sydney)

[421] *Artificial Lines in Saltwater and Sand: Boundaries, Borders, and Beaches in Oceania and Australia*

Islands have long appeared to Western eyes as naturally bounded entities. It has been proposed that they represent 'natural laboratories' for understanding natural and cultural evolution. At the same time, islands are recognised as contact zones, for example historian Greg Dening has outlined the significance of 'the beach' for cross-cultural encounters. Pacific Islanders, for their part, see the ocean not as a boundary but as a medium for voyaging, exchange, and communication, Epeli Hau'ofa's famous 'sea of islands'. In this paper, I explore some of the ways that arbitrary boundaries, usually drawn by Europeans, have shaped Oceanic histories, from early encounters with Pacific Islanders, to the territorialisation of Tasmania, to contemporary Australian border policies. These usually immaterial lines have profound material outcomes that resonate across time and space.

Flint, Richard (Latin American and Iberian Inst., Univ. of NM)

[257] *Not the World as We Know It*

The Coronado expedition to Tierra Nueva of 1539-1542 was an enterprise of reconnaissance and conquest, traveled from home locales to one exotic target locale. But before anyone who eventually made the trip had ever heard the name Cíbola, the future expeditionaries were already certain where and what that place was. They were heirs to a geography of expectation. With the hindsight of more than five hundred years we might imagine that in the years after Columbus' voyages, navigators and geographers quickly corrected his geographical errors, bringing to the world maps of Earth that broadly resembled our modern vision of the planet from space. But that was not the case. At the time of the Coronado expedition, though, European conceptions of the Earth were still Medieval allowing for only three continents: Europe, Africa, and Asia. So since Cíbola was not in Europe or Africa, it had to be in Asia. Indications and presumed facts, learned from various independent sources, suggested this was so. The Tierra Nueva of Cíbola would be home to camels and elephants; great herds of yaks; producers of exquisite silks and luminous porcelains; and wholesalers of exotic spices and dyes. That much, future expeditionaries were sure of.

[367] *Discussant*

Floerke, Kevin (Independent Researcher) and Stephen Berquist (University of Toronto)

[233] The Cusco Valley Road System

The Inca road system in the Cusco Valley has been remarkably understudied and undertheorized despite lying at the heart of the largest empire in the Americas and being the origin point for a road system designated as a World Heritage Site by UNESCO. Far from the simplistic vision of four primary roads emanating to the four corners of Tawantinsuyu, this paper presents the Cusco Valley road system as a complex and multifunctional network that worked to enact and perform elements of Inca state power and perception. The paper also analyzes the form and function of viewing platforms found in close association with road remains near the valley horizon, suggesting a consideration of forced perspective and structured experience relating to the act of entering and exiting the Cusco Valley. Analyzing data collected during an extensive field survey conducted over two years between 2012-2013, this paper considers implications for our understanding of how intervisibility relates to and constructs Inca ideas of authority, relatedness, and identity.

Flood, John (Department of Anthropology, Indiana University Purdue University Indianapolis) and Jeremy Wilson (Department of Anthropology, Indiana University Purdue)

[205] Star Bridge: A Late Mississippian Village in the Central Illinois River Valley

The late pre-Columbian period in the central Illinois River valley (CIRV) is demarcated by the development of large, oftentimes fortified Mississippian towns, farming hamlets, extensive trade networks, and shifting political alliances between AD 1050 and 1400. The fission and fusion of local polities ceased with abrupt abandonment of the CIRV by AD 1450 as part of the larger Vacant Quarter phenomenon. Located on a hypothesized boundary between Mississippian and Oneota zones of socio-political influence during the 14th century, Star Bridge (11BR17) was a Mississippian village previously believed to have been incinerated during an assault. Through the analysis of an avocational surface collection, a 1992 excavation assemblage, and recent geophysical investigations, our research reexamines Star Bridge and also assesses the site's integrity after decades of agricultural modification. Our geophysical data and the material culture from excavations suggest Star Bridge never burned, but was abandoned after one or two generations of occupation shortly before regional abandonment. Meanwhile, our analyses also revealed a dearth of Oneota-derived symbols and material culture, indicating minimal interaction between Star Bridge's inhabitants and their neighbors upstream.

Flores, Carlos [375] see Méndez, Humberto

Flores, Luis [409] see Haas, Randy

Flores, Mary Faith (University of Oklahoma), Brian M. Kemp (University of Oklahoma) and Marc Levine (University of Oklahoma)

[419] Were Turkeys Domesticated by Prehistoric Farmers in Oklahoma?

Turkeys (*Meleagris gallopavo*) were domesticated by Basketmaker peoples in the American Southwest and independently by prehispanic Mesoamerican groups, yet relatively little is known about the nature and origin of ancient Oklahoma turkeys. In this project, we analyze the genetic and stable isotope composition of ancient Oklahoma turkey specimens to determine whether they were domestic or wild. The first stage of the investigation uses mitochondrial DNA sequencing to determine which genetic lineages of the turkeys were once in Oklahoma, comparing archaeological samples to reference subspecies – *M. g. intermedia* (Rio Grande turkey), *M. g. merriami* (Merriam's turkey), and *M. g. silvestris* (Eastern turkey). We expect that domestic populations will show reduced genetic variability relative to wild populations, as farmers selectively breed only a few birds for desired traits. The next step is measuring the ratios of stable carbon (13C/12C) and nitrogen (15N/14N) isotopes, which are indicative of diet. We will use this analysis to reveal if the turkeys were foraging or being fed maize by farmers. Following previous studies, ours should reveal if native groups in Oklahoma exploited turkeys like other ancient North American societies did.

Flores Esquivel, F. C. Atasta [410] see Reese-Taylor, Kathryn

Flores Huacuja, Marlen (Universidad Nacional Autonoma de Mexico-Instituto Nacional de Medicina Genomica), Humberto Garcia-Ortiz (Instituto Nacional de Medicina Genomica), Angelica Martinez-Hernandez (Instituto Nacional de Medicina Genomica), Lorena Orozco-Orozco (Instituto Nacional de Medicina Genomica) and Meradeth Snow (University of Montana)

[253] Identification of Mitochondrial Haplogroups in Native Mexican and Mestizo Populations

Currently in Mexico there are around 68 ethnic groups, grouped into 11 linguistic families, representing 15% of the Mexican population. The mitogenome (mtDNA) has allowed us to make inferences about the history of and relationships between these populations. However, the evaluation of the mitochondrial genetic structure in the Mexican population has been restricted to a small proportion of the underlying ethnic diversity among these populations. The complete sequencing of the mitogenome has generated specific information of the populations and has increased our understanding of the population events that have shaped the population structure of today. The present study focused on the characterization of the variants and haplogroups that represent the Mexican population across the country, taking samples from each state. We identified the four previously reported Native American haplogroups A2 (55%), B2 (23%), C1 (18%), and D1 (4%), and 73 subhaplogroups, most of them not previously reported in the Mexican population. Some haplogroups suggest association with metabolic diseases. It is concluded that within the indigenous populations there is great genetic diversity, providing clues about the history of the

population, including its origin, divergence, and migrations, thus contributing to the knowledge and understanding of the settlement of the Americas.

Flores-Fernandez, Carola [33] see Salazar, Diego

Flores-Fernandez, Carola (Center for Advanced Studies in Arid Zones, Chile)

[240] *Nearshore Paleoceanographic Conditions and Human Adaptation on the Coast of the Atacama Desert (Chile, 25°S) During the Early and Middle Holocene*

The transition period between the Early and Middle Holocene is associated with important changes in climate and human dynamics around the world. The coast of the Atacama Desert (Chile, 25°S) is not an exception. Early Holocene archaeological sites show evidence of a generalized coastal economy that towards the Middle Holocene changed to a consolidated marine subsistence with a marked increase in fish remains and specialized fishing tools. Changes in local nearshore sea surface temperatures (SST) are also recorded from cooler to warmer conditions. SST plays an important role in modulating natural conditions of nearshore habitats. At the same time, subsistence strategies of fishing communities are strongly linked to the natural dynamics of these habitats. Data on past SST, archaeological marine fauna and fishing technology from the coast of the Atacama Desert (Chile, 25°S), will be presented to discuss the relationship between the development of specialized fishing communities and nearshore habitats along the Pacific Coast of South America.

[33] Chair

Flynn, Alexandria (UNLV), Karen Harry (UNLV) and Leilani Lucas (CSN)

[151] *Puebloan Subsistence Patterns on the Shivwits Plateau, North Rim of the Grand Canyon*

Based on fieldwork from the South Rim, Alan Sullivan has argued that ancient Puebloans in the Grand Canyon region practiced little or no corn agriculture. Instead, he proposes they relied on the gathering and processing of wild plants such as pinyon nuts, amaranth, and goosefoot. Here, we evaluate the applicability of this model to the southern portion of the Shivwits Plateau, located on the Grand Canyon's North Rim. Like Sullivan's study area, the latter area is located on the Colorado Plateau in a pinyon-juniper woodland setting. However, unlike along the South Rim, archaeological research on the Shivwits Plateau has yielded ample evidence of maize agriculture. In this paper, we examine why these differences in subsistence patterns might have occurred.

Flynn-Arajdal, Yasmine (Université de Montréal), Katherine Miller Wolf (Indiana University East), Carolyn Freiwald (University of Mississippi) and Christina Halperin (Université de Montréal)

[111] *Isotopic Analysis and Social Identities from Classic Period (ca. 300-900 CE) Burials at the Maya Site of Ucanal, Petén, Guatemala*

Ucanal, is an archeological site situated in the Petén area of the southern Maya Lowlands. Close to the modern-day border between Guatemala and Belize, it is situated on the Mopan River which seems to have facilitated the trade of objects between different neighboring sites. While we know that this site was a nexus for the movement of goods from afar, less is known about the movement of people. With the analysis of strontium and oxygen isotopes sampled from human burials excavated between 2016 and 2018, and the identification of an isotopic baseline in the region, this study explores the social identities and migration of individuals from Classic period (ca. 300-900) Ucanal burials.

Fogle, Kevin (University of South Carolina) and Diane Wallman (University of South Florida)

[295] *Free to Choose? Emancipation, Foodways and Belonging on Witherspoon Island*

After emancipation, formerly enslaved people in the American Southeast encountered significant challenges while transitioning to free life. Despite many obstacles, individuals and communities chose diverse paths towards establishing new lives as free men and women. Here, we examine post-emancipation foodways through historical archaeology on Witherspoon Island, an upland cotton plantation in South Carolina, to explore how newly freed people and families formulated social, economic and ecological networks. After the Civil War, tenant farming developed at Witherspoon Island, with African American residents falling into two groups: former slaves from neighboring plantations; and former Witherspoon slaves who chose to return to their old homes after being forcibly relocated in 1862. By synthesizing the archaeological and ethnohistorical record, we explore the multi-scalar socioecological and economic networks created by the tenant farming community at Witherspoon. The research suggests that through animal husbandry, fishing, hunting, trade and exchange, the freed men and women at Witherspoon maintained connections to the land and community developed under slavery, while also establishing novel social, economic and foodways practices.

Foguth, Adesbah

[118] *A Case Study in the Use of Photogrammetry for Management, Public Outreach, and Research Potential*

Photogrammetry has become increasingly relevant in the field of archaeology as digital software becomes more accessible, with the increased ease in which archaeological sites can be recorded three-dimensionally, and with the ease in which it can be added to regular field work with minimal monetary costs or time. Despite current interest in 3D technology, the practicality of this method is debated and often underutilized. Presented is a case study on the ways in which Cultural Resource Management firms, tribal governments, and federal and state agencies can leverage 3D documentation technologies to record, preserve, and remotely share cultural heritage with the public.

Photogrammetry as a method of management, research, and public outreach is examined through a Mimbres site in Cliff, New Mexico. This site is remote and inaccessible to the public. As such, this case study demonstrates the suitability and applications of 3D technology in remote locations. A presentation of resulting models produced in the photogrammetry program Agisoft Photoscan demonstrate the versatility, importance, and ease with which photogrammetry can be used by archaeologists.

Foin, Jeremy [237] see Ryan, Elisa

Folan, Lynda Fiorey [219] see Ochoa-Winemiller, Virginia

Folan, William J. [219] see Ochoa-Winemiller, Virginia

Follensbee, Billie [76] see Teel, Sarah

Follensbee, Billie (Missouri State University)

[76] *A New Gauge: More on Formative Period Textiles and Technologies*

While considerable research has been conducted on the importance of textiles in Classic and Postclassic Mesoamerica, little study has been done on textiles among Early or Middle Formative period cultures, mainly due to scanty preservation. As noted in previous research, however, depictions of textiles are evident in sculpture, and evidence of textile-making can be found through re-examination of small stone Formative period artifacts. Close analysis and replication studies have revealed that objects previously identified as "bloodletters" most likely served as functional weaving picks and awls; perforated iron ore cubes were likely net weights; certain types of figural celts and clamshell pectorals may have served as net gauges; and the objects known as tailed "spoons" were likely small weaving battens. Further research has revealed that other small stone objects previously deemed as purely ornamental also may have been used as net gauges or battens, and this research is supported by objects found in an exciting new cache of jades recovered at the Middle Formative period Maya site of Paso del Macho, Yucatan. All together, these data reveal much about the making and use of ancient textiles and highlight the considerable importance that textiles held for these Formative Period cultures.

[76] *Chair*

Force, Eric [420] see Howell, Wayne

Ford, Anabel (UCSB) and Cynthia Ellis Topsey (Community Champion Belize)

[58] *Sustainability of the Model Milpa Cycle: Connecting from Master Maya Forest Gardeners to the Ancient Maya Settlement Patterns*

Globally, the Mesoamerican and Maya Milpa is gravely misunderstood as primitive, called shifting cultivation by the sole focus on annual crops combined with the fallacy of fallow, accurately defined as an unseeded plowed field. The attention to the annuals ignores the intentional and patient development of perennials, the utilitarian trees grown for fruit and lumber not to mention the diverse utility of secondary forests. In this paper, we consider local Master Maya Forest Gardeners whose intimate three-dimensional knowledge of the forest as a garden link directly to the foundation of the settlement patterns of ancient Maya civilization and demonstrate a path to food sovereignty today.

[163] *Discussant*

Forde, Jamie

[162] *Untangling Shifting Social Agendas at Colonial Achiutla, Oaxaca, Mexico*

In this paper, I draw on both archaeological and documentary evidence from the site of San Miguel Achiutla, in the Mixtec region of Oaxaca, Mexico, to examine the complex relationships that residents of this indigenous community had with colonial Spanish rule. At certain points, members of the community harassed resident Dominican friars and threatened their lives, while at others helped them translate the Christian doctrine into the Mixtec language. Indigenous families actively acquired certain European goods and participated in the newly imposed economic system, while they simultaneously rejected other European technologies in favor of prehispanic ones. Native officials cooperated with Spanish viceregal and religious authorities on certain matters, while in other instances they assaulted and imprisoned these same officials for interfering in community matters.

Taken together, the evidence suggests that indigenous community members did not see the Spanish colonial project as something monolithic, to be simply accepted or resisted on the whole. Instead, engagement or disengagement with the viceregal system and Spanish authorities shifted from situation to situation, from moment to moment, depending upon a complex suite of political, economic, and spiritual agendas.

Forde, Jamie [197] see Bérubé, Éloi

Forest, Marion (Brigham Young University)**[307] From the Sky and from the Ground: Using Multiple Survey Strategies to Map El Palacio, Northern Michoacán**

In this paper, I present the recent results of the archaeological surveys conducted at El Palacio, an important pre-Tarascan site located in the Zacapu Basin, Northern Michoacán. The settlement was occupied from the Epiclassic through the Colonial era, with an important episode of urbanization occurring ca. 1250 A.D. If the modern agricultural activity has altered significantly several areas at the site, other areas present an excellent state of preservation, coupled with a general erosion and low post-abandonment soil deposit. Prehispanic architecture remains overall, clearly visible. In order to create the first map of the site and understand its spatial structure, I combined various tools and techniques to survey this highly contrasted topography and preservation of archaeological remains at the site. The use of remote-sensing techniques (LiDAR) was coupled with a pedestrian survey to obtain a reconstructed multi-layer map of the site that allows advanced spatial analyses, and consistent excavation sampling strategies. Finally, the observations made shed the light on the progressive destruction of the archaeological zone.

Forest, Marion [349] see Testard, Juliette

Forestier, Hubert [361] see Li, Yinghua

Forst, Jannine (UCSC Anthropology), Richard Burger (Yale University Anthropology), Lucy Salazar (Yale University Anthropology), Brenda J. Bradley (George Washington University) and Lars Fehren-Schmitz (UCSC Anthropology)**[286] The Population Genetics of Machu Picchu**

Since its discovery a century ago, Machu Picchu has become an iconic archaeological site, inspiring researchers and visitors alike. Its history and function, however, are unclear and hypotheses have been advanced ranging from Machu Picchu as a royal estate, sacred shrine, or city. Here we present the preliminary results of our genomic study of human burials found at Machu Picchu. Genome-wide and mitochondrial data were obtained from 34 individuals buried in Machu Picchu and 40 from a variety of contemporaneous archaeological sites in the Sacred Valley and Cuzco. Combined with previously published isotopic and archaeological work, these data allow us to define the diversity of the Machu Picchu burial population and sheds light on the resident population's origin, kinship, and the integration of migrants from different parts of the empire. This in turn provides a broader context for understanding the population genetics of the Inca empire as a whole.

Fort, Matthew [348] see Hedman, Kristin

Forton, Maxwell (Binghamton University)**[180] A Great House in the Petrified Forest: Iconography of a Possible Chacoan Outlier**

The Chaco Phenomenon remains a contentious and ever evolving paradigm of Southwest Archaeology. Key to understanding the nature of Chaco is the extent and purpose of the many outlying great house communities scattered across the northern Southwest. One of the farthest flung of these possible outliers is the Mac-Stod great house of the Petrified Forest National Park expansion lands. This structure is diminutive in scale compared with canyon great houses, but retains multiple features associated with Chacoan architecture. Its relationship to the greater Chaco world is unclear, but such structures did not exist in isolation and must be regarded as part of a larger cultural landscape. One often-overlooked aspect of Chacoan landscapes is the presence of rock art. Surveys around Mac-Stod found large concentrations of petroglyphs depicting a range of motifs, placed in a variety of settings on the landscape. By comparing the depicted elements to panels found throughout the rest of the park and the greater Southwest, this study seeks to understand regional influences represented in the iconography. With this study we gauge whether the Mac Stod site was ingrained within locally rooted systems of interaction or may represent an extension of Chacoan influence into the Petrified Forest.

Forton, Maxwell [421] see Whitson, Erin

Fosha, Michael [88] see Carlson Dietmeier, Jenna

Foster, Alison [20] see Larson, Greger

Foster, Sally [251] see Lees, William

Fournié, Guillaume [20] see Bendrey, Robin

Fournier, Patricia (Escuela Nacional de Antropología e Historia) and Cynthia Otis Charlton (Independent)**[38] Basin Enterprise: The Next Generations**

The Basin of Mexico book elucidated for a broader audience the work and philosophy of William Sanders and his first generation of collaborators and students and has influenced many generations of Mesoamerican scholars since. We draw on the broad studies of long-term work carried out under this legacy in the Teotihuacan Valley, Otumba region and in the Mezquital Valley and look at how modern climate research such as that of Lachniet et al. may help to inform our archaeological and ethnographic understanding of the development of Otomi groups there and their varied response to the challenges of their arid environments.

Fournier, Patricia [198] see Otis Charlton, Cynthia

Fowler, Thomas [20] see Ameen, Carly

Fowler, Tom (University of Nottingham), Carly Ameen (University of Exeter) and Naomi Sykes (University of Exeter)**[153] Exploring Hare Introductions and Management**

Archaeological studies of animal management have traditionally focused on domestic livestock, such as cattle, sheep/goat and horses. Within farming societies, less attention has been paid to wild animals - particularly smaller taxa, such as lagomorphs. Evidence suggests that the brown hare (*Lepus europaeus* Pallas, 1778) is a non-native species in Britain, so this is a major oversight, the introduction of new fauna being closely related to new animal and landscape management practices, as well as changing cultural phenomena.

This paper will explore the introduction of the brown hare to Britain. It will present the results of new osteometric data, which allow us to differentiate between bones of brown hares and Britain's native lagomorph, the mountain hare (*Lepus timidus* Linnaeus, 1758). Combined with new (zoo)archaeological research, they illuminate the chronology of this introduction, and reveal how hares have been managed in the past. Case studies of hares found at key Iron Age settlements, and high-status Roman sites, will show how they transitioned from specially deposited "exotica" to managed wild fauna. Size change and age profiles from prehistory to the medieval period will show how human relationships with hares in Britain are reflected in their interactions with them.

Fowler, Tom [352] see Alves, Joel

Fowler, William (Vanderbilt University) and Payson Sheets (University of Colorado)**[191] Arqueología sin Fronteras: Reflections on the Career of Frederick W. Lange**

For the past five decades, Frederick W. Lange has tirelessly bridged geographical barriers and political boundaries to promote and help to create an archaeology of interaction of Mesoamerica with Central America and northern South America. As one of only two leaders in the field, he brought about fundamental changes in the practice of archaeology in Costa Rica, training the first generation of national archaeologists and professionalizing the discipline. On an interpretive level, he has focused largely on pre-Columbian networks of interaction, trade and exchange, and political integration, and he has encouraged others to address these issues from a wide variety of theoretical perspectives and methodological interests. Deploying his gregarious nature and infectious enthusiasm, Fred has for decades brought together scholars of several generations and of many nationalities in conferences and published volumes that represent milestones in the literature of Central American archaeology and ethnohistory without regard for national borders.

Fowles, Severin (Barnard College, Columbia University)**[84] Discussant**

Fox, Amy [127] see Duke, Hilary

Fox, Jacqueline [194] see Cureton, Travis

Fox, Jacqueline (Logan Simpson), William Bryce (SWARA), Andrea Gregory (Archaeological Consulting Services) and Travis Cureton (Logan Simpson)**[319] Assessing Evidence of Hunting as Subsistence Specialization at an Early Classic Period Hohokam Farmstead**

Logan Simpson recently mitigated multiple prehistoric sites along the Middle Gila River in Arizona for the Natural Resources Conservation Service's Florence Flood Retarding Structure Rehabilitation project. One site, AZ

U:15:836(ASM), is a small Hohokam farmstead within the Grewe-Casa Grande canal system. Recent investigations at the site identified evidence for specialized subsistence behavior focused on hunting. We use the results of flaked-stone, faunal bone, and geographical analyses to argue that the occupants of AZ U:15:836(ASM) focused on hunting. We then contrast those results with evidence from other sites and time periods along the Grewe-Casa Grande canal system.

Frachetti, Michael [101] see Merkle, Ann

Frachetti, Michael (Washington University in St. Louis), Paula Dupuy (Nazarbaev University) and Taylor Hermes (Christian-Albrechts-Universität zu Kiel)

[196] *Diffusion, Migration, and "Culture" in the Eurasian Bronze Age*

The past 25 years has led to a completely new understanding of Eurasian Prehistory. Archaeometric analysis, landscape archaeology, and aDNA have allowed longstanding debates to be silenced, and fundamental principles underpinning key concepts such as social interaction, participation, migration, and more, have been lofted to new heights of enquiry in Eurasian Archaeology. This paper traces some of this progress in regards to the Bronze Age in light of primary data and new discoveries, and sets out new directions for the decades to come.

Frahm, Ellery (Yale University)

[316] *Beyond the Technical Revolution: Epistemological Shifts in Archaeological XRF (or: "The World of XRF Will Never Be the Same Again")*

In 1983, an advertisement for a Tracor X-ray spectrometer proclaimed that "the world of XRF will never be the same again" thanks to an integrated microcomputer that "takes the confusion out of instrumental analysis." It was an exaggeration that this model offered "mistake-proof" XRF, but the point is that this instrument was more automated than those in previous decades. Such an instrument might have been unrecognizable to Edward "Teddy" Hall, who, as the first Director of Oxford's Research Laboratory for Archaeology and the History of Art, pioneered the use of XRF in archaeological science during the 1950s. As Shackley noted in 2011, XRF has become "easy to use" because "tasks that once required the constant attention of a trained analyst can now be handled by skilled students and are fully automated." Critics of pXRF, however, suggest that this technology has become too easy for archaeologists without "hard science" backgrounds to use. One could instead view it as an advantage for our field, specifically how analytical knowledge is generated and who is able to do so. This process began in contexts such as UC-Berkeley, where, for two decades, undergraduate and graduate students in archaeological classes learned to use XRF from Shackley.

Francis, Julie (Anthropology Department, University of Wyoming)

[369] *The Lasting Legacy of Larry Loendorf at Legend Rock*

For over 30 years, Larry Loendorf has spurred rock art research throughout Wyoming and Montana. Nowhere have his contributions been more important and deeply felt than at the Legend Rock State Petroglyphs site (48HO4) in Wyoming. Through encouraging the use of standard archaeological methodology at rock art site, development of standardized classification systems, exploration of new dating techniques, use of new technology for documentation, incorporating the use of ethnography to aid in interpretation, and strong advocacy for conservation and protection, Larry has helped ensure the preservation and long term management for both research and public education of this key rock art site in Wyoming. He has done this through mentorship of other researchers and cajoling and prodding of site managers and state officials. This paper reviews some of his many contributions which have resulted in a lasting legacy for this site.

Franco, Nora [110] see Parish, Ryan

Franco, Nora (CONICET-UBA)

[364] *Luis Borrero's Model of Peopling of Patagonia: Some Examples of his Application in Lithic and Mobility Studies*

Borrero's work has greatly influenced Patagonian archaeology. Through his papers and classes, he strongly influenced new generations of archaeologists. In the case of lithic studies, his model of the peopling of Patagonia was integrated with ethnoarchaeological information within an organization of technology framework in order to generate expectations to be tested with the archaeological record of the Upper Santa Cruz River basin. Results obtained, which took into account the availability and quality of lithic resources, allowed researchers to identify the main changes in the way this space was utilized, which were in turn related to environmental changes. In addition, the application of this model, allowed researchers to identify not only an exploration phase of human peopling of this environment at the beginning of the Holocene, but also a new exploration at ca. 500 BP which, according to genetic results recently obtained, corresponds to the introduction of a new human population. In the case of the Southern Deseado Massif, the application of the same model was useful to understand the role of different resources in the human ranking of habitats, as well as the technological and mobility strategies used during initial human dispersal into this environment.

Franco Cassino, Mariana [404] see Shock, Myrtle

Franklin, Hayward (Maxwell Museum, UNM)

[203] *Ceramics of Sterling Site and Cultural Interaction along the Middle San Juan River, New Mexico*

Ceramic analysis of older collections from the Sterling Site on the San Juan River reveal local and imported types from Cibola-Chaco, Chuska Valley, and northern San Juan districts. Pottery suggests active interaction between populations from three adjacent districts in the period AD 900-1300.

[203] Discussant

Franklin, Janet [368] see Marean, Curtis

Franklin, Jay [403] see Christensen, Lauren

Franklin, Jay, Jean-Philippe Rigaud (Université Bordeaux 1) and Lauren Christensen (University of Arizona)

[403] *A Techno-morphological Analysis of Gravettian Stone Tools from Four Sites, Dordogne, France*

We examine techno-morphological attributes of Gravettian tools from four sites in the Dordogne region of France to argue truncated elements were not recycled broken Gravette points. Truncated elements were the focus of a specific chaîne opératoire to produce tools for composite hunting technology. Our previous work at La Grotte Seize and La Ferrassie support this idea. We found the width of the average truncated element is more than one standard deviation greater than that of the average Gravette point. Cross-section morphology is also different. For this study, we bolster our sample sizes by including tools from Corbiac and Le Flageolet.

Franklin, Samuel [94] see Fitts, Mary

Franklin, Stephanie (National Park Service)

[66] *Home Is Where the Plants Are: Spatial Analysis of Land Use during the Archaic Occupation of Coronado National Memorial*

Coronado National Memorial in the Huachuca Mountains is best known as a possible entry point into the American Southwest by Spanish conquistador Francisco Vázquez de Coronado. While Coronado's historic presence remains a mystery, this small park on the border of Mexico has a rich prehispanic archaeological heritage ranging from Early to Late Archaic period. Forty-three archaic sites recorded on only 178 acres; however, there is no indication of any Ceramic Period occupations. For Archaic hunter-gatherers, availability of natural resources and the maximization of return for output of energy were likely important factors for the selection of short-term camp locations. Using spatial analysis, this paper explores the question "why was this area repeatedly visited during the Archaic?" When making site location decisions hunter-gatherers likely took many factors into account, I explore six: water, soil, site vegetation, elevation, slope, and aspect –on a landscape level to establish possible land use patterns. These data are then compared to the environmental background of the park to determine whether the Archaic land use in Coronado National Memorial was representative of randomly selected campsites in the Huachuca Mountains or areas chosen specifically for the availability of discrete natural resources.

Franks, Rob [188] see Duff, Andrew

Frantz, Laurent [20] see Dimopoulos, Evangelos

Frasier, Brenna [31] see Szabo, Vicki

Frazier, Denise

[120] *Identification of Altars at Angamuco in Michoacán, Mexico Using Geospatial Analysis of LiDAR Data*

The site of Angamuco was discovered during a survey of the Lake Pátzcuaro Basin in 2007. Angamuco is located in western Mexico, within the modern Mexican state of Michoacán. This site has been identified as part of the Purépecha Empire. Angamuco has primarily been examined using spatial data from LiDAR flights. Previous researchers have used the spatial data to understand how the residents of Angamuco organized their buildings and social space, to classify and analyze the function of circular architectural features, and to understand the political and spatial organization of Purépecha cities. I will use the geospatial data to identify, classify, and analyze altars across the entire site of Angamuco. Using ArcGIS, I will locate the altars on the site. After the altars have been identified, they will be differentiated by where they are in relation to the architectural features around them. I expect to find altars that are used for residential, community, and district-wide religious activities. The proposed research project will provide more information about the Purépecha Empire by defining previously unresearched architectural features on the site. It will also provide future scholars with more details on the religious activities in this state-level society.

Freas, Laurel (Defense POW/MIA Accounting Agency) and Kelley Esh (Defense POW/MIA Accounting Agency)

[129] “Inconceivable!”: Innovation and Improvisation on a WWII-Era Aircraft Crash Site in the Swamps of Papua New Guinea

Archaeological recovery of an aircraft crash site differs significantly from traditional archaeology in that the former often takes place in locations unsuitable for human habitation, in geographic and environmental settings beyond the scope of standard excavation strategies, tools, and methods. These circumstances require considerable flexibility, innovation, and resourcefulness on the part of the archaeologist, to adjust methods and develop tools, often “on the fly,” in order to meet the demands of the site. Our recent excavation of a WWII-era aircraft in Papua New Guinea’s sago swamps showcases this adaptability and creativity in approaching a site in a neither wholly terrestrial nor wholly underwater context. Among the archaeological problems confronting the archaeologists were 1) maintaining horizontal and vertical provenience in an excavation area lacking typical sedimentary deposits and with no discernable stratigraphy; 2) conducting systematic excavation to depths of approximately 1.5 m in conditions of extremely limited underwater visibility; 3) ensuring fullest possible recovery of incident-related materials while essentially excavating “blind;” and 4) ensuring team safety while operating in an area contaminated with aircraft fuel, unstable and hazardous aircraft wreckage, and dangerous wildlife. This poster will demonstrate the novel techniques and purpose-built, improvised tools employed to successfully excavate this unusual site.

Frederick, Charles [36] see Koenig, Charles

Frederick, Charles [36] see Lawrence, Ken

Frederick, Charles

[56] *What Lies between the Dots: Exploring the Archaeology of the Broader Basin of Mexico Landscape*

The Basin of Mexico survey established a diachronic palette of settlement locations that has served as the baseline for a wide range of studies. But settlements only comprise the nucleus of the most visible form of past human activities. A wide range of activities, agrarian and otherwise, populate the vast expanses between the settlements identified by the survey. This presentation will examine the challenges of examining broad-scale long-term land use in a variety of landscape settings in order to delineate those places where the greatest insights can be made.

[56] *Chair*

Freeman, Andrea (University of Calgary), Darren Sjogren (University of Calgary), Aaron Williams (University of Calgary) and Dianne Draper (University of Calgary)

[223] *Employing Disruptive Technologies Teaching Archaeology in Field and Classroom Settings*

Recent studies in pedagogy indicate that knowledge acquisition and retention among millennials is facilitated when phased assessment criteria are used. Our multidisciplinary team (Archaeology and Geography) has employed a variety assignments around disruptive technologies (cellular telephones) in order to move students from elementary knowledge milestones (foundational knowledge) to sophisticated milestones (application or integration of knowledge) in a travel study setting. The methods employed allow both rapid delivery and assessment of student work and allow students to build on skills using alternative technologies. These methods, involve non-traditional narrative delivery, preparing students for a global workforce in which alternative forms of knowledge acquisition and delivery are commonplace. We also teach foundation skills in delivering factual information, building on prior knowledge. Similar techniques were employed in three semester offerings of a general education course on archaeology, the last of which utilized word association as a way of measuring the success of knowledge acquisition and transformation. Both efforts have integrated learner-centered approaches with top-down traditional lecture formats. The former approach is guided by group exercises, democratic dialogue, and competition, which helps students learn valuable skills in collaboration, leadership, and communication while at the same time teaching them the value of multi-vocality in archaeological interpretation.

Freeman, Jacob (Utah State University)

[166] *Discussant*

[248] *Chair*

Freeman, Jacob [209] see Nabity, Samantha

Freeman, Jacob [248] see Robinson, Erick

Frei, Karin M. [386] see Walsh, Matthew

Freidel, David (Washington University in St. Louis)

[234] *Discussant*

Freire, Shannon (University of Wisconsin-Milwaukee)**[121] Exploring Targeted Postmortem Investigative Practices at the Milwaukee County Poor Farm Cemetery**

The Milwaukee County Poor Farm Cemetery is an umbrella term used to describe the four cemeteries that were used by Milwaukee County, WI from 1878 through 1974 for the burial of the indigent, unclaimed, institutionalized, and anatomized. The focus of this research is the twice-excavated Cemetery II, in use between 1882 and 1925. Approximately one-quarter of Cemetery II interments did not meet expectations for standard, institutionalized pauper burials and have been associated with the local medical establishment. Outstanding questions related to the practices that resulted in these two general categories of burials, here identified as Categories A and B, persist. This project utilized strontium isotope analysis to address whether specific immigrant groups were targeted for the postmortem investigative practices that frequently resulted in Category B burials. Permanent molars of 30 individuals from each category were sampled for enamel apatite to determine whether there was a relationship between strontium isotope values and type of burial. This research demonstrates that there was no targeted selection of a specific immigrant population for dissection on the part of Milwaukee's early medical colleges and institutions. Rather, the factors that led to an individual being interred in a Category B burial may have been more opportunity-based.

[60] Moderator

Freiwald, Carolyn [111] see Flynn-Arajdal, Yasmine

Freiwald, Carolyn (University of Mississippi)**[199] Crossing Borders: What Isotope Geochemistry Reveals about Migration among the Maya**

Present day conversations about migration focus on borders and limiting population movement with the presence of police, harsh regulations, and walls. This paper examines the concept of migration in the Maya region and what the past decade of isotope geochemistry research tells us about population movement and ancient boundaries. Was mobility bounded by physical places, such as rivers and mountains, or did it relate to political borders between regions with distinct ceramic and architectural styles? On a more basic level, how do patterns of population movement reveal aspects of societal organization and how it changed over space and time? This paper presents isotopic case studies from the Formative through Colonial periods to characterize mobility in Mesoamerica. I then focus on the Maya region, specifically the central lowlands, to interpret where people moved and what that tells us about boundaries, both social and political.

[284] Discussant**[199] Chair****French, Kirk (Pennsylvania State University), Elijah Hermitt (Pennsylvania State University) and Neal Hutcheson (North Carolina State University)****[373] The Land and Water Revisited Project**

In 1961, archaeologist William T. Sanders traveled to México's Teotihuacan Valley to film a documentary based on his 1957 Harvard dissertation. The film, Land and Water: An Ecological Study of the Teotihuacan Valley of México, provides an invaluable snapshot of agricultural and land-use practices in the area just prior to the urban explosion of México City. Sanders documented peasant farmers using masonry dams, canals, and splash irrigation; women and children washing clothes at a nearby spring; and the many uses of the native maguey plant. Cultural conservation was not the intention of the original film, but it is a sobering reminder of how quickly traditional landscapes and cultural adaptations vanish when sustainability is ignored. The Land and Water Revisited Project consists of 1) a look at what the original film captured; 2) a comparison of the old footage with the valley today; and 3) how researchers are currently studying the effects of urbanism in the Teotihuacan Valley. In the end, the film will be a modern and tangible view of the effects of unchecked and unregulated growth. Here we present the results of our 2018/2019 field seasons.

Freund, Kyle (Indian River State College)**[316] Obsidian Characterization as a Means to an End: A Survey of the Scholarship of Professor Steven Shackley**

Obsidian sourcing is a well-established facet of archaeological practice and has the capacity to address a wide range of relevant archaeological questions. For decades, Professor Steven Shackley has been on the forefront of methodological and theoretical developments in obsidian characterization studies, and his contribution to our understanding of past human societies is immeasurable. This presentation focuses on the specific archaeological questions and issues that Professor Shackley has addressed over his long career, in turn highlighting how his scholarship has influenced the way archaeologists contextualize obsidian provenance data and how his work has impacted an entire generation of researchers around the world.

Friberg, Christina (University of California, Santa Barbara)**[205] Tradition in Transition: New Data and New Insights on Mississippianization from the Audrey-North Site**

The Mississippianization of the Midwest unfolded during the late 11th and early 12th centuries as interactions with Cahokia influenced aspects of local community organization, ceremonialism, material culture, and access to exotic

raw materials. For local peoples in the northern hinterland regions, these encounters and affiliations also facilitated interactions between Mississippian groups beyond Cahokia. New data from the early Mississippian (AD 1100–1150) Audrey-North site (11GE20) in the Lower Illinois River Valley illustrate the localization of Cahokian practices in a village uniquely positioned within a vast network of long-distance exchange and sociopolitical interaction. An interregional comparative analysis using published ceramic and lithic datasets from the Apple River and Central Illinois River valleys adds to the growing narrative of local innovation and interregional interaction in the Mississippian Midwest. This paper further seeks to demonstrate the complexity of cross-cultural encounters in the forging of new traditions.

Friberg, Christina [205] see Livingood, Patrick

Friedel, Rebecca (The University of Texas at San Antonio), Bernadette Cap (The University of Texas at San Antonio) and Jason Yaeger (The University of Texas at San Antonio)

[370] *Paleoethnobotanical Remains from an Early Classic Maya Tomb at Buenavista del Cayo, Belize*

In the tropics, paleoethnobotanists often face challenging preservation environments, making most of the macrobotanical specimens that we analyze those that are preserved through processes of carbonization. This preservation issue is often framed as limiting the questions we can ask and the interpretations we can make about ancient Maya relationships with the environment. Occasionally, unusual preservation contexts reveal new and exciting possibilities for understanding ancient human-plant relationships. In 2018, the excavation of an Early Classic Maya tomb at Buenavista del Cayo, Belize, recovered a variety of uniquely preserved, uncarbonized macrobotanical remains, including hundreds of maize kernels that were likely originally part of whole ears buried with the individual. The paleoethnobotanical analysis of the remarkably preserved contents of this tomb allow us to contribute new ideas about the use of plant materials in Maya royal burials. Additionally, the plant remains found with this individual have the potential to shed new light on ancient landraces as well as trade and migration throughout Mesoamerica.

Friedrich, Volney [410] see Quinn, Rhonda

Fries, Eric [151] see Willis, William

Fries, Eric (UNLV)

[410] *Distributed Site Cores and Low-Density Urban Settlement at the Site of Zibal, Belize*

The sites of Zibal and Kich'pan Uitz in western Belize, recorded as minor Maya centers by the Aguacate Regional Archaeology Project, have recently been investigated via remote sensing, survey and test excavation. As a result, we see that these two clusters of monumental structures, along with their secondary nodes, are located in a continuous fabric of settlement that covers the surrounding area. The two monumental groups, separated by 1.5 km, can thus be understood as distributed central locations of the same site. This low-density urban settlement pattern is consistent with recent findings across the southern Maya lowlands. Testing at the Zibal site indicates that the monumental core was established in the Preclassic and went through multiple configurations and phases of construction. The establishment of low-density urbanism settlement patterns in close proximity to minor site cores located in remote areas may be taken as an indicator that low-density urbanism is an early and pervasive feature of Maya settlement, rather than a later development.

Friese, Crystina (University of New Hampshire), Jaime Ullinger (Quinnipiac University), Julia Giblin (Quinnipiac University) and László Pája (University of Szeged)

[126] *Burning Up and Breaking Up: Understanding Heat-Induced Bone Modifications in a Hungarian Bronze Age Cemetery*

In an attempt to better understand how social inequality manifests itself in Middle Bronze Age Hungary, the Bronze Age Körös Off-Tell Archaeology (BAKOTA) project has been researching a cemetery in the Körös region of Eastern Hungary. The individuals in the cemetery appear to have been buried in a consistent manner, mostly cremated and placed in urns regardless of age. Prior research shows that cremated remains have various fracture patterns that may relate to how the body was prepared pre-burning. This poster focuses on comparing the presence of certain types of heat-induced bone modifications (i.e., longitudinal, curvilinear, and transverse fractures, patina, and warping) between adult and subadult burials to determine whether they were cremated using different practices. Based on a sample size of 14 human burials, results suggest that adults and subadults were not burned differently, as they exhibited no statistically significant differences in fracture patterns. This may suggest that bodies would have been positioned in a similar manner on a funeral pyre regardless of age, causing similar fracture presence when burned. These tentative conclusions contribute to the discussion surrounding the usefulness of the analysis of heat-induced bone modifications in determining social practices.

Frink, Liam (University of Nevada Las Vegas)

[13] *Moderator*

Fritz, Gayle [302] see Hayashi Tang, Mana

Fritz, Noreen [380] see Porter, Douglas

Froese, Tom (Universidad Nacional Autónoma de México)

[406] *From Collective Government to Communal Inebriation in Ancient Teotihuacan, Central Mexico*

A simulation model of Teotihuacan's hypothetical collective government has shown that a highly distributed network of leaders could have been effective at ensuring social coordination in the city by means of consensus formation. The model makes a strong prediction: it indicates that this collective mode of government would have been most effective in combination with large-scale communal rituals, especially rituals involving strong alterations of normal mental functioning. These communal rituals could have allowed the sociopolitical network as a whole to escape from the suboptimal behavioral configurations that otherwise tend to result from the interactions between self-interested individuals. In line with this prediction, recently there has been a growing recognition of the existence of communal rituals involving inebriation, even to the point of vomiting and loss of motor control. The current consensus holds that these rituals are based on a mildly alcoholic beverage made from maguey, today known as pulque. However, in accordance with the model's strong prediction and based on iconographic and ethnographic evidence, I propose that in some cases the beverage was made more potent with the addition of powerful mind-altering substances, in particular delirium-inducing plants from the genus *Datura*, today known as toloache.

Fruhlinger, Jake (Idaho National Guard)

[282] *Moderator*

Frye, Joshua, Jonathan Reeves (George Washington University), Matthew Douglass (University of Nebraska Lincoln) and David Braun (George Washington University)

[390] *Post-depositional Processes and Their Impact of Inferences of Behavior at FxJj 34 (Koobi Fora Formation, Northern Kenya)*

It is often argued that surface assemblages provide insight into human behaviors at a regional scale. Measures of artifact use life and reduction intensity at this broad scale are often used to characterize the structure of stone tool use across space. However, once re-exposed, artifacts are subject to a variety of processes that potentially bias the behavioural signatures evident in lithic assemblages. Size sorting is a particularly common effect. Here, we study both the surface and excavated assemblages at the site FxJj34 (Okote Member, Koobi Fora Formation, northern Kenya) to characterize the impact of modern erosional process on lithic assemblages as well as the potential biases they introduce into behavioral patterns evinced by stone tool reduction. In addition to measures of stone tool reduction, we also apply resampling methods. This documents distinctions between surface and excavated assemblage and also investigates the statistical significance between these assemblages. Our results indicate that despite the logical chain linking artifact winnowing as a source of bias in measures of stone artifact reduction, inferences of behavior based on reduction proxies in surface and in situ artifact assemblages are identical at FxJj34.

Fryer, John [252] see Olsen, Nancy

Fuentes, Agustin [247] see Kissel, Marc

Fuld, Kristen [99] see Hulse, Eva

Fulgham, Samantha, Colin Grier (Washington State University) and Audrey Rainey (Washington State University)

[398] *What's It Alder About? Paleobotanical and Zooarchaeological Analysis of Feasting Remains from the DgRv-006 Village, Galiano Island, SW British Columbia*

The study of feasting activity in precontact societies can illuminate hierarchical social structures that existed within a community, because of the labor and wealth investments required to produce a successful feast. It can also highlight the integrative aspects of feasts, since they often involved widespread participation. We present results of paleobotanical and zooarchaeological analysis of bulk soil samples from a Late Period plankhouse at DgRv-006. A large, centrally located hearth feature in the plankhouse has yielded fuel wood and faunal remains from a single feasting event that are significantly different from remains collected from contexts representing daily consumption and wood fuel use. Fuel woods utilized in the feasting feature are unique to the feature, and not represented anywhere else in the house. Additionally, a massive volume of sea urchin from the feature suggests that this feasting event was produced for more than just the occupants of the house. Based on the differences in feasting consumption and daily subsistence exhibited at this site, we suggest that the feasting remains represent both a prestige and solidarity enhancing feasting event, but which also needs to be contextualized in the broader context of Coast Salish social practices.

Fullen, Brittany (Binghamton University)**[250] *The End Is in Sight: Preliminary Findings for Terminal Middle Horizon Occupation at Huari***

Continuing excavations at the domestic sector of Huari in 2018 (re)opened several structures whose occupation spanned the end of the Middle Horizon. The collapse of the Wari empire is not well understood, and the perspective these quotidian examples provide will help us continue to untangle what happened to the Wari. This presentation explores the similarities and differences found not only with the Patipampa sector occupation, but with other sectors of Huari, and more broadly with other sites within the Wari realm at the beginnings of a pivotal moment of change. The preliminary analysis will focus on room closure/abandonment, mortuary remains, depositional practices, and ceramic chronology to elucidate indicators of Wari decline, and its effects upon inhabitants both within the capital city, as well as those throughout the heartland and hinterland.

[250] Chair**Fuller, Dorian****[352] *Pathways to Plant Domestication: Categories of Cultivation Practice and Convergent Evolution***

Taking inspiration from Zeder's notion of pathways to animal domestication (commensal, prey, directed), this presentation will outline equivalent pathways of plant domestication types, and suggest a range of species that can be grouped by these pathways. These pathways are united by issues of habit (annual, perennial), ecological constraints (early successional or late successional) and the nature of selection during the domestication process, which can be illustrated by a range of archaeological examples from both the Old World and the New World. These pathways include the well-documented grain annual pathway shared by primary cereals and pulses, but also secondary vegetal pathway, of later weedy cereals, a camp-following ruderal pathway, of numerous vegetables and some of the earliest domesticates; a tuber pathway of short cycle perennials, woody perennial pathway, shared across most tree fruits and vines, and ecosystem engineering pathway that applies to management of long-lived trees within quasi-natural woodlands.

[302] Discussant

Fuller, Dorian [404] see Garay-Vazquez, Jose

Fuller, Reba [110] see Hull, Bryna

Fulton, Deirdre [310] see Zori, Davide

Funk, Caroline (SUNY University at Buffalo)**[269] *Gardens in the Aleutian Islands: Landscape Management by Unangan/Unangas Ancestors***

Prehistoric large village midden sites in the Aleutian Islands provide soil chemistry and drainage environments optimal for the growth of plants that feature prominently in Unangan/Unangas traditional subsistence. Previous interpretations view this as fortuitous and non-deliberate. We argue that evidence suggests instead that plants useful in subsistence and as raw materials are present in elevated proportions on and in the vicinity of prehistoric village middens because Unangan/Unangas ancestors deliberately managed them. The village locations are in effect long-term gardens and managed landscapes. We explore the hypothesis that the gardens were managed specifically by women.

[13] Discussant**Fuqua, Julie (Director of Conservation The Walters Art Museum) and Glenn Gates (The Walters Art Museum)****[39] *Influence and Exchange: A Technical Study of Colonial Period Ivories from the Philippines***

This paper focuses on the early phases of a technical study of the polychrome and gilding on colonial period ivory sculptures produced in the Philippines and transported into Mexico via an annual trade network known as the Manila Galleons. These ships moved goods to and from colonial ports in Asia, to the Americas, and on to the port of Seville, Spain. It exploited the riches, gold and silver, of the Americas and brought in silks, porcelains from Asia, and a new type of sculpture produced under catholic missionary rule. The Catholic sculptures—usually depictions of Christ, the holy family, and archangels like St. Michael—were all carved in ivory and decorated with gilding and paint. Technical studies of these ivories are rare and questions about where the ivories were decorated have been posed. Were they carved in the Philippines and then painted in Mexico as some scholars have proposed? Minimally and non-invasive techniques of analysis including, XRF, FORS, FITR and Pyrolysis-Gas Chromatography Mass Spectrometry were used to characterize materials. This paper will summarize early results of a coordinated effort to study the materials and techniques of the polychrome and gilding materials in order to help identify and support places of production

Furlong, Julia [326] see Galm, Jerry

Furlong, Julia (Archaeological and Historical Services, EWU)

- [328] *Geochemical Analysis of Crystalline Volcanic Rock Artifacts from Three Olcott Sites along the Elwha River, Clallam County, Washington*

Raw material sourcing of crystalline volcanic rock (CVR) artifacts through geochemical analysis has a decades long history in Olympic Peninsula archaeological research and is an important aspect of site interpretation. Recent archaeological investigations at three Olcott sites by Archaeological and Historical Services, EWU as a part of Washington Department of Transportation's US 101 Elwha River Bridge Replacement Project yielded a relatively abundant lithic assemblage composed almost entirely of CVR raw material. Whole rock geochemistry and trace element analysis of CVR artifacts from the three sites along the Elwha River (sites 45CA727, 45CA774, and 45CA775) were analyzed using non-destructive portable X-Ray Fluorescence Spectrometry. The resulting geochemical data provides critical lines of evidence to assess potential raw material sources and CVR procurement strategies used at the three sites. The site-scale results are then placed into broader regional patterns of CVR toolstone procurement strategies.

Fye, Margaret (Pima Community College) and Wolfgang Whitney-Hul (Pima Community College)

- [125] *Twenty-nine Wash Excavations and Collaboration AZ BB: 5:127 (ASM)*

The Pima Community College archaeology program has conducted field work at AZ BB: 5:127 (ASM), the Twenty-nine Wash site, intermittently since 1997. The Twenty-nine Wash site is a large Hohokam habitation site that lies in the western foothills of the Santa Catalina Mountains north of Tucson, Arizona. Due to its proximity to nearby communities and encroachment from washes, the site was in danger from both erosion and looting. This prompted the Pima Archaeology Centre to obtain permissions to conduct fieldwork at the site. Thirty-two surface and subsurface features have been identified at Twenty-nine Wash including middens, pits and pithouses while many more features remain buried and not yet discovered. Twenty-three of the identified features have been fully or partially excavated and students and faculty have recovered, cleaned, sorted, and stored over 100,000 artifacts, some of which have been further analyzed by students. This productive collaboration between Pima Community College and the Arizona State Land Department has led to extensive field training and research opportunities for students and to the preservation of information that was being lost to erosion and vandalism. This poster discusses the history of archaeological investigations at the site, and summarizes the research done to date.

Gabe, Caroline (University of New Mexico)

- [208] *San Gabriel del Yunque: As Seen through a Museum Assemblage*

In 1598, the first Spanish colonists in the southwestern United States established a capitol at Yunque Owingeh, later known as San Gabriel del Yunque, New Mexico. They concentrated in a series of converted Puebloan roomblocks until the capitol was moved to Santa Fe in 1610. For over 300 years, the location of this first capitol was the stuff of legends and oral traditions. In 1944, Marjorie Tichy Lambert conducted salvage archaeological tests at one possible location, which was further examined in the late 1950s and early 1960s by Florence Hawley Ellis and University of New Mexico field schools. Based on these excavations, Ellis argued that the Spanish Area of Yunque was modified into 13 apartments, a kitchen, a blacksmith area, and a possible convent. This poster presents a reanalysis of the artifacts excavated by Ellis from the Spanish Area and evaluates the assemblage composition and spatial distribution to reexamine Ellis's initial interpretations. Initial results show variations in the distribution of artifacts within the reused roomblocks, but that specific use areas within the structure are not always supported. Instead, new interpretations are proposed.

Gadsby, David

- [385] *Negotiating Complexity in the Management of Sensitive Digital Data*

Appropriate stewardship of sensitive archeological data necessarily involves overlapping and intertwined authorities, systems, and institutions. The authorities, in turn have different limits and requirements, while various entities have divergent purposes, needs, and protocols. Archeologists, librarians, data managers, planners, and resource managers who work with sensitive data require a thorough understanding of the nature of both the physical and digital resources and the contexts in which they are embedded. Healthy institutional relationships and the effective communication that comes with those relationships are as critical to ensuring appropriate access to data as they are to protecting them from unwanted disclosure. Legacy data present a particular challenge, especially when methods for their appropriate disposition are ambiguous. I describe some of the complexities of managing these data, and examine practices and procedures for the stewardship of older data and examine some consequences of inappropriate disclosure.

Gagnon, Celeste [55] see Sutter, Richard

Gaillard, Meg [88] see Smith, Karen

Galaty, Michael (University of Michigan), Haxhi Mehmetaj (Kosova Institute of Archaeology), Sylvia Deska (University of Michigan) and Erina Bacic (University of Michigan)

- [42] *Regional Archaeology in the Peja and Istog Districts of Kosova (RAPID-Kosova): Results of the 2018 Field Season*

This paper reports the results of an initial season of regional archaeological survey in western Kosova, in the districts of Peja and Istog. RAPID-Kosova is the first intensive, systematic survey ever conducted in Kosova, and aims to document settlement and settlement change through time. During June of 2018, we ran three survey teams in three zones covering 15.4 square kilometers in 1510 tracts. Fifteen new sites were identified and 3521 pieces of pottery were collected and analyzed, indicating significant occupations in the region in all periods of the past. Perhaps the most important discovery was a large Bronze Age settlement, called Pepaj, located on the foot slopes below the Gradina hill fort near the village of Lubozhdë. Such "flat" Bronze Age sites are rare in the Balkans, e.g. in Albania. Most late prehistoric sites are located on eroded hill tops with little remaining stratigraphy. Pepaj thus presents the opportunity to investigate an intact late prehistoric village of the type that must certainly have been in contact with villages in northern Albania. Ultimately, we hope to gauge the importance of such contacts to the formation of complex societies in Kosova, including as a result of trade with Greece and, later, Rome.

[183] *Discussant*

Galke, Laura (George Washington Foundation)

[145] *Evolving Narratives of Mother Washington*

Ideal gender roles feature prominently in biographies written about George Washington. Once his father passed away, a young Washington was raised by his single mother, Mary Ball Washington. The narratives of Washington's life, and his mother's influence upon him, are dynamic, reflecting prevailing gender ideologies of the times in which they were written. Influenced by the cult of domesticity, Mother Washington was venerated in early nineteenth century. Transformative social movements, which questioned traditional gender roles or that promoted civil rights for women, often inspired critical appraisals of her. Despite negative portrayals, the modern communities that surround Mary Washington's historical homes celebrate her with museums, street names, a monument, and eponymous institutions. One of these homes, Washington's boyhood home in Stafford County, Virginia, was managed by Mary for over three decades. Archaeological investigations there underscore the dissonance between the material culture of his youth and popular stories about his upbringing. Social media has intensified social movements relating to women, bringing renewed interest to Mary's depiction in Washington biographies.

Gallaga, Emiliano (EAHNM)

[336] *The Presidio San Carlos Archaeological Project: Preliminary Results*

The Camino Real was a cultural, political, and economical link between the Viceroy of Mexico and the northern communities of the New Spain, mostly mining centers. But these new territories were not only harsh geographically but dangerous by the constant raids by the local communities of American Indians, and pressure from foreign nations like England, France and Russia. Because of that the Spanish empire establishes a military line of presidios from California to Florida not only to protect the empire frontier. These structures were simple constructions made of local material. Several of these presidios were short lived; others become major cities today, such as Chihuahua. The conformation of the frontier in colonial times is well known historically, but poorly known archaeologically specially in Mexico. The Presidio San Carlos is located near the community of Manuel Benavidez, Chihuahua, near the Texan border. Its relative isolation contribute to its well preservation and present a good archaeological opportunity to explore and know more about the "presidiales" life and its relation with the landscape and local communities. Here we will present the result from the recent archaeological survey project conducted at the Presidio San Carlos this summer of 2018.

Gallardo, Francisco [55] see Pinder, Danielle

Gallareta Cervera, Tomás (Kenyon College), Anna Novotny (Texas Tech University) and Brett A. Houk (Texas Tech University)

[63] *The Role of Burials in Place Making at Chan Chich, a Royal Court in Northwestern Belize*

Research on ancient Maya cities is generally focused on large paramount sites that had written records of the rulers' activities. However, these large cities are the exception, rather than the norm, since the majority of the urban sites consist of smaller settlements. Research at the archaeological site of Chan Chich recovered evidence of the development of a non-paramount ancient city. Excavations at the Upper Plaza, the site's main royal precinct, suggest large construction projects, including a large northern platform, nicknamed "Blanca", two smaller platforms at the northeast and northwest, likely topped by perishable super-structures whose use spanned the Late Preclassic and Early Classic periods. In addition to the expansion of monumental construction, the Upper Plaza was a focus of mortuary ritual for the Chan Chich elite during this time. Excavations in 1997 recovered a Terminal Preclassic royal tomb in the center of the plaza and our 2016-2018 excavations uncovered six interments containing eight individuals intrusive into Late Preclassic architecture, including another possible royal internment. In this paper, we examine the local urban tradition at the site of Chan Chich and how the construction of monumental architecture in the Upper Plaza articulates with the mortuary record.

Gallareta Negrón, Tomás [219] see Parker, Evan

Galle, Jillian [295] see Hollenbach, Kandace

Galle, Jillian [362] see Bollwerk, Elizabeth

Gallegos Gomora, Miriam Judith (Centro INAH Tabasco) and Ricardo Armijo Torres (Centro INAH Tabasco)**[349] Contextos y Narraciones del Clásico: Las Figurillas de Tabasco, México**

En territorio tabasqueño se han identificado tres tradiciones de figurillas desarrolladas a lo largo del período prehispánico. A partir de las colecciones de sitios excavados en las llanuras aluviales tales como Jonuta o Comalcalco y sus alrededores, la evidencia sugiere que durante el Clásico Tardío existieron dos estilos de figuras antropomorfas, uno de los cuales se asocia principalmente con los depósitos funerarios mientras que el otro se encuentra en diferentes contextos, lo que sugiere que existió un uso diferenciado de estas piezas. Además, de manera individual las representaciones plasmadas en las figuras miniaturizadas transmiten conceptos y emociones, mientras que otras descubiertas en grupo narran una historia, ideas que se abordarán en esta presentación.

Gallenstein, Gwenn (National Park Service)**[21] Remorseful Returns: What to Do with Returned Surface-Collected Items from National Park Service Units**

Millions of surface-collected artifacts (and natural features for that matter) have been and are being stolen from public lands by visitors. Some are returned, often with letters indicating guilt and remorse. Most of these items have little to no provenience information attached. This paper demonstrates the broad range of items being stolen from National Park Service units across the country, with a focus on the Southwest; discusses what is returned and the circumstances under which items are returned; gives a brief synopsis of the remorseful letters and the reasons for returns; and explains under what conditions returned items are accessioned and catalogued into the Sunset Crater Volcano, Walnut Canyon, and Wupatki collections in particular.

[21] Chair

Gallenstein, Gwenn [21] see Leap, Lisa

Gallivan, Martin (William & Mary)**[239] Algonquian Landscapes and Multispecies Archaeology in the Chesapeake**

Archaeological and ethnohistorical studies have begun to trace the ritualized practices of Native groups as they returned to places with deep histories throughout the Southeast during the colonial era. In the seventeenth-century Chesapeake, Algonquian groups traveled across contested territories to bury ancestors, animals, and objects in places with long, precolonial occupations but no resident colonial-era population. This paper compares these colonial-era practices with the precolonial history of a site located near the James River that also lacked a yearlong residential population. Periodic visitation at the Hatch site produced a 400-year long record of human interments, dog burials, and feasting debris. Borrowing ideas from multispecies ethnography, this comparison considers the complicated and shifting entanglements between human lives and dogs, highlighting intersections between landscape, political economy, and cultural representations in the Algonquian Chesapeake.

Galm, Jerry, Stan Gough (Eastern Washington University) and Julia Furlong (Eastern Washington University)**[326] Site Organization and Abandonment Processes: A Late Paleoindian Case Study**

Abandonment processes at the Sentinel Gap site highlight a high degree of formalism, ritual behavior, and sophistication in this Late Paleoindian site record. The structured distribution of recovered remains from the site includes an abandonment overlay of "killed" artifacts, the redistribution of broken objects across the occupation surface, and the burning of two probable domestic structures. Although the combined elements of this abandonment signature imply a planned departure, the available evidence likewise indicates no clear intent of returning to this locale. From a regional perspective, site organization and abandonment records support the presence of different cultural groups in the Columbia Plateau during the Late Paleoindian era.

Galvan, Melissa [100] see Seligson, Ken

Gambim Junior, Avelino**[185] Materiality of Amerindian Human Bodies in the Mouth of the Amazon River: Life and Death at the Curiaú Mirim I Site, Around the Second Millennium AD**

These paper aims to show an osteobiographical approach to read human bodies like a special kind of material culture which was inspired by the concepts of Amerindian ideas of construction of bodies and persons in the interpretation of the data analyzed. The Curiaú Mirim site is formed by funerary burials, ceremonial structures, which was dated by the 10th to 16th centuries AD associated to Mazagão, Marajoara, Koriabo and Caviana cultural complexes. In order to understand and characterize the funerary practices in that site, this study privileged human skeletal analysis to know how the persons was buried there and how funerary treatment was dispensed to them by the living mourners in the Ancient Amazon. It was possible to observe different kind of gestures in funerary/ceremonial depositions, as well as some osteobiographical inferences in the ways of life and burial practices interpreted in the light of ethnographical and ethnohistorical data concerning some Amerindian world views that allowed possible explanations of the cultural rules and cultural choices. There were seems to have been a continuity in the way of use of specific places that was spatially marked to bury the dead that indicates ancestor

worship.

Gamble, Lynn (University of California, Santa Barbara)**[308] Secret Societies, Power, and Ritual among Hunter-Gatherers in California**

Secret societies are groups of individuals that possess esoteric knowledge that is not available to non-members, and therefore are by definition exclusive. Many such societies are associated with administering ritual ceremonies. The Chumash Indians of southern California had a secret society known as the 'antap, a political and religious organization whose primary purpose was to access and manage supernatural powers necessary for the maintenance of balance in the universe. High-ranked individuals were members of the 'antap society, and included chiefs, their family members, and religious specialists who performed dances and rituals at public ceremonies. Members were baptized into the 'antap as children, with relatively large quantities of shell-bead money paid by their parents as a type of membership fee. All chiefs and their immediate family members were required to be initiated into this prestigious group. Members learned sacred dances and songs, and communicated with one another through an esoteric language. Ethnographic data indicate that only members of the 'antap society possessed and used large deer-tibia whistles, which appear in the archaeological record about a thousand years ago. Certain members of the 'antap society used coercion and intimidation to maintain their power and concentrate wealth.

Gamboa, Eduardo Pío (Arqlo. Eduardo Pío Gamboa Carrera)**[173] Identificación de los valores de autenticidad e integridad en la restauración de los monumentos arqueológicos en México**

El presente documento es una propuesta metodológica que aborda los principios básicos para identificar los valores de la autenticidad y la integridad de un monumento arqueológico intervenido para su conservación. Empleando conceptos fundamentales de la arquitectura como -- los materiales de construcción, los sistemas constructivos, los estilos arquitectónicos, la historicidad, y el estado físico del bien -- se logra identificar y medir las cualidades esenciales del bien y reconocer la integridad del monumento luego de una intervención para su conservación.

Gambrell, Natasha [244] see Silliman, Stephen

Gang, David [211] see Damitio, William

Gannan, Kylie [316] see Glascock, Michael D.

Gantt, Sean (Crow Canyon Archaeological Center)**[104] Indigenous Public Archaeology: A Multi-cultural Landscape Approach to the Central Mesa Verde Region**

In this presentation I will discuss plans to diversify the Public Anthropology program offerings through the Crow Canyon Archaeological Center to include more accessible and relevant content for local Native American youth. I plan to utilize a "multi-cultural landscape approach" to the interpretation of the Central Mesa Verde Region which will include not only Pueblo history, but also Diné (Navajo), Ute, and settler understandings of this landscape. It is important that we not only tell the story of western archaeological research in this area, but that we include Native American understandings and interpretations of this landscape on an equal footing.

[104] Chair**Gao, Bo, Xiangyu Zhang (Xi'an institute of cultural relics protection) and Chenggang Duan (Xi'an institute of cultural relics protection)****[78] A New Discovery of a Tang Dynasty Cemetery in the Eastern Suburb of Xi'an**

Between August 2017 and December 2018, more than one thousand Tang dynasty tombs had been found in the eastern suburb of Xi'an by Xi'an Institute of cultural relics protection and archaeology. Abundant important antiquities were uncovered, including Persian style silverwares, silver sachets, bronze mirrors, stone incense burners, and stone epitaphs of princesses, eunuchs, and ministers. Most of the tombs were outside the eastern wall of the capital of the Tang dynasty, and those tombs' owners were likely common civilians of the Tang dynasty who were living in ancient Chang'an city. Research about tombs of the Tang dynasty is meaningful in representing ordinary life quite vividly for that time, showing the relationship between city and cemetery, and indicating cultural exchange between the east and the west.

Gao, Ziyue [253] see Moots, Hannah

Garay-Vazquez, Jose (University College London), Dorian Fuller (University College London) and Jose Oliver (University College London)**[404] The History of Archaeobotanical Research on the Island of Puerto Rico and Its Relationship with Notions of Poor Preservation of Macro-botanical Remains on Archaeological Contexts**

Archaeobotanical research of macro-botanical remains in the Caribbean is scarce due to notions of poor preservation in tropical landscapes. This shifted archaeobotanical research towards the analysis of micro-botanical remains because these types of analysis have been reported as more successful for recovering data of subsistence practices in the Neotropics. However, there has not been a study that questions the preservations issues of macro-botanical remains in the Caribbean. Even though, the presence of macro-botanical remains has been reported on various Caribbean islands on pre-Columbian and historical contexts, there have been limited attempts at systematic assessment of the presence and utility of macro-remains. Based on a historical overview of archaeobotany in Puerto, several inconsistencies in recovery strategy are noted. I then report results from my own recovery by flotation from 6 sites where charred seeds, parenchyma, wood charcoal, and possible cooked food remains have been recovered. These results highlight the potential for more archaeobotanical work on Puerto Rico on a wide range of plant remains.

Garbellano, John Michael
[324] *Shell Middens: Foodways at Dogan Point and Other Hudson River Sites*

This research focuses on reanalyzing the Dogan Point site and other Archaic shell midden sites along the lower Hudson River. The Dogan point site has a shell component with calibrated dates ranging from 7919 B.P. and 2343 B.P., and a non-shell component with calibrated dates ranging from 3261 B.P. and 473 B.P. Dogan Point was originally investigated by Louis A. Brennan in the 1960s and 1970s, and reinvestigated by Dr. Cheryl Claassen in the 1980's and 1990s; however, there are still several important site-specific research questions surrounding Dogan Point that remain unanswered or incompletely resolved. The role of shell middens in the lower Hudson River has been looked into closely, but at Dogan Point and other shell midden sites it has been years since anyone has done systematic investigations. This research will focus on defining the foodways of the occupants of Dogan Point and other shell midden sites along the lower Hudson. The results will provide new insights on the Dogan Point site, and more generally on riverine adaptations of Holocene Native Americans in the Lower Hudson.

Garcia, Alondra [151] see Rankle, Chad

Garcia, Arnau (McDonald Institute for Archaeological Research, University of Cambridge), Héctor A. Orengo (Catalan Institute of Classical Archaeology), Tania Polonio (Catalan Institute of Classical Archaeology) and Josep M. Palet

[154] *Archaeology of High-Mountain Pastoral Campsites in the High-Pyrenees*

European high-mountain landscapes are nowadays characterized by the presence of pastures and grasslands. Archaeological and palaeoenvironmental research conducted during the last decades are picturing these environments as long-term cultural productions, resulting from complex environment-society interactions. Since prehistory, herding appears as one of the main factors in the ecology of high-mountain landscapes. The Landscape Archaeology Research Group from the Catalan Institute of Classical Archaeology has conducted different multidisciplinary projects in the Eastern Pyrenees since 2004. The archaeological work included the excavation of 100 structures related to the temporary accommodation of both shepherds and animals and the micromorphological study of the soils. This contribution will present different case studies of excavated structures, with chronologies from the Neolithic to the Modern period. In this paper we will analyze (1) the internal articulation of the sites, (2) relation to landscape transformations and (3) the integration of high-mountain activities in complex supra-regional socio-economic dynamics of the different periods.

Garcia, Christopher [254] see Garcia, Damian

Garcia, Damian (Acoma Historic Preservation Office), Everett Garcia, Christopher Garcia, Kimberly Pasqual and Darwin Vallo

[254] *Pueblo of Acoma's Rapid Ethnographic Surveys of the Navajo-Gallup Water Supply Project*

The Pueblo of Acoma officially signed onto the NGWSP Programmatic Agreement to be a Concurring Party member on May 20, 2016. At that time, the Bureau of Reclamation provided the Pueblo with a Financial Assistance Award (FAA) that would be used for Phase I of this project. Through this FAA the Pueblo was able to get out into the field and walk approximately 96 miles of the actual pipeline corridor, in most areas prior to actual construction. This presentation will focus of the Pueblo's experience and a best practices model that Acoma used to avoid and minimize destruction to important cultural resources.

[5] Discussant

Garcia, Everett [254] see Garcia, Damian

Garcia, Lauren [372] see Levin, Anais

Garcia, Louie [76] see Gearty, Erin

Garcia Ortega, Gerardo Aldair [373] see Zavala, Bridget M.

García-Contreras Ruiz, Guillermo [310] see Pluskowski, Aleks

Garcia-Des Lauriers, Claudia (California State Polytechnic University, Pomona)

[270] Caminos a Los Horcones, Chiapas: A Least Cost Path Analysis of Early Classic Trade Routes

During the Early Classic Period (250-600 CE), the site of Los Horcones rose to become an important gateway community sitting strategically on the flanks of Cerro Bernal where it controlled the terrestrial trade route along Pacific Coast into the Soconusco region. Archaeological research of this important regional center has revealed a complex history of interactions with many regions and centers, including with the Central Mexican metropolis of Teotihuacan. Using GIS we applied Tobler's Hiking Function to explore some of the most important least-cost paths from Los Horcones to and from regions with whom we have documented contacts. This particular function is particularly useful for looking at Mesoamerican trade as all transport of goods was done without the benefit of wheeled carts and draft animals. We then take these paths and discuss the possible networks used for the movement of goods.

[270] Chair

Garcia-Fox, Joseph (Pima Community College) and Jesse Ballenger (University of Arizona)

[125] Prehistoric Land Use in the Upper San Simon Valley and Chiricahua Mountains: A View from the Finley and Sally Richards Projectile Point Collection

The Finley and Sally Richards collection represents the largest and most complete collection of projectile points documented from the remote corners of southeastern Arizona and southwestern New Mexico. The collection, donated to the Arizona Archaeological and Historical Society in 2013, offers a rare overview of the prehistoric cultural history of the upper San Simon Valley and Chiricahua Mountains. Study of the collection, which spans the Holocene epoch, was made possible through a healthy partnership between not just archaeologists and a local ranching family, but the entire community of Portal, Arizona, who collectively invited us to generate the information provided here. Our analysis documents the attributes and variables of the projectile point collection, and summarizes the sequence of typological designs that are distinctive to the southern Plains, the Chihuahuan Desert, and the Sonoran Desert. Raw materials used to create the tools, including obsidian, demonstrate a fluid territory between what is today described as the U.S.-Mexico borderlands. The process of observing, measuring, describing, and interpreting such a group of textbook artifacts provides an ideal opportunity for student learning, while contributing to our understanding of the regional archaeological record.

García-García, Marcos [310] see Pluskowski, Aleks

Garcia-Lewis, Angela

[93] Discussant

García-Moreno, Cristina (Centro INAH Sonora) and James Watson (University of Arizona)

[202] Shell Jewelry Exchange and Social Status in Central Sonora

The archaeological site of El Cementerio, dated between the Middle and Late Sonoran Ceramic Period (circa AD 1000-1521) and located in central Sonora along the Yaqui River, displays several characteristics suggestive of closer links to West Mexican coastal settlements including the presence of shell jewelry and intentional cranial and dental modification among the mortuary sample. All other artifacts consist of locally manufactured materials and traditions, whereas the shell jewelry was clearly manufactured at the coast and traded into the site. Less than half (36.9%) of the mortuary sample were buried with jewelry (pectorals, pendants, bracelets, earrings, and beads), and most were juveniles (56.1% of total with objects). This pattern contrasts the rich burial assemblages found among contemporaneous communities along the coast, and the probable source of the jewelry. We suggest that individuals buried with jewelry reflect direct connections with coastal communities and were afforded higher social status. The higher proportion of juveniles buried with jewelry likely reflects their inherited status and perceived future importance within the community.

Garcia-Ortiz, Humberto [253] see Flores Huacuja, Marlen

Garcia-Putnam, Alex (University of Wyoming), Melissa Murphy (University of Wyoming) and Todd Surovell (University of Wyoming)

[285] Modeling the Spread of Smallpox during Spanish Colonial Rule in the Chicama Valley, Peru

Myriad reasons for the native depopulation of the Americas have been cited, chief amongst them is the spread of Old World diseases like smallpox (*Variola major*) with the arrival of Europeans. Ethnohistorical documents are limited in understanding the direct effects of infectious diseases at the community level, especially in small indigenous towns where documents are limited. Coupled with this, many diseases, including smallpox, are skeletally

invisible, making interpretation difficult. Here we use ethnohistorical documents and the epidemiological characteristics of smallpox, in order to investigate the effects of this epidemic disease at the reducción of Magdalena de Cao Viejo (1578 ~ 1750) in the Chicama Valley, Peru. We present a computer model for the spread of smallpox from the large colonial city of Trujillo to this small 'backwater' town. This model was made to illustrate the speed and scale of such an epidemic and to illuminate how communities may have coped with their spread. While it is impossible to account for the countless variables influencing disease proliferation in such a complex system as Colonial Peru, this model provides a foundation for future study and, in complement with the archaeological record, can inform our understanding of life under colonial rule.

Gardiner, Caroline

[3] Archeology as a Teaching Tool

This project, conducted between summer and fall of 2018, was part of a larger NPS initiative to use archaeology as an educational tool. The project's main objective was to use this interdisciplinary field to teach concepts stemming from various academic subjects, ranging from history to chemistry. To achieve this goal, lesson plans were created for the National Park educational website that highlighted these concepts. This project is a useful example for further NPS public education endeavors. It demonstrates existing issues, specifically the need for technological accessibility and website consolidation. It also speaks to project adaptability, communication with park staff, and the challenge of creating material that addresses both educator need and wider NPS objectives.

Gardner, A. Dudley (Western Wyoming College) and William Gardner (Yale University)

[397] Variability in the Cultural Assemblage During the Formative Period in the Upper Colorado River Drainage Basin

The Formative period in the upper Colorado Drainage has been variously defined but broadly extends from 2000 B.P. to 400 B.P. Recent investigations indicate there was a high degree of variability in the cultural assemblage during this period. Specifically, habitation structures, maize storage facilities, and maize types show a great deal of variability. In this presentation, we will briefly look at this variability in terms of spatial distribution and the chronology of the Formative in the Upper Colorado River Basin.

Gardner, William (Yale University)

[154] New Insights on Mobile Pastoralist's Household Ritual Activity: Early Observations from the Excavation of a Mongol Period Ephemeral Dwelling in Northern Mongolia

Conversations on ritual practice along the Mongolian steppe are often dominated by discussions of monumental architecture that is typified by large stone mounds referred to as "khirigsuurs" or "Deer Stone" steles. Conversely, the idea that ritual space and practice can be considered at the small-scale household has been mostly dismissed. This is in large part due to prior misconceptions about the inability of the archaeologist to identify the ephemeral dwelling spaces of mobile peoples. However, recent discoveries of ephemeral habitations in northern Mongolia has shown that these once-invisible spaces are in fact preserved and identifiable in the archaeological record. The discovery of such dwellings now gives us access to aspects of the mobile pastoralist's life that have been previously unexamined. Considering the ethnographic work of Rebecca Empson on household ritual space in modern pastoralist's dwellings in Mongolia, this presentation will explore the idea of ritual practice at the household level while reporting the initial findings of the excavation of a Mongol period housepit in the Tarvagatai Valley of northern Mongolia.

[101] Discussant

Gardner, William [397] see Gardner, A. Dudley

Garland, Shauna

[345] Transportation or Transformation?: Road Depictions in Relaciones Geográficas of 16th-Century New Spain

The 16th century was a time of extraordinary cultural exchange in Central Mexico. The heterogeneous indigenous populations interacted with recently arrived Spanish and the Creole populations. In this paper, I examine one manifestation of these peoples' concepts of place, space, and movement as visually represented in maps. Focusing on the sixty-nine maps created in response to a questionnaire sent by the official cartographer of Spain's King Philip II allows for a close examination of how different scribes from different cultural backgrounds treat the same prompt. These hybrid maps hold a record of cross-cultural interactions and how these groups viewed place and space differently. I focus on the use of footprints by indigenous scribes to show their different perception of roads from that of the Spanish. I contend that the ways scribes reflected their sense of place and space through depictions of roads, the movement from place to place, and in particular the use of footprints is intimately connected to indigenous creation myths, migration narratives and ultimately their quotidian experience of roads.

Garnett, Justin [329] see Gover, Carlton

Garnica, Marlen, Ramiro Edmundo Martinez Lemus and Eugenia Robinson**[303] The Representation of the Serpent in the Rock Art of the Eastern Zone of Guatemala: A Chor'ti' Cosmological Interpretation**

The archaeological investigations in the eastern zone of Guatemala have reported many sites with painted rock art or petroglyphs. There are other similar representations in rock shelters in Guatemala especially at La Casa de las Golondrinas in the Antigua Valley. At these sites, the representation of serpents is very frequent and significant because it relates to rituals of fertility, water sources and the regeneration of the earth. A bibliographic and ethnographic review of the Chor'ti' area shows that the serpent is mythological, and it represents natural events such as natural disasters, presence or absence of rain, and seismic movements. For this reason, the inhabitants of the region perform ritual to maintain order and harmony in the universe.

Garraty, Christopher [8] see Steinbach, Erik

Garraty, Christopher (Logan Simpson), Travis Cureton (Logan Simpson), Erik Steinbach (Logan Simpson) and Paula Scott (Logan Simpson)**[194] Exploring the Pre-Classic Roots of Hohokam Platform Mounds: New Evidence from La Plaza**

Recent archaeological and historical investigations at the Hohokam site of La Plaza revealed robust evidence that a platform mound once stood in the north part of Arizona State University's Tempe campus. Recently obtained archaeological evidence suggests that the mound was built during the middle-late Sedentary period (ca. A.D. 1020–1125/1150) using Sedentary period canons of mound form and composition, as evidenced by its oval or subrectangular shape in plan, small size, and absence of adobe walls and interior rubble fill. Analyses of the fill contents and arrangement of multiple puddling pits and a large borrow pit associated with the mound provide insights into labor effort associated with the mound's construction and maintenance. Notable also is the presence of Classic period (post- A.D. 1125/1150) features beneath the outer edges of the inferred mound footprint, which implies that the mound was expanded during the Classic period but that Sedentary period canons of mound form and construction were maintained. In this presentation, we discuss the broader implications of our findings concerning the organization of public space in La Plaza and, more broadly, the mobilization of labor for communal construction projects in Hohokam society.

Garrett, Zenobie [196] see Campana, Douglas

Garrett, Zenobie (University of Oklahoma)**[266] A Site with a View? A 3D Reconstruction of the Structures at Dun Ailinne**

The site of Dún Ailinne (Knockaulin) in County Kildare is one of four major ceremonial sites of the Irish Iron Age. The site sits on a large, isolated hill in an otherwise flat landscape on which a large earthen bank and ditch encloses approximately 13 ha of land at the top. Excavations in the 1960s-1970s, as well as ongoing excavations today have defined several timber structures and phases of construction at the site. The stunning vistas that the hilltop affords today have inspired archaeologists, including myself, to consider the importance of vision in the experience of ceremony at the site. While archaeologists have postulated that gaps in the timber structures would have controlled not just access but also views, these studies have largely focused on the location of the structures, without taking into account the visibility of the building themselves. This paper builds upon this work by presenting the results of a 3D reconstruction built for the site and exploring the structures visibility and invisibility both within the site itself and in the larger landscape. In so doing, this paper seeks to understand the impact these structures would have had on local performance and activity.

[266] Chair

Garrido, Francisco (Museo Nacional De Historia Natural)**[355] Reconsidering the Imperial Subjects of the Southern Collasuyu: Commensality and Agency in Northern Chile**

As in other parts of the empire, Inca pottery in the southern provinces portrays a mix of Cuzco and local designs. Inca aryballos, plates, and jars incorporated local styles, just as local pots incorporated Inca styles. However, does the presence of Inca style always indicate imperial control? How did locals manage to express their closeness or distance to the Inca state?

Through contextualizing the use of pottery in the case of Copiapó valley, northern Chile, I explore how these pots were used in ritual activities and daily life, including state sponsored commensality, and domestic and funerary use. The distribution and diversity of styles and practices associated with pottery suggests that in this region, Incas established their domain in a selective way, leaving room for local groups to express their autonomy and aspirations, during times of higher social complexity and broader regional interconnection.

Garrido, Jose [199] see Mongelluzzo, Ryan

Garrido Durán, Daniela Angélica [244] see Landry-Montes, Khristin

Garrido Lopez, Jose Luis [199] see Halperin, Christina

Garrigue, Alexandra [29] see Welch, David

Garrison, Thomas (Ithaca College)

[79] *Stephen Houston's Impact on Maya Archaeology: Celebrating His Completion of 3 K'atuns*

Stephen Douglas Houston was drawn to archaeology and ancient scripts from a young age, fascinated by the rune stones of his mother's native Sweden. While he is most widely seen as an epigrapher to outsiders, Mayanists recognize that he is, in fact, a world class field archaeologist that knows where to dig to answer anthropological questions, and is not afraid to get his own hands dirty. Houston's intellect possesses an insatiable curiosity, which means that he has given his informed opinion on a number of important debates in archaeology, shaping and advancing academic discourse. Even with such lofty credentials, he has always made the mentoring of young scholars a priority, which also keeps him on top of the most current theories, debates, and methods that are emerging in Maya archaeology. In this paper, I will reflect on my ten years working with Steve at El Zotz. In that time, he has dramatically influenced my existing views on remote sensing, GIS, and digital technologies in general. In our most recent work using lidar data, Steve has pushed me beyond settlement pattern analysis and has helped me see how this technology is changing our understanding of the ancient Maya at many levels.

[79] Chair

Garrison, Thomas [280] see Estrada-Belli, Francisco

Garvey, Raven (University of Michigan)

[127] *Simulation and the Identification of Archaeologically-Relevant Units of Analysis in the Study of Prehistoric Cultural Transmission*

Reconciling the archaeological record's coarse grain with the person-to-person information exchanges central to cultural transmission (CT) models will allow us to better tap this powerful body of theory. Previous efforts at reconciliation demonstrated that within- and between-assemblage coefficients of variation (CV) are archaeologically relevant units of analysis in CT models (e.g., patterns of artifact attribute variation indicate particular learning biases and their relative strengths). Still lacking was a means of interpreting intermediate CVs—ones poorly aligned with independent standards for very high and very low CVs. Simulation can generate “artifacts” with well-specified production histories, and these simulated data can be used to interpret archaeological CVs. Here, I use simulations informed by rich contextual data to generate archaeologically-appropriate CT predictions for interpreting intermediate CVs observed in a collection of late prehistoric projectile points from the U.S. Southwest. Specifically, I simulated point attribute data under four learning scenarios: model-based biased transmission and within-household learning at three levels of transmission fidelity. The archaeological CVs are most consistent with extremely high-fidelity, within-household copying, which may reflect a strong group-affiliative norm or heightened incentive to “advertise” group membership given the social context in which the points were produced.

Gasco, Alejandra [364] see Barberena, Ramiro

Gasco, Janine (CSU-Dominguez Hills)

[198] *Material Culture and Technological Innovation in Colonial Soconusco, Chiapas, Mexico*

The Soconusco region of Chiapas, Mexico, quickly attracted the attention of the Spanish invaders in the Early Colonial period because of the valuable cacao produced in the area. Intensive trade brought long-distance merchants to Soconusco bringing trade goods to exchange for cacao, as had been the case in the Late Postclassic period. As a result, indigenous Soconusqueños acquired new materials such as glazed ceramics, metal tools, and glass objects, in greater quantities than was the case in areas that did not produce goods in demand on the larger Mesoamerican or international markets. New plants and animals also were introduced and became integral parts of local lifeways, and a range of new social institutions—religious, political, and economic—were imposed by the colonial regime. In this paper I focus principally on patterns of consumption and production of these new materials, and I consider how they may reflect sociocultural continuity and change. Additionally, I explore the lasting legacy of these patterns for postcolonial and contemporary Soconusco residents.

Gaskell, Sandra (Tribal Archaeologist Southern Sierra Miwuk Nation)

[400] *Indigenous Archaeological Involvement in Front of Suppression Reduces Mitigation*

During early suppression efforts of two wildland fires, indigenous firefighters reduced damage by sharing unrecorded cultural site polygons created from oral tradition aligned to dozer lines ahead of the fire's predictive path. During the Detwiler Fire (2017), and the Ferguson Fire (2018), the Tribal Archaeologists from two tribes, and the Cultural Officers from the Seven Affiliated Tribes of Yosemite participated at Incident Command during suppression efforts by guiding fire lines that would avoid unrecorded roundhouse depressions, milling features, and burial locations. Confidentiality of the information was protected through the use of controlled distribution of data to only the field READ and REAF for the sites being protected on that day in advance of the dozer crews. Tribal Archaeologists compare resource maps (historic, prehistoric, flora and fauna) to see which resources overlap tribal sacred sites not

yet discovered. When the repair process begins, tribal monitors and archaeologists participate in the mitigation measures revealing less damage to sites than in previous fires. GIS collector applications used by field archaeologists can hold an abstract polygon for the areas of interest, which the tribes request to remain unrecorded by a site survey record form.

[400] *Chair*

Gaspar, Maria Dulce [33] see DeBlasis, Paulo

Gasparyan, Boris [388] see Gill, Jayson

Gassaway, Linn [12] see Reed, William

Gastelum, Alfonso [375] see Gutierrez, Patricio

Gastelum, Alfonso [375] see Martínez Vázquez, Dante

Gates, Glenn [39] see Fuqua, Julie

Gates-St-Pierre, Christian [73] see Tremblay, Roland

Gaugler, Kristina

[116] *Heating Stones: An Experimental and Ethnographic Analysis of Fire Cracked Rock at Two Monongahela Sites in Southwestern PA*

The use of heated stones in both cookery and social rituals is an important technology in the repertoire of human food and lifeways. Archaeological assemblages often contain high percentages of these heated stones, or fire cracked rock (FCR). Yet despite its relative frequency in archaeological collections, the full diagnostic potential of FCR for determining feature or site function is little explored, specifically regarding its use among the Monongahela. This research experimentally created FCR through stone boiling, dry-roasting, and steaming to assess the morphological characteristics of the resulting heated stones. The experimental methodology was informed through consultation with Native American community members and through ethnohistoric research concerning traditional cooking methods. Experimentally created FCR was then compared to archaeologically recovered FCR from two Late Woodland period Monongahela sites located in southwestern Pennsylvania: the Johnston and Squirrel Hill sites. This study seeks to improve our interpretation of FCR recovered during archaeological investigations and to aid in differentiating between either cooking and non-cooking behavior, or between specific types of cooking techniques.

Gaulton, Barry [22] see Rankin, Lisa

Gaumnitz, Kaylee and Gabriela Gutierrez

[172] *Ceramic Variation between Two Caribbean Islands*

The Exploring Globalization and Colonization Through Archaeology and Bioarchaeology National Science Foundation (NSF) Research Experiences for Undergraduates (REU) provided ten undergraduates the opportunity to conduct research on the Dutch Caribbean island of Sint Eustatius (Statia). This research poster's goal is to compare ceramic sherds Fort Amsterdam on Statia and Brimstone Hill Fortress on Saint Kitts. The research examines how globalization impacted Statia. Fort Amsterdam was used by military personnel and was in close proximity to numerous trading warehouses. Brimstone Hill was a British fort and we use ceramics from an area occupied by the Royal British Engineers, who would have had enough income to possess ceramics from around the world. Unlike the free port of Statia, Saint Kitts was under strict British trading restrictions; therefore, limited ceramic variety was predicted for the Brimstone Hill assemblage. Ceramic comparison methods involved using a standardized analytical methodology used by St. Eustatius Center for Archaeology Research (SECAR). Ceramics were grouped by ware and decorative types to determine the ceramics' country of origin. Concluding our research, this project found that ceramic variety was greater at Fort Amsterdam than Brimstone Hill.

Gauthier, Nicolas [9] see Wissler, Amanda

Gauthier, Nicolas (Arizona State University)**[127] Generalized Additive Mixed Models for Archaeological Networks**

Distance is a fundamental constraint on human social interaction. This basic principle motivates the use of spatial interaction models for estimating flows of people, information, and resources on spatial and social networks. These models have both valid dynamical and statistical interpretations, a key strength well supported by theory and data from geography, economics, ecology, and genetics. To date, archaeologists have primarily relied on the dynamical approach because the idiosyncrasies of archaeological data make the wholesale adoption of statistical approaches from other fields impractical. Here, I argue for the use of generalized additive mixed models (GAMMs) for statistical inference on interaction networks in archaeology. GAMMs are a flexible form of regression model well-matched to the complexities of the archaeological record, including non-normal distributions in the form of counts or proportions, non-independent observations with correlated errors, and non-linear functional relationships. Using two case studies, an ethnographic marriage network and an archaeological assemblage similarity network, I illustrate how this approach can lead to unbiased parameter estimates and more robust comparisons of competing hypotheses. I conclude by outlining how future empirical efforts can help to refine our thinking about past network dynamics and reveal cross-cultural regularities of human social interaction in the present day.

Gaylord, Donald (Washington and Lee University) and Alison Bell (Washington and Lee University)**[11] A Comparative Analysis of Ceramic Assemblages from Slave Plantation Sites in the Valley and Piedmont of Virginia**

The excavation and analysis of slave plantation sites from the Valley of Virginia, and especially their comparison to the well-documented sites of eastern Virginia, is becoming an important new source of information regarding variability in the conditions of enslavement across the Atlantic World. This poster compares ceramic assemblages from slave plantation sites near Lexington, Virginia with similar ones in the Piedmont by building on recent quantitative analysis of free and enslaved sites at Monticello (Gaylord and Bell, forthcoming). Ceramic cost and decorative diversity will be analyzed in relation to other variables such as distance to market, plantation size/population, and distance between slave plantations. Data collected by Washington and Lee Archaeology from early 19th-century sites during the 1970s through the 1990s will be compared with those curated by the Digital Archaeological Archive of Comparative Slavery (DAACS).

Gayó, Eugenia (Center for Climate and Resilience Research (CR)2) and Jose M. Capriles (Department of Anthropology, Pennsylvania State University)**[248] Climatic and Demographic Changes in the South Central Andean Highlands during the Late Holocene**

The south central Andean highlands have a rich and complex socio-environmental history. Although generally seen as a single cultural area with fluid sociocultural interaction, its geographic heterogeneity is mirrored by its cultural diversity. To explain the varying effects of climate in the late Holocene history of the south central Andean highlands, we constructed four paleodemographic records of radiocarbon dates following a precipitation gradient: Lake Titicaca, Central Altiplano, Southern Altiplano, and Precordillera. Using regional proxies of paleoenvironmental change, we evaluate the timing, intensity, and resilience of each of these regions to significant events of environmental change. Our results suggest that climate had an observable effect on demographic trends including accelerating or slowing population growth and possibly causing migratory movements between neighboring regions. This outcome suggests that the south central Andean highlands emerged as an integrated cultural area as a consequence of long-term processes of climatic change as to processes of sociopolitical integration driven by emergent complexity. Funding: Fondecyt 1180121, FONDAP 15110009, PII20150081, CAPES FB-0002-2014.

Gayó, Eugenia [248] see Latorre, Claudio

Ge, Yun (Harvard-Yenching Institute)**[361] The Origin of Metallurgy in China: Retrospect and Prospect**

Early metallurgy is considered one of the most essential factors to the development of Chinese civilization, and the controversy concerning its origin has been going on for decades. With increasing number of early bronzes found in the past decades, scholars keep renewing their views on this topic, and as a result, the controversy has been updated with time. One of these views, which states that early metallurgy was introduced into China, became popular in the 21st century, and recently, the latest technologies and new approaches add even more evidence. We are now able to learn more from samples, and thus there is no better time for us to make clear how can we conduct our research and take it further. Especially the latest finds in Shaanxi province will change our understanding to the origin of metallurgy in China.

Gearty, Erin (Flagstaff Area National Monuments), Laurie Webster (University of Arizona), Chuck LaRue and Louie Garcia (Language arts specialist and Piro/Tiwa weaver)**[76] Weaving and Spinning Technologies from the Northern Southwest: Recent Research by the Cedar Mesa Perishables Project**

Perishable materials that provide information about precontact weaving traditions rarely preserve in the archaeological record. One region where they have survived is the Four Corners region of the North American Southwest, where the arid environment and intensive use of dry caves allow for the extensive preservation of textiles and production implements related to cotton processing and weaving. These fabrics and tools demonstrate a robust tradition of cotton textile production and provide a rare glimpse into its underlying material culture. Recent research by the Cedar Mesa Perishables Project has resulted in the documentation and analysis of numerous wooden cotton

beaters, spindle sticks, awls, temples, battens, and finishing needles, as well as wood, gourd, and bighorn sheep horn spindle whorls, from sites in southeastern Utah and northeastern Arizona. This work has identified cultural preferences in the selection of raw materials and documented the construction techniques used to make various implements. These precontact weaving and spinning traditions also provide a direct connection to contemporary Pueblo Indian tribes, with Pueblo weavers using many of the same weaving technologies today.

Gearty, Erin [313] see Webster, Laurie

Geller, Pamela (University of Miami)

[317] Bioarchaeology and Bioethos

The future of bioarchaeology requires a robust sub-disciplinary bioethos. The concept refers to consolidation of a habit that gives rise to moral, normative practices related to exhumation, documentation, analysis, and posthumous treatment of dead bodies. Conversations in bioethics—about consent, anonymity, vulnerable populations, legislation of policy, etc.—are germane, but require expansion so as to be useful for the particulars of studying archaeologically contextualized dead bodies. I cite the contemporary case of HeLa/Henrietta Lacks as instructive for building a bioethos applicable to the remains of ancient (or historic) decedents. Illustrative are Kennewick Man/Ancient One and Ata the “Alien” Mummy from Chile. More than cautionary or idiosyncratic tales, these cases, the latter of which continues to unfold in interesting and unforeseen ways, have involved normative, disciplinary practices in need of deeper deliberation. I focus on naming, facial reconstruction, and genetic testing. These techniques are useful for personalizing individuals, thereby making academic analyses more interesting to non-specialists. But, they also raise epistemological and ethical concerns related to stakeholders’ ontological security (or its destabilization) and dissemination of narratives in mediascapes, among other issues. By way of conclusion, I suggest that bioarchaeologists begin research by posing certain key queries.

[340] Moderator

[185] Discussant

Gellert, Carl

[74] From the Earthly to the Celestial: Material Culture and Funerary Practice at Fujinoki Kofun

In 1985, archaeologists excavating Fujinoki Kofun opened for the first time the tomb's sealed burial chamber. They were surprised to discover that not only had the site been undisturbed by tomb robbers, but that it contained one of the most lavish collections of grave-goods to have been recovered from Japan's Late Kofun period (500-600 CE). Bridging the fields of archaeology and visual culture studies, this paper considers the formal design and positional relationships of the Fujinoki artifacts as a means of analyzing the mortuary rituals conducted at the site. This study represents a departure from the dominant scholarly discourse on kofun, which approach tumuli primarily as monuments symbolizing regional authority, often overlooking the soteriological beliefs that precipitated the creation of tombs. The argument highlights the need to move beyond studies relegating Japan to a passive role in a core-periphery relationship with the mainland, classifying protohistoric objects as either “native” Japanese or “foreign” imports. This paper posits that the design of the Fujinoki grave-goods embody an intersection of cultural traditions, reflecting the fluid exchange of people and ideas across the Japan Sea, and displaying the integration of mainland derived materials into a funerary system specific to the sixth century Nara Basin.

Gentil, Bianca (The Pennsylvania State University)

[374] Mapping Obsidian Exchange Networks in Central Mexico from the Late Postclassic Periods (900-1519CE)

This study examines the differentiation of obsidian exploitation between large centers and domestic settlements in the region of Puebla-Tlaxcala. The results of pXRF analysis of obsidian artifacts from the surface and excavated materials from three single occupation sites are compared to pXRF studies of the larger centers of Tepeticpac and Cholula. This study engages in the discussion of the effect that the Triple Alliance blockade on the Tlaxcala region, with the hypothesis that smaller sites were less affected (if at all) by such a strict trade imposition. Domestic contexts of small, rural settlements have rarely been thoroughly investigated. This study sheds light on center-hinterland relationships.

Genuardi, Monica [388] see Skinner, Jane

George, Diane (Fordham University)

[228] Moderator

George, Nicole [186] see Morgan, Christopher

George, Richard (The Pennsylvania State University), Stephen Plog (University of Virginia), Adam Watson (American Museum of Natural History), Kari Schmidt (American Museum of Natural History) and Douglas J. Kennett (The Pennsylvania State University)

[153] Archaeogenomic Evidence from the American Southwest Points to a Pre-Hispanic Scarlet Macaw Breeding Colony North of the Endemic Neotropical Range in Mexico between 900 And 1200 CE

Hundreds of scarlet macaw skeletons have been recovered from archaeological sites across the American Southwest and northwestern Mexico. The location of these skeletons more than 1,000 km outside their Neotropical endemic range has suggested a far-reaching pre-Hispanic acquisition network. Although evidence for scarlet macaw breeding within this network is only known from the settlement of Paquimé in northwestern Mexico dating between 1250 and 1450 CE, researchers have speculated on the existence of earlier breeding centers within the region. In this study, we analyzed 14 ancient scarlet macaws mitogenomes dating between 900 and 1200 CE from archaeological sites in Chaco Canyon and the contemporaneous Mimbres area of New Mexico. We observed remarkably low genetic diversity consistent with the breeding of a small founder population translocated outside their natural range. Phylogeographic comparisons with mitochondrial sequences from historic macaws collected from their endemic Neotropical range identified genetic affinity between the ancient macaws and a single rare haplogroup (Haplotype 6) only observed among wild macaws in Mexico and northern Guatemala. Our results suggest that people at an undiscovered pre-Hispanic settlement dating between 900 and 1200 CE managed a macaw breeding colony outside the endemic range and distributed these symbolically important birds through the American Southwest.

Geraghty, Jennifer [11] see Murphy, Shayna

Gerard, Paul [210] see Medina, Shelby

Gerard, Paul (California State University, Los Angeles) and Rene Vellanoweth (California State University, Los Angeles)

[210] Testing the Efficacy of Methodologies for the Estimation of Body Size of California Mussel Based on Shell Fragments

Over the past decades, archaeologists have developed regression formulae to estimate animal body size based on shell fragments. In this study, we tested the efficacy of five different methods by measuring over 1200 mussel (*Mytilus californianus*) shells excavated from an archaeological site (CA-VEN-395) in the Santa Monica Mountains, located about 9 km from the coast. These formulae are based on a variety of umbo measurements to infer total length and include 1) umbo height; 2) umbo width; 3) umbo length; 4) umbo thickness; and 5) umbo length to inner hinge teeth. The umbo is the thickest and hardest element of the mussel shell and typically remains intact in most archaeological contexts. Our results suggest that each method has its own set of limitations because of differential growth rates among mussels or allometry, habitat specific conditions like overcrowding, broad oceanographic events, and other ecological and climatic variables. Of these methods, umbo length, and umbo thickness produced the best results, whereas umbo height was the most limited in its application. Methods for the estimation of total shell length needs further research to establish reliable and effective regression formulae.

Geurds, Alexander [412] see Donner, Natalia

Geurds, Alexander (University of Oxford)

[412] Discussant

Ghaheri, Fatemeh

[399] Long-Term Climate Change: A Case Study on Climate Records from the Middle East in Relation to the Neo-Assyrian Empire Agriculture

The Neo-Assyrian Empire as one of the major empires in the Ancient Near East emerged soon after late Bronze Age collapses. It ruled Mesopotamia from the eastern Mediterranean Sea to western parts of Iran and to Persian Gulf during the first millennium B.C. in a cold period in the Holocene Epoch. For my thesis, I am focusing on their plant cultivation, agriculture and plant based products in the Peshdar Plain region in Iraqi Kurdistan. It is essential to understand environmental and climatic conditions during that time to understand their influences on these plants and plant choices of farmers and elites. In this paper, I will focus on the paleoclimate records from lakes including Van, Zeribar, Mirabad, caves including Soreq and Dim, and the Neo-Assyrian archival records and cuneiforms. Different scientists documented climatic changes during this period using multiproxy records and various methods. I hypothesize that dry periods should produce a shift to more aridity resilient plants such as barley. This is confirmed by phytolith analyses, climate records and archival records cohesively.

Ghezzi, Iván [236] see Suarez Ubillus, Mónica

Ghosh, Saskia (Sophomore at Barnard College of Columbia University)

[208] 18th to 20th Century Architectural Changes of Embudo's Torreon

This poster will analyze the architectural changes of an 18th-century defensive tower called a Torreon, located in

Dixon, New Mexico—previously known as the buffer community Embudo. Acting as community protection against Plains Indians during Hispanic settlement in Northern New Mexico, the Torreon's initial use as a defensive structure may be identified through written documentation: a 1975 analysis by Larry S. Lopez of a will written by the Torreon's original owner. Documentation of the Torreon after this period does not occur until the 1960s in the form of two pictures. However, excavations performed by Barnard College's field program, led by Severin Fowles, have helped uncover archaeological evidence of spatial repurposing in the Torreon—specifically, changing adobe structures, materials, and methods of storage. Using evidence from the excavations as well as historical context of the area, this poster will provide a cohesive, relative timeline of the Torreon's architectural changes from the period in which it was constructed to the 1960s: heretofore a 200-year gap in its history. Therefore, this poster identifies how the utilization of the Torreon adds to Embudo's brief, irregularly recorded history, providing evidence for how buffer communities in Northern New Mexico reformed after Plains attacks ceased.

Giardina, Miguel [364] see Neme, Gustavo

Gibbs, Kevin [399] see Banning, Edward

Giblin, Julia [126] see Duffy, Paul R.

Giblin, Julia (Quinnipiac University)

[126] Bronze Age Burials from the Carpathian Basin: New Isotope Results

Material culture, burial customs, and isotopic data have been used to suggest that the Bronze Age in the Carpathian Basin was characterized by high levels of human mobility; however, the extent to which people in this region migrated and travelled, and its relevance to questions regarding culture change, remain unresolved. In this study, we present new isotopic results collected from cemeteries of the Bell Beaker, Kisapostag, Vatya, Füzesabony and Tumulus cultures; assemblages that span the first one thousand years of the Bronze Age (2500–1500/1400 BC) in Hungary. Multiple isotopes ($\text{Sr}^{87}/\text{Sr}^{86}$, $\delta^{18}\text{O}$, and $\delta^{13}\text{C}$) were analyzed from tooth apatite samples from inhumation burials ($n=95$) and archaeological fauna ($n=53$). Results are compared to regional isotopic estimations for eastern and western Hungary, as well as previously published data for earlier time periods.

[126] Chair

Gibson, D. (El Camino College)

[224] Down and Out at Dysert O'Dea

Dysert Molanín castle was constructed by a leading lineage of the O'Dea clan in the late 15th century in north central Co. Clare, Ireland. The clan occupied a territory within a composite chiefdom that had been dismembered and incorporated into a primitive state in the 12th century AD, led by the O'Briens. The O'Deas hung on to their lands as aristocratic clients of the O'Brien leaders, and in the specific case of Dysert Molanín on account of the status of the O'Deas as high-ranking clergy and coarbs of an ecclesiastical territory. Though the O'Deas and their successors the Neylons weathered the political turmoil of the 16th and 17th centuries, they fell prey to the negative consequences of downward genealogical emplacement and the monetization of the political economy. The archaeological survey of fields in the castle's vicinity clarified the organization of the local political economy as expressed by the organization of land enclosure. What the survey highlighted was the continuity of this economy from the Early Medieval Period. The excavation carried out on the grounds of the castle revealed the physical impact of Oliver Cromwell's 1649 invasion of Ireland.

[224] Chair

Gibson, Rebecca (University of Notre Dame)

[149] Representation Matters: Disabled Professorship and a Move Toward a Higher Standard of Accessibility in the Office and the Field

While workplace affecting disabilities are covered by the ADA (Americans with Disabilities Act), oftentimes universities struggle with how to accommodate faculty with disabilities. When conversations between faculty and chairpersons occur, they may cover only the bare minimum that must be acknowledged to maintain ADA compliance, yet true accessibility should go beyond merely being able to access one's own office. Additionally, professional and academic archaeologists with disabilities have further complications when attempting to work in field situations which are not accessible due to distance, the physicality of the location, or the weather. This narrows the opportunities for a disabled archaeology faculty member, and truncates the contributions they would otherwise be completely capable of making to the discipline. This presentation will focus on two aspects of the current struggle for representation of disability within full time archaeology faculty: normalizing language surrounding accommodations, including addressing disability as a measure of inclusiveness and diversity in hiring practices, and what aspects of accessibility are practical to address in arranging, funding, and stocking fieldwork expeditions on local and national excavations.

Gidding, Aaron (University of California, Santa Barbara) and Alicia Boswell (University of California, Santa Barbara)

[200] *Frontiers and Borderlands Phenomena, What Would Bradley Say?: Comparative Case Studies from the Levant and Andes*

In this paper we seek to emulate two different aspects of Bradley J. Parker's career: his transition from the Near East to the Andes and his interest in the theoretical underpinnings of frontier communities. We are inspired by his work on frontiers and borderlands in our own work in these regions and use his theoretical writings on frontiers and borderland processes to enable greater interdisciplinary dialogue and comparative studies. We build on Parker's work on defining the "continuum of boundary dynamics" (2002, 2006) by adding the dimension of time to discuss what we call "dynamic frontiers" in two case studies from the Levant and the Andes. The Levantine example focuses on the frontier processes described by Parker at the site Khirbat Hamra Ifdan in southern Jordan to highlight the value of studying frontiers over the longue durée. The Andean example from Collambay in the Moche valley introduces what we call an "enclosed" frontier which is only recognizable through diachronic study.

Gidna, Agness [154] see Grillo, Katherine

Gidusko, Kevin A. [160] see Schultz, John

Giersz, Milosz (University of Warsaw) and Branden Rizzuto (University of Toronto)

[288] *Pre-Colombian Metallurgy at the Middle Horizon (600–1000 CE) Site of Castillo de Huarmey, Huarmey Valley, Peru*

The site of Castillo de Huarmey, located on the north coast of Peru and dated to the Middle Horizon period (650–1050 CE), is widely known for an important discovery of the first undisturbed Wari royal mausoleum. With multiple burials, rich ceremonial offerings, and a wealth of grave goods, the assemblage embraces a diversity of artistic, iconographic, and technological craft traditions which represent a plethora of Central Andean cultural backgrounds. In 2018 a new primary burial context was discovered which contained the preserved remains of a young male individual with an intriguing set of copper and bronze objects, an argentiferous lead ingot, and metallurgical byproducts such as slag and speiss. The following poster presents an archaeometric and archaeological comparison of the metallurgical materials discovered in both this newly discovered tomb and the royal mausoleum at Castillo de Huarmey. The results indicate that associated craft artisans employed a variety of technological strategies to produce an eclectic mix of copper, arsenic bronze, silver, and gold objects with differing chemical compositions and material properties. These results shed further light on early Middle Horizon metallurgical technologies within the Central Andes, including early arsenic bronze technologies on the North Coast of Peru.

Gifford-Gonzalez, Diane [231] see Fine, Paul

Gifford-Gonzalez, Diane (University of California, Santa Cruz)

[231] *The Role of Faunal Evidence in Pyrodiversity Studies: Cases from California*

Ascertaining the past existence of fire-based landscape management practices requires the use of multiple lines of geological, arboreal fire scar, pollen and charcoal, archaeobotanical, and faunal evidence. In our initial project in a now-woody valley near the Central California coast, these and other lines of evidence converged toward indicating maintenance of an open local environment with high-ranked nut trees, through repeated use of fire. The rodent fauna was the strongest faunal evidence for local habitat, dominated by voles (*Microtus*) and field mice (*Peromyscus*), as opposed to closed country species (e.g. *Neotoma*, *Sciurus*). Recent sampling of coastal sites has provided further lessons in the importance of site selection for retrieving adequate records of habitat management.

[364] *Discussant*

Giglio, Rossella [421] see Blake, Emma

Gil, Adolfo (CONICET-IANIGLA Grupo Vinculado San Rafael), Gustavo Neme (CONICET & UTN FRSR), María de la Paz Pompei (CONICET & UTN FRSR), Laura Salgan (CONICET; UTN FRSR; ICES) and Nuria Sugrañes (CONICET & UTN FRSR)

[248] *Human-Environment System Change and Stability in the Farming/Hunter-Gatherer Transition*

Central Western Argentina shows during historical times a surprising mosaic of human strategies, ranging from populations with domestic plants and animals in one extreme, to populations focused on wild resources in the other. In general, this variation was associated with more sedentary and dense populations opposed to more mobile and scattered populations. Using radiocarbon SPD as a demographic proxy, we explore differences in demographic trajectories in different areas of the region and how variable they were during the last 3000 years. The results show that the incorporation and spread of domesticates was associated with a peak in human demography and that the hunter gatherer archaeological record suggests changes in its organization.

Gil, Adolfo [364] see Neme, Gustavo

Gil, Brian [118] see Skaggs, Sheldon

Gilbert, M. Thomas P. [302] see Ramos Madrigal, Jazmín

Gilbert, Steven [254] see Yost, Scott

Gilbert, Tom [253] see Smith, Oliver

Gilbertson, Christine

[213] *Exploring Cultural Differences in Irrigation Canal Systems through Time at the Creekside Village Site, New Mexico*

Irrigation systems provided the foundation of many prehistoric and historic communities in the Southwest. Creekside Village near Tularosa, New Mexico, is a Jornada Mogollon site occupied from AD 400-1150 containing evidence of both prehistoric and historic irrigation systems. Geoarchaeological investigations of stratigraphic sequence and site formation processes are used to reveal possible morphological differences in the two systems, which may be used to distinguish the canal systems culturally and chronologically. This comparative phenomenological and geoarchaeological approach to Creekside Village's irrigation systems is an investigation into the potential of sediment characteristics, canal morphology, and placement to inform our understanding of past cultural landscapes. Methods include participatory excavation/trenching and survey to aid site understanding as well as stratigraphy, particle grain size distribution, soil texture, organic and calcium-carbonate content, and GIS modeling. A focal goal of the project is to contribute to our diachronic understanding of past cultures' perspective and mitigation of water scarcity in the Southwest.

Gilchrist, Anthony

[118] *The Impact of Humans on Shipwrecks in Lake Winnipesaukee, New Hampshire*

Shipwrecks are adversely affected by human activities. Some of the most common activities conducted by humans, include recreational SCUBA diving and fishing, have the potential to destroy the data and cultural integrity of these sites. Human interaction with shipwrecks requires additional research in order to find the best way to limit human impact on shipwrecks. This project's primary goal was to measure the level of human impact on newly discovered shipwrecks one year after their locations were made publicly accessible. To achieve this goal six shipwrecks whose locations were previously unreleased until 2017 in Lake Winnipesaukee, New Hampshire were examined during the summer of 2018. The primary method was the comparison of previously collected video data with video data collected in 2018 to determine if there are any noticeable changes in the conditions of the shipwrecks including evidence of looting since their locations have been published.

Giles, Bretton [147] see Koerner, Shannon

Giles, Bretton (CEMML, Colorado State University), Ryan Parish (University of Memphis) and Marta Alfonso Durruy (Kansas State University)

[176] *Kindling "New Fires" in Ohio Hopewell Ceremonial Regimes*

Our paper investigates the relationship between Ohio Hopewell ceremonial hearths and the caches interred within/adjacent to them in submound buildings at Hopewell and Mound City. While large Ohio Hopewell mega-caches have captured the attention of archaeologists, discussions of the ceremonial hearths associated with them have typically focused on their use. Yet these interpretations have often missed how the use of Ohio Hopewell fired clay basins and charnel houses was intertwined, since new hearths and buildings were sometimes constructed over older dismantled/razed structures. We argue that the razing and renewal of these spaces could be akin to ethnohistorically documented "new fire" ceremonies in which ceramic vessels, buildings, effigies and other objects were often destroyed in a ritual that served to purify the community. This raises the possibility that long-term continuities exist in the ceremonial linkage of fire in the Eastern Woodlands to 1) the sun, 2) communal health and purification, 3) the treatment of the dead, 4) world renewal and 5) rites of riddance. We conclude by considering how these associations might alter interpretations of Middle Woodland ceremonial regimes, especially the significance/importance of Ohio Hopewell caches.

[176] *Chair*

Gill, Jacquelyn [48] see Hamley, Kit

Gill, Jayson (University of Connecticut), Daniel Adler (University of Connecticut), Keith Wilkinson (University of Winchester, UK), Ana Barun (University of Connecticut) and Boris Gasparyan (Institute of Archaeology and Ethnography, Armenia)

[388] Rocks through the Ages: A 360° Geometric Morphometric Approach to Middle Pleistocene Bifacial Technological Variability in Central Armenia

This study applies a three-dimensional landmark-based geometric morphometric (GM) technique to evaluate chronological variation in Acheulian bifacial technology during the Middle Pleistocene of Armenia. This analysis utilizes 360° documentation of biface shape to supplement more commonly used single-surface and outline GM approaches. Furthermore, traditional metric classification schemes are used to contextualize the source of variation documented by GM. Structured light 3D-scanning is employed in this research to obtain highly-accurate models of bifaces from three Armenian Middle Pleistocene assemblages for use in GM analysis. Bifaces from Hatis I (>MIS 11), Nor Geghi I-South (~MIS 11), and Nor Geghi I-North (MIS 9e) reveal a sequential pattern of expansion and retraction in biface variability. Principal component analysis and metric classifications suggest that this variation is consistent with a chronological trend from elongated pointed forms to discoidal forms. Additionally, this trend reveals a shift from maintenance of rounded proximal ends to reduction strategies that produce flatter proximal areas. Similar trajectories in Western Europe are rationalized as a product of the linear evolution of form, differences in resharpening behaviors, or raw material dissimilarities. These explanations as well as considerations of reduction strategies, social learning, and the relationship between core and biface shape trajectories are investigated.

Gill, Lucy (University of California, Berkeley) and Kaz van Dijk (Leiden University)

[412] Preliminary Results of Archaeological Survey in the Zapatera Archipelago, Granada, Nicaragua

Although archaeology within the Zapatera Archipelago was initially documented in the 19th century due to the islands' exceptional stone statuary and petroglyph panels, little scientific archaeology or environmental work has taken place there. This paper presents the results from the first season of the Proyecto Arqueológico de Zapatera, which consisted of opportunistic survey drawing on local, community-based knowledge of Zapatera Island and the surrounding smaller isletas. Additionally, it illustrates the considerable potential of digital survey methodologies in a region where such techniques are underutilized. Previous research suggests that despite Zapatera's proximity to the western coast of the lake, the architectural and ceramic styles more closely resemble those of the Chontales region, on the eastern side of the lake. Therefore, this archipelago is uniquely situated to provide a perspective on networks of interaction across Lake Cocibolca, as well as how those interconnectivities were influenced by microenvironmental variations, exploitation of lacustrine resources and perceptions of landscape. This survey documented human activity areas, evidenced by mounded architecture, petroglyphs and artifact scatters, as well as geomorphological features, to discern relationships between settlement locations, non-occupational activity areas, and prominent constituents within the landscape, which include rivers, rock shelters and volcano peaks.

Gillam, J. Christopher [216] see Roades, Sean

Gillam, J. Christopher (Winthrop University)

[416] Upper Paleolithic Cultural Landscapes of the Selenge Tributaries, Northern Mongolia

The distribution of Upper Paleolithic sites in northern Mongolia indicate that maintaining social networks, subsistence and shelter were all significant factors in the cultural landscapes of these ancient hunter-gatherers. In 2018, 12 new Upper Paleolithic sites were documented in the Naryn Tolberiin Gol (Narrow Tolbor River, n=21) valley of the greater Selenge River Basin that feeds Lake Baikal farther north, bringing the total number for the Tolbor locality to 95 sites (including 74 sites from the neighboring Ikh Tolberiin (Big Tolbor/Tolbor), n=45, Kharganyn, n=17, and Altatyn, n=12, rivers). Site distributions indicate a settlement preference for south- and east-facing slopes, warmth from solar exposure and shelter from cold northern winds, with prominent viewsheds of surrounding terrain for game monitoring, and locations near either mountain passes or confluences with the Selenge River or secondary drainages, for maintaining social networks between valley systems.

[416] Chair

Gillaspie, Amy (Univ. of Colorado Denver; Belize Valley Archaeological Reconnaissance Project), Julie Hoggarth (Belize Valley Archaeological Reconnaissance Project) and Jaime Awe (Belize Valley Archaeological Reconnaissance Project)

[371] Understanding the Ritual of Peri-abandonment Deposit Behavior Evidenced by Late Classic Maya Figurines at the Site of Baking Pot, Cayo District, Belize

The Belize Valley Archaeological Reconnaissance Project is an archaeological field school operating in the Cayo District of Western Belize and has excavated at multiple sites in Belize annually since 1988. In the past five years, the project has focused on excavation of peri-abandonment deposits, or deposits of artifacts built up during and after the abandonment of city centers during the Late Classic period of Maya history (approximately 750 – 900 AD). This poster will present data on two specific artifact types, ceramic figurines and musical instruments, that were recovered from peri-abandonment deposits at the site of Baking Pot, Cayo District, Belize. In looking at these figurines and instruments, this poster will first detail the iconography of the Baking Pot collection, which includes 234 items. Next, a brief discussion of the composition of the collection will be outlined, showing categorical differentiation of the items into groups of figurines versus instruments, hand-made versus mold-made items, and anthropomorphic, zoomorphic, and unknown representations (with unknown representations being undiagnostic fragments of these items). Finally, the poster will discuss hypotheses of ritual behavior, and conclude why these items were included in these specific peri-abandonment deposits made by the Maya of Baking Pot during the Late Classic.

Gillespie, Jeanne (Jeanne Gillespie)**[304] Skirts and Scorpions: Female Power and Poisonous Creatures**

In the *Tratado de supersticiones* (1626) Hernando Ruíz de Alarcón documented invocations and prayers to pre-Hispanic divinities to assure a good catch/hunt or to protect against poisonous/painful bites/stings. This confirmed that these divinities remained important the local consciousness even 100 years after the arrival of Europeans. Ruíz de Alarcón included an intriguing account about the creation of the scorpion in this collection. In this legend three female Aztec divinities Citlalicue (Star-her-skirt), Chalchihuitlicue (Jade-her-skirt) and Xochiquetzel (Flower-quetzal) interacted with a warrior-priest, Yappan, who was serving penance to improve his military prowess. As a result of contact with the divinities, Yappan was transformed into a deadly scorpion; however, one of the divinities interceded to lessen the power of the poison. Ruíz de Alarcón documented that the common practice for curing scorpion stings was to tie off the afflicted body part, to cover the victim with a huipil, and to invoke the divinities for healing. This study will examine the associations between these three divinities and images of scorpions and other poisonous creatures from Post-Classic and colonial sources.

Gilliam, David [69] see Roquemore, Katie

Gillot, Celine (University of Montreal, Canada) and Christina Halperin (University of Montréal, Canada)**[161] Knowledge Networks and Entanglements in the Crafting of Pre-Columbian Maya Ceramics and Architecture**

One of the underlying precepts of materiality is that, whereas people make objects, objects simultaneously and recursively make people. Objects also make objects, however, in so far as seemingly separate crafting traditions were intimately entangled with each other, stimulating and reinforcing similar procedures, practices, and aesthetics. In this paper, we argue that Pre-Columbian Maya decorated ceramic vessels and plastered masonry buildings were linked through the knowledge networks of different craftspeople producing seemingly very different things. We document the similarity in production techniques of ceramics and mortars and discuss the social and technological implications of knowledge networks between different craftspeople and objects in antiquity.

Gillreath-Brown, Andrew [86] see Bocinsky, Kyle

Gillreath-Brown, Andrew (Washington State University), Kyle Bocinsky (Crow Canyon Archaeological Center) and Tim Kohler (Washington State University)**[248] The Impact of Temperature on the Transition to Maize Agriculture in the Northern Upland United States Southwest**

While the Neolithic Demographic Transition (NDT) spread rapidly across most of Europe (~600 years) after the first introduction of domesticated plants, the NDT is much more gradual in the southwestern United States (1600–2600 years) following the first appearance of maize (ca. 2260–1990 BC). Climate had a major impact on the boom-and-bust cycles in the Southwest and likely had an impact on the adoption and intensity of maize farming, which did not move directly south to north but exhibited more of a “leapfrog” pattern. Maize dependence increases substantially in southeastern Utah during Basketmaker II (500 BC – AD 500); however, maize farming does not expand across southwestern Colorado until around AD 600. Cooler temperatures in the northern Southwest from 100 BC to about AD 600 could have contributed to the absence of maize farming. Here we use pollen data from the Neotoma Paleoecology Database to produce low-frequency temperature reconstructions using the Modern Analog Technique—implemented as part of the Synthesizing Knowledge Of Past Environments (SKOPE) project—to cover the period of the introduction of maize to heavy dependence. Reconstructing past temperatures allows for an understanding of how climate might have affected the transition to maize farming in the northern Upland United States Southwest.

Gilman, Patricia (University of Oklahoma), Jakob Sedig (Harvard University) and Darrell Creel (University of Texas, Austin)**[263] Contextualizing the Differences Between Upper Gila and Mimbres River Valley Ceramic Design Elements**

This poster updates our previous research that examined similarities and differences between upper Gila Valley and Mimbres Valley painted ceramic designs. That work focused on the identification and quantification of stylistic elements and demonstrated that there are some significant differences between the painted designs in the two river valleys. We begin this phase of our research by assessing when design element differentiation between the river valleys first emerged. In particular, we examine the hypothesis that the “Gila” elements we identified in our previous research appeared on bowls from Gila sites or with Gila NAA sources earlier than “Mimbres” elements on bowls from Mimbres valley sites or with Mimbres valley NAA sources. We use “strong cases”—bowls from burials or contexts that have been directly dated—to test this hypothesis. We then situate our data within broader Mimbres contexts, to explore how sociocultural transformations might help explain the patterns in design element distribution and timing we have identified. We focus especially on whether differences in pottery design elements might be associated with the apparent ritual/religious changes that occurred in the Mimbres Valley between the Late Pithouse and Classic periods.

[343] Discussant

Gilmore, Kevin P. (HDR), Donald G. Sullivan (University of Denver) and Maria Caffrey (University of Colorado)

[49] *Paleoenvironment, Population, and the Origins of Resource Intensification on the Eastern Edge of the Colorado Plateau*

Site 5ME13127, a Formative-Era camp at the eastern edge of the Colorado Plateau, was excavated in 2018. Macrofloral and faunal analyses indicate small seeds and lagomorphs dominated subsistence by AD320-420, and the bow was adopted by AD560-650. Sediment cores from Kannah Creek fen on Grand Mesa (27km southeast) provide paleoenvironmental context for interpretations of the site. Fluctuations in relative humification and organic content of peat provide proxies for effective moisture and temperature, respectively. The summed probability distribution curve for archaeological radiocarbon dates in the Northern Colorado River Basin provides a population proxy. The Formative was characterized by steadily increasing population beginning 400BC. From 200BC-AD400, generally warm and dry conditions were punctuated by two episodes of significant drought, the latter occurring during the initial occupation of the site at AD300-400. Severe drought coincident with increasing population may have compelled resource intensification, which once established, continued during a long period of more mesic conditions and rapid population growth from AD400-1000. Many of the technological and economic innovations that define the beginning of the Formative reflect reliance on less nutritionally dense resources and increased efficiency in resource procurement. These technological innovations acquired during drought-related resource shortages were retained even when conditions ameliorated.

Gilpin, Dennis [254] see Potter, James

Gilstrap, William (Massachusetts Institute of Technology), Michael Callaghan (University of Central Florida) and Daniel Pierce (University of Missouri)

[152] *Pottery, Practice and Provenance. Interpreting Ceramic Data from the Middle Preclassic Site of Holtun, Guatemala*

Formal studies of archaeological pottery have moved far beyond traditional typological approaches through applications of complementary instrumental analyses, borrowed mainly from the Natural Sciences. No contemporary study of archaeological pottery is complete without some form of compositional examination, be they chemical or mineralogical, resulting in some plausible identification of material origins – provenance. With a dearth of primary production evidence, interpretations of compositional data rely heavily on a combination of comparative geological information and theoretical bridging arguments to determine if an object can be subjectively characterized as “local”. But what is local? What do these compositional signals actually represent? In this paper we consider that manufactured objects, such as pottery, are the results of human behavior influenced through cultural, environmental and material constraints. Through reconstructing culturally informed technological systems of production in pottery assemblages at the site of Holtun, Guatemala, we are able to identify, characterize and compare discrete practices associated with specific production units in Middle Preclassic lowlands.

Gilstrap, William [298] see Echenique, Ester

Gingerich, Joseph A. M. [324] see Emery, Taylor

Gingerich, Joseph A. M. (Ohio University)

[324] *Quantifying Intra-site Spatial Patterns at Early Paleoindian Sites*

Understanding intra-site spatial patterning has long been a focus in archaeology. This poster focuses on patterns observed through a detailed analysis of an Early Paleoindian site. The models developed from these analyses provide testable hypothesis to compare to other mobile hunter-gatherer sites. In total, over 18,000 artifacts with exact spatial coordinates were examined from the Shawnee-Minisink Clovis site in Pennsylvania, USA. The patterns and models presented come from observations that include lithic analysis, lithic refitting, and use-wear. As few sites have this level of detail in terms of completed analyses and the precise mapping of small and large artifacts (i.e., many pieces <1 cm), this poster offers both behavioral and methodological considerations for interpreting hunter-gatherer campsites.

Giomi, Evan (University of Arizona) and Nicole Mathwich (University of Arizona)

[421] *Colonial Ideology and the Organization of Spanish Missions in Nuevo México and the Pimería Alta*

Archaeologists working from a post-colonial framework are increasingly examining how the politics of Indigenous societies in North America structured European colonialism on the continent. In these colonial encounters, conflict and the social transformation that followed often resulted from the dissonance between the imagined, colonial subject and the reality of Indigenous social organization. Understanding the organization of Indigenous societies is therefore not enough; the ideological basis of colonial attempts to organize and control social space is a necessary counterpoint in the dialectic of colonial encounters. We present two case studies to address this issue. We compare the imagined colonial organization of early 17th century Spanish missionization among the Pueblos of New Mexico with 18th century missionization in the Pimería Alta of Arizona and Sonora. Network analysis is applied to documentary evidence to evaluate the idealized structure of Spanish missions systems in both regions. Through this analysis, we highlight areas of dissonance and conflict in the social organization of space through time, as local realities altered colonial expectations. The Spanish attempted to structure mission communities around their own organizational ideals, and these imagined spaces intersected with Indigenous societies to produce the topology of

colonial conflict and social transformation.

Giovas, Christina [35] see DiNapoli, Robert J.

Giovas, Christina (Simon Fraser University)

[159] *What Is Good to Eat Is Good to Translocate: The Intangible Dimension of Non-Native Animal Introduction and Consumption in the Pre-Columbian Caribbean*

Despite occupying the Caribbean since ca. 6500-6000 BP, Amerindians did not introduce continental animals to the islands until approximately 2000 years ago. In most cases, non-native taxa, while consumed, did not rival local marine resources in dietary importance; yet there is limited evidence to support an alternative, ritual-based explanation for their introduction. Why were these animals transported over water into the Antilles, and what do these actions signify? Focusing on a suite of a half-dozen mammals, I examine the possible material, social, and ideological drivers of animal introduction, including risk management, logistics, identity and status mediated consumption, and animal agency, among other possibilities. I also consider the likely reasons for the apparent late dispersal of these fauna into the islands, while critically assessing the authenticity of this patterning. Antillean translocation studies are at a critical juncture, requiring new lines of inquiry and data to move forward. Existing evidence suggests, however, the intangible dimensions of ethnophoresy are a necessary component to explaining this phenomenon and identifying its archaeological correlates in the pre-Columbian Caribbean.

Girard, François [128] see Paquin, Simon

Girón García, Patricia [346] see Kita, Yuko

Gisch, Dillon (Stanford University)

[149] *Images of Aphrodite, Sexual Desire, and the 'Chilly Climate' of Classical Archaeology*

Since 1792, nine catalogues of surviving ancient Roman replicas of the Knidian Aphrodite—the first monumental image of an unclothed woman in Western art—have been compiled. During this time, the number of known ancient replicas has increased by two orders of magnitude, yet analyses of this corpus have not changed. Overwhelmingly, elite, cis-gendered, heterosexual men of central or northern European origins have employed connoisseurial methodologies to analyze these images, advancing formalist arguments that consistently elevate the same few images above hundreds of others. Such analyses inspect the bodies that these images show, rank these images by their bodies' perceived sexual desirability, and preferentially analyze the subset of images that show more sexually desirable bodies. By contrast, this paper's author begins his analysis from a different standpoint—that of a cis-gendered, multi-ethnic, gay man—and reframes the study of this corpus through social archaeology and anthropological approaches to images. Two conclusions emerge. First, modern scholarly interpretations premised on the sexual desirability of these images' bodies are the products of a longstanding "chilly climate" in classical archaeology. Second, analyses from different standpoints can produce more nuanced and reflexive interpretations of the past and bring about disciplinary transformation in the present.

Givens, David [72] see Leach, Peter

Gjesfjeld, Erik (University of Cambridge) and R. J. Sinensky (University of California - Los Angeles)

[175] *Modeling the Dynamics of Diversification*

Quantifying diversity is one of the most fundamental components of both a scientific and evolutionary approach to archaeology. While archaeologists have spent decades painstakingly describing diversity, we continue to lack a comprehensive understanding on broader evolutionary patterns of diversification. This work applies a novel Bayesian modeling approach, developed in quantitative paleontology, to estimate rates of technological innovation and extinction. This approach offers improvements over existing methodologies by providing a quantitative framework to estimate rates of diversification that does not rely on strong phylogenetic assumptions and only requires data on the occurrence (times of first and last appearance) of artifact lineages. Quantitative analysis of ceramic data from the Southwest Social Networks Database will be demonstrated using the program PyRate with visualization of results using tools from R. Results highlight a dynamic pattern of technological change with strong responses to social and environmental perturbations. Broadly, this work contributes to a growing set of computational methods that give greater flexibility for comparing and contrasting patterns of technological change.

Glascock, Michael D. [316] see Tripcevich, Nicholas

Glascock, Michael D. (University of Missouri), Kylie Gannan (University of Missouri) and Thomas R. Hester (University of Texas-Austin)

[316] *Obsidian Artifacts from La Venta and Sources in Mesoamerica*

In the late 1960s, Heizer and colleagues at UC-Berkeley began to use X-ray fluorescence to measure chemical fingerprints for obsidian artifacts from a number of sites in Mesoamerica. In their study of obsidian artifacts from the Olmec site of La Venta, they found that 93% of the artifacts were explained by five distinct chemical types (A thru E). The remaining artifacts were from less frequent types. At that time, the source for only one of the major types at La Venta was known (Type A = Pachuca). Despite the fact that many more sources of obsidian have been located during the intervening years, it appears that no one has ever revisited Heizer's original La Venta article and explicitly identified the source names for the remaining chemical groups. In this paper, we review the progress made with respect to obsidian source and artifact studies in Mesoamerica from the 1970s to the present. Finally, we report on our re-analysis of the original La Venta artifacts to identify the obsidian types found at La Venta.

Glencross, Bonnie, Taylor Smith (Department of Anthropology, McMaster University), Gary Warrick (Indigenous Studies and History, Wilfrid Laurier University) and Tracy Prowse (Department of Anthropology, McMaster University)

[109] *Geographic and Temporal Variation in Canid Dietary Patterns from Five Huron-Wendat Village Sites in Ontario, Canada*

Stable isotope analysis of bone collagen in 48 dogs (*Canis familiaris*) was conducted to investigate geographic and temporal variation in diet at five Huron-Wendat sites (A.D. 1250-1650) in southern Ontario, Canada. Carbon and nitrogen isotope data indicate intra- and inter-site variation in dietary protein for these dogs, as well as temporal variation in diet between the Middle Ontario Iroquoian (MOI) (A.D. 1250-1400) and Contact Period (CP) (A.D. 1600-1650). Published faunal data from the CP Kelly-Campbell site are used to characterize the local/regional food web. Intra-site analysis reveals that dogs recovered from middens had significantly lower $\delta^{15}\text{N}_{\text{col}}$ values than those recovered from house contexts. Variability in $\delta^{13}\text{C}_{\text{col}}$ values is greatest during the MOI and Contact periods, with the highest values in the Late Ontario Iroquoian (LOI) samples. The trend of increased isotopic values during the LOI is also observed in humans and has implications for using dogs as proxies in human dietary studies. Dogs from the Ball site had significantly lower $\delta^{13}\text{C}_{\text{col}}$ values than those from Ossossané. Nitrogen isotope ratios gradually increase through time with significant differences between the MOI and CP. These results are considered in relation to dog ecology and the variable roles of dogs in Huron-Wendat communities.

[343] *Discussant*

Gliganic, Luke [32] see Wilkins, Jayne

Glover, Jeffrey B. (Georgia State University)

[227] *Discussant*

Glover, Lauren

[141] *Jade and the Illusion of Jade: Gokok and Magatama in Korea and Japan from 250–700CE*

Ritual stone ornaments (gokok and magatama) found in elite burials in Korea and Japan were examined to determine raw material and manufacturing process as well as use life. The primary materials examined were hard jadeite and nephrite, though softer stones such as alabaster/gypsum, amblygonite and hydrogrossular were sometimes used. When new, these softer stones would have resembled jadeite/nephrite. Such colored stone beads made of precious materials, or what was perceived to be precious materials, were integral to the ritual and political life of elites in both regions. Both quantitative and qualitative documentation was undertaken, including bead shape, size, manufacturing indicators and use wear. Scanning Electron Microscope analysis of drill hole impressions was used to differentiate drilling techniques and the degree of string wear. Many of the beads showed heavy string wear and abrasion indicating long periods of use before final deposition. Drill shape analysis indicates two major workshop traditions, one associated with Japan and one with Korea, utilizing different shaped drills and abrasives as well as drilling chaîne opératoire. Decorative incised lines are sometimes found around the perforation hole of the beads; comparative analysis of their production and distribution will be presented.

Glowacki, Donna (University of Notre Dame), Mark Varien (Crow Canyon Archaeological Center), Grant Coffey (Crow Canyon Archaeological Center) and Kyle Bocinsky (Crow Canyon Archaeological Center)

[188] *Mesa Verde Centers and Regional Analyses: Good Stuff!*

Beginning with his dissertation, Kintigh's research in the Zuni/Cibola region has focused on the formation, organization, and distribution of large ancestral Pueblo villages. His methods and the Zuni historical models he developed have notably influenced how we have approached research on large sites (aka community centers) and regional-scale analyses in the Mesa Verde region (CE 600-1280). Recent comparative evaluation of VEP II output with the known archaeological data for each center has highlighted the need to further improve large site data and modify analytical algorithms to better account for biases introduced by surface remains when assessing multicomponent sites among other issues. These newly updated data and the output of estimated households per period from the refined algorithms are used to examine the spatial and temporal dimensions of continuity and change among large Mesa Verde villages. We explore intraregional variation in key dimensions such as the timing of construction, occupation and population history, and use of farmland, and are particularly interested in the period from CE 880-1180/1200 when social dynamics are affected by the ebb and flow of Chaco and Aztec influence in the

region.

Gmoser, Glenn (Caltrans) and Adie Whitaker (Far Western Anthropological Research Group)

[357] *Transcending Transects: Research Contexts for a Landscape View of Highway Corridor Archaeology in California.*

Archaeology within highway corridors is too easily hampered by an inability to adequately address bigger research issues due to the narrow slices of landscapes crossed, access restrictions, project-specific limitations on funding and focus of attention on isolated or smaller pieces of larger archaeological resources. Research contexts developed for the California Department of Transportation (CALTRANS) attempt to broaden the scope of research concerns addressed, provide methodological guidance and add value to the investigations undertaken here. District-scale geoarchaeological sensitivity models, a regionally focused research design for the San Francisco Bay Area, and a bedrock milling feature thematic context offer examples of ways to address resources that may be hidden, disturbed, or otherwise dismissed due to a lack of appropriate contextual scale. Highlights are presented with added emphasis on tribal cultural values and concerns not readily addressed by more narrowly focused compliance studies.

Gnivecki, Perry [37] see Beamer, Dawn

Goar, Toni [259] see Kerr, Stanley

Gobalet, Kenneth [9] see DeSilva, Upuli

Goddard, Tim

[344] *Discussant*

Godfrey, Laurie [248] see Hixon, Sean

Godfrey, Linda [410] see Quinn, Rhonda

Godinez, Teresa (California State Polytechnic University), Paul R. Duffy (University of Toronto) and Györgyi Párditka (University of Michigan)

[126] *Channeling the Stylist Within: A Comparative Analysis of Bronze Age Ceramic Design Structure in Eastern Hungary*

The design structure—or position of individual design elements—has the potential to highlight social boundaries and the degree of interaction between potters in a comparative analysis of ceramics. This poster focuses on the design structure of ceramics from the Békés 103 site, a Middle Bronze Age (1600–1280 calBC) cemetery in eastern Hungary. We first try to determine whether elements such as channeling, bosses, and specific motifs such as spirals occur only on particular parts of the ceramic vessels at Békés 103. We then broaden the investigation of design structure by comparing the results from Békés 103 to a contemporaneous nearby cemetery, Csanytelek-Palé. We attempt to identify differences in the design structures of the two cemeteries that may result from social boundaries, despite the shared sets of individual design elements found between them.

Godinez, Teresa [270] see Garcia-Des Lauriers, Claudia

Goebel, Ted [10] see White, John

Goebel, Ted (Texas A&M University), Joshua Lynch (Texas A&M University) and Caitlin Doherty (Texas A&M University)

[249] *Stemmed Points from Nevada Caves*

The lack of a comprehensive and sound geochronology of Paleoindian sites in the Great Basin has long been a stumbling block for explaining variability in Western Stemmed points and their relationship with Clovis. Open-air sites are often undatable or present conflicting radiocarbon dates, while stratified records from caves and rockshelters are often mixed from biogenic or anthropogenic post-depositional processes. In this paper we present new information on the geochronologies and/or stemmed-point assemblages from three important rockshelter sites: Bonneville Estates Rockshelter, Smith Creek Cave, and Handprint Cave. Bonneville Estates and Smith Creek Cave contain records of Haskett stemmed points that approach and even overlap the age of Clovis elsewhere in the western US, while the previously identified stemmed point from Handprint Cave is better labeled as a middle Holocene Humboldt point form. Details on raw-material procurement, technology, and function of the Haskett points from Bonneville Estates and Smith Creek Cave are presented, and these findings are placed in the broader context of Paleoindian variability in the intermountain west.

Goff, Sheila

[62] *Discussant*

Gokee, Cameron and Jason De Leon

[83] *Backpack Biographies: Re-scaling Undocumented Migration in the US-Mexico Borderlands*

Federal agencies and news media often report undocumented migration across the US-Mexico border in gross terms of hundreds of thousands to millions of crossings and apprehensions—a scalar project that then plays into broader political discourse about national belonging. In this paper we draw on research by the Undocumented Migration Project to develop an alternative scalar project through a discussion of the backpacks carried and discarded by migrants crossing the Sonoran Desert of southern Arizona. On a microscale, the biographies of these objects, including acts of personalization, techniques for repair, and traces of suffering, offer material testaments to the ethnographic accounts of migrants themselves. On a macroscale, the contemporary archaeological contexts of these objects, including time and place of deposition, associated artifacts, and quantities measured as a minimum number of individuals (MNI), reveal how individual practices accumulate into an increasingly deadly process of migration shaped by US border policies over the last two decades. Ultimately, an archaeology of backpacks aims to critique popular narratives of the US-Mexico borderlands by mediating between these scales, and by valorizing the material traces of undocumented migration as an historical process.

Golden, Charles (Brandeis University) and Takeshi Inomata (University of Arizona)

[79] *Making Sense and Divining Senses: Maya Royal Courts and Communities*

Throughout his decades of scholarship, Stephen Houston has fundamentally changed our understanding of Maya courtly life and community. He synergistically weaves results from groundbreaking decipherment and archaeological excavations like no other scholar in the field. His many publications illuminate not merely the who and when of dynastic history, but also the experience of courtly life, its engagement with the senses, and the overarching physicality of the human condition. The humanity that defines the personages that Houston reveals in his research has fundamentally enriched our understanding of the organization of political and moral communities in Classic period Maya kingdoms. In this presentation, we discuss the transformative impact that Prof. Houston has had on the discipline, while also highlighting the particular influence he has had on shaping our own scholarship and research projects in Guatemala and Mexico.

Golden, Charles [219] see Roche Recinos, Alejandra

Golden, Charles [392] see Seidita, Max

Goldmann, Lukas (Deutsches Archäologisches Institut), Friedrich Lueth (Deutsches Archäologisches Institut) and Rainer Komp (Deutsches Archäologisches Institut)

[155] *The Magnetic View of a Princely Landscape*

The Hallstatt period hilltop settlement at Mont Lassois and its environs have been the focus of archaeological interest ever since the discovery of the famous princely grave of the “Dame de Vix” in 1953. Several excavations as well as aerial and geophysical prospections have since explored the sites on top and around the hill. Starting in 2013, the German Archaeological Institute in cooperation with the multinational Programme Collectif de Recherche “Vix et son environnement” has been conducting large-scale geomagnetic surveys, using a vehicle towed 16-channel magnetometer system. The interpretation of the resulting magnetograms is complemented by the numerous aerial images taken of the area, as well as LiDAR based elevation models. This survey project has now covered more than 700 ha, and the results so far have not only revealed numerous new sites dating to the neolithic to historic periods, but have also enhanced our understanding of the ancient landscape, showing clear patterns of distribution for both burial and settlement sites, embedded in a natural network of waterways and dominated by the prominent hill Mont Lassois.

Goldstein, Lynne [188] see Steponaitis, Vincas

Goldstein, Lynne (Michigan State University - Retired)

[308] *Aztalan from the Perspective of Institutions of Social Relatedness*

The archaeological site of Aztalan is located between the modern cities of Milwaukee and Madison, Wisconsin, and is commonly identified as Mississippian, dating to about AD 1000. The site has been known since the 1800s, and many amateur and professional archaeologists have excavated there. Much of the Aztalan literature focuses on time and whether or not the site is predominantly Late Woodland or Middle Mississippian in nature. My own work has focused on the mortuary and spatial organization and layout of the site, and how it was used for display and communication by means of landscape alteration, placement, and use of color and textures. Using Aztalan data, combined with data from a few other outlying Mississippian sites, I investigate the nature and degree of social relatedness one might infer from Aztalan site organization and repetition of symbols and structures. The question of change and/or repetition over time will also be addressed.

[87] *Discussant*

Goldstein, Paul [289] see Santillan Goode, Julianna

Goldstein, Steven (Max Planck Institute for the Science of Human History), Natalie Mueller (Cornell University), Elizabeth Sawchuk (Stony Brook University), Emmanuel Ndiema (National Museums of Kenya) and Christine Ogola (National Museums of Kenya)

[82] *Iron Age Agriculture at the Multi-Component Site of Kakapel Rockshelter, Western Kenya*

The domestication of African cereals and origins and spread of plant agriculture in eastern Africa remain poorly understood. Questions about the timing of farming, crop packages, and correlations with migration events, endure largely due to a lack of paleobotanical recovery and high-resolution dating on inland eastern African sites. In this paper we report on the initial findings of archaeological fieldwork at the Kakapel Rockshelter site, southwestern Kenya carried out in collaboration with the National Museums of Kenya. Situated north of Lake Victoria on the low-flanks of Mt. Elgon, Kakapel is a rock art site that preserves a sequence representing the Late-Holocene Kansoore fisher-foragers, Early Iron Age Urewe producing early-farmers, and the Late Iron Age Roulette period. Extensive flotation at the site revealed large quantities of domesticated sorghum, finger millet, and wild plants from different archaeological phases. We also report briefly on the rich faunal assemblage, excavations of burials at the site, and evidence of activity areas and related features. In combination, these lines of evidence provide critical new insights into the chronology of early farming, and lifeways of early farmers, in western Kenya. In addition, results from Kakapel Rockshelter highlight the importance of intensive flotation at eastern African sites.

[235] *Discussant*

Golitko, Mark [126] see McGrath, Alyssa

Golitko, Mark (University of Notre Dame)

[320] *Holocene Paleoenvironment and Demography of the New Guinea North Coast*

The Pacific islands are often used as model cases of human-environment systems and the development of biocultural diversity. In comparison to the smaller islands of the southwestern Pacific, the prehistory of the north coast of New Guinea remains poorly understood, particularly prior to ~2000 BP. We draw together a variety of archaeological evidence collected during fieldwork in the area around Aitape (Sandaun Province, Papua New Guinea) as well as paleoenvironmental data from coring (pollen, diatoms, charcoal) to examine the regional environmental sequence, land use intensity, and inferred paleo-demography. We find likely increases in population and land use intensity during the mid-Holocene, including a particularly rapid increase after ~3500 BP, a period that witnessed rapid movement of people out of Near Oceania. We argue that population growth from about 6000-3000 BP was a region-wide phenomenon driven largely by increasing environmental productivity on newly emergent coastlines after the Holocene Thermal Optimum and Marine Transgression. After 2000 BP, declining resource potential and unsettled climate may have contributed to population decline. These demographic and environmental trends have important implications for interpreting cultural and biological patterning in the region.

[320] *Chair*

Gomani-Chindebvu, Elizabeth [32] see Bertacchi, Alex

Gomes, Ana (ICArEHB, University of Algarve), Mussa Raja (ICArEHB, University of Algarve and Eduardo Mondlane), Célia Gonçalves (ICArEHB, University of Algarve), Nuno Bicho (ICArEHB, University of Algarve) and Jonathan Haws (University of Louisville & University of Algarve)

[82] *Quaternary Paleoenvironmental Changes in the Inhambane Bay (Southeastern Mozambique)*

Contrasting with other areas of the globe, there are few palaeoenvironmental studies in Africa and in particular in Mozambique. However, the knowledge about Quaternary palaeoenvironmental changes and their forcers (e.g. climate and sea level changes) is essential to understand the environmental context of human occupation of the Inhambane area. Thus, to shed light on this subject, we collected 4 cores in a mangrove east of the city of Inhambane. All cores were sedimentologically described and samples were collected every 10 cm for geochemical and diatom analysis (unicellular algae with a short-live cycle and largely sensible to environmental variables such as salinity, sediment texture, duration of the tidal inundation and nutrients). The analyzed record encompasses the last 4700 years, period during which Praia da Rocha and Praia do Tofo archaeological sites were occupied. Preliminary results showed that, during this time span, the environmental changes of the studied area were mainly related to the bay lateral progradation, after the mean sea level stabilization. Moreover, diatoms (which were moderately preserved and presented high diversities per sample) point to the occurrence of wetter conditions at ca. 4500-4700, 2500-3000, 1000-1500 years cal. BP.

Gomes, Ana [110] see Matias, Roxane

Gómez, Juliana (Universidad de Caldas) and Henry Tantaleán (University of South Florida)**[182] Fardos Funerarios de los Antiguos Paracas en el Valle Medio de Chincha, Costa Sur del Perú**

Este trabajo presenta los resultados del análisis bioarqueológico realizado a ocho fardos funerarios del periodo Paracas Tardío (400-200 BCE) relacionados con el estilo cavernas que fueron recuperados en el Cerro del Gentil, valle de Chincha. Los fardos funerarios asociados a este periodo han sido poco conocidos en la costa sur, entre otras razones debido a su mala preservación. En este sitio también se recuperó cerámica, abundante material botánico, huesos, líticos, canastos, mates y diversos artefactos depositados como ofrendas durante consecutivas ceremonias rituales de abandono del sitio. Los resultados presentados aquí describen la estructura de cada fardo y la complejidad en la distribución de las ofrendas, según la edad y el sexo del individuo. La conformación de estos fardos revela el desarrollo de una tradición funeraria compleja, que posiblemente daría lugar a los reconocidos fardos Warikayán de la península de Paracas descubiertos por Julio C. Tello. Nuestros hallazgos indican que el valle de Chincha fue una región central para el desarrollo cultural de los Paracas y que los fardos constituyeron una de las ofrendas más importantes con fines políticos y rituales antes de la llegada de la tradición Topará.

Gómez Ambriz, Emmanuel (ENAH) and José Luis Punzo Díaz (INAH - Michoacán)**[192] Offerings in the Yacatas: The Funerary Objects from Tzintzuntzan Burials**

The most important city of The Tarascan Empire was Tzintzuntzan. The Yacatas, political and ceremonial center of this site, was explored in the first half of the 20th Century by Mexican scholars. Nevertheless, information about these excavations is not clear at all. For this reason, here we offer a revision of the burials located in the Yacatas and its features from data that were never published with the objective of understanding the importance of ornaments for the Tarascan culture during Postclassic era.

Gómez, Emmanuel [185] see Lozada, María

Gómez, Emmanuel [373] see Vidal Aldana, Cinthya

Gonçalves, Célia [82] see Gomes, Ana

Gonçalves, Célia (ICArEHB, Universidade do Algarve), Claudia Umbelino (Departamento de Ciências da Vida - Universidade de) and Joao Cascalheira (ICArEHB, Universidade do Algarve)**[88] Muge Portal: A New Digital Platform for the Last Hunter-Gatherers of the Tagus Valley, Portugal**

This work presents "The Muge Shellmiddens Project: a new portal for the last hunter-gatherers of the Tagus Valley, Portugal" that focuses on the requalification and valorization of the archaeological and paleoanthropological heritage of the Mesolithic complex of Muge (Tagus Valley, Portugal), classified as Portuguese National Monument since 2011. It is a new multidisciplinary and innovative approach that involves the development of cybernetic infrastructures and e-science initiatives, that in turn will allow: (1) a systematization of the archaeological data collected over the last 150 years in Muge, implementing an online database that offers the possibility of storing, consulting and performing analytical-interpretative and spatial queries of archaeological, paleoanthropological, paleoenvironmental and historiographic data; (2), and the creation of interactive didactic and dissemination contents based on augmented and virtual reality technologies. With these approaches, the project intends to promote a new path of scientific and cultural access to the Muge shellmiddens, transporting the Mesolithic to the present in a vibrant, as well as informative way.

Gonçalves, Célia [144] see Cascalheira, Joao

Gonciar, Andre [386] see Zejdlik, Katie

Gonlin, Nan (Bellevue College)**[24] City Nights: Archaeology of Night, Darkness, and Luminosity in Urban Environments**

In the modern world, we are constantly surrounded by natural and artificial light that blends day into night. As a result, the contrasts between day and night, and their associated activities, have been deadened in our contemporary urban environments. This blurring has also bled over into our examination of cities of the past. Both low-density and high-density urban environments were significantly and experientially different from our modern experience, even a hundred years ago. This evolving urban nightscape can be examined from many perspectives. A focus on the archaeology of night and darkness allows us to envision nocturnal cityscapes that inhabitants navigated to perform particular activities, as well as the objects associated with those activities. The study of ancient lighting (lychnology) brings to the fore how and how much early urbanites lit up their spaces to participate in nightlife, nightshifts, and other nightways. Lighting devices also provide insight into the cost of these implements and the social prestige that illumination provided. A consideration of how much planning was done to urban landscapes for nocturnal activities reorients our perspective from day to night. This orientation is enhanced by sensory archaeology when we consider how the senses engaged with the ancient urban night.

[164] *Discussant*

[24] *Chair*

Gonlin, Nan [24] see Landau, Kristin

Gonzales, Alicia (Oregon State University), Shunashi Soledad Victoria Bustamante (Escuela Nacional de Antropología e Historia), Jeffrey Blomster (George Washington University), Veronica Perez Rodriguez (University at Albany, SUNY) and Ricardo Higelin Ponce de Leon (Indiana University)

[197] *The Impact of Diet and Dental Health among the Mixtec Urban Societies from the Formative Period of Oaxaca, Mexico*

We present the results of a preliminary study that investigates the impact of increased social complexity on the dental health of two Mixteca Alta populations, one from the Middle Formative (850 – 400 BC.) component of the site of Etlatongo and the other from the Late to Terminal Formative (400 BC. – AD. 300) urban center of Cerro Jazmín. Our research sample includes over 70 burials from Etlatongo and Cerro Jazmín, both sites in the Nochixtán Valley, Oaxaca. We assessed the presence of approximal, buccal, lingual, and root caries, antemortem dental loss (AMTL), and the degree of dental wear, and compared these factors between a site (Etlatongo) that develops early indicators of urbanism during the Yucuita phase (500-300 BC) and another that presents a later and fully urban (Cerro Jazmín) population. The results of this study provide a baseline to discuss how changes on diet and subsistence strategies impact in the transition of increasing social complexity from urban centers.

Gonzales, Moises

[193] *Genízaro Ethnogenesis and Futurism*

Genízaro Ethnogenesis, Emergence, and Futurism is an emerging story about the evolution of identity and cultural practices of the Genízaro people of New Mexico. The term Genízaro was the designation given to North American Indians of mixed tribal derivation living among the Hispanic population in Spanish fashion: that is, having Spanish surnames from their masters, Christian names through baptism, speaking a simple form of Spanish, and living together or sprinkled among the Hispanic towns and ranchos (Chavez, 1979). The permanence of Genízaro identity and cultural practice blurs the lines of distinction between Native and Hispanic frameworks of race, cultural affiliation, and identity. The continuance of contemporary indigenous cultural production through futurism generated by Genízaros in New Mexico is countering a dominant cultural hegemony of the Spanish American identity in New Mexico. This study attempts to provide insight to the origins of Genízaro identity, how it has evolved and adapted, and more importantly, how Genízaro identity is beginning to emerge in New Mexico as a counter hegemonic force challenging the historic notion of being Hispanic or Spanish American in New Mexico.

Gonzales, Myron [85] see Stark, Jonathan

Gonzales, Vidal (Bandelier National Monument) and J.T. Stark (Bandelier National Monument)

[90] *Engaging Local Pueblo Youth to Preserve Ancestral Pueblo Sites at Bandelier National Monument, New Mexico*

Bandelier National Monument lies on the Pajarito Plateau where the Tewa, Keres, and Zuni Puebloan ancestors chose to reside. These people modified, then utilized naturally eroded recesses in welded volcanic ash to create what archaeologists term cavates. Ancestral Puebloans also used the soft volcanic tuff to shape the building blocks for their homes. Today these archaeological sites are managed by diverse organizations and federal agencies that preserve and study these sites. In order to preserve Ancestral Puebloan sites, Bandelier National Monument partnered with Rocky Mountain Youth Corps to establish the Bandelier Preservation Corps (BPC) in 2015. The BPC consists of local Pueblo youth, as well as youth from surrounding communities, to help preserve these ancestral sites. The BPC allows for Pueblo youth to gain hands-on interaction with the architecture of their ancestors while being guided by experienced Pueblo community members who work for the National Park Service. The BPC works together to stabilize, repoint, and record data on standing architecture. This program has been very successful in its ability to maintain the archaeological sites of Bandelier National Monument and mobilize youth to engage in preservation.

Gonzalez, Albert (Cal State University - East Bay)

[193] *Chicanxperimental Archaeology: Inclusion and Inclusions in the Experimental Construction of Earthen Ovens*

This paper describes the pedagogical and scientific results of the construction and testing of several miniature scale Mexican-style adobe ovens (hornos) by faculty and students in Anthropology at California State University, East Bay (CSUEB). Findings are divided into three sections: Adobe as Teaching Technology, Adobe as Construction Technology, and Adobe and Thermal Mass. We explore the use of adobe as a valuable contemporary pedagogical technology in addressing the achievement gap in archaeological science courses between under-represented minority (URM) students, particularly those of Latinx and Chicanx backgrounds, and others and encouraging their retention and graduation. The paper also presents a blueprint for the construction of the same experimental ovens in order to encourage outside replication of CSUEB experiments, suggesting utilization of the template in college archaeology laboratories, in primary and secondary school lesson plans, and among descendant communities. Finally, the paper presents experimental results as to the relative thermal mass of those ovens in hopes of paving a path for development of a model archaeological signature for the colonial- and Mexican-era adobe ovens of the

American West. The paper draws the results of horno and pedagogical experiments together in order to improve historical-archaeological practice in the field, laboratory, and classroom.

Gonzalez, Ana Lucia [395] see Maurer, Kathryn

Gonzalez, Carolina (Purdue University, Anthropology), Jake Harris (Arizona State University), Curtis Marean (Arizona State University), Daniel Joyce (Kenosha Public Museum) and Erik Otarola-Castillo (Purdue University)

[127] *A 3D Geometric Morphometric Comparison of Bone Surface Modifications on Proboscidean Assemblages from the Western Great Lakes*

Currently, an alarming number of plants and animals are on the brink of extinction due to habitat loss caused by human activities and climate change. Though numerically unprecedented, this may not be the first instance of a human-driven mass extinction. For decades, scholars have hypothesized that human predation led to the extinction of North American megafauna in the Pleistocene. However, trace evidence of proboscidean butchery by humans in the form of cut marks and other bone surface modifications (BSM) is contentious. For example, independent experts observing identical BSM on four Clovis and Pre-Clovis aged proboscidean assemblages from the Western Great Lakes region disagree on whether the agents responsible for the marks were human butchers. Here, we conduct a 3D geometric morphometric analysis of BSM from the Hebior, Fenske, Mud Lake, and Schaeffer proboscidean assemblages. We compare these marks to known human and natural BSM using Bayesian inference to assign probabilities that each agent caused the marks. This technique has shown enough statistical power to differentiate between cut marks resulting from different behaviors in the past. Results facilitate a methodology allowing researchers to better understand the origins of BSM and contribute to our knowledge of human-megafauna interactions in the Pleistocene.

Gonzalez, Juan (The University of Texas Rio Grande Valley), Brandi Reger (The University of Texas Rio Grande Valley), Sarah Hardage (The University of Texas Rio Grande Valley) and Russell Skowronek (The University of Texas Rio Grande Valley)

[218] *Projectile Points Exhumed by Dune Migration, Implications for Human Presence and Mid-Holocene (?) Wetter Climate in the South Texas Sand Sheet*

The South Texas Sand Sheet (STSS) spans ~7,000 km², and consists largely of sand sheet deposits, mostly under three meters thick, stabilized by vegetation, but active SE-NW longitudinal dune ridges make up less than 5% of its area. Evidence of human presence in the STSS in prehispanic times is sparse. Limited archeological investigations have revealed a record characterized by low preservation of non-lithic remains, and overall very sparse cultural remains. Chronology of human occupation, subsistence strategies, and settlement patterns remain poorly known. A migrating dune at the center of the STSS, has exhumed projectile points and abundantdebitage, suggesting the presence of seasonal camps occupied by large groups. Preliminary findings from an ongoing investigation at this unique site include: 1) evidence of human occupation, dating back to Paleoindian or Early Archaic times, suggested by Golondrinas and Abasolo points; 2) a well-developed soil, over one meter thick, on which the archaeological horizon sits is interpreted as a stabilized and vegetated dune indicative of a wetter climate; and 3) fastest rates of dune migration captured by aerial photography occurred in the late 1950s coinciding with severe drought conditions. Results of optically stimulated luminescence ages on this newly exposed surface are pending.

[218] *Chair*

Gonzalez, Kerry (Dovetail Cultural Resource Group), Joseph Blondino (Dovetail Cultural Resource Group), Joanna Wilson-Green (Virginia Department of Historic Resources), Jazriel Cruz (Ibero American University and University of Miami) and Martin Levin (University of Pennsylvania)

[396] *Primitive Dentistry from a Native American Burial in the Southern Chesapeake Region, Virginia*

Dovetail Cultural Resource Group conducted an emergency excavation of two Native American burials in the Southern Chesapeake Region of Virginia which were AMS dated to 620±20 and 540±20 RCYBP. The ensuing analysis of the human remains showed evidence for prehistoric dentistry in one of the individuals, a male who died between the ages of 40–45. A large circular carious lesion in the mandibular left second molar led to consultation with several dental and physical anthropology experts. The tooth was subsequently examined with optical focus-stacking microscopy, periapical radiography, cone beam computed tomography, and micro-CT scanning to image the carious lesion and compare it to a smaller carious lesion on another tooth. The imaging revealed compelling evidence for purposeful removal of decayed tissue. Scanning electron microscopy was also utilized to examine striations observed on the interior surface of the cavity to identify the tools and methods employed in the treatment of the tooth. In addition, there is evidence for extraction of the mandibular right third molar, suggesting that the individual sought treatment for dental ailments on at least two occasions. This paper will discuss the analyses and conclusions drawn from the studies as well as potential future research avenues.

Gonzalez, Laureano and Lilia Lizama Aranda (Manejo Cultural, AC.)

[71] *El Modelo Portuario de México como modelo de Administración Arqueológica en México*

En esta presentación realzamos la importancia que tienen los sitios arqueológicos de menor tamaño que yacen en ruinas, que por la falta del recurso y políticas del sector público representan un nicho de inversión para la iniciativa privada. De aquí que, la problemática de administrar sitios arqueológicos de menor tamaño, con suficiente fondo financiero como humano, representa la oportunidad de convertirlo en un sitio sustentable accesible al turismo-población y un parteaguas en la disciplina arqueológica. Para ello, en este trabajo se parte de la diferencia entre la administración de los puertos antes y después de los noventa. Resaltando, el paralelismo entre la administración de

los puertos y la de los sitios arqueológicos en México. Antes de los noventas, se trataba de una administración a distancia desde el centro de México situación similar a la actual administración del patrimonio arqueológico. Los resultados arrojan indicadores sobre la administración antes y después de la integración de la administradora privada en los puertos, así como el discurso de la iniciativa privada presenta un procedimiento sobre el sector cultural que mimetiza el modelo de los puertos. Esto implica la participación del sector académico para la formulación de un Plan Maestro de Desarrollo Arqueológico para dichos sitios.

González, Lissandra [307] see Castañón-Suárez, Mijaelly

González, Lissandra (Universidad Nacional Autónoma de México, Posgrado en Antropología), José Luis Punzo Díaz (INAH), Juan Pablo Vargas (Gobierno Autónomo Descentralizado de la Municipalidad) and Manuel Espinosa (ININ)

[314] *Was There a Relationship between Michoacán and Ecuador? An Analysis of Copper Objects*

There are many studies on the interactions between the North Coast of South America and the Western part of Mesoamerica where many relationships have been seen in objects. In this paper we will present an analysis of similar metal archaeological materials produced from Michoacan and Ecuador, exploring their technological and form similarities, but also noticing the great differences that there are in many of these, which accounts for a shared history but with a particular development.

Gonzalez, Sara L. (University of Washington, Seattle) and Ora Marek Martinez (Northern Arizona University)

[136] *Good Medicine: Prescriptions for Indigenous Archaeological Practice*

While the history of North American archaeology points to a long engagement with tribal elders and scholars, these encounters largely consist of unequal, extractive relationships wherein indigenous collaborators and indigenous archaeologists have been treated more as objects of study and pity—what Bea Medicine refers to as “creatures”—rather than as equal research partners. As indigenous women, we reflect on the life journey and scholarship of Bea Medicine, whose work has provided generations of indigenous anthropologists with the means to participate in the discipline with their whole selves and, importantly, on their own terms. We argue that Medicine’s contributions—alongside indigenous archaeologies’ often overlooked grandmothers, mothers, and aunts—provide concrete strategies for continuing to decolonize the discipline and its broader relations and highlight continuing disparities in archaeological practice.

[376] *Discussant*

Gonzalez, Silvia (Liverpool John Moores University), Samuel Rennie (Liverpool John Moores University) and David Huddart (Liverpool John Moores University)

[38] *Paleoindians from the Basin of Mexico: How Do They Fit in the Early Peopling of the Americas?*

The Basin of Mexico is important in the debate on the early peopling of the Americas because several well preserved Paleoindian/Preceramic individuals have been found in the lake sediments/volcanic deposits surrounding the Late Pleistocene Lake. They include: Peñon Woman III, Tlapacoya Man, Metro Man, Chimalhuacan Man, Tlahuac Woman, Tepexpan Man and San Vicente Chicoloapan. Here we characterise them, discussing their stratigraphy, dating of the skeletons and preservation status together with their skeletal morphology and paleodiet information. We then compare their craniometric information against other Paleoindian/Preceramic human populations in Mexico (e.g. Pericues, Coahuiltecans) and elsewhere in the Americas (e.g. Arch Lake Woman, Kennewick Man, Prehistoric Chumash from Santa Cruz Island) to establish connections and migration pathways across the American Continent. Our data strongly support a Pacific Coast migration route passing through Mexico. As with other Paleoindian skeletons found in the Americas, in Central Mexico there is an older “Paleoindian skull morphology” with long and narrow skulls for the Late Pleistocene individuals. This morphology changes to the “Amerindian skull morphology” with rounder and shorter skulls at around 9,500 years ago. The implications of these different skulls morphologies differences will be discussed.

Gonzalez, Toni (University of California, Santa Barbara)

[383] *Alternative Interpretive Lenses for Landscape at Mulch'en Witz, La Milpa, Belize*

This paper discusses ongoing archaeological investigations at the Late Classic Period (CE 600-800) Maya site of Mulch'en Witz, La Milpa, Belize. Survey and excavation at the site have revealed an unconventional geographical density of man-made subterranean spaces (“chultuns”) in association with provocative architectural and geological features. While ‘utilitarian’ interpretive frameworks are available to make sense of this modified landscape, this paper recognizes that such an approach may be over-constrained. The possibility will be explored using an ahistorical archaeological interpretation, which can present new perspectives on relationships between landscapes and cultural processes. By introducing artistic representations of landscape such as ‘Wasp Mountain’ in the Mixtec Codex Zouche-Nuttall, this presentation incorporates attested indigenous perspectives into the realm of archaeological interpretation. Not only do we begin exploring alternate relationships between ritual and utilitarian practices and activities, we also allow for different kinds of questions to emerge during archaeological excavation.

Gonzalez La Rosa, Luis Manuel

[356] *Architectural Contexts in Quilcapampa*

This paper will briefly discuss the architecture at Quilcapampa, with particular emphasis on possible patio groups at the site. We discuss these groups, the contexts found in the rooms, and the access patterns between spaces. The site appears to be arranged around a principal asymmetric plaza, with sections orientated differently related to that

plaza. The paper suggests that the construction of Quilcapampa La Antigua was part of an ongoing negotiation between Wari settlers, local groups, and visitors.

González López, Angel [202] see Matadamas Gomora, Diego

González López, Angel (UC Riverside) and Lorena Vázquez Vallín (Museo de Templo Mayor; Programa de Arqueología Urb)

[243] Templo Mayor and Representations of the Flower World: Agriculture, Fire, Sacrifice, Death, Rebirth, and Imperialistic Agendas

One of our primary sources of descriptive information about the Flower World comes from Central Mexican colonial historical documents. While ethnohistorical accounts have portrayed this world with shared beliefs of the floral paradise, this paper provides a complementary scenario, by explaining nature and representation of the Flower World in the heart of the capital through an analysis of the many material culture products from archaeological explorations in and around the Main Temple of Tenochtitlan. This paper seeks to explore the idea of the Flower World from the Mexica angle, by focusing on the one hand of articulation with the solar war cult, with militaristic ideology and with fire as a transformative element to access to this realm. On the other hand, this narrative is linked with agricultural behavior promoted by the Mexica state as part of an imperialistic agenda. This paper focuses on iconographic information and contextual analysis of 56 sculptures from the Main Temple area and historical sources to show to what degree and how the Flower World was interpreted and understood by the head of the Aztec empire, especially with a tendency towards state violence and exploitation using stone images as relevant media.

González López, Martha Cecilia (Escuela de Conservación y Restauración de Occidente) and Martha Lorenza López Mestas Camberos (Instituto Nacional de Antropología e Historia)

[173] Diagnóstico, registro y conservación interdisciplinaria en el Occidente de México: El caso del Ixtépete, Jalisco

Esta ponencia abordará las distintas exploraciones e intervenciones realizadas en el sitio arqueológico del Ixtépete, Jalisco, a lo largo del siglo XX; mismas que, si bien permitieron entender las técnicas y etapas constructivas, así como la cronología del lugar y sus monumentos, también ocasionaron su rápido deterioro y destrucción, aunado a los procesos de crecimiento urbano y la problemática social que conlleva. En contraparte, se presentarán los resultados de las últimas intervenciones llevadas a cabo en las principales estructuras del sitio, a partir de un enfoque interdisciplinario que permitió respetar la integralidad de los monumentos, su estabilización y conservación, al igual que su estudio.

Gonzalez-Hernandez, Galia [38] see Acosta-Ochoa, Guillermo

Gonzalez-Morales, Manuel [403] see Straus, Lawrence

Goodale, Nathan (Hamilton College), Anna Prentiss (University of Montana) and Alissa Nauman (Hamilton College)

[70] Bayesian Models for the Occupational History of Complex Hunter-Gatherer-Fisher Communities in the Interior Pacific Northwest

The interior Pacific Northwest landscape contains a system of waterways that coalesce to form three major drainages with outlets in the Pacific Ocean. Substantial evidence has been provided that complex hunter-gatherer-fisher communities occupied sites in these river drainages during the late Holocene. Some chronological frameworks suggest there are similarities across the region while others indicate disparate timing of cultural developments spanning material culture, settlement patterns, and sociopolitical organizations. This paper presents Bayesian models for late Holocene sites the Middle Fraser and Upper Columbia River areas. Results suggest that while region-wide chronologies have been adopted, Bayesian models predict very different occupational histories for villages in the Mid-Fraser and Upper Columbia River areas. Intensive excavations from the sites Bridge River (EeRl-4) and Slocan Narrows (DkQi-1, 2, and 17) will be case studies for discussion.

Goodwin, Rebecca (University of Western Ontario)

[269] Beyond Binaries: Queering the Archaeological Record of the Western Canadian Arctic

Queer theory is often equated with sexuality research in archaeology (Blackmore 2011), but a queering of the archaeological record actually allows us to challenge all aspects of (hetero)normativity in archaeological practice (Croucher 2005; Blackmore 2011). Queer is “whatever is at odds with the normal, legitimate and the dominant” (Halperin 1995:62), and it allows us to replace binaries—including those related to gender—with a proliferation of differences. Instead of focusing on a generalized understanding of gender, created and perpetuated in the archaeological literature, a queering of the archaeological record asks us to focus on examples of objects, spaces, or individuals that deviate from these generalizations. In this paper we will provide an overview of the gendered landscape of arctic archaeological research, including a retrospective survey demonstrating the normative ways arctic archaeologists have commonly discussed gender in their research. Additionally, we will discuss examples of individuals or groups who deviate from normative, binary gender roles drawn from both the ethnographic record and from interviews conducted with Inuvialuit elders and knowledge holders. Finally, we will consider the archaeological implications of viewing gender outside of simple binaries and how to move forward in our examinations of the material record.

[269] *Chair*

Goodwin, Whitney [47] see Reeder-Myers, Leslie

Goodyear, Albert C. [122] see Moore, Christopher

Goralski, Craig T. (Cypress College)

[60] *Discussant*

Gore, Angela (Center for the Study of the First Americans, Texas A&M University)

[332] *From Source to Site: Investigating Diachronic Toolstone Procurement and Land-Use in the Nenana Valley, Interior Alaska*

The archaeological record of Eastern Beringia is critical to understanding human dispersal into the Americas and the settling-in processes of the First Americans and their descendants. Investigating prehistoric landscape use and provisioning behaviors is significant in answering questions related to adaptive behaviors of prehistoric Beringians. We can begin exploring behavioral adaptation through the lens of toolstone procurement and use in the Nenana Valley, central Alaska, by characterizing the lithic landscape upon which prehistoric Alaskans provisioned themselves as well as by employing geochemical sourcing methods such as portable x-ray fluorescence (pXRF), a useful tool for characterizing non-obsidian volcanic materials (basalts, dacites, andesites and rhyolites). In an effort to define the lithic landscape and explore hunter-gatherer land-use and provisioning strategies, this paper presents results of raw material surveys conducted to map the distribution of knappable materials in the Nenana Valley, then compares results of geochemical (pXRF) analyses of artifacts from several Late Pleistocene and Holocene sites in the Nenana Valley with both primary (outcrop) and secondary (alluvium) sources within the valley to understand and explore how local (and extra-local) materials were utilized by prehistoric Alaskans in Eastern Beringia.

[332] *Chair*

Gorenflo, Larry (Penn State University)

[38] *Twentieth Century Settlement Patterns in the Basin of Mexico: In Search of Pre-Colombian Roots for Regional Demography and Land Use*

Archaeological settlement pattern surveys in the Basin of Mexico during the 1960s and 70s capitalized on cultural behavior that seemed to share important connections with the Pre-Columbian past. The labor-intensive agricultural economy that dominated the region throughout much of the 20th century involved dozens of rural communities, many growing the same crops found prior to the Spanish Conquest, helping to justify use of modern material remains to interpret the archaeological record. This paper uses historic air photos, maps, and census data to document settlement in the Basin of Mexico during different parts of the 1900s. Results indicate some striking similarities between Pre-Columbian and historic 20th century settlement and land use that seem to support a link between the historic and prehistoric past. Urban sprawl and expansion of commercial agriculture, beginning in the 1970s in much of the basin, mark the emergence of important differences with the region's Pre-Colombian past. Late 20th century settlement and land use, continuing into the first decades of the 21st century, have yielded a very different landscape that, among other things, have important implications for many of the more than 3,900 sites discovered by settlement pattern surveys.

Goring-Morris, Nigel [15] see Schechter, Heeli

Goring-Morris, Nigel (Hebrew University) and Anna Belfer-Cohen (Hebrew University)

[366] *Neolithic Group Sizes – Further Thoughts*

The dominant paradigm concerning group size is frequently couched in terms of the "social brain hypothesis" (Dunbar 1998). On the other hand ethnographic evidence (Hill et al. 2014) posits much higher interaction rates amongst individuals than those based solely upon biological criteria (cognitive capacities, kin-based relationships, etc.). Such interactions, especially those with a ritual basis, may have major implications concerning the scale and scope of interactions relating to the shift from the mobile foraging bands to settled farming communities during the terminal Pleistocene and early Holocene in the Near East. We shall attempt to evaluate the implications of such observations concerning cultural dynamics in the region. One should bear in mind that during this period of significant changes in lifeways (both material and social/spiritual), the intensity and, especially, geographic scope of desired culture exchange networks (archaeologically most evident in the material remains) increased dramatically.

Gorman, Alice [157] see Walsh, Justin

Gosling, Anna [321] see Zalloua, Pierre

Gosner, Linda (University of Michigan), Alexander Smith (The College at Brockport - State University of New York), Jessica Nowlin (The University of Texas at San Antonio), Daniel Plekhov (Brown University) and Seth Price (University of Arkansas)

[387] *Sinis Archaeological Project: Preliminary Results of the First Season of Landscape Survey in West-Central Sardinia*

The Sinis Archaeological Project is a new regional survey in west-central Sardinia that explores the landscapes of the Sinis Peninsula and adjacent territories from multi-scalar, diachronic perspectives. The region is a diverse landscape of agricultural plains, coastal areas, and mountainous territory. In antiquity, it was inhabited by both local Nuragic people and foreign colonizers (Phoenicians, Carthaginians, and Romans) who exploited its rich resources, ranging from salt and other marine resources, to metals, to agricultural products. Our aim is to understand the diverse social and environmental factors impacting resource extraction, settlement patterns, and colonial interactions in this varied and dynamic landscape in the 1st millennium BCE through late antiquity, as well as the impacts of modern landscape use on the archaeological record. We focused our first season of work in June 2018 on the territory surrounding the site of S'Urachi, a major indigenous inland site of the 1st millennium BCE located in an agricultural plain. We incorporated traditional Mediterranean pedestrian survey alongside multi-scalar remote sensing techniques, including multispectral satellite and drone reconnaissance. This poster details the results of our first season and discusses the benefits of our multi-scalar methodology for understanding this and other varied ecological landscapes.

Goudge, Charlotte (University of Bristol)

[145] *Of Pirates and Pilots: The Impact of Climate on Illicit and Survival Behaviour on the Fringes of Global Society*

Relationships between people and landscapes can be used to inform upon social and behavioural variations. Hurricanes and shifting climactic dynamics around Ocracoke Island in the Outer Banks NC directly affected this relationship. Historically, Ocracoke provided vital trade and communication links from the West Indies to North America. Pilot Town, on Ocracoke island, was so-named for ships' pilots who guided ships safely through treacherous, moving inlets and sand-banks. Outer-Bankers based their survival on developing intimate knowledge/relationships of their environment and climate. Ocracoke provides an extreme example of developing isolation, making it a useful case study to examine reactions, relationships and developmental attitudes. This study combines island and hurricane mapping to examine social communication and isolation models to highlight acclimatisation within local environments, and test how changing climactic-environmental factors affected social structure hypothesising that the local landscapes, both static and shifting, affected human interactions and lifeways.

Gougeon, Ramie [108] see Evans, Amanda

Gough, Stan [326] see Galm, Jerry

Gould, Peter (University of Pennsylvania Museum)

[157] *Archaeology and Contemporary Capitalism*

Hamilakis and Duke first considered the relationship between "Archaeology and Capitalism" in 2007. In the intervening decade, contemporary capitalism has changed vastly, relocating and concentrating wealth and economic power, constraining national sovereignty in globalized markets, disrupting industries through technology at an accelerating pace, and exacerbating demographic and social pressures. The neoliberal consensus among economists in the early 2000s has splintered, austerity-driven government policies have undermined official support for archaeological research and museums, philanthropy's turn toward "effective altruism" and "impact measurement" have called into question the value and even the ethics of supporting archaeology, and tentative steps have been taken toward engaging market forces and digital economies in support of archaeology. Such conditions call into question the ethics of engagement with capitalist forces, yet also underscore the necessity for archaeology to adapt to new realities if funding, and public and political support are not to wither. This paper will revisit the relationship between archaeology and contemporary capitalism, reassess the critical perspectives of a decade ago, and consider whether and, if so, in what fashion, capitalist motivations, market forces, and business technologies may be engaged to promote archaeology and offset the consequences of austerity, the new philanthropy, and changing public priorities.

[377] *Discussant*

Gover, Carlton (University of Colorado Boulder & Pawnee Nation of Oklahoma) and Justin Garnett

[329] *A Possible New Paleoindian Area of the Hell Gap Site: The 2018 Shovel Test at Locality IV*

During the 2018 field season, a fluted preform was recovered during surface survey at Hell Gap Locality IV. A shovel test was dug at the location of the preform to investigate the stratigraphy, landform characteristics, and assess the possible age of the deposit. The test uncovered 675 very tightly vertically clustered artifacts, suggesting a Pleistocene age surface. Paleoindian artifacts such as fluted projectile points and paleo aged scrapers, along with C. Vance Haynes' analysis of paleo-sediments support the Pleistocene age living surface conclusion. As excavation of Locality I of the Hell Gap National Historic Landmark is coming to completion, the findings at the 2018 Locality IV shovel test offer the possibility of an additional Pleistocene age occupation area for future investigation.

Gowland, Rebecca (Durham University)**[317] *Ruptured: Bodies, Boundaries and Reproductive Loss in Bioarchaeology***

The concept of the bounded body is powerfully resonant within the post-industrialised western world; it is performed and reinforced through cultural practices which observe the maintenance of bodily space and the delineation of individual bodies. Recent research on the developmental origins of health and disease hypothesis, epigenetics and microchimerism has increasingly exposed the fragility of this construct. As feminist scholars have stated, the pregnant body represents the ultimate boundary transgression: the body within a body. This presentation aims to provide a theoretical exploration of the maternal body, the interconnectedness of mothers and infants in relation to bodily boundaries, and the impact of reproductive loss (miscarriage/neonatal death). Approximately 15-25% of pregnancies end in miscarriage and infant mortality rates in the past are estimated at 25-30%. Reproductive loss brings violent rupture to a woman's sense of bodily boundaries, both literally in that she is unable to contain the fetus, but also because she is required to reconfigure her expected self. Up to 40% of mothers who miscarry suffer from PTSD three months afterwards. This rupture of the infant/mother nexus creates social anxieties concerning the boundedness of both infants and mothers that have hitherto unexplored repercussions for burial practice and bioarchaeological interpretations.

Graesch, Anthony [116] see Salazar, Hector

Graesch, Anthony (Connecticut College)**[157] *Tossed Cigarettes, Illegal Dumps, and Soiled Cardboard: An Archaeology of Illicit, Invisible, and Seldom-Studied Discard Phenomena in the Twenty-First Century***

Archaeology has long sought to distance itself from the present, and despite a small corpus of novel and seminal research emerging over the last four decades, an archaeology that addresses the contemporary has remained only on the fringes of the discipline. Highlighting recent investigations in which the anthropological lens is refocused on discard and material culture in the twenty-first century, this paper explores the ways that an archaeology of and for the contemporary can excite a deeper, more impactful engagement with the methods and analytic contributions of anthropological archaeology both within and beyond the academy. In particular, I focus on how the archaeological study of seldom-examined and backstage garbage-related phenomena opens anthropologically potent lines of inquiry into attitudes and behaviors inextricably linked to acts of discard: ideologies of dissent; involuntary dispossession; socially performative identity; liminal possession; sanctification of consumption; object atomization; and environmental toxicity. In turn, I argue that a more resonant archaeology of the contemporary capitalizes on the discipline's unique strengths: assemblage-focused analyses; depositional context; spatial patterning; robust datasets; and systematic data recovery. Such resonance is realized in the fostering of positional reflexivity, the cultivation of empathy, and the connection of research products to present-day communities and challenges.

Graham, Anna [168] see Kassabaum, Megan

Graham, Anna [302] see Adams, Karen

Graham, Russ [48] see Veres, Matthew

Grant, Evelyn and Dana Kollmann**[160] *Going Back and Forth: Case Studies of Historic Facial Reconstruction***

In the field of Forensic Anthropology, artistic facial reconstruction is used to aid in the identification of unknown human remains when other scientific techniques and approaches have failed. In Forensic Archaeology, the same techniques can be utilized to bring historical remains back to life. In the context of historical case studies, several methods of forensic facial reconstructions for skeletal and post mortem remains are discussed.

Grant, Vernelda (San Carlos Apache Tribe)**[294] *Our Personal and Professional Journeys to a Sacred Unity: Archaeology, Social Justice and the Protection of Apache Sacred Sites***

'TRUST-ship' in Archaeology—Our definition of a practice that supports meaningful interaction between people and organizations who TRUST one another. Building trust with communities and individuals in society is a basic tool that anthropologists use in conducting research or gathering data for projects. Actions that support the building of trust, is an important part on behalf of indigenous (Native American Indian) communities to see and feel from non-Indigenous persons. In order to obtain true representation from an Indigenous culture; practitioners of Western Science must understand that their science is not the only science, that the Indigenous perspective and way of life is not confined, measured, and sometimes seen with the naked eye.

For decades, the San Carlos Apache Tribe, through the looking-glass of two individuals representing the tribal community, will share real-life scenarios and historic events that have impacted cultural and political practices that affect issues related to the impact of archaeology, social justice and the protection of Apache sacred sites such as

Dzil Nchaa Si An (Mount Graham) and Chi'chilbildaagoteel (Oak Flat).

[93] *Moderator*

[93] *Discussant*

Grauer, Kacey

[280] *Using Landscape to Unbuild Binaries: Human-Environment Relationships at Aventura, Belize*

Dividing the landscape into the categories of natural and cultural clouds an understanding of the relationship between humans and their ecological environment. Humans are not separate from or above the landscape they inhabit, and landscape archaeology is well-situated to address arbitrary binaries that reinforce problematic notions about human-environment relationships. In this paper, I confront two binaries associated with urban landscapes: inside/outside and built/unbuilt. At the ancient Maya city of Aventura, the landscape is characterized by seasonally wet karstic depressions known as pocket bajos. Pocket bajos are both inside and outside of the city. Some are surrounded by temple complexes, directly abutting monumental architecture and households, while others stretch to areas with little or no settlement. Pocket bajos are also both built and unbuilt. In some areas pocket bajo edges were modified by humans, while in other locations, their form was determined by water and erosion. Using data from pedestrian survey and excavation, I demonstrate that the pocket bajos at Aventura offer a way to go beyond a division of natural and cultural landscapes. Doing so is not only important for understanding human-environment relationships in the past, but for reflecting on our inextricable connection to the ecological environment in the present.

[234] *Discussant*

Grávalos, M. Elizabeth [288] see Tomczyk, Weronika

Grávalos, M. Elizabeth (University of Illinois at Chicago) and Isabelle Druc (University of Wisconsin-Madison)

[298] *Tracking 1,600 Years of Ceramic Technology at Prehispanic Jecosh (Ancash, Peru)*

How do ebbs and flows in regional trade relations affect village level practices of pottery production? We assess this question by tracking variability and continuity in ceramic technological traditions at the site of Jecosh, located in the Callejón de Huaylas of Ancash, Peru. Recent excavations of domestic and mortuary structures at Jecosh revealed a continual site occupation, beginning with the Huarás cultural tradition (~100BCE-200CE) and enduring through the Inka occupation of the valley (1450-1534CE). Jecosh's residents had access to a diverse ceramic assemblage throughout this time, including Recuay kaolin finewares, and later, coarse Aquilpo styles. Easily accessible clay sources and tempering materials near Jecosh, as well as possible ceramic production tools recovered from excavations, suggest that locals likely produced much of their pottery. Here we present the results of a sample of petrographic thin-sections ($n=97$) of 46 paste groups. We examine their technological differences, compare their composition with local geological samples, and situate findings within regional politico-economic trends. This preliminary study will yield insights into shifting potting traditions at Jecosh. Further, as the first petrographic study of Huarás and Recuay pottery, we will expand scholarly understandings of these iconic prehispanic styles and the people who produced and used them.

Grave, Alfonso [373] see Vidal Aldana, Cinthya

Grave, Peter [27] see Kealhofer, Lisa

Gravel-Miguel, Claudine (Arizona State University), Julien Riel-Salvatore (Université de Montréal), Jamie Hodgkins (University of Colorado Denver), Caley Orr (University of Colorado School of Medicine) and Fabio Negrino (Università di Genova)

[195] *An In-Depth Study of the Arma Veirana Pierced Shells and Pendants used as Grave Goods*

During the 2017 excavation season at Arma Veirana, a cave site located in the Italian pre-Alps, a Final Epigravettian burial was discovered. Careful excavation of the feature has uncovered an important number of grave goods comprised of over 80 perforated marine shells. The majority of these ornaments were made from the shells of *Columbella rustica*, while four bigger pendants – the likes of which had never been encountered before in an Upper Paleolithic site – seem to have been made from larger bivalves. Here, we present the results of our research on these ornaments, which involves the use of experimental archaeology to reproduce the large pendants and better understand the importance of the interred individual. We will also place this new burial and its associated grave goods within the contemporary context of the region, as well as the larger mortuary context of the European Upper Paleolithic.

Graves, Michael W.**[257] *Science in Archaeology: Ann Ramenofsky's Contributions***

Ann Ramenofsky has a record of scholarship in archaeology in which one can identify a consistent application of a science-based approach. This approach recognizes: the systematic nature of science; the distinction between conceptual and empirical domains; the role of unit formation in science, the complementary roles of theory and methodology, and how archaeological methods must be sufficiently rigorous to be tied to a set of expectations that can be demonstrated to be false. This approach is exemplified here in several of Ramenofsky's key publications on population collapse, using frequency seriation as a tool for creating intra-pueblo community chronological sequences, and how to reconstruct prehistoric to historic population histories in the American Southwest.

[312] *Discussant***[408] *Chair***

Graves, Michael W. [408] see West, Stephen

Graves, Timothy (Versar, Inc.) and Myles Miller (Versar, Inc.)**[36] *Labor, Settlement, and Social Dimensions of Earth Oven Use in Southern New Mexico and West Texas***

A decade of investigations of earth oven baking pits and their associated burned rock discard middens across southern New Mexico and west Texas have revealed new insights into the economic and social roles of these ubiquitous features. Investigations range from pedestrian and aerial surveys and 3-D image enhancement to the excavation of 80 earth oven facilities under a standard set of field and laboratory methods. Massive feasting pits were constructed during the Middle Archaic period, thousands of smaller baking pits were used during the Ceramic period, and during the Protohistoric and Historic periods large quantities of rock were transported to construct pits in distant locations in desert basins up to seven miles from the source of rock. These and other research findings challenge the conventional view that such features had relatively unimportant roles in past settlement and social organization. Systematic studies of large samples of earth ovens establishes that the features did not solely serve as a technology for food preparation, but instead functioned as active agents in social production related to labor organization, land tenure, feasting, and political economies. This paper explores the social dimensions of earth oven use in prehistoric and historic societies of the US Southwest.

Greaves, Russell [41] see McCall, Grant

Green, Amie [387] see Bernstetter, Jessica

Green, Debra (University of Oklahoma, Archeological Survey)**[312] *A Deposit Is More Than the Sum of Its Artifacts: A Case Study from Centro Ceremonial Indígena de Tibes, Puerto Rico***

Constructing the depositional history of an archaeological deposit requires identifying and describing the physical attributes of the sediment particles, including artifacts. Observable changes in the physical properties is the basis for distinguishing one archaeological deposit from another. The Ceremonial Center of Tibes, Puerto Rico provides the ideal case study to demonstrate the importance of differentiating deposits in archaeological contexts. Tibes was originally founded as a small village in A.D. 1. Between A.D. 600 and A.D. 900 changes occurred in the social, economic, and political systems that resulted in a significant transformation to the Tibes landscape. Multiple ball courts and plazas were constructed that reorganized the landscape and use of space. Current research has uncovered evidence of natural transformation processes that also played a role in the development of the cultural landscape at Tibes. Geoarchaeological, archaeological, and radiometric evidence suggest that a major flood event associated with a prehistoric hurricane occurred during late occupation at the site, sometime between A.D. 800 and A.D. 900. These results are compared to similar conclusions from other parts of Puerto Rico and the Caribbean.

[312] *Chair*

Green, Katie [87] see Richards, Julian

Green, Laura [352] see Charles, Michael

Green, Stanton (Monmouth University)**[22] *Discussant*****[22] *Chair***

Green, Kirsten [121] see Radford, Britney

Greene, Alan F. [359] see Lindsay, Ian

Greenwald, Alexandra (Arizona State University), Beth Scaffidi (Arizona State University) and Kelly Knudson (Arizona State University)

[206] *Parental Investment in a High-Stress Environment: Weaning Age and Early Childhood Diet at Uraca, Lower Majes Valley, Peru*

Human behavioral ecology predicts that individuals alter reproductive strategies to maximize reproductive success in response to environmental and social conditions. We employ stable isotope measures ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$) of weaning age and early childhood diet from serial micro-samples of first molar dentin from 10 individuals as proxies for the reproductive strategies employed by individuals interred at the site of Uraca, in the Lower Majes Valley of Arequipa, Peru during the Early Intermediate Period (EIP) to Middle Horizon (ca. AD 200 – 750). This era in southern Peru is marked by regional shifts in trade relationships, settlement patterns, and subsistence practices that reflect the impact of intense flood-drought cycles during the EIP and the transition to Wari imperial rule during the Middle Horizon. Bioarchaeological evidence shows Uraca was a status-differentiated cemetery of locally-born people, plagued by high levels of interpersonal violence. Given that injured men from the elite sector consumed more C4-enriched diets as children, we hypothesize that the early lived experience of Uraca children, measured through weaning age and diet, will exhibit status and gender distinctions. These data on differential parental investment provide one avenue for understanding how the population responded to shifting environmental and social conditions.

Greenwald, David (Jornada Research Institute)

[86] *Creekside Village: Early Village Organization and Subsistence Strategies in Tularosa Canyon, South-central New Mexico*

Investigations at Creekside Village are focused on exploring the cultural landscape within Tularosa Canyon. Creekside Village is one of the best preserved and most informative sites of the Mesilla phase in the Tularosa Basin. Investigations conducted indicate that it was occupied between AD 600 and 850, and its occupants established a permanent settlement that included numerous pit houses (ca. 200) and a great kiva. Residents built an irrigation system that diverted water from the Rio Tularosa for fields located on the floodplain. They also created an elaborate water collection and conservation system that included ditches, a reservoir, and agricultural terraces above the floodplain. Considerable effort was invested in constructing facilities to increase the carrying capacity of their surroundings in support of a sedentary lifestyle with a focus on corn agriculture through diverse farming methods and water conservation. Attempts are being undertaken to assess the level at which Tularosa Canyon was used as a travel corridor and the role of Creekside Village in regional trade and exchange. Additional contemporaneous villages in Tularosa Canyon are being evaluated. These efforts are demonstrating the need to reconsider the organization of and strategies employed by the Jornada Mogollon during the Mesilla phase.

Greenwald, David [413] see Jackson Legare, Lora

Greer, Allan (McGill University)

[162] *The Indigenous Colonization of New France*

While the French were settling their colony of Canada in the 17th century, Iroquois, Wendat, Abenaki and other indigenous people also established villages in their midst along the St Lawrence River. Historians have considered these native enclaves very much from a European perspective, as markers of the success or failure of efforts to Christianize and “frenchify” natives, all in the service of an integrative colonial project. This paper considers the same relocations in terms of indigenous purposes. Natives, it appears, sought access to northern hunting territories and they valued the diplomatic and commercial advantages that close association with the French could provide. Within strict limits, they were willing to adapt to the ways of their neighbors, but they insisted on maintaining their political autonomy and cultural identities. Both alliance and “disentanglement” are in evidence when we examine indigenous relations with the French colony. This paper focuses on marital practices, land tenure and criminal jurisdiction, areas where the indigenous villagers of the St Lawrence demonstrated their determination to stay aloof from the French.

Greer, John [190] see Greer, Mavis

Greer, Mavis (Greer Archeology) and John Greer

[190] *Arriving at a Meaningful Rock Art Interpretation*

Knowing the past through rock art interpretation has been a hallmark of Polly Schaafsma's rock art studies. She has advocated and practiced her stance that the meaning of rock art is not a guessing game but is instead the result of data collection and analysis completed within a theoretical framework, and this may result in different scenarios relative to function based on the knowledge of the individual doing the study and the questions they ask of the data. Her use of ethnographic information is often tied to rock art's place within the greater landscape, and this approach can serve the study of rock art in any region around the world. On the edge of the Northwestern Plains of North America there are two caves whose interiors are completely painted red. These sites predate any historical records, and their complete painting leaves no figurative images that can be compared with others. However, their location within the landscape, their sizes, shapes, and associated nearby cultural items and ethnographic and historical information on tribal beliefs and rituals all provide data to create a meaningful interpretation of their function prior to European contact.

[190] *Chair*

Greer, Taylor (Center for Big Bend Studies)**[259] Revisiting Spirit Eye: Ongoing Research from a Cave in West Texas**

This poster presents some of the preliminary results from two seasons of excavation work at Spirit Eye Cave, a prehistorically occupied site near Presidio, Texas. Despite being heavily impacted by decades of collecting, the Center for Big Bend Studies began excavations in the cave in 2017 and recovered thousands of artifacts discarded by collectors as well as intact deposits. More excavations were planned, preceded by efforts to preserve the deposits with 100-pound stock mats and mapping the cave with a terrestrial LIDAR scanner. In 2018, a SRSU/CBBS field school produced thousands more artifacts, many of them perishable items such as cordage, corn, and a sandal, and located intact features and deposits. Our field efforts have produced some unanticipated results, such as a Clovis-aged fiber bed and, at the moment, the oldest maize in Texas. Spirit Eye is an excellent case study that illustrates the useful, collaborative studies that can be done at previously looted sites with an unconventional research agenda.

Gregonis, Linda [258] see Evans, Victoria

Gregorio De Souza, Jonas**[248] Climate Change and Culture in Late Pre-Columbian Amazonia**

Climate change has been linked to the reorganisation of past societies in different parts of the globe. However, until recently, the lack of archaeological and palaeoclimate data for the Amazon had prevented an evaluation of the relationship between climate change and cultural change in the largest rainforest of the world. Thanks to advances in archaeological and palaeoclimate research, such assessment is now possible. Here, the most relevant cultural transformations seen in the archaeological record of six different regions of Greater Amazonia during late pre-Columbian times are reviewed. The chronology of those cultural transitions is compared with regional paleoclimate proxies, showing that, while some societies faced major reorganisation during periods of climate change, others were unaffected and even flourished. The results suggest that societies with intensive, specialised land-use systems were more vulnerable, whereas those combining forest enrichment, polyculture and the formation of fertile Amazonian Dark Earths were more resilient to climate change – reinforcing the role of those economic strategies for sustainable land use in tropical forests.

Gregory, Andrea [319] see Fox, Jacqueline

Gregory, Carrie J. [189] see Swope, Karen K.

Gregory, Danny [65] see Ingalls, Teresa

Gregory, Danny (New South Associates) and Lauren Walls (New South Associates)**[128] Using Digital Data for a Landscape Approach at Fort Campbell, Kentucky and Tennessee**

Fort Campbell has a robust dataset for cultural resources following decades of survey, testing, and monitoring projects. Recent surveys of thousands of acres have included the collection of digital data. Coupled with the complete survey coverage of large areas of the installation, this data was used for a landscape approach examining pre-contact and historic settlement systems and site preservation. Instead of looking at the number of sites of a given type or age, this approach looks at the proportion of each area that is within a delineated site boundary. Using Fort Campbell's extensive GIS database, these areas were compared to a set of variables for selected site types and temporal periods to identify patterns in settlement systems and in the preservation of these resources. The goal of this research was to provide predictive patterns for use in resource management by the Fort Campbell Cultural Resources Office.

Gregory, Teresa (Statistical Research, Inc.) and Shelby Manney (Arizona Army National Guard - Department of Emerge)**[75] Digital Curation Laws and Practice: Creative Measures for a Big Problem**

Excavating through all of the digital curation laws, practices, and procedures for proper handling and storage of archaeological data can be overwhelming and somewhat daunting. Have no fear! It is true that you must figure out how the laws related to one another (e.g., 36 CFR Part 79 and Part 1220.1-1220.20 in terms of Federal records) and how to follow them using the most creative and innovative data management solutions to ensure proper archiving of the digital record. Understanding these laws is crucial for Section 106 CRM projects and it is vitally important to follow set guidelines and archival standards, such as file naming conventions, when thinking about record curation. The development and implementation of a comprehensive and integrative CRM database is essential to aide in the handling and storing of all the digital data in perpetuity. Adhering to Federal and State laws and regulations also is key and quite necessary to achieve the most complete digitally archived record for cultural resources for us and future generations. Digital Curation is indeed a Big Problem, however there is a Creative and Innovated Solution at hand!

Greig, Karen (University of Otago) and Richard Walter (University of Otago)**[354]** *Core-Hinterland Dynamics in New Zealand Archaeology*

The concept of 'hinterland' encompasses ideas of distance, marginality and challenge and is often contrasted with 'core', which in turn implies centrality and resource richness. In this paper we address the applicability of both these concepts in New Zealand and examine their role in understanding long-term Maori history. We suggest that high mobility, low population density and extreme environmental and climatic diversity shaped circumstances where core-hinterland dichotomies were fluid and easily subverted. Working at different scales, we show how places transitioned across the core-hinterland continuum in response to socio-cultural, economic and environmental processes. Our case study shows that in New Zealand core-hinterland relationships were temporally dynamic and contingent rather than emerging from fixed principles of geographic resource distribution and accessibility.

Grenda, Donn (Statistical Research, Inc.)**[4]** *Discussant***Grier, Colin (Washington State University)****[188]** *Stability and Change in the Construction of Place: Juxtaposing Practices on the Pacific Northwest Coast with the US Southwest*

Southwestern precontact history appears written in migrations and dramatic shifts in settlement patterns and identity over the last two millennia. Recent data from the Northwest Coast of North America, in contrast, suggest people may have been situated in specific places and persisted in certain practices for as much as 10,000 years. Such differences have significant implications for the way in which people were connected to and constructed place. I examine this issue initially from a theoretical perspective, invoking approaches to place-making to contemplate the construction of social identities and histories over varying time scales. Second, I take a more operational view, considering the methodologies by which we might address currents of social change and stability in these two regions. Despite the differences of continuity versus fluidity, and of maritime abundance versus agricultural marginality, Southwestern and Northwest Coast communities appear to have negotiated tensions between social differences and collective identities in somewhat similar ways. Limitations of Northwest Coast data — in chronological resolution, in material survivorship, and in density of research — are daunting relative to the Southwest, but I argue that constructions of place provide a productive basis to juxtapose these otherwise disparate areas of precontact North America.

[70] *Discussant*

Grier, Colin [398] see Fulgham, Samantha

Griffin, Ryan**[235]** *Discussant***Griffith, Cameron S. (Texas Tech University)****[252]** *The Allegory of Xibalba: Confronting Shadowy Realities in the ancient Maya Underworld*

Cave archaeologists around the world are increasingly utilizing many new platforms and techniques to document subterranean artwork, including digital imaging and scanning technologies. In this presentation I "throw shade" at these high-tech approaches by revisiting and focusing upon the oldest of the old-school technologies involved with the visualization of cave art: Light. I also explore related phenomenological issues critical to understanding and identification of cave art, specifically vantage points, perspective, methodology, and perception to further illuminate the ancient Maya artistic phenomenon known as Monumental Modified Speleothem Sculpture (MMSS).

Griggs, Carol [81] see Turkon, Paula

Grillo, Katherine [82] see Janzen, Anneke

Grillo, Katherine (University of Florida)**[154]** *The Communalities of Pastoralist Life: Perspectives on Household Organization at the Pastoral Neolithic Site of Luxmanda, Tanzania*

Household organization has been a topic of relatively little archaeological discussion in the Pastoral Neolithic (PN) literature for eastern Africa, in part because domestic architecture has rarely been found. Scholarly literature has therefore focused on pastoralists' putative mobility, rather than on their settlements. However, recent excavations at the 3100 BP settlement of Luxmanda in Tanzania have revealed a spatially complex site with evidence for multiple house floors, hearths, distinct collections of large lower grindstones, and other concentrations of domestic refuse. This paper addresses the methodological challenges of recognizing and analyzing households at a pastoralist open-air settlement. We also examine ways in which pastoralist social organization may or may not be reflected in the

spatial layout of a PN settlement site, and we specifically question assumptions made about the communalities of pastoralists' domestic lives.

[13] *Discussant*

Grills, Brian [357] see Versaggi, Nina

Grimm, Eric [48] see Veres, Matthew

Grimstead, Deanna [47] see Lubinski, Patrick

Grimstead, Deanna [419] see Peart, Daniel

Grinnan, Nicole (Florida Public Archaeology Network) and Michael Thomin (Florida Public Archaeology Network)

[297] *Maritime Archaeological Collections and Public Engagement in Florida: An Ocean of Opportunity*

With the second longest coastline in the United States, Florida has a maritime past that spans at least 14,000 years of human habitation. Archaeological collections from prehistoric middens, colonial-era shipwrecks, and industrial coastal communities, among a variety of other maritime and submerged sites, demonstrate this long history. As a leader in archaeological education and outreach in the state of Florida, the Florida Public Archaeology Network (FPAN) seeks to engage the public with maritime history and archaeology in thoughtful and energetic ways. While each public audience requires a unique approach, utilizing archaeological collections has been one of the most successful ways of bridging the disparity that many people feel between past and present, intangible and tangible. FPAN's citizen science programs, STEAM workshops, and educator seminars have thus all benefited from the use of maritime collections as "real" representations of the past. Program assessment has also shown that sensory connections created through access to artifacts can reinforce and reinvigorate interpretive themes and messages. This paper reflects on FPAN's most recent efforts to involve the public in archaeology with collections specifically from maritime and submerged sites, including thoughts on the uses of technology to enhance future engagement with collections across broader audiences.

Grinnell, Calvin (Mandan Hidatsa Arikara Nation)

[7] *Discussant*

Groat, Nicholas [95] see Van Gijn, Annelou

Grody, Evin (Columbia University)

[153] *Bodies Shaping Bodies: Using Butchery to Trace Human-Animal Relationships*

While our relationship encompasses far more than just the dinner menu, food is one of the key ways in which human and animals lives and bodies directly shape one another. Indeed, beyond just the act of eating, how human and animal bodies meet in the context of procurement and processing can produce tangible traces of how these long-extinguished lives intersected, not to mention highlighting the agency present on both sides of the human-animal equation.

This paper explores how butchery and other coupled taphonomic and zooarchaeological analyses can tease out such aspects of animal use. Examples from the southern African Iron Age—including two intensive, if not specialised, large wild mammal hunting sites—are used to track particular processing choices, their associated taphonomic patterns, and the socioeconomic and craft implications of those strategies.

Grone, Michael (UC Berkeley)

[231] *Ancient Shoreline Management on the Central California Coast*

While extensive archaeological investigation regarding indigenous landscape management practices has been conducted in this region, little work has been done regarding shoreline management practices affecting intertidal and wetland regions, such as kelp harvesting and the exploitation and possible management of shellfish populations. This talk will focus on the analysis of invertebrate remains from several sites along the Santa Cruz coast and how this data can broaden our understanding of ancient coastal California, revitalise dormant traditional ecological knowledge lost during colonization, and influence policy based on traditional management practices.

[231] *Chair*

Groombridge, Jim [153] see Przelomska, Natalia

Grooms, Seth, Grace Ward (Washington University in St. Louis) and Andrew Schroll (Tulane University)**[99] Jaketown Re-Revisited**

In the summer of 2018, we reopened two previously excavated units at the Jaketown site in Humphries County, Mississippi. We collected geoarchaeological and paleoethnobotanical data from basal Poverty Point contexts. These deposits, dating to the Late Archaic (ca. 4000-3000 cal B.P.), represent the earliest and most intensive occupation at Jaketown. Analyses of these two datasets will inform our understanding of how the Late Archaic people at Jaketown interacted with their landscape, specifically through earthen construction and plant management. We will subject soil samples to magnetic susceptibility testing, loss on ignition, laser diffraction particle-size analysis, and macrobotanical analysis. In this paper, we present our preliminary findings.

Grossman, Joel**[306] Seeing Underground: The Feasibility of Archaeological Remote Sensing in Coastal and Highland Peru**

This paper reports programmatic recommendations, an advanced seminar series in archaeology, and field tests in geophysics undertaken during a consultancy with the Peruvian Institute of Culture (INC) in October 1982. The invited international program focused on the investigation of eleven historic, Inca, and pre-Inca sites throughout the coast and highlands. Funding was provided by the OAS, UNESCO, and the Andres Bello fund. This is the first formal presentation of this effort. The Sendero Luminoso war prevented future investigations under this initiative. The collaborative international effort had three major components: 1) a three-week seminar series on applied technology in archaeology for the archaeological and preservation staff of the INC in Lima, Cuzco, and Ayacucho, 2) a visit to eleven INC project sites to recommend appropriate applied technology strategies in support of excavation and stabilization efforts, and 3) resistivity and soil chemistry tests at each site to establish the utility of a variety of site-specific remote sensing strategies (e.g. resistivity, magnetics, or ground penetrating radar) for the enhanced definition of archaeological boundaries and internal site structure.

Grouard, Sandrine (Muséum National d'Histoire Naturelle (Paris)) and Sophia Perdikaris (College of Arts and Sciences, Department of Anthro)**[159] From Frog to Bat: The Extraordinary Bestiary of the Pre-Columbians from the Caribbean**

Zooarchaeological studies bring information on the history of the vertebrate faunas during the last 30000 years and especially on their relationships with human activities since 5000 years in the Lesser Antilles.

In such an oceanic island environment, the Pre-Columbians have mainly exploited animals from the sea. However, in a society that consumes mainly fish, what is the place of other vertebrates in the food and the symbolism?

For example, the Racer snake (*Alsophis*) has been extinct in Barbuda during the historical time period and thus never previously described. This docile and non-venomous racer snake appears to have inhabited Barbuda and has been found in context dating to 400 AD. The presence of bones in cooking pits and articulations indicate that the snake was cut in sections and either burned or cooked for possible consumption.

In a second case, we will draw up a list of the animals of the ordinary and extraordinary bestiary of the Pre-Columbian of the Lesser Antilles, based on zooarchaeological analysis, chroniclers writings, engraved bones, and archaeological stylized representations on ceramics, lithics, and shells. We will discuss the symbolism of few animals: were the manatees, dogs, bats, frogs, lizards and snakes consumed or were they taboos?

Grouard, Sandrine [159] see Perdikaris, Sophia

Gruber, Anya (University of Texas, Austin)**[414] Palynological Investigations of 17th Century Spanish Colonialism and Ecological Change at LA 20,000, New Mexico**

This talk will use archaeological pollen data from LA 20,000, a Spanish rancho site located approximately 12 miles from Santa Fe, New Mexico, to investigate how Pueblo and Spanish environmental alteration made long-term, complex changes to the landscape. By identifying and quantifying pollen taxa, this research will demonstrate how plant population fluctuations near LA 20,000 indicate localized ecological shifts. These patterns are then understood within the context of cultural activities, particularly, agricultural and pastoral practices. This research also seeks to dispel myths of the Native American 'noble savage' living in harmony with a 'pristine Nature'; rather, signatures of a marshy and meadow-like pre-Hispanic environment show a Pueblo-modified environment prior to the arrival of the Spanish. Furthermore, though the Spanish instituted agro-pastoral practices that heavily modified the environment, it was a slow process that took place over time, rather than a rapid and immediate change. Spanish introduction of intensified wheat agriculture and animal grazing led to a drier, more heavily disturbed landscape with increased populations of ruderal weeds and fewer riparian trees and shrubs.

Grujic, Jelena [363] see Radivojevic, Miljana

Grund, Brigid [329] see Pelton, Spencer

Grund, Brigid (University of Wyoming) and Stephen Williams (University of Wyoming)**[329] Can Soil Microbial Community Composition Distinguish Indoor and Outdoor Spaces?**

Various methods have been used to differentiate among activity areas at archaeological sites (e.g., element and lipid analysis), but additional work in this area is needed. To our knowledge, no previous studies have attempted to classify indoor and outdoor spaces by examining soil microbial community composition. Phospholipid fatty acid (PLFA) analysis is a technique widely employed by soil scientists to estimate microbial presence in soils. PLFA signatures may be used to identify the occurrence and prevalence of certain groups of soil microbiota, such as bacteria, fungi, and protozoa. Ethnoarchaeological soil samples collected from inside and outside nomadic Dukha house footprints in Northern Mongolia in 2013 produced significantly different PLFA signatures, indicating that this technique could potentially inform archaeological interpretation. In 2014, soil samples were collected from inside and outside stone circles at the Hell Gap Tipi Ring site (48GO556) in eastern Wyoming, just southwest of the well-known Hell Gap Locality 1 Paleoindian site (48GO305). In this poster, PLFA results from Mongolia and Hell Gap are compared to determine whether differences in PLFA signatures persist on a timescale that is archaeologically useful.

Gruner, Erina**[357] Recent Work at the Pueblo del Alamo: Ceramic Production and Exchange in the Lower Salt River Valley**

Since 2015, WestLand Resources has excavated sites along the proposed South Mountain Freeway, Loop 202 extension in Phoenix, Arizona, for the Arizona Department of Transportation. The freeway corridor lies in the western, lower Salt River Valley near the confluence with the Gila River, within what is traditionally defined as the Hohokam core. It includes a portion of Pueblo del Alamo, a major Hohokam settlement occupied from the Pioneer to the Classic periods (~A.D. 600-1450). I discuss two attributes of the ceramic assemblage identified during the initial analysis, and the implications of these findings regarding local exchange networks and demographics. First, the Colonial period assemblage contains red-on-brown variants of the Hohokam Middle Gila Buff Wares, that were likely produced in the lower Salt River Valley. These differ in composition, style, and distribution from the Middle Gila Buff Wares and should constitute a separate series. I also discuss increased diversity in utility wares during the Sedentary period, including unnamed types with technological qualities similar to the Patayan ceramic tradition. The appearance of these utility wares at Pueblo del Alamo and neighboring sites presents further evidence of interaction or co-residence between Hohokam villagers and nomadic Patayan populations during the Sedentary period.

Gruntorad, Kelsey, Katie K. Tappan, G. Tucker Austin and Chrissina Burke**[260] Rabbits, Pronghorn, Oh Deer! Oh My! Part II: A Complete Faunal Analysis of Utility Indices at Wupatki National Monument, Northern Arizona**

Wupatki National Monument, a Puebloan site located in the Sinagua region of Northern Arizona, yielded an assortment of wildlife available to past populations. Analyzing faunal remains from archaeological sites on the Colorado Plateau develops a holistic understanding of the prehistoric lifeways of Southwest communities. Through the determination of taxa present, minimum number of individuals, animal portions utilized, cultural modifications such as butchering and pot polish, and natural taphonomic signatures, our research provides a thorough investigation of animal use through time at the site. Further, we examine utility indices such as MGUI and FUI, and discuss the relative frequencies of Artiodactyls and Lagomorphs in the community's diet. Our research highlights the importance of understanding the role of animals in the Southwest diet, and provides discourse on animal resources in an arid environment.

Grunwald, Allison**[131] Ten Right-Sided Sheep Femora and Other Peculiarities: What To Make of the Arch Street Faunal Assemblage**

In 1860, a concerned party claimed that neighboring tenement dwellers used the cemetery of the First Baptist Church of Philadelphia as their personal dumping ground, leaving behind 'refuse of their domestic economy' in the form of material culture and food waste. In 2017, salvage archaeology operations at the cemetery recovered a small faunal assemblage of 214 identified specimens, and an additional 26 specimens likely from the same timeframe. Due to rushed recovery, the assemblage is both small and likely incomplete, potentially leading to peculiarities in species and element representation. But the assemblage nevertheless offers insight into the economy and habits of the tenement occupants who took advantage of the neglected church grounds.

Guadalupe De Jesús, Coralisse [418] see Torres Roldán, Isaac

Guadalupe De Jesús, Coralisse (University of Puerto Rico, Río Piedras Campus)**[418] Stitching Histories: Women in the Puerto Rican Clothing Industry between 1910-1930**

This case study focuses on the reconstruction of stories of women who worked in the clothing industry, specifically dressmakers and seamstress in the Mercado neighborhood of San Juan, Puerto Rico, between 1910-1930. The aim of this research is to demonstrate the viability of using primary sources such as maps, population census and images to create a better understanding of this group. The information acquired was organized in a database that considers variables including the level of literacy, family composition, age groups, and generational characteristics. Also, the use of commercial registries permits the pinpointing of places where they most likely acquired tools and materials related to the aforementioned trades. The results of this study can be used as a point of reference for future investigations that will consider connecting this data to existing archaeological evidence, as well as promote

the reassessment of women's contribution to the local workforce.

Guderjan, Thomas [30] see Hanratty, Colleen

Guderjan, Thomas (University of Texas at Tyler)

[30] *And here's the NEWS from Xnoha! Understanding Maya Settlement and Early Anthropocene Landscape Modifications at a Small Maya Center*

Xnoha is a small Maya center in northwestern Belize that has seen two phases of investigation since it was recorded in 1990. While current research is largely focused on the Central Precinct or kawik, we have also invested much energy in the outlying groups of monumental architecture and settlement.

Xnoha is located in a heavily dissected zone east of the Alacranes Bajo and north of the Dumbbell Bajo. The Central Precinct and associated Elite Residential Groups are located on a broad hilltop with four other such areas surrounding it in each of the cardinal directions. Each of these, NEWS groups, are residential groups with approximately 100 residences in each. Each residence is bounded by low albarradas, which may have formed bases for larger "living walls". These functioned to define residential space and possibly land ownership. Each bounded area was also large enough to support household level agricultural production tying each household into larger market systems.

At the bases of these hilltop residential groups are ditched intensive agricultural systems that likely were controlled by the ruling elites of Xnoha and would have employed labor from the surrounding settlement zone.

[63] *Discussant*

[30] *Chair*

Gudino, Alejandra (University of Missouri)

[350] *Shared Spaces, Shared Stories: A Reflection on Archeology and Community from the Ecuadorian Rain Forest*

This presentation attempts to reflect on the dynamic relationship between archeology and communities, based on the 17 years of field experience of the Palmitopamba Archeological Project, in NW Pichincha Province, Ecuador. The success and challenges of our experience demonstrate the need for a more reflective archeology that aspire to be participatory in its pedagogy, outreach and methodology. An archeology that feels comfortable implementing multivocality as a framework to produce work that "is inclusive and that tells multifaceted stories" (Joyce, 2002:1-11).

[350] *Chair*

Guebard, Matthew (National Park Service)

[85] *Architectural Documentation at the Montezuma Castle and Casa Grande Ruins National Monuments*

This presentation will discuss a partnership between the National Park Service and the University of New Mexico for in-depth documentation of ancient architecture at the Montezuma Castle cliff dwelling and Casa Grande great house. While the project was initially developed to produce a management plan, it also resulted in the discovery of decorative plaster washes. Colored washes are the primary form of decoration on interior walls and may provide clues to the visual symbolism associated with certain colors and visual effects found on interior walls at both sites. This presentation will highlight efforts to document, manage and interpret these washes.

[85] *Chair*

Guengerich, Anna (Vanderbilt University)

[18] *Houses and the Puzzle of "Public Space" in Ceja de Selva Communities of Northeastern Peru*

Researchers seeking to systematically compare built environments across the late Andean highlands have frequently noted the absence of monumental corporate architecture at hilltop sites. A number of alternative candidates that fulfilled the function of public architecture have therefore been proposed, such as communal tombs and large perimeter walls. In this paper, I explore the question of how social communities were created in built environments that lacked architectural settings capable of accommodating community-wide gatherings. In the context of the ceja de selva of northeastern Peru, I propose that houses—rather than special-purpose structures—were the principal element that fulfilled this function for communities in this region. The large scale and elaborate exteriors of houses brought communities together during the events surrounding the initial construction process, but also as individuals continue to experience their façades as they moved through space on a daily basis. At the same time, the architectural similarities between houses and ceremonial structures reinforced the connection between household groups and spaces of shared value. In sum, these built environments provide a perspective not only on what "public space" meant in the LIP, but also how we conceptualize its relationship to domestic space more generally.

[59] *Discussant*

[18] *Chair*

Guengerich, Anna [98] see Crandall, James

Guerra, Rafael [280] see Qiu, Yijia

Guerra, Rafael [371] see Nachamie, Abel

Guest, Nicholas [211] see Donnermeyer, Christopher

Guildford, Roxanne (University of Edinburgh)

[34] Beyond Counting Sheep: An Interdisciplinary Review of Faunal Assemblages in the British Pastoral Landscape

One of the challenges in zooarchaeological research is to advance new methods of understanding animal husbandry within the past socio-ecological context. Intensification of wool production is typically evidenced in the archaeological record by the increase of sheep remains in species abundance and adult mortality; however, with increasingly complex data sets, classical quantitative methods of taxonomic abundance may not provide robust explanations of human activity based on herd structures alone. The application of computational archaeology to faunal analysis allows for the study of intra- and inter-site variation, as well as the investigation of regional trends with environmental, geographic, and temporal variables. To further explore the changes in sheep husbandry related to wool production in Medieval Britain, this project aims to provide reproducible analysis using computational archaeology to refine interpretations that reject generalizations and test the validity of patterns found in the archaeological record. Data sets from published assemblages are presented in case studies that move beyond regional descriptions of pastoral systems to assess faunal and environmental data with statistical analysis and models. The relevance of computational methods for zooarchaeology is critical for sharing complex data across disciplines, formalizing approaches in quantification, building new research questions, and informing perspectives on site variability.

Guilfoyle, David (Applied Archaeology International), Jen Smith (University of California, Berkeley), Genevieve Carey (Applied Archaeology International), Jenna May (Eyak Cultural Foundation) and Robert Bearheart (Applied Archaeology International)

[17] Connecting Language, Places, Stories, and Archaeology for Landscape-Level Heritage Preservation: A Collaborative Archaeology Case Study of Eyak Lake, Alaska

This paper explores a methodological process for documenting the intricate relationships between language, place names, stories, and cultural places for effective landscape heritage preservation. This multi-disciplinary program, led by the Eyak community, is focused on the analysis of place-based data and cultural knowledge systems, as the basis for protecting and mitigating the threats and impacts upon Eyak heritage and land; embedded within a broader program of language revitalization and community resilience. As a community initiative, it is the language learning process itself that directs the community-based research into the way place names and stories are organized and structured; it is the method of revealing aspects of underlying knowledge systems and cultural principles embedded in landscape. When integrated with archaeological methods and regional studies, the process also provides insights into patterns of traditional settlement and traditional management practices, and how they relate to these cultural systems and layers. This methodological process outlined here is applied in an assessment of Eyak Lake as a collaborative, strategic response to a range of direct and indirect threats to heritage places - including traditional burial grounds and salmon habitats - within this cultural landscape.

Guirguis, Michele [321] see Zalloua, Pierre

Guiry, Eric [110] see Royle, Thomas

Guiry, Eric (Trent University) and Trevor Orchard (University of Toronto Mississauga)

[169] Hunting Varmints, or Tasty Morsels?: An Isotopic Survey of Iroquoian Garden Hunting

We use stable carbon and nitrogen analyses of over 500 archaeological animal bones to explore the relationship between ancient farming practices and local wild fauna in the context of Iroquoian horticulture in Southern Ontario (AD 1000-1600). By creating openings in the forest and introducing non-local plants, Iroquoian farming served to increase habitat diversity and foraging opportunities for wild animals, potentially attracting a wide range of mammal and bird species that could then be hunted and incorporated into local subsistence. While such garden hunting has long been theorized for Iroquoian sites in the region, it has been difficult to securely identify garden-hunted specimens in the archaeological record. Because maize, a key plant grown in these gardens, has a distinctive isotopic signature, animals feeding within a garden-subsidized ecosystem for a significant portion of their lives should be isotopically distinctive. By comparing the relative importance of maize in the diets of different wild taxa, we identify which species were most effective at exploiting ancient human food systems and relate this to the widely theorized practice of garden hunting. These findings also shed new light on the role of indigenous farming practices in the ecological structure of ancient forest ecosystems.

Guiterman, Christopher [220] see Towner, Ronald

Gullapalli, Praveena (Rhode Island College)**[161] Taking Things Apart: Reconfiguring Production Practices in South India**

In this paper I explore how taking apart the bundle of practices grouped together as 'metallurgy' might lead to a better understanding of not only that technology but also of ancient South Indian society. While cross-craft approaches to technologies allow archaeologists to explore potential relationships between production activities that otherwise might be investigated independently or in isolation, disaggregating the processes involved in any given craft can further their potential to illuminate past production practices. A focus on constituent practices—rather than on the bundle that constitutes each craft—draws our attention to how such practices might be present not only in varied crafts but also in other, non-craft, activities; to how such activities might reflect divergent, locally specific bundles of practices. This tracing of discrete components can be potentially useful in South India and especially regarding the development of local metallurgical productive activities. The archaeological landscape there presents evidence attesting to a range of production practices that do not easily fit those boundaries of craft production and technological development usually used by archaeologists. This mis-fit reveals a glimpse into a possible alternative crafting framework, perhaps one better suited to South India.

Gunchinsuren, Biambaa [416] see Gillam, J. Christopher

Guo, Meng (China Northwest University)**[214] A Primary Study of Ceramic Technology at the Shimao Site**

The Shimao site was a significant stone-walled settlement in Northern China dating to around 2000 BCE. In recent excavations, vast amounts of pottery sherds were unearthed from Huangchengtai, the stone-walled platform which was encircled by both the interior and exterior stone walls. Around 200 pottery sherds were examined by naked eye or hand magnifier, meanwhile samples were analyzed with petrography and X-radiography. We found that some pots were made by coiling or molding, but throwing was also a critical primary forming technique of certain shapes. Pots thrown on the wheel were usually trimmed on the wheel as well, while paddling was also a significant secondary forming technique for pots made by coiling. The dark gray color of most sherds suggested that they were cooled in a reducing atmosphere. The smudging technique was employed when a metallic black color was desired.

Gupta, Neha (University of New Brunswick), Susan Blair (University of New Brunswick) and Ramona Nicholas (University of New Brunswick)**[77] What We See, What We Don't See: Spatial Data Quality in Large Digital Archaeological Collections**

In an era of cyber-infrastructures, large digital archaeological collections have the potential to enable deep insights into human history. Yet the life of digital archaeological data post-field recovery is not well understood, and consequently, issues of spatial data quality in large digital archaeological collections have been under-examined. Archaeological practices impact the quality of spatial data and any subsequent analysis and interpretation of those data. We shed light on the quality of digital archaeological data from the perspective of post-colonial and Indigenous archaeology. We re-conceptualize maps in a representational model to examine the role of digital archaeological data and simple map visualization as a part of heritage management in New Brunswick, Canada. We argue that critical examination of maps and map-forms can open broader discussion on the interweaving of power, space and knowledge in archaeology, which in turn, can create opportunities for addressing the quality of digital archaeological data and deepening our understanding of the past.

[344] Discussant

Gupta, Neha [87] see Blair, Susan

Gurova, Maria [392] see Bonsall, Clive

Gustas, Robert (University of Victoria)**[378] Comparison of Circuit and Least Cost Path Modeling for Maritime Peopling of the Americas**

Despite much recent scholarship there is still much to learn about the exact method, route, and timing of the Peopling of the New World. Geographic Information System (GIS) based analytical methods provide opportunities to model where and when coastal peopling events could have taken place. I will compare the results of traditional Least Cost Path models to Circuit Theory models and discuss how these techniques can be used to inform site prospection efforts. While previous scholarship has examined and compared the application of Least Cost Path and Circuit Theory models to terrestrial movement events, substantially less work has been done to compare the use of these methods in large scale maritime migration events in the deep past. To this end, I analyze results produced by both these methods using reconstructed coastlines (accounting for sea level change) as they would have existed 15,000 years BP, from multiple locations on the coast of British Columbia; including Barkley Sound, Prince Rupert Harbour, and the Dundas Islands. The results of this analysis as well as the strengths and weakness of both approaches are discussed in the context of early movement events in the Americas.

Gutierrez, Gabriela [172] see Gaumnitz, Kaylee

Gutiérrez, Gerardo (University of Colorado at Boulder, Department of Anthropology)

[39] *The Authentication of the Codex Maya of Mexico, Previously Known as the Grolier, through Scientific Analysis*
After 45 years of polemic about the Codex Grolier, the Instituto Nacional de Antropología e Historia of Mexico finally decided to undertake major scientific studies on this document to evaluate its authenticity. During 2017, several research teams analyzed the codex using both non-invasive and invasive methods ultimately producing the largest scientific corpus of data ever created for any Mesoamerican codex. Here, we present the results of testing done by the Colors of History Project and Laboratory of the University of Colorado, Boulder. The presence of the pigment Maya Blue was confirmed; no modern inks or materials were found, and three additional AMS C14 dates placed the manufacture of the document in the Early Postclassic period. All of the material evidence and analyses discount the notion that this document was a fabrication of the 20th century and instead support the authenticity of the Codex Maya of Mexico.

[39]

Chair

Gutiérrez, Gerardo [39] see Jurado, Erik

Gutiérrez, Gerardo [39] see Sanders, Mariana

Gutierrez, Isaac [254] see Chavarria, Benji

Gutierrez, Jesse [254] see Chavarria, Benji

Gutierrez, María (CONICET, INCUAPA), Gustavo Martínez (CONICET, INCUAPA), María Clara Álvarez (CONICET, INCUAPA), Cristian A. Kaufmann (CONICET, INCUAPA) and Daniel J. Rafuse (CONICET, INCUAPA)

[285] *New Surveys along the Middle Basin of the Quequén Grande River, Pampas Region (Argentina)*

During the last 30 years, archaeological research in the middle course of the Quequén Grande River, Pampas region (Argentina), has provided a wealth of data, both in the density of recorded archaeological sites, and in its chronological representation, which spans from the Late Pleistocene to Late Holocene (10,250–1500 14C years BP). This is true of the archaeological localities Paso Otero and Zanjón Seco. Given this background, new surveys carried out recently in areas near these localities assumed the finding of a significant number of sites with diverse chronologies. However, the recorded findings did not yield the results according to these expectations. In this paper we discuss the disparity in results found along different sectors of the river. The number of findings recorded on the surface is the result of lower archaeological visibility than those often recorded decades ago, produced by changes in the modern plowing methods (no-till farming). The lack of materials registered in stratigraphic position (sites located along the river banks) likely corresponds to a predominance, in some sectors of the stratigraphic sequences, of deeper sections of paleo-lakes, not feasible for human occupation, and with a low representation of stable buried soils.

Gutierrez, Patricio (ENAH - PAPACSUM), Alfonso Gastelum (ICAT-UNAM), José Luis Punzo Díaz (INAH Michoacán), Lissandra González (PAPACSUM) and Dante Martínez (ENAH - PAPACSUM)

[375] *A Possible Sculptural Tradition in Eastern Michoacán and Western State of México*

Scant attention has been paid to the past of the current border of the states of Michoacán and Estado de México, though there has been a proposed local archaeological traditions for the region in order to understand archaeological contexts. There are archaeological data about large carved stone sculptures which can lay the foundations to start a regional archaeological study. In the High Cutzamala River Basin region, there are around fifteen carved stone sculptures found between its northwest end (San Felipe Los Alzati, Michoacán) and its southeast end (San Lucas del Pulque, Estado de México). Some of them are in regional museums, community museums, and private collections. These impressive sculptures have been described since the mid-20th century, attributing them to its aesthetic similarity to "snake heads" or "rattle snakes" and their shapes have been compared to sculptures from distant regions. However, these studies have not placed these important monuments in a firm spatial and temporal archaeological context. In this study, I present a detailed typological study to develop a first categorization, identify them in time and space, and determine the technological and symbolic features they express.

Gutiérrez Martínez, María de la Luz [369] see Diaz-Andreu, Margarita

Guzzo Falci, Catarina (Leiden University), Marlieke Ernst (Leiden University), Thomas Breukel (Leiden University) and Corinne L. Hofman (Leiden University)

[363] *Transferable Skills: Crafts and Knowledge Transmission in the Ancient Caribbean*

In this paper, we examine the development of craftsmanship and knowledge transmission in the pre-colonial and

early colonial Caribbean. By adopting a chaîne opératoire approach to different crafts, we aim to investigate processes of circulation of materials and knowledge between different social groups. We focus on multiple scales of interaction through time, as illustrated by 1) the exchange of exotic gemstone ornaments across the eastern Caribbean (ca. AD 0-400), 2) the production and circulation of ground stone celts on the northwest of the Dominican Republic (AD 1200-1500), and 3) the development of transcultural ceramics from one of the first large Spanish settlements of the New World (Dominican Republic, AD 1492-1562). Combined with ethnographic and ethnohistoric sources, this approach allows us to evaluate possible social mechanisms responsible for raw material, typo-technological, and skill variability in these artefact repertoires.

Gwenaëlle, Goude [195] see Rossi, Stefano

Haakanson, Sven [31] see Fitzhugh, Ben

Haakanson, Sven

[138] *Discussant*

Haaland, Deb

[342] *Discussant*

Haas, Hannah [368] see Braje, Todd

Haas, Randy [175] see Brantingham, P. Jeffrey

Haas, Randy (University of California Davis), Luis Flores (University of California Davis), Bryna Hull (University of California Davis), Nathaniel Kitchel (Dartmouth College) and Patricia McNeill (University of California Davis)

[409] *Preliminary Investigations of Archaeological Vicuña Drives on the Andean Altiplano*

Archaeological game drives are well documented in many parts of the world but are virtually unknown in the Andes Mountains despite millennia of large-game hunting. Using satellite imagery, we identify nearly 200 V-shaped, stone-wall structures that exhibit qualitative and quantitative properties of game drives. Furthermore the features coincide with the habitat of vicuña—a species of wild camelid that lives at high altitudes. Ground observations were made at ten of these remotely identified structures and excavations at two of them. Combined with ethnoarchaeological observations of modern Aymara vicuña drives, the archaeological results suggest that prehistoric communities of 30-100 individuals used the structures to capture up to 50 vicuña in a single event. We conclude with a discussion of the implications for Andean economics and the evolution of human cooperation.

Habiba, Habiba [127] see Scholnick, Jonathan

Habicht-Mauche, Judith (UC-Santa Cruz)

[25] *The Western Connection: Using Comparative NAA Data to Source Glaze Wares from Tijeras Pueblo*

Non-local glaze-painted pottery types, such as Heshotautla and Kwakina polychromes, comprise more than 20% of the decorated ceramic assemblage at Tijeras Pueblo (LA581). Despite Tijeras Pueblo's location at the eastern edge of the Albuquerque basin in the central Rio Grande region, these pottery types exhibit strong stylistic and technological affinities to contemporaneous pottery produced across broad parts of the Western Pueblo area, including the Western Keres, greater Zuni, and Upper Little Colorado regions. Provenance studies, including NAA, suggest that this "Western-style" pottery at Tijeras is a mix of imported vessels and local copies. In this paper we compare the NAA chemical compositional data from Western-style Glaze Wares recovered from Tijeras Pueblo with recently compiled multi-regional NAA ceramic databases from across the Western Pueblo area of the American Southwest in order to better pinpoint the origin of the imported vessels. These results have the potential to significantly impact our understanding of the history of migration and processes of community formation at Tijeras and throughout the central Rio Grande during the 14th century.

[25] *Chair*

Habicht-Mauche, Judith [188] see Duff, Andrew

Habu, Junko (University of California Berkeley)

- [74] *Long-Term Perspectives on the Resilience of Food and Socioeconomic Systems in Prehistoric Japan: Examples from the Early and Middle Jomon Periods*

This paper argues that the examination of rich archaeological data from the Jomon period of prehistoric Japan can contribute to the recent discussion of the resilience of food and socioeconomic systems. Theories of resilience which consider the importance of adaptive cycles and panarchical connections provide an ecological viewpoint from which we can pose the question of why diversification and decentralization, along with several other traits, are crucial for systems' resilience. Discussions of local and traditional ecological knowledge (LEK and TEK) have revealed the limitations of a "scientific" understanding of the efficiency of food production systems, and calls for an integrative understanding of food production in relation to the whole range of human-environmental interaction, including the role of material culture. In particular, physical and social landscapes are inextricably linked to LEK, TEK, and material culture that contain bundles of practices, meanings, attributes and values. Using examples from northeastern Japan, I argue that understanding continuity and change in landscape use from prehistoric times to the present may be key in developing proposals for alternative food production systems that are both resilient and sustainable.

- [74] *Chair*

Hackbarth, Mark [189] see Howard, Alex

Hackenberger, Steven (Central Washington University) and Jon Shellenberger (Yakama Nation)

- [122] *Cultural Landscape Studies: Central Washington Yakama Nation Partnerships*

This is our 15th year of formal collaboration between Central Washington University (CWU) Department of Anthropology and the Yakama Nation Cultural Resource programs (YNRP). CWU (Ellensburg) is located in the center of Ceded Lands of the YN and an hour from YN tribal headquarters (Toppenish). Contracts, learning agreements, lecture programs, internships, and field school sessions have involved three CWU academic programs and four YNRP. The majority of our partnerships involve: inventory, mapping, monitoring, damage assessment, supporting databases, and site assessment. Two initiatives are highlighted: 1) lidar and ground mapping of house settlements, and 2) ground penetrating radar studies of sites with cooking features and house features. Airborne Lidar coverage has grown and improved in resolution due to extensive wildlife and fisheries studies and habitat improvements. This coverage is aiding mapping and monitoring of house settlements that remain threatened by looting, grazing and fire management. Pilot projects using ground penetrating radar are proving useful for evaluating type and number of cooking/heating features outside and inside of small and large house features. While sources of funding and support are under threat, our working relationships stretch our capabilities, build resilience, and add educational and cultural outcomes for the communities we serve.

Hadden, Carla [34] see Reitz, Elizabeth

Haddow, Scott [388] see Twiss, Katheryn

Hadley, Dawn (University of York) and Elizabeth Craig-Atkins (University of Sheffield)

- [379] *The 'Bitter' Death of Children: Health, Welfare and the Funerary Treatment of Infants and Young Children in Christian Anglo-Saxon Cemeteries*

This paper will discuss the burials of infants and young children in the earliest Christian cemeteries in Anglo-Saxon England (10th and 11th centuries CE). While in earlier pagan periods the burials of the very youngest members of communities are conspicuous by their paucity, the earliest Christian cemeteries have a much more representative complement of child burials. Yet the burials of such individuals are still notably distinct, with many being interred in clusters close to the walls of churches, or around, or even within, prominent adult burials, often those of males. In this paper we explore the reasons for this patterning, incorporating stable isotope evidence that appears to reveal different health and weaning experiences for infants buried in distinctive locations, which may help to explain their funerary treatment. We also argue that the form of the burials of children may have played a part in ensuring their welfare in the afterlife, and also the welfare of the communities among which they had lived and died.

Haggis, Donald [404] see Scarry, C. Margaret

Hahn, Christina

- [168] *Rethinking Ceramic Attribute Technology during the Late Woodland Period in Southwest Ohio*

The focus of this research is the variability of ceramics from Late Woodland (A.D. 400-1000) sites in the Little Miami River Valley in Hamilton County, Ohio. Few Late Woodland features have been recovered and little is known about the ceramic technology in southwest Ohio, but these artifacts still play a major role in understanding prehistoric societies. The Hahn's Field (33Ha10) and Firehouse (33Ha419) sites were selected to show how changes in ceramic technology affected vessel attributes. Variability in temper, exterior-surface, interior-surface, weight, maximum thickness, burn patterns and thermal features were examined to determine differences between sites. Radiocarbon dating provided a Late Woodland context to the features and ceramic attributes, and x-ray diffraction

analysis provided a bases to develop inferences about resource selection through key mineral identifications. Considerable differences between Hahn's Field and Firehouse ceramic technology were determined in this study. Specifically, variability in temper, exterior-surfaces, burning, and thermal features of sherds indicates that change in ceramic attributes occurred on a shorter timescale than previous models suggest. Combining ceramic analyses with dating results revealed that Hahn's Field and Firehouse were contemporaneous (A.D. 392-564). Finally, mineral identifications supported the inference that local resources were used to produce these ceramics.

Haines, Helen (Trent University)

[284] *Moderator*

Haines, Jeremy (Cococino National Forest) and S. Joey LaValley (Logan Simpson)

[189] *The Other Black on White: Aspen Carvings of the Flagstaff Region*

Once a widespread industry throughout the southwest, sheepherding has left its mark, albeit a delible and dwindling one, throughout the high elevation mountains of the American southwest. Aspen carvings made by sheepherders provide a window into the daily lives, ethnicity, politics, and personal sentiments of these men. In the 1990s through the 2000s archaeologists from the Coconino National Forest led volunteers into the aspen groves in the mountains surrounding of Flagstaff, Arizona to document hundreds of names, dates, and images carved into the aspens by Basque and Hispanic sheepherders during the early to mid-twentieth century. The work has continued through several contract archaeology projects on the forest. This paper reports the results of these efforts, provides a preliminary analysis of the spatial and temporal distribution of these dendroglyphs, and attempts to apply these glyphs towards understanding the people who cultivated the sheepherding industry of Flagstaff.

Haines, Julia (University of Virginia)

[347] *Mauritian Indenture in the Indian Ocean*

This paper presents a case study of an African/Indian Ocean plantation that focuses on daily lives of indentured laborers during the 19th century. Mauritius's Bras d'Eau National Park was a sugar estate that functioned from 1786 to 1868. During the 1830s, French colonial landowners shifted from a reliance on enslaved laborers primarily from Mozambique and Madagascar, to indentured laborers primarily from India. Four hundred and fifty thousand men, women and children traveled to Mauritius on five-year indenture contracts to live and work on sugar estates. Domestic artifacts from the plantation village, such as Indian smoking pipes, glass bangle fragments, buttons from second-hand British military uniforms, cowrie shell currencies, lotus bowls, and traces of a pulses-and-rice-based diet are broadly representative of long-standing Indian Ocean cultural networks. On the other hand, the organization of village housing reflects laborers' preferences not just for individual homes over communal barracks, but for houses adapted to the local environment and climate based on Indian health practices and the western concept of miasma. As such, the landscape and material culture of Bras d'Eau are expressions of indentured immigrant identities that are specific to Mauritius, but that also fit within Indian Ocean and European colonial sensibilities.

Hair, Amy (The University of Southern Mississippi), Gabriel Wrobel (Michigan State University) and Jack Biggs (Michigan State University)

[134] *The Maya Cranial Photogrammetry Project: A Look at Ethics and Best Practices*

The Maya Cranial Photogrammetry Project consists of a database of digitized crania that can be used to investigate questions related to biological and cultural histories. The shape of human remains reflects a complex interplay between the environment and genetics, and thus can be used to reconstruct evolutionary processes. Typical methods rely on obtaining metric data directly from the physical remains, however, poor preservation and prolonged access have proven challenging. 3D modeling technologies have emerged and made it possible to preserve the remains and access collections remotely. Despite these victories, digital data has manifested its own challenges, such as; management, preservation, and of particular concern when discussing digitized human remains, security and access. Utilizing crania from Tipu, a Colonial mission site located in western Belize, 3D models were created using photogrammetry and craniometric data were produced digitally. This paper does not aim to address the biological and cultural transitions occurring in the contact period, but instead use the growing database as an opportunity to explore guidelines and best practices in the management of digitally produced and recorded data.

Hajdu, Tamás [126] see Giblin, Julia

Hajic, Edwin (GeoArc Research), Andrew Martin (Cultural Resource Analysts, Inc.) and Paul Bundy (Cultural Resource Analysts, Inc.)

[47] *Honing an Integrated Approach to Geoarchaeological Research in Alluvial Environments of the Lower Ohio River Valley*

Identification and interpretation of buried cultural deposits in alluvial settings is improved by an integrated approach that considers the area at an appropriate scale in line with prehistoric land use; applies key underlying concepts; and utilizes multiple methodologies of subsurface investigation, laboratory analysis, and environmental modeling. Success at finer resolution depends on recognition that a "floodplain" represents a range of depositional environments that in the stratigraphic record have a varying potential to contain intact cultural deposits. Key concepts include identification and significance of alluvial veneers, facies analysis, and dynamic modeling of soil - evolution, -facies, -stratigraphy and -geomorphology. Integrated methods and techniques of the approach include the use of LiDAR-based digital elevation models; graphic sediment soil logs; and dark soil color distinctions that

reveal stacked and welded upper sola. Drawn from work in progress in the Knob Creek Bottom of the Ohio River Valley, example results show: 1. A previously unrecognized soil complex of three buried soils; 2. Subtle hill slope segment differences in the natural levee environment that have soil-stratigraphic and -morphologic consequences; and, among others, 3. A previously undifferentiated fine grain terrace sediment assemblage that is divisible into six lithofacies with prehistoric settlement, activity, discovery and other archaeological implications.

Halcrow, Sian [27] see Tayles, Nancy

Halcrow, Sian (University of Otago, New Zealand), Kate Domett (James Cook University), Jennifer Newton (Trent University), Thanik Lertcharnrit (Silpakorn University) and Louise Shewan (University of Melbourne)

[317] Ethical Issues of Bioarchaeology in Southeast Asia

Since the 1990s, there has been an increase in bioarchaeological research in many parts of Southeast Asia conducted by both locals and non-locals. Southeast Asian countries are characterised by varied social, cultural, and political histories, but there are also some broad similarities in terms of poor economic development that limits much local research, strong nationalism, and rigid bureaucratic procedures for research. All have implications for the future of bioarchaeological research. Despite increasing growth in the field, the ethics of the practice of bioarchaeology in this region remain relatively underexplored. This paper presents some of the main ethical issues of research with human remains in the region focusing on the countries of Thailand, Myanmar, and Cambodia, from a non-local and local researcher viewpoint. We review a range of ethical issues, including the varied way different cultures respond to bioarchaeological work, local and non-local partnership in research, community archaeology, bioarchaeological methods including post-excavation management, and looting of archaeological sites. With the recent development of local expertise in bioarchaeology in the region, the repatriation of skeletal samples, the increase in local training, and partnerships between local and non-local bioarchaeologists, there is much promise for the further development of local research in the field.

Hale, Micah (Dudek)

[235] Discussant

Haley, Cambria [112] see Perkins, Jeremiah

Halford, Fredrick (BLM, Idaho Deputy Preservation Officer/State Archaeologist) and Jayson Mурготио (BLM, Idaho GIS Specialist)

[88] Getting Out of the Box: New Horizons for Cultural Resources Data Management and Analyses

Though making great strides over the past 50 years, Section 106, the primary driver of Cultural Resource Management (CRM), is still boxed in by rote inventory and unimaginative interpretation and implementation. This poster details a national initiative by the Bureau of Land Management to create cultural heritage resource data standards, which allow the application of more rigorous data management principles to landscape level planning and data modeling across the Western United States. Using a systematic attribution structure and ubiquitous domain values, the standard facilitates proactive versus reactive resource assessments, allows for advanced querying and geo-statistical analysis, and enables development of appropriate treatments of cultural heritage values. This poster exhibits the BLM national CRM standard and associated modeling tools, showing ways we can break out of the box through standardized data management and applied analytical applications.

Hall, Amanda (University of Florida)

[362] Rewriting Narratives by Challenging Old Ideas: The Potential in Applying Recent Innovations in Archaeology to Legacy Collections.

In the 1970s and 1980s, the Army Corp of Engineers Mobile District funded excavations in Mississippi to salvage a number of Native American sites along the Tombigbee River from the construction of the Tennessee-Tombigbee River lock and dam complex. Three of these sites, Tibbee Creek (22Lo600), Kellogg (22Cl527), and Yarborough (22Cl814) are multi-component farmstead collections that have been housed at the Cobb Curation Laboratory at Mississippi State University for decades. Aside from site reports, the collections have not received in-depth research inquiries. However, advancements in theoretical approaches and new concepts coupled by methodological and technological innovations offer ideal opportunities to pull these collections off the shelves and "re-excavate" to mine fresh research regarding cultural patterns and drivers of change in the area during the Late Woodland and Early Mississippian Periods. At the time excavations were conducted, migration was rejected by most as a means for explaining culture change because of its unpredictable nature and the difficulties it presented in the archaeological record. Using the assemblages from the three sites, this preliminary paper examines what new research questions and analyses could potentially reveal regarding the migration of Mississippian peoples into the area during the Early Mississippian Period (A.D. 1000-1100).

[362] Chair

Hall, Sarah (Arizona State University)

- [9] *Bodies Apart: Dissection and Embodied Structural Violence in a Historic Skeletal Assemblage from San Francisco*

Historic-era skeletal samples from the United States routinely reflect marginalized and vulnerable populations, many of which were also subject to dissection, a practice widely considered a form of desecration in the nineteenth century. Using historic and osteological data from a skeletal assemblage (MNI=25) at Point San Jose in San Francisco, CA (AD 1863-1903), this work builds upon previous scholarship to discuss the marginalized social identities of the individuals within the assemblage. The commingled assemblage at Point San Jose comprised thousands of human bones, many with cut mark damage, suggesting they were used for anatomical dissection. Assessment of biological characteristics suggested that individuals of non-European ancestry were overrepresented based on late nineteenth-century census data from the Bay Area. This study explores the ways structural violence is embodied in these skeletal remains during life and after death using several lines of evidence, including isotopic analyses of diet and migration, burial context, and osteological evidence of dissection. The ensuing discussion of embodiment and postmortem agency is critically applied not only to historic postmortem examinations but also to the excavation and analytical methods used for this assemblage.

Halligan, Jessi (Florida State University)

- [33] *Coastal Paleoindians in the Southeastern US? Envisioning Early People on the Now-Drowned Continental Shelves*

Archaeological data have demonstrated that the Southeastern United States were occupied by at least 14,550 years ago, but evidence of these first people is limited to far inland and upland settings as more than half of Florida's peninsula was drowned between 18,000-5500 cal BP. Recent models suggest that at least some of the first Americans may have arrived by coast and may have colonized the continent from the margins inward. Human behavioral ecology in combination with recently-refined paleoenvironmental reconstructions of the Florida Gulf Coast and the known pre-9500 cal BP archaeological record can be used to discuss when and where coastal opportunities for the first Floridians would have been greatest and discuss potential early coastal lifeways on the now-submerged continental shelf.

- [171] *Chair*

Halligan, Jessi [171] see Wilson, David

Halling, Christine (Louisiana Department of Justice)

- [160] *A Case Study of Legal and Practical Pitfalls of Forensic Archaeology Recovery of Human Remains from a New Orleans Pauper Cemetery*

Many coroners' offices in the State of Louisiana have a contract for interring unclaimed or unidentified individuals, keeping their coolers clear for new bodies. Therefore, the public relies on interment to document the location of the body in the event that family members require disinterment in the future. When these contracts are with private companies, questions of ownership and access to the records may arise. Just such a situation has occurred in New Orleans, Louisiana, raising such issues as: Who has the right to access the interment information? In the event of a disinterment, what parties are responsible for assisting in the location and recovery of the remains? When there are incomplete or inaccurate records, or multiple interments in a single space, what precautions must be observed with regard to other interments? Do the dead have rights that must be respected? In this case study, an experience with a New Orleans pauper's cemetery and the successful excavation and disinterment of a specific individual is employed to address these questions and more.

- [60] *Discussant*

Halmhofer, Stephanie

- [376] *Discussant*

- [215] *Chair*

Halperin, Christina [111] see Flynn-Arajdal, Yasmine

Halperin, Christina (Université de Montréal)

- [199] *Convergence Zone Politics and Cultural Affiliations at the Archaeological Site of Ucanal, Petén, Guatemala*

The Maya archaeological site of Ucanal is located in Petén, Guatemala, close to the contemporary border with Belize. In Pre-Columbian times, the site also sat at the borders of some of the largest political centers, such as Caracol (Belize) and Naranjo (Peten, Guatemala). Entangled between these dominant centers and with ties to peoples in the Upper Belize Valley and the Petexbatún region in Guatemala, Ucanal was arguably a critical convergence zone of political and cultural interaction. This paper synthesizes three years of archaeological research at Ucanal to underscore the ways in which this small polity manoeuvred within and between different cultural affiliations and political networks. In considering monuments, prestige items, and common household items dating to the Late Classic and Terminal Classic periods, we find that the site's border status was more of a bridge than an edge.

[199] *Chair*

Ham, Allison, Haagen Klaus (George Mason University), Daniel Temple (George Mason University) and David Hunt (Smithsonian Institution)

[258] *Survivorship and Periosteal Lesion Activity at Pueblo Bonito and Hawikku: Examining the Biological Impact of Contact in the Ancestral Pueblo Southwest*

A consideration of periosteal lesion activity and its effect on the likelihood of survival can communicate a deeper understanding of major cultural-ecological transitions by elucidating the effect of heterogeneous frailty on the formation of a skeletal assemblage. This study tests the effects of Spanish contact on the association between survivorship and periosteal reactions in the Ancestral Pueblo Southwest by examining skeletal samples from Pueblo Bonito (AD 800-1200) and Hawikku (AD 1300-1680). The study hypothesizes that survivorship will differ based on lesion activity category – individuals with healed lesions will possess a survival advantage over those with active, mixed, or no lesions. Further, due to similarities in settlement environment and subsistence, the relationship between survivorship and periosteal lesions will not differ between the two sites. The results of the Kaplan-Meier survival analysis documented a significant difference between activity level and survivorship at both Pueblo Bonito and Hawikku. Individuals with healed lesions appear to possess a survival advantage over those with active, mixed, or no lesions. The results suggest that Spanish contact did not have an observable effect on the relationship between activity level and survivorship, potentially reflecting a broader trend between heterogeneous frailty and periosteal reactions in the archaeological record.

Hambly, Joanna [251] see Lees, William

Hamerow, Helena [102] see Stroud, Elizabeth

Hamilakis, Yannis (Brown University)

[83] *Food and Eating Practices as Affirmative Bio-politics on the Border*

In this paper, I will explore the role of provision, preparation, and consumption of food among undocumented border-crossers on the island of Lesbos in Greece. In the various migrant centres run by solidarity groups, cooking and eating become the embodied experiences that bind migrants and solidarians together. Relying on primary archaeological ethnography fieldwork, I will be tackling the following questions: (1) How do the materiality and corporeality of food provision, preparation, and consumption produce time and memory in the various border-crossing contexts?; (2) How do they define and redefine sociality and community, and shape understandings of the border and of the migrant experience?; and (3) What kind of bio-political effects do such material and corporeal phenomena produce, for migrants, solidarity groups, and local communities? Based on the insights gained from the anthropology and archaeology of food, sensoriality, and memory, and on the Deleuzian concept of the “assemblage” (redefined as “sensorial assemblage” – Hamilakis 2017), I will be claiming that food provision, preparation, and consumption on the border operate as affirmative bio-politics (cf. Esposito 2008): as a positive, affective and corporeal/multi-sensorial act of place-making and community-building, as well as an arena for trans-corporeal and trans-cultural flows, and political agency and emancipation.

[161] *Discussant*

Hamilton, Derek (Scottish Universities Environmental Research Centre), Kerry Sayle (Scottish Universities Environmental Research Centre) and Gordon Cook (Scottish Universities Environmental Research Centre)

[111] *Using Multiple Isotopic Analyses to Infer Population Mobility in Iron Age Britain*

This poster presents the ongoing results on isotopic research on Middle Iron Age (~400–200 cal BC) populations in Wessex and East Yorkshire. The multi-isotopic approach has been employed to infer population mobility for both the inhumed human population at a series of sites and the faunal assemblages from either the associated settlements or directly recovered from graves. A traditional ‘population’ approach allows us to investigate broad questions of human and animal movement, such as to what degree were livestock transported across the landscape? Additionally, a ‘differential’ approach (i.e. looking at the changes in the isotopic ratios in an individual through time) can help reconstruct the movements of individuals within the population and approach questions about individual mobility, social differentiation, and the treatment of the individual in death. The combination of these two approaches in a single research strategy, thus produces data at multiple scales that allow us to develop a robust narrative of the society.

Hamilton, Marcus (University of Texas at San Antonio)

[187] *The Paleoecology of the Mockingbird Gap Clovis site, New Mexico and Surrounding Region*

In this paper I discuss recent work at the Mockingbird Gap Clovis site, New Mexico, and the surrounding region. Our goal was to understand how Clovis hunter-gatherers utilized and adapted to the regional landscape and its available resources. Focusing on lithic raw material use, I show that the Clovis occupants of Mockingbird Gap had access to a wide diversity of high quality raw materials from a large area of the Southwest. Moreover, Clovis raw material network analysis across the continent suggests that Mockingbird Gap was an important link between the Southwest and Southern High Plains. This work shows that Clovis people in this region of the Southwest had an extensive and specific knowledge of the landscapes around them, and may well have had connections to other Clovis peoples in neighboring regions.

Hamley, Kit, Jacquelyn Gill (The University of Maine - Climate Change Institute), Kathryn Krasinski (Adelphi University - Department of Anthropology) and Daniel H. Sandweiss (The University of Maine - Climate Change Institute)

[48] Fire and Foxes: Investigations into a Pre-historic Human Presence in the Falkland Islands

The warrah (*Dusicyon australis*), also known as the Falkland Islands wolf, was the only terrestrial mammal native to the Falkland Islands when Europeans arrived in the seventeenth century. The lack of definitive evidence of a pre-European human presence, coupled with the expansive channel separating the islands from mainland South America, raises questions about how and when the extinct, endemic *D. australis* arrived in the islands. Two competing theories have been proposed to explain the presence of *D. australis* on the Falklands: 1) the warrah crossed a hypothetical ice bridge at the Last Glacial Maximum (21,000 B.P.) when sea level was lower than present, and 2) prehistoric humans traveling from southern South America brought the warrah to the Falklands via canoes. Through a combined paleoecological and archaeological approach we have begun investigating the potential prehistoric arrival of humans to the Falklands. At one remote island location the close association of numerous marine mammal and bird bone piles with an orders-of-magnitude increase in fire frequency and magnitude, coupled with the proximal presence of one locally sourced stone point, suggests that New Island may hold the earliest known evidence of pre-historic human arrival in the Falkland Islands.

Hammer, Emily [92] see Boles, Oliver

Hammerstedt, Scott (University of Oklahoma), Marc Levine (University of Oklahoma) and Amanda Regnier (University of Oklahoma)

[155] Multisensor Geophysical Survey of Monte Albán's Main Plaza

During the summer of 2017, we conducted a landscape-scale geophysical survey of the Main Plaza at Monte Albán, Oaxaca, Mexico. We obtained full coverage of the plaza with gradiometry, electrical resistance, and ground-penetrating radar and also generated a centimeter-level accuracy map using a drone and a robotic total station. The most prominent feature discovered was a buried building that we interpret as a probable temple. Survey results add to our archaeological understanding of Monte Albán, show the benefits of utilizing multiple technologies, and provide potential guidelines for heritage management.

Hampton, Ashley (University of Montana)

[308] Social-Relatedness and Power: Determining Lineages and Multi-Clan Connections within a Singular Housepit (HP54)

This paper focuses on understanding how lineage-based and clan-based connections structured labor patterns and access to prestige/power within a multi-generational housepit (HP54) over time. The Bridge River site (EeRI4), located in the Mid-Fraser Canyon, British Columbia, Canada, was generally egalitarian, but shows variation and situated power-differentials in terms of wealth and influence of individuals or groups based on familial, lineage, and/or clan connections across several generations. These relationships were likely negotiated both within households and externally between houses as well. Due to the longevity of occupation of HP54 (roughly 346 years), this housepit may be representative of long-lived kin groups who were connected to the initial construction of the housepit, and/or to each sequential expansion of the space. Clan-based resource connections and spatially-defined traditions were potentially passed down through generations, a possibility reinforced by the presence of multi-floor/multi-generational site furniture (e.g. in situ grinding stones). Through an examination of changing patterns in subsistence resource management and the use of space across these occupational floors, we examine micro- and macro-scale shifts in lineage-based connections or alliances at this household level in order to illuminate how such connections interplay with the development of prestige-based social distinctions and subsequent access to power.

[14] Chair

Hancock, Ronald G.V. [301] see Michelaki, Kostalena

Hangan, Margaret (Kaibab National Forest)

[189] Grazing on the Kaibab: Sheep Industry in Arizona

The domestic sheep industry played a very important economic role in the historic development of Arizona. This paper will give a brief overview of historic sheep grazing related sites found on the Kaibab National Forest and how they fit into the context of the historic sheep industry of Arizona.

Hanks, Bryan (University of Pittsburgh, Department of Anthropology)

[196] Conceptualizing Eurasian Steppe Space, Place and Movement

The scholarly contributions by David Anthony have added significantly to current understandings of prehistory in the Eurasian steppes. Drawing on multiple lines of evidence, ranging from historical sources, archaeological data, genetics and linguistics, he has developed intriguing, and at times, controversial models for social, economic, and technological developments in the steppes and adjacent regions. An important aspect of this work is that it has focused on developing better explanations for the movement of ideas, technologies, and people across the steppes. Looking forward, this paper draws on these important contributions and sets out several significant problems that

remain to be overcome in conceptualizing and examining the emergence of space, place and the flow of ideas, technology, and people across the steppes in prehistory.

Hanks, Bryan [409] see Canaday, Timothy

Hanna, Jonathan (Pennsylvania State University) and Christina Giovas (Simon Fraser University)

[35] An Landscape IFD: Predicting Archaeological Settlements from Grenada to St. Vincent, Eastern Caribbean

Building on the Caribbean-wide models presented in Giovas and Fitzpatrick (2014) and predictive models recently synthesized for Grenada, this study focuses on a fine-grained analysis of environmental and cultural factors affecting settlement locations in the multi-island/archipelagic region from St. Vincent and the Grenadines south through Carriacou and Grenada. We compiled an inventory of all archaeological sites in the area, designating a sub-sample of settlements for analysis based on availability of accurate data (ceramic types, radiocarbon dates, confirmed locations). A multivariate analysis of environmental data was then conducted on each settlement, including soil attributes, proximity to freshwater/stream beds, structure and sizes of marine environments (grasslands, reefs), and net primary productivity layers. Common variables were analyzed to discern which areas would be the most suitable in an unsettled landscape, and the timing of settlement for each area was then predicted using an IFD model. The model was iteratively tested and refined using the remaining site inventory locations. Stronger predictions of settlement patterns were made when an island-centric approach was set aside for a larger landscape perspective. Notably, the pattern of longevity seen at the earliest sites highlights potential Allee effect/conspecific density dependence factors that correlate to larger notions of cultural niche construction.

Hannigan, Elizabeth and Laura Heath-Stout (Boston University)

[149] Affording Archaeology: How the Cost of Field School Keeps Archaeology Exclusive

In response to the contemporary critiques about discrimination and inequality within the archaeological academic community, many individuals and advocacy groups have suggested field school scholarships as one tactic in promoting diversity in the field. In this paper, we will explore the costs of going to the field in various parts of the world, the strategies that archaeologists use to make fieldwork affordable, and the availability of scholarships. While creating these field school grants may provide the appearance of generating change, the reality is that there are an extremely limited number of these opportunities and that the financial allowance is inadequate to cover the cost of field schools. These scholarships allow academics to feel as though they are supporting diversity in archaeology while maintaining the white/cis/straight/upper-middle-class demographic of the field. These empty gestures hinder many potential archaeologists from gaining the experience necessary to finish their undergraduate degrees, conducting their own research, or finding employment in cultural resource management. The aim of this paper is to address one aspect of the institutionalized racism and discrimination exhibited by the archaeological community and to consider potential solutions to these problems.

Hanratty, Colleen (Maya Research Program), Thomas Guderjan (University of Texas at Tyler), Carlos Quiroz (Maya Research Program), Hollie Lincoln (Maya Research Program) and Kevin Austin (Maya Research Program)

[30] Understanding the Architectural, Ritual, and Temporal Dynamics of a Maya City: A Perspective from Xnoha, Belize

Over the past seven field seasons, the Blue Creek Archaeological Project has conducted extensive investigations of the residential and public architecture at the site of Xnoha, Belize. These excavations have revealed complex architectural sequences and ritual activities dating from the Late Preclassic to the Terminal Classic periods. This paper will summarize the data recovered from these excavations with particular focus on the site's architectural features and ritual deposits recovered from chultuns, caches, and burials.

Hanratty, Colleen [30] see Guderjan, Thomas

Hanselka, Kevin (Texas Department of Transportation), Leslie Bush (Macrobotanical Analysis, Manchaca, Texas) and Philip Dering (Texas State University, Department of Anthropology)

[36] Macrobotanical Perspectives on Earth Oven Use in the Lower Pecos Canyonlands, Texas

The tradition of cooking foods in earth ovens goes back at least 10,000 years in the Lower Pecos Canyonlands of southwest Texas. Throughout millennia earth ovens were used to transform otherwise inedible plants into food, fiber, and possibly beverages. The region's arid climate favors preservation of perishable materials in abundant dry rockshelters, allowing insight into past plant use generally not accessible in open-air sites where preservation of uncarbonized organic material is rare. Excavated earth oven features in sheltered sites in the Lower Pecos contain not only the partially-carbonized remains of plant foods, fuelwood, and packing material used in these facilities, but also post-oven discard deposits of largely uncarbonized botanical materials associated with other activities (e.g., fiber production, tool manufacture). This outstanding preservation provides a unique opportunity to evaluate pre- and post-oven plant processing and track behavioral chains involved in rendering plants into food and fiber artifacts. Using plant identifications obtained incidental to several research projects, we attempt to address the challenges of modeling prehistoric processing of plants with multiple uses (e.g., lechuguilla [*Agave lechuguilla*] and sotol [*Dasyliion* spp.] for both food and fiber); factors governing selection of particular plants for food, fiber, and fuel; and aspects of past environments.

Hansen, Neil [30] see King, Eleanor

Hansen, Richard [409] see Paine, Richard

Hanson, Diane (University of Alaska Anchorage)

[31] Clearing the Fog: Contributions to Central Aleutian Island Archaeology

Archaeological survey and excavation on Adak Island, Aleutian archipelago, Alaska were funded by NSF through the American Recovery and Reinvestment Act of 2009. The chance NSF and Anna Kerttula took on a small project in a remote location with a small crew had an unexpected and significant effect on the understanding of pre-Russian occupation and on the crew. While some upland sites were previously recorded, the reports were not considered credible by many archaeologists. This research demonstrated that these sites were numerous and occupied between 4000 years and the protohistoric period. Populations were much higher during the Neoglacial than previously supposed. The excavated house is similar to Arctic Small Tool tradition houses in the Eastern Aleutian Islands leading to a new proposal to determine if ASTT extends into a strictly maritime environment. The undergraduates and graduate students contributed to the project through their MA theses and one initiated PhD studies on an Aleutian project.

Hanson, Kelsey [245] see Odegaard, Nancy

Hanson, Kelsey (University of Arizona)

[318] Driving Us Nuts: Acorn Processing Experiments and the Impact of Mentorship and Yooper Wisdom

Jim Skibo has undeniably had a profound impact in archaeological method and theory, but he has had an even greater role in teaching and student mentorship, providing his students with a robust foundation infused with Yooper wisdom. In an homage to the theoretical and methodological foundations provided by Jim, this paper reviews an experimental archaeology project spearheaded by Jim and carried out by a team of his graduate students. Inspired by the results of lipid residue analyses that demonstrated the presence of nut lipids in early pottery, we developed an experimental protocol to evaluate the performance characteristics of processing acorns in ceramic vessels. Our results indicate that acorn oil can be effectively rendered at simmering temperatures like those afforded by low-fired ceramic vessels. In contrast, no oil is rendered when acorns are subjected to boiling temperatures. This paper outlines the results of these experiments, highlighting the importance of Jim's methodological and theoretical training and unwavering support in shaping research and career trajectories, especially my own.

[318] Chair

Hanson, Paul [45] see Mahoney, Gosia

Hanvey, Vanessa

[94] Morphometric Analysis and the Investigation of Communities of Stone Toolmakers

This paper will explore the usefulness of morphometric analysis when investigating how communities of stone toolmakers are embedded in and help construct their social landscape. Utilizing the concept of communities of practice, I intend to examine the culturally and historically situated nature of stone toolmakers through the analysis of their products. Morphometric analysis has the ability to preserve the complex three-dimensional morphology of artifacts; and the measurement of whole artifact forms may provide insights into geographic and temporal learning patterns of stone toolmakers. Specifically, I will investigate hafted bifaces created by communities of stone toolmakers during the Archaic period in southeastern North America because of the existence of spatial and temporal morphological trends in this tool type. Data from a preliminary study of Early Archaic hafted bifaces from a lithic manufacturing site in Kentucky will be discussed. Intensively occupied during the Early and Middle Archaic periods, site 15TR1 has extensive lithic deposits that represent all stages of manufacture. Hafted bifaces typed as Kirk and Kirk-Like make up approximately 70% of the total hafted biface assemblage (n=455). This paper presents analysis results and discusses how such an approach is useful when exploring communities of practice.

Hao, Side [361] see Li, Yinghua

Hard, Robert [263] see Whisenhunt, Mary

Hard, Robert (Univ of Texas at San Antonio), John Roney (Colinas Cultural Resource Consulting), A.C. MacWilliams (Independent Scholar), Mary Whisenhunt (University of Texas at San Antonio) and Karen Adams (Archaeobotanical Consultant)

[263] *The Sanchez Site: An Early Agricultural and Early Pithouse Period Cerro de Trincheras on the Upper Gila River, Arizona*

The Sanchez cerro de trincheras is situated on a 650-foot mountain above the Gila River in the eastern end of the Safford Valley, Arizona. The site contains about 130 rock rings clustered on and near the top of the ridge and has perimeter walls with an aggregate length of 1.5 km. Based on radiocarbon dating and the plain brown ware ceramics the site has both Early Agricultural period (800 B.C. – A.D. 50) and Early Pithouse period (A.D. 200-550) occupations. The Sanchez site has internal site organization, numerous features, and a constructed plaza and is relevant to questions regarding village formation, population aggregation, and the regional role of this cerro de trincheras.

Hard, Robert [370] see Carpenter, Michelle

Hardage, Sarah [218] see Gonzalez, Juan

Harder, David [66] see Walton, Lauren

Hardy, Thomas (University of Pennsylvania)

[233] *The Inca Transformation of the Lucre Basin*

In the study of archaic states and empires, much can be gained from analyzing how imperialist regimes transform and modify the landscape and built environment in the pursuit of their political goals. The Inca Empire, which expanded out of the Cusco Valley in the south-central Peruvian Andes ca. 1400 CE, provides an ideal case study to understand this process. However, this type of interrogation has rarely been applied towards understanding how the Inca consolidated their heartland. That is, how did the Inca manipulate the built environment to integrate local ethnic groups closer to the imperial capital itself? I examine this question using material from the Lucre Basin, approximately 30 km southeast of Cusco. Within a century of its integration, the Lucre Basin had been radically transformed through a series of construction projects and landscape modifications. I argue that this was done in ways to not only enforce and expand material dimensions of Inca power (i.e., through productive infrastructure), but also specifically structured the daily lived experience of non-Inca ethnic groups in the basin. In other words, things like buildings, terraces, and canals worked to transform notions of local sovereignty into structured experiences of subjugation.

Hargrave, Michael and Carey Baxter (USACE Engineer Research and Development Center)

[112] *Experimental Use of 3-D Data to Predict the Risk of Slumping at Monks Mound, Cahokia*

Monks Mound is the largest prehistoric mound north of Mexico, and is arguably the Cahokia World Heritage Site's most dramatic monument. Major slumps that occurred in 2007 did significant damage to the mound. Repair of the slumped area revealed a complex stratigraphy, multiple features, and evidence for previous prehistoric and historic slumps. Mounds, like earthen levees, are more likely to slump when saturated. Expected changes in climate will likely place Monks Mound at an increased risk of additional slumps in the future. An experimental study is exploring the feasibility of predicting the risk of slumping using 3-D data. Our initial hypothesis is that seasonal variation in soil moisture causes subtle but measurable changes in the mound's micro-topography. One challenge is that the grass and brush that covers Monks Mound varies in height and density. We compare 3-D data from a Leica P40 terrestrial scanner with aerial LiDAR. The former yields very high density data but records a single return, precluding production of a bare earth model. The aerial LiDAR data is much lower density but its multiple returns allow the effects of vegetation to be removed. This poster reports on methodological issues and initial results.

Hargrave, Michael [241] see Baxter, Carey

Harkins, Kelly [253] see Fehren-Schmitz, Lars

Harkness, Rebecca (Northern Arizona University)

[213] *Kill Holes in Context: A Study of Kill Holes in Prehispanic Southwest New Mexico*

Mimbres Classic Black-on-white is the hallmark of the Mimbres Classic period (A.D. 1000-1130) in prehispanic Southwest New Mexico. Bowls from this region are often marked by an interesting practice where holes, called kill holes, are punched out of the bottom. Kill holes are found across sites in the Mimbres archaeological region, however, little statistical research has been conducted on them. Many explanations for this practice have been proposed, mostly associating the hole with burial ritual. This study expands on recent research on the relationship between iconography on bowls and kill holes by adding the context in which bowls are found. A previously unanalyzed site, Treasure Hill, is added to data from Galaz, Mattocks, Swarts Ruin, NAN Ranch, and Cameron

Creek. Exploratory data analysis is used to see if bowls with kill holes are placed in burials at a significantly higher rate. Assuming the theory that kill holes are associated with burial ritual is correct, I expect to find a statistically significant association of kill holes with burial context. However, a lack of statistical correlation could indicate that kill holes hold different significance, and could pave the way for new theories as to their significance.

Harle, Michaelyn (Tennessee Valley Authority) and Lynne Sullivan (University of Tennessee)

- [183] *Ridges, Valleys, Mountains, and Plateaus: The Topographic Context of Late Mississippian Diversity in East Tennessee*

Topographical constraints played a role in shaping the social trajectory of the Southern Appalachian region. The Ridge and Valley physiographic province of East Tennessee includes the Tennessee River and is characterized by linear ridges and parallel valleys, with the Blue Ridge Mountains to the east and the Appalachian Plateau province to the west. The north to south elevation decrease in the Ridge and Valley has the result that floodplains of the Tennessee River and its tributaries are broader to the southwest. The configuration of the topography also was an obstacle to east-west travel. In this presentation, we focus on Late Mississippian communities in East Tennessee, referred to as the Dallas Phase (AD 1300 to 1600). Elsewhere we have argued that the term "Dallas Phase," while reflecting broad similarities, actually obscures a great deal of internal variation. Through mortuary, bioarchaeological, and material cultural analysis, we explore the ways in which this variation relates to the topographic diversity among Ridge and Valley Dallas Phase towns and how this diversity had both biological and social consequences.

Harman, Jon (DStretch)

- [369] *DStretch Contributions to Sacred Sites Projects in Montana and Wyoming*

In 2014 – 16 I participated in Sacred Sites Research rock art documentation projects in Montana and Wyoming, led by Larry Lowendorf. My contribution was my expertise with the DStretch program, which I created. DStretch proved to be an important resource in aiding the documentation of sites and recognizing tobacco related imagery in the rock art. I present images from several sites where DStretch was particularly impressive. They include Medicine Lodge Creek State Park and Ten Sleep Alcove in Wyoming and Frozen Leg Cave, Valley of the Shields, and Comanche Creek in Montana.

Harmand, Sonia [127] see Duke, Hilary

Harmon, Craig [420] see Christensen Hawks, Diana

Harmsen, Hans (Nunatta Katersugaasivia Allagaateqarfialu//Greenland National Museum & Archives), Christian K. Madsen (Nunatta Katersugaasivia Allagaateqarfialu//Greenland National Museum & Archives), Elie Pinta (Université Paris 1 Panthéon-Sorbonne) and Michael Nielsen (Nunatta Katersugaasivia Allagaateqarfialu//Greenland National Museum & Archives)

- [251] *Climate Change, Capacity-Building and Local Engagement: Report on the 2018 Arctic Viking Field School, Vatnahverfi, South Greenland*

The Eastern Arctic is currently observed to be undergoing significant environmental change as a direct consequence of global warming. For archaeologists working in Greenland, this means the rapid and complete loss of cultural remains due to changing soil conditions. As annual temperatures increase, many middens in Greenland are in an active state of 'composting' their once well-preserved artifacts and ecofacts. The Norse Eastern Settlement in Southwest Greenland (>500 sites) possess a substantial number of prehistoric and colonial era archaeological sites and is now over the critical threshold—with hundreds of these sites now rapidly degrading. Greenland faces an urgent threat because these unique scientific and cultural resources may soon be lost forever. This paper discusses the recent initiatives by the Greenland National Museum to combine a robust international field school training program combined with public engagement to addresses the loss of archaeological resources in Southwest Greenland, where climate change is observed to be having immediate impacts on heritage.

Harris, Andrew (University of Toronto)

- [333] *What Was Angkorian Theravada? New Analyses and Findings from "Buddhist Terraces" and Other Monastic Structures at Angkor Thom, Cambodia*

The Khmer Empire (c. 802-1431 CE) is believed to have undergone a dramatic religious transition during the 14th century from syncretic Brahmano-Buddhist worship to what is defined currently as "Theravada Buddhism". While demarcated in previous scholarship by a cessation of monumental temple-building central to previous traditions, the establishment and practice of "Theravada" in Cambodia has only recently been analyzed beyond a framework of culture-history and art-historical iconography. Recent fieldwork undertaken within and immediately surrounding the Khmer capital of Angkor Thom has revealed a vast Theravada Buddhist urban landscape consisting of the remains of more than seventy monastic substructures known in early scholarship "Buddhist Terraces". Through their survey, mapping, clearance, and photogrammetric imaging, unique structural typologies, patterns of placement, and the reuse of pre-existing ritual space and urban infrastructure at Angkor Thom have emerged. Architectural morphologies and visible renovations, too, reveal that "place-making" at Angkor appears to have transcended religious affiliation, which helps to explain the uniqueness of the Theravada remains at Angkor compared to other Southeast Asian contexts. This study thus applies an anthropological framework to understanding how religious practitioners and builders viewed, augmented, and appropriated the ritual spaces of their ancestors, stressing the imperfect nature of localized religious practice.

Harris, Ashley [117] see Holsten, Jarrett

Harris, Edwin (Colorado State University)

[221] Defining the Urbanism of the Ancient Purépecha Site of Angamuco

The ancient Purépecha site of Angamuco located in the Lake Patzcuaro Basin of Michoacán, Mexico provides an unrivaled opportunity to study the urban tradition of the Purépecha prior to the formation of the empire in the late postclassic (1350 – 1520 CE). Previously, the understanding of Purépecha urbanism relied upon analysis of the imperial capital Tzintzuntzan, now covered by the modern town of the same name. Angamuco occupies a densely vegetated malpais, ancient volcanic lava flow, which has preserved the site's architectural features to include pyramids, mounds, raised roadways, water control features, and ballcourts. Utilizing LiDAR data, ArcGIS, and additional open source GIS software applications, a methodology is presented which allows for the extraction of above ground architectural features from the surrounding complex topography. This methodology allows for easier analysis of the pre-empire Purépecha urban tradition and provides an avenue to understanding the transition from multiple chiefdoms to an empire within the Lake Patzcuaro Basin.

Harris, Jacob (Arizona State University), Andrew Bishop (Institute of Human Origins, School of Human Evolution), Christopher Brooke (School of Natural Resource Management), Kim Hill (Institute of Human Origins, School of Human Evolution) and Curtis Marean (Institute of Human Origins, School of Human Evolution)

[128] Archaeological Applications of Optimal Foraging Theory: Employing Bayesian Probability Modeling to Estimate Profitability Parameters for Rare and Extinct Prey

Reconstructing the subsistence strategies of past hominin populations remains one of the most important endeavors of archaeological studies. However, the presence and relative frequency of species alone, recovered as faunal material in archaeological contexts, is insufficient to reconstruct the complex foraging decisions made by hominins. Optimal foraging theory (OFT) refers to a family of formal foraging models that are designed to predict the foraging decisions of a particular organism given a suite of parameters. A key parameter is a robust estimate of profitability associated with pursued prey. However, in the case of rare and extinct prey species, measured profitability estimates do not exist. Here we describe a novel solution to this dilemma using Bayesian inference applied to modern observations of hunting behavior. We use a Bayesian probability model, populated with ecological and behavioral data collected from modern prey species collected from field research with Hadza hunter-gatherers in Tanzania, to build a predictive model of prey profitability, thus producing robust estimates of prey profitability to be used in archeological contexts.

Harris, Jacob [128] see Stow, Evalyn

Harris, Jacob [368] see Brooke, Christopher

Harris, Jake [127] see Gonzalez, Carolina

Harris, Kathryn (AAAS/AGU Congressional Science Policy Fellow)

[292] Moderator

Harris, Matthew (AECOM Technologies) and Mary Lennon (AECOM Technologies)

[128] Estimating the Effect of Endogenous Spatial Dependency with a Hierarchical Bayesian CAR Model on Archaeological Site Location Data

This research presents a method to test the endogenous spatial correlation effect when modeling the landscape sensitivity for archaeological sites. The effects of endogenous spatial correlation are inferred using a Hierarchical Bayesian model with an Conditional Auto-Regressive (CAR) component to better understand the importance of modeling spatial cultural process. In current practice, effects of endogenous spatial autocorrelation are rarely explicitly incorporated into quantitative archaeological predictive models. This is due in part to the difficulties of measuring how cultural process relate across space and time, as well as accepting the assumption that geographically near sites are implicitly more related than distant sites. Typically these difficulties are side-stepped by including aspects of cultural processes as features and ignoring endogenous spatial correlation by assuming sites are spatially independent phenomena. While there are benefits to this approach, aside from convenience, the validity of either of these assumptions has not previously been tested. The approach developed here leads to better understanding the penalty for assuming spatial independence and the development of methods to model spatial cultural process

Harris, Megan**[396] *Bury Me with Beads***

Ground stone disk beads represented a tangible signal of wealth within the Salish Sea archaeological record; they appeared continuously from 7,000 – 500 BP across the region in scattered frequencies to massive caches. The massive caches were often observed in a burial context, despite non-burial contexts being more frequent and widespread. The differences in both their deposition (burial vs. non-burial) and frequency (scattered vs. caches) demonstrated that beads had a specific conceptual niche within Coast Salish society, communicating wealth in a particular way. This paper intends to look at beads recovered from burial contexts. Examining beads from a burial context acknowledges a relationship between the living and the dead with a focus on how the living represented the dead. Investigating beads recovered from a burial context, with an emphasis on biological sex and age of the individual, contextualizes how an individual was perceived at the time of their death.

Harris, Michael [350] see Martinez, Valentina

Harris, Samuel (University of Chicago), Amanda Logan (Northwestern University) and Anne M. Compton (University of New Mexico)**[110] *Archaeobotany of Food & Craft near Bono Manso, Ghana, during the Transition from Trans-Saharan to Atlantic Trade***

Kranka Dada is a village site on the periphery of Bono Manso, a complex polity occupied between the 14th – 17th centuries AD, at the height of the trans-Saharan trade and the shift to early Atlantic trade. Questions remain about the degree and nature of the involvement of sites like Kranka Dada in these different trade networks. In this paper, we offer preliminary results on archaeobotanical analysis of flotation samples from Kranka Dada. The archaeobotanical assemblage is dominated by indigenous pearl millet, with little to no botanical evidence for introduced crops like maize. This is in contrast to the pottery assemblage, which includes maize cob impressed pottery and tobacco pipes in 16th-17th century contexts. One of the most interesting botanical finds from Kranka Dada is probable indigo, which suggests the presence of a local cloth-dyeing industry. We consider the implications of these archaeobotanical results for understanding the dynamics of craft and trade in the region.

Harris, Stephen [414] see Boudreux, Edmond

Harris, Susan [386] see Fisher, Lynn

Harrison, Ramona (University of Bergen, Norway)**[251] *Saving the Story of Medieval Icelandic Fishery Development: Siglunes as a Case Study***

The combination of deep sea fishing and dried fish production, and its distribution to inland consumers, is a distinctive and largely Nordic contribution to European diet and economy of eventual global impact in the 14th -17th centuries. One of the main questions is how and when this Viking Age pattern of marine resource use became integrated into the growing stockfish trade of the Medieval Period. Threatened by modern coastal erosion, the site of Siglunes, North Iceland offers a most unusual opportunity to consider the development of commercial fisheries in its local environmental and cultural context. Erosion reveals a well-stratified archaeofaunal record that provides insights into the Atlantic marine ecosystem before Early Modern commercial whaling and through the major climatic shifts of the MCA LIA. Siglunes has excellent organic preservation conditions, resulting in the recovery of significant amounts of well-preserved marine and terrestrial mammal, fish, and bird bone. The Siglunes deposits, dated by AMS radiocarbon, volcanic tephra, artifacts, and documentary sources, span the 9th to early 20th centuries AD. They thus represent a major archive for zooarchaeology, cultural and environmental history, and for fisheries biology and marine mammal conservation science.

Harrison-Buck, Eleanor (University of New Hampshire) and Timothy Pugh (Queens College-CUNY)**[199] *Breaking with Tradition? Terminal Classic and Postclassic Developments across the Guatemala – Belize Border***

Following the Classic Maya “collapse” a clustering of traits appear at sites in the Peten – Belize area of the Southern Maya Lowlands. These include new architectural forms, such as circular and colonnaded buildings and the introduction of distinctive portable goods such as molded-carved ceramics, as well as phallic and turtle effigies, among other material forms. These “new” assemblages embody “old” Classic Maya narratives concerning captive-taking, penis bloodletting, ancestor conjuring and replacement, and the sacrifice and rebirth of the Maize Lord. We examine these elements in the context of new alliances and conflicts that arose in this area during the Terminal Classic and Postclassic periods (ca. AD 830-1525). We conclude that an emphasis on masculinity is undergirded by a concurrent focus on the maternal line as an important element of elite legitimization in the Southern Maya Lowlands, echoing concerns expressed at the distant Maya capitals in northern Yucatán during this time.

Harrison-Buck, Eleanor [370] see Phillips, Lori

Harrod, Chris [102] see Santana Sagredo, Francisca

Harrod, Ryan (University of Alaska Anchorage), Debra Martin (University of Nevada, Las Vegas) and Pamela Stone (Hampshire College)

[142] Often the Victims, Occasionally the Aggressors: The Role of Women in Warfare and Raiding in the Ancestral Pueblo World

Discussions about warfare in the pre-contact Southwest tend to focus on lethal interactions between male combatants or the capture of women during raids; much of our own research has focused on the latter. What is overlooked most of the time, however, is the roles that women played in hostile encounters in the region, especially in supporting, engaging in, and socially sanctioning acts of violence. Archaeological and bioarchaeological data collected in the Colorado Plateau dating to between AD 800-1300, informed by ethnographic accounts, provides a means of assessing the ways women engaged in warfare and raiding among the Ancestral Pueblo. Mortuary context and human skeletal remains were analyzed in the Colorado Plateau from sites that include: Aztec Ruins and Black Mesa, and multiple pueblos in Chaco Canyon, Mesa Verde, and throughout southern Utah. Taking a temporal and regional approach, this research considers the agency of women in times of conflict. The intent is to identify how women were more than just victims of violence, but also occasionally aggressors, defenders, or even supporters of warfare and raiding.

Harry, Karen (University of Nevada-Las Vegas) and William Willis (University of Nevada Las Vegas)

[151] Puebloan Occupation of the Shivwits Plateau, North Rim of the Grand Canyon

In this paper we examine the archaeology of the southwestern portion of the Grand Canyon-Parashant National Monument. Drawing on an extensive survey database of more than 600 site records, we trace the Puebloan occupation of the area from the initial settlement at around A.D. 900/1000 to abandonment at about A.D. 1250. In particular, we examine what the data suggest regarding the area's population density and the settlement and subsistence strategies used by the prehistoric inhabitants. These patterns are then compared to those found in other areas occupied by Ancestral Puebloan populations, and reasons for apparent differences and similarities are explored.

Harry, Karen [151] see Flynn, Alexandria

Hart, Ashlee (University at Buffalo, SUNY)

[106] Archaeometric Analysis of Ceramics from Iron Age Thrace, Bulgaria

In American archaeology the use of archaeometric testing such as neutron activation analysis and inductively coupled plasma-mass spectrometry have become increasingly utilized since the 1960s. These techniques, adopted from parallel disciplines including geology, continue to be relatively underrepresented approaches out of Western European and American archaeology. This presentation shows the results of two popular forms of ceramic testing - X-ray fluorescence spectrometry and thin section petrography - conducted in Bulgaria on ceramic materials from the Bulgarian Iron Age (1,200-200 B.C.E.). Through this process new relationships were forged between Bulgarian archaeologists and geological scientists aimed at testing different methodologies, using equipment previously underutilized, and incorporating computer programs for statistical analysis and special analysis through geographic information systems. These efforts address the importance of interdisciplinary collaboration, the development of a user-friendly international database, as well as a combined approach in archaeology that includes traditional practices with new methods and theory.

Hart, Isaac A. [47] see Lebzon, Roxanne

Hart, John [73] see Abel, Timothy

Hart, Sharlot (University of Arizona)

[85] Pluvia Ex Machina: Testing Rainfall Variability on Adobe Structures

In recent years, National Park Service and Vanishing Treasures cultural resource managers have noted archeological site damage caused by seasonal rain events. Standing earthen architecture, like adobe, appears to be most vulnerable to weather-related damage, particularly extreme rainfall events. Efforts to efficiently document and assess storm damage, however, currently rely on anecdotal and qualitative descriptions of material loss. These accounts suggest that changing rainfall patterns cause damage to fragile earthen architecture at increasing levels; however, no previous study has been conducted to clarify this cause-and-effect relationship. This study sought to fill that gap, as well as test the potential of terrestrial laser scanning (TLS) as an accurate and precise method for quantitative measurement of material loss. In heritage preservation TLS is commonly used to document, map, visualize, and measure cultural resources. While TLS is also employed in Building Information Modeling, manufacturing and parts inspection, and industrial deformation studies, the equipment is expensive and the knowledge to interpret results is limited to specialists. In addition to forecasting the effects of rainfall damage on earthen architecture, this project helped document a financially feasible workflow for accurately assessing physical impacts to adobe cultural resources.

Hart, Siobhan (Skidmore College)**[414] The Invisible Whiteness at New England's Native Heritage Sites**

While many of New England's memorials contribute to the false narrative of Native American disappearance, a growing number of heritage sites create and promote public memories that counter these myths. In some instances, Native American communities and heritage professionals work collaboratively to use objects and landscapes to challenge erasures and re-shape popular memory. In this paper I discuss the results of a study of four Native New England heritage-scapes (Deerfield, Aquinnah, and Plimoth, Massachusetts, and Mashantucket, Connecticut) that attempt to replace disappearance narratives with stories of survivance. In these places objects, landscapes, and bodies are used to challenge and create alternatives to existing narratives of social extinction that deny modern Indianness. Offered in public settings and aimed at largely (but not exclusively) non-Native audiences, they serve as interventions in popular recountings of Native histories, identities, and modernities, and interruptions in non-Native ideas about cultural distinctiveness, land and property rights, and race. I conclude that the memory work engaged in these places demands much from Indigenous curators, interpreters and collaborators, but little from non-Native visitors except "an open mind." This common trope reinforces white privilege and obfuscates the normalization of whiteness that persists as a legacy of colonialism.

Hart, Thomas (Franklin and Marshall College), Debora Trein (National Geographic Society) and Fred Valdez (University of Texas at Austin)**[30] Maya Paleoethnobotany and La Milpa: Evidences from Northwest Belize**

Widespread terrace construction in the Lowland Maya region is often viewed as a response to increasing demands for food during the Late Classic. Such was the demand that terraces became integrated into the architectural arrangements of large urban entities, going so far as to be built right up to the edge of a settlement center. Despite their ubiquity, very little is known about what was grown on these terraces and how they relate to the adjacent ceremonial core. This paper discusses the paleoethnobotanical contents of terraces that abut the ceremonial core of the third largest Maya urban center in Belize, La Milpa. An analysis of the terrace sediments collected from the 2017 excavation season of the Programme for Belize Archaeological Project revealed macrobotanical and phytolith indicators of mulching and fertilization activities. This presentation examines some of the preliminary results from these analyses, and provides a discussion on the role of terraces in both Maya ceremonial activities as well as Late Classic agricultural intensification and extensification practices.

Hartley, James**[259] Date Precision and Faunal Distribution from Pleistocene Sites (Archaeological vs. Paleontological) in the American Southwest**

Precise dates are helpful in tracking changes in paleoenvironment and faunal distribution through the Pleistocene. The ages of Paleoindian archaeological sites in the American Southwest with faunal remains are often precise. They have a specific date with a margin of error. This precision allows for the distinction between warm and cold periods. However, paleontological sites, while more abundant in the Southwest, are not as precise. They are often somewhere within a land mammal age (often Irvingtonian or Rancholabrean, each spanning hundreds of thousands of years) without a specific date. It is thus more difficult to assess changes in distribution through time of animal taxa. It is also more difficult to assess whether or not said changes align with known cold and warm periods.

Hartman, Gideon**[102] Post-Charring Bacterial Degradation of Archaeological Lentils by Bacterial Degradation**

According to common knowledge, the preservation of stable isotope values in archaeological seeds requires that they be charred at low temperatures, because charring reorganizes sugar and protein polypeptides into stable Maillard reaction products. Charred seeds are understood to be resistant to diagenetic alteration, and therefore lab processing is limited to the removal of secondary deposited contaminants. In this study we compared charred modern and archaeological lentils from the Iron Age site of Tel Dor, Israel. Through a combination of structural, genetic, and isotopic analyses we show that the charred archaeological lentils were subjected to post burial diagenetic alterations that significantly impacted bulk carbon and nitrogen isotope values. Shotgun DNA extraction and sequencing of bacterial 16S rRNA from modern and archaeological lentils revealed that bacteria genera capable of degrading lentils into Maillard reaction products were present in the archaeological lentils.

Harvey, Allison [187] see Fenerty, Brendan

Harvey, David (University of Nevada, Reno)**[35] Despotism in the Southern Sierra Nevada: Linking Habitat Distribution and Tubatulabal Territorial Behavior**

Fifty years after their introduction, ideal distribution models have recently contributed to our understanding of numerous behavioral processes. In this paper, I argue these models hold the potential to increase our understanding of a broader suite of behaviors including, but not limited to, territoriality. Territorial and competitive behaviors are fundamental components of the ideal despotic distribution and have often been overlooked in discussions of such spatial patterns. Here, I present an ideal distribution model for the Tubatulabal of the far southern Sierra Nevada, California in an effort to link habitat distribution and territorial behavior among low population density foragers. Though such behaviors are often viewed as an active process, passive territorial and competitive behaviors should

be reflected in the distribution and land-use patterns of a population, which can elucidate the processes behind territorial formation and maintenance through time. Tubatulabal territory provides a unique opportunity to assess these hypotheses as they are the long-term occupants of the far southern Sierra Nevada and maintained their territory through contact despite dramatic demographic shifts and the emplacement of larger population density groups with more complex sociopolitical organization in adjacent territories throughout the late Holocene.

Harvey, William (Oxford University), Sandra Nogué (University of Southampton), Nathan Stansell (Northern Illinois University) and Kathy Willis (Oxford University)

[412] *The Apparent Resilience of the Dry Tropical Forests of the Nicaraguan Region of the Central American Dry Corridor to Extreme Variations in Climate over the Last c.1200 Years*

The Central American dry corridor is currently and has historically been the most densely populated area of the Central American Isthmus and is subject to the greatest covariance in precipitation between seasons. The vegetation of this region was typically composed of dry tropical forests, which are suggested to be highly susceptible to variations in climate and anthropogenic activities. This study examines the vulnerability of past dry tropical forests surrounding the Asese Peninsula, Nicaragua to climatic and anthropogenic disturbances over the past c.1200 years. Past vegetation, climate, burning, and animal abundance were reconstructed using proxy analysis of fossil pollen, diatoms, macroscopic charcoal, and dung fungal spores (*Sporormiella*). Dry tropical forests reduce during wetter conditions associated with increased fire and expand during relatively drier conditions associated with reduced fire. Heightened seasonality (1030-1180 and 1450-1600 CE) coincides with dry tropical forest community reorganization as well as the abandonment of the pre-Columbian settlement of El Rayo (1100-1150 CE). There is no palynological evidence for traditional agriculture during this time, therefore pre-Columbian hunter-gatherer subsistence is suggested to have persisted up until European contact. Results from this research also suggest that dry tropical forests have been highly resilient to past climatic and anthropogenic perturbations.

Harvkey, Jesse

[14] *Dungeons, Dragons, and Conquest: Using Fantasy to Address Topics of Colonialism, Archaeology, and the Destruction of Indigenous Culture*

In this research experiment, I use the tabletop role-playing game Dungeons & Dragons to examine topics of colonialism, archaeology, and destruction of indigenous culture. Basing aspects of my fictional fantasy game on these real-world historical and modern-day issues, I plan to place my players into situations which will allow them to both learn the importance of cultural preservation and see the effect of colonialism on indigenous lands and peoples in a fictional world. The story and game will last until May of 2019, with the plot section relating to these topics ending in late March. During this time, I will examine and record my players' actions and reactions when given an interactive storyline of imperial conquest of native lands. They will be exposed to rich indigenous cultures and given opportunities to place themselves into the narrative, to learn of cultural preservation and archaeology, and to test their own western belief systems. I hope to open my players' eyes to these difficult topics and place them into the midst of this intense storyline, giving them the opportunity to take action and make conscientious decisions based on the knowledge and emotions I hope to bring to the table.

Hasenstab, Robert

[176] *The Sugartown Earthwork: A Late Prehistoric Hilltop Site in the Upper Allegheny River Drainage*

The Sugartown Earthwork, situated in Cattaraugus County, NY, is one of a series of late prehistoric hilltop earthen enclosures in the upper Allegheny River valley of southwestern New York and northwestern Pennsylvania. It was the subject of a previous SUNY Buffalo Archaeological Field School and is revisited here. Limited testing revealed evidence of habitation, maize horticulture, and shell-tempered ceramics. The earthen embankment revealed a wicker-style palisade enclosure. Radiocarbon dates obtained cluster around A.D. 1520, uncalibrated. This site, along with its related counterparts in the surrounding region, remain poorly understood in terms of their cultural affiliation, site function, and reason for their remote settings.

Hass, Randall [253] see Lindo, John

Hastings, Charles [306] see Parsons, Jeffrey

Hastorf, Christine A. (University of California-Berkeley)

[137] *Moderator*

Hatcher, Lawford [370] see McKenzie, Emily

Hauser, Lorenz [312] see Kopperl, Robert

Hawkins, Rebecca

[167] *Discussant*

Hawkins, Seth (Wake Forest University)

[140] *Discussant*

Hawley, Kirsten (Indiana University), Laura Scheiber (Indiana University) and Amanda Burtt (Indiana University)

[80] *Visualizing Mountain Shoshone Occupations in the Washakie Wilderness of Northwestern Wyoming*

Interpreting past uses of mountainous regions of the American West is hampered by difficult access, excessive ground vegetation, and wilderness restrictions. Recently however researchers working in the Greater Yellowstone Area have recorded hundreds of sites exposed by forest fires, and our knowledge of campsite structure, resource use, and movement patterns has increased dramatically. Remote campsites often contain tens of thousands of artifacts that represent a greater commitment to mountain resources and places than previously considered. In this paper, we focus on the seventeenth-century Caldwell Creek site (48FR7091) in the Shoshone National Forest as a case study. At more than 30,000 square meters in area, Caldwell is a massive campsite with over 70,000 recorded artifacts including diagnostic lithics, sourced obsidian, carved pipestone, and the largest quantity of ceramics found in western Wyoming. We discuss challenges in data recording, our evolving methodologies, and ways to combine disparate data sets, photographs, and field maps. In order to better visualize the campsite, we present the results of three-dimensional models and photogrammetry. Using emerging technologies increases our ability to participate in wider discussions of cultural heritage and preservation.

Haws, Jonathan [82] see Gomes, Ana

Haws, Jonathan (University of Louisville)

[144] *Late Pleistocene Refugia and Neanderthal Extinction in Southern Iberia*

The Iberian Peninsula has long been regarded as a glacial refugium for humans, as well as temperate, Eurosiberian flora and fauna. The well-documented Cantabrian region served as an “active” and densely populated refugium during the LGM and Late Pleniglacial. In southern Iberia, the Mediterranean-type biota found refugia in small-scale pockets along the coastal strip and sheltered valleys in the interior. The bioclimatic zones generally shifted in elevation and latitude. Humans adapted to these environmental changes, maintaining populations through long-distance social networks. In contrast, models for late Neanderthal survival and the persistence of the Middle Paleolithic technology in southern Iberia imply a more “passive” refugium where species on the road to extinction may be found in low densities as the last remaining populations holdout in adjacent areas. In this scenario, southern Iberia may have been a suitable Neanderthal refugium, but abrupt climate shifts further reduced the conditions favorable to their survival. This paper uses new data from Lapa do Picareiro on the western edge of Iberia to evaluate the impact of abrupt climate change on different human socio-ecological systems.

Hayashi, Naotaka [251] see Walls, Matthew

Hayashi Tang, Mana (Washington University in St Louis), Xinyi Liu (Washington University in St. Louis), Gayle Fritz (Washington University in St. Louis) and Zhijun Zhao (Institute of Archaeology, Chinese Academy of Social)

[302] *Roots and Tubers in Late Pleistocene to Early Holocene China: Experimental Paleoethnobotany and Preliminary Case Studies*

Recent advances in paleoethnobotanical research reveal that plants have been critical to the human diet for longer and in more diverse ways than previously assumed. This paper addresses the relative dearth of paleoethnobotanical information on the early uses of vegetatively propagated plants in China, despite their significant representation in modern crops. We developed a systematic criterion for diagnosing taxa of roots and tubers, also known as vegetative storage organs (VSOs), from macrobotanical remains in the archeological record. We characterized commonly consumed and historically significant VSOs in China, by studying experimentally charred modern samples under the scanning electron microscope (SEM). We then compared the characteristics of these modern VSO samples against systematically floated plant remains from archaeological sites in China. VSO taxa can be differentiated by using multiple lines of evidence, including the texture and arrangement of parenchymous cells, as well as the shape and arrangements of various organs. Though identification is difficult when fragile cell structures have collapsed or deteriorated, more robust features are often preserved for diagnosis. Our results suggest that the potential for studying the role of vegetatively propagated plants in early human-environmental interactions is overlooked, and can be expanded significantly with further investment in their systematic identification.

Hayashida, Frances (University of New Mexico), Diego Salazar (Universidad de Chile), Andres Troncoso (Universidad de Chile), Mariela Pino (Universidad de Chile) and Shelby Magee (University of New Mexico)

[315] *Water, Waka's, and Empire in the High-Altitude Atacama*

Through his teaching and research, John Rick has reshaped our thinking on how people in the past related to the land, each other, and supernatural beings and the ways in which politics altered these relationships. Student

participants on his field projects at the Panaulauca rockshelter site in the Junín puna, Zuni, and Chavín learned these lessons first hand, and many have continued to apply them in their own research. After briefly revisiting the Panaulauca field school, we discuss Inka incorporation of the Ríos Loa and Salado region located in the high-altitude Atacama in northern Chile, which was accompanied by investment in state infrastructure, a marked increase in copper mineral mining, and the expansion of irrigation agriculture. We argue that an explanation for these changes requires acknowledging, as the Inka and local communities did, the role played by powerful non-human beings (*wak'as*) in local life and imperial politics, and how Inka claims to water, land, and labor were reinforced and legitimated through their control and use of copper minerals, a substance essential for offerings to mountain *wak'as*, the source of water and hence of life in this hyperarid environment.

Hayden, Suzanne [135] see Kober, Brent

Hayes, Nathan [118] see Smith, Alexander

Haynes, Gary (University of Nevada-Reno), Janis Klimowicz and Piotr Wojtal

[368] *Can Mammoth Killing Be Distinguished from Mammoth Scavenging by Humans and Carnivores?*

The characteristics of human-killed and human-scavenged elephant carcasses differ in important ways. The bones of an elephant butchered immediately after humans killed it are identifiably distinct from bones taken from a "ripened" carcasses that was scavenged by humans. With newly killed carcasses, the butchering may be light to full, resulting in variable modifications such as cuts made during meat-stripping or scraping marks made during removal of periosteum to prepare bones for breaking. The locations and intensity of carnivore gnaw damage also diagnostically vary when carnivores feed on elephant prey, versus when they scavenge human-killed elephants. Not all these differences may be equally relevant in analysis of fossil proboscidean assemblages, but some diagnostic patterns appear to be applicable for interpreting mammoth sites.

Hays, Maureen [403] see Christensen, Lauren

Hays-Gilpin, Kelley (Northern Arizona Univ), Robert Mark (Rupeстrian CyberServices) and Evelyn Billo (Rupeстrian CyberServices)

[190] *Mural Ecology: Walls That Bring People Together*

Our daily news brings much shouting about building giant walls to divide neighbor from neighbor. We optimistically turn our attention to walls that brought people together—Puebloan painted walls. In the 1960s, the painted kiva walls of Pottery Mound, near Albuquerque, brought artist Polly Schaafsma together with a motley crew of archaeologists. In the decades since, she has continued to bridge art and archaeology, rock art and mural painting. Analyses of the kiva murals themselves reveal past encounters between locals and migrants from the south, and between eastern and western pueblos. Contemporary mural artists today weave past and present through art in public places where all can gather instead of the traditional smaller and restrictive kiva space.

[243] *Discussant*

Hays-Gilpin, Kelley [258] see Terlep, Michael L.

Hazard, Rebecca [408] see Field, Julie

He, Yongshan [299] see Ma, Kara

He, Yuling [49] see Lin, Yi-Ling

Head, Sara (Archaeological Fantasies Podcast and Blog)

[376] *Discussant*

[215] *Chair*

Headrick, Annabeth (University of Denver)

[410] *A Royal Portrait at Chichen Itza? Central Mexican Emblems of Authority in the Northern Maya Region*

The city of Chichen Itza has defied attempts to identify individuals who ruled the city and its basic political organization. Scholars once argued for a shared governance system called multepal, basing this assertion on glyptic references to a series of people who apparently jointly held power. Subsequent scholarship challenged this assertion, as revised hieroglyphic decipherments revealed that many of these "people" were in fact deities; thus, a

textual list of royal names was not substantiated. Nevertheless, glyphic evidence still supports the existence of an individual named K'ak'upacal, indicating that at least one historic leader was celebrated. This paper uses the visual record, arguing that a portrait of an ancestral ruler may exist among the Temple of the Chac Mool's relief columns. The image contains royal elements that are distinctly Maya, but the majority of his emblems of authority participate in a pan-Mesoamerican tradition with roots in the ancient city of Teotihuacan. Not only will iconographic analysis reinforce this assertion, but also the Early Postclassic date of the image offers additional support. Furthermore, this identification bolsters arguments for foreign intrusions into Chichen during the Early Postclassic and helps elucidate the nature of political reorganization at the city during this period.

Healan, Dan (Tulane University)

[38] Interaction between the Basin of Mexico and West Mexico In the Prehispanic Era

Nearly fifty years ago Paul Tolstoy and David Grove argued that a major component of the so-called Tlatilco complex was West Mexican in origin, raising awareness of substantial interaction between the Basin of Mexico and an area then considered largely peripheral to Mesoamerica. Since that time investigations in both the Basin and various parts of West Mexico have uncovered evidence of systematic interaction between the two areas throughout prehistory. Such interaction appears to have been highly variable in terms of its nature and the specific areas of West Mexico that were involved. This paper reviews the evidence from a diachronic perspective and offers explanatory models for some of the mechanisms of interaction that may have been involved.

Healy, Alissa (North Wind Resource Consulting) and Jana Comstock (Santa Fe National Forest)

[213] Understanding Gallina Pitstructures

The Gallina culture is one with a fascinating history of violence, defensive environments, unique artifacts, and most importantly—the sustained habitation of pitstructures for the duration of their 200 year occupation (AD 1100—1300). This behavior is dissimilar to the surrounding pueblo period cultures. Several cultural resource management firms have conducted intensive pedestrian surveys of approximately 10,000 acres of the Gallina region in which numerous pitstructures have been identified and recorded. This paper assesses the variation in the physical and environmental contexts of a sample of pitstructures recorded during recent cultural surveys. It is expected that certain relationships among the structures may be identified, including the density of artifacts and the placement of structural materials and masonry structures associated with each feature. This study will examine the types of artifacts, the locations of external unit houses/bin features, and the directions in which they were constructed to better understand social constructs of the Gallina culture.

Heath-Stout, Laura (Boston University Archaeology Program)

[69] The Invisibly Disabled Archaeologist

At an SAA conference, one is not likely to see wheelchair users, American Sign Language interpreters, copies of the program rendered in Braille, or attendees accompanied by personal care assistants. One might think that all archaeologists are nondisabled; after all, we prize fieldwork and physical exertion. Yet, archaeologists with non-apparent disabilities are all around us. I have interviewed 72 archaeologists about their experiences of race, gender, and sexuality, and stories of disability have emerged along the way. Some disabled archaeologists told me about the difficulties of asking for accommodations in an ableist profession. As one graduate student with a mental illness put it, "To come to a panel of people who have your future literally in their hands and say, 'These are all the ways that I'm incapable,' is a very humbling experience, and it is one that's hard to recover from in terms of professional ability." Others told of finding ways to shape a career that fit their particular strengths, or of the complexity of passing as nondisabled. First, I consider what these stories tell us about how our discipline privileges some bodies and minds over others. Then, I offer suggestions for building a truly inclusive and accessible archaeology.

[340] Discussant

Heath-Stout, Laura [149] see Hannigan, Elizabeth

Hechler, Ryan (Tulane University)

[96] Born This Way, Becoming That Way: Difference, Disability and Sickness in Inka Society

The Inkas' social constructions of physical difference recognized 'disability' as a permanent state of being, one that Guaman Poma de Ayala suggested was considered a specific calle or passage of life. Unlike much of the contemporary Late Middle Ages of Christian Europe, such individuals were not socially induced into aspiring for miraculous divine healing to achieve some physical state of perceived 'normalcy'—they were valued as an integral part of Inka society for their lived difference. Oppositely, illnesses were recognized as momentary transformations of health that could result in death and could only be counteracted through an act of healing. Many healers within Inka society were people who survived an illness themselves, being reflective of actual lived experiences they could guide others through. The vast majority of what is known about Inka notions of medical care and social welfare networks is derived from ethnohistory; however, bioarchaeological research has increasingly contributed to this. Primarily through a review of ethnohistoric sources, I will elaborate on Inka systems of medical care, perceptions of mental health, and social constructions of physical difference.

Hedgepeth Balkin, Jessica (University of Colorado, Boulder), Arthur Joyce (University of Colorado, Boulder), Raymond Mueller (Stockton University) and Sarah Barber (University of Central Florida)

[307] Full-Coverage Survey in the Lower Río Verde Valley, Oaxaca, Mexico: Broad-Scale Insights on Human-Environment Relations

Regional survey in the lower Río Verde Valley, Oaxaca, Mexico has been ongoing since 1994. Our full-coverage approach resulted in extensive spatial coverage (224 km²) spanning the valley's major physiographic zones (e.g., floodplain, piedmont, etc.). The coarse-grained data produced via this methodology is ideal for broad-scale research questions. We focus on the recursive relationship of settlement choice with: 1) political shifts, and 2) the development of highly productive resource areas (c.a. 1800-150 BCE). To be fully understood, these settlement shifts must be placed in a macroregional context. Land use choices are made in relation to a network of agents operating at both local and broader spatial scales. Interdisciplinary evidence indicates that urban settlement in the Mixtec highlands had far-reaching effects, including the transport of eroded settlements from the highlands to the lower Verde coast. Ultimately, this led to the expansion of the floodplain and the enclosure of estuaries. After discussing the history of survey on the lower Verde coast, this paper details the results of a geospatial study on long-term human-environment relations.

Hedman, Kristin [109] see Yarlagadda, Karthik

Hedman, Kristin (Illinois State Archaeological Survey, University of Illinois), Thomas Emerson (Illinois State Archaeological Survey, University o), Timothy Pauketat (Illinois State Archaeological Survey, University o) and Matthew Fort (Illinois State Archaeological Survey, University o)

[348] Temporal Patterns in Diet and Population Movement within Greater Cahokia

At its peak, Greater Cahokia had a population of over 30,000 people, and engaged in social, political, and religious interactions that covered the midcontinent. The factors that influenced the rise and dissolution of Greater Cahokia between ca A.D. 1000 and 1300 remain a focus of inquiry. Archaeobotanical and isotopic research indicates maize first became a significant food resource for American Bottom populations at about A.D. 900 and quickly increased in importance. Strontium (87Sr/86Sr) analysis provides evidence that immigrants from a variety of regions contributed significantly to population growth at Greater Cahokia. For some immigrants, a move to the American Bottom correlates with a dramatic change from a diet low in maize to one heavily maize dependent. New data from the well-contextualized East St. Louis excavations, an expanded isotopic dataset for the American Bottom, and a better understanding of midcontinental strontium signatures, allows us to explore temporal and regional patterns of diet and the movement of people within Greater Cahokia. We will consider these patterns of subsistence change and population movement in light of regional climatic conditions.

Hedquist, Saul [254] see Laurila, Erick

Hegberg, Erin [189] see Jarrett, Jordan

Hegberg, Erin (Office of Contract Archeology, University of New Mexico)

[189] The Ideal Site (LA 8671): A Mexican Territorial Residential Site Near Placitas, New Mexico

The Mexican Territorial period (1821-1846) is perhaps the least-studied historical period within New Mexico. However, one site that is almost always mentioned in culture history overviews is the Ideal Site, LA 8671, excavated by the UNM field school and Dr. J. J. Brody in 1963-1964. However, there was only one publication reporting on this small residential site: a 1966 El Palacio article that summarized the pottery and imported materials found at the site and described a small three room house with an outdoor kitchen and an animal pen. Recently, this collection was revisited with detailed technological analysis of the imported materials and New Mexican ceramics at the site, including petrographic analysis. Results indicate that this small, relatively isolated settlement actually possessed ceramics from a fairly wide variety of sources from both local and Tewa Pueblos. Residents also consumed a surprisingly high proportion of imported materials. Contrary to expectations, it appears that residents at the Ideal Site adapted to their lack of close neighbors by cultivating a wider regional network to help meet their material needs. These results suggest that some of our ideas about trade and social relationships on the Mexican frontier need to be revisited as well.

[189] Chair

Hegmon, Michelle (Arizona State University) and Matthew Peeples (Arizona State University)

[31] The Human Experience of Social Transformations in the North Atlantic and US Southwest

Archaeologists and other scholars have long studied the causes of collapse and other major social transformations and debated how they can be understood. This paper instead focuses on the human experience of living through those transformations, analyzing 18 transformation cases from the North Atlantic and the US Southwest. The transformations, including changes in human securities, were coded based on expert knowledge and data analyzed using Qualitative Comparative Analysis techniques. Results point to the following conclusions: Major transformations, including collapses, generally have a strong and negative impact on human security; flexible strategies that facilitate smaller scale changes may ameliorate those difficulties. Community security is strongly implicated in these changes; strong community security may minimize other negative changes. The relationships among the variables are complex and multi-causal; while social transformation may lead to declines in human

securities, declining conditions of life can also push people to transform their societies. Finally, the considerable variability indicates that some societies are better able to deal with difficulties than others. These kinds of cases, in the past as well as today's world, are worthy of much more attention.

Heile, Jonathan [115] see Hundman, Brittany

Heilen, Michael (Statistical Research, Inc)

[225] *Discussant*

Heilen, Michael [261] see Murrell, Monica

Heiner, Price [397] see Stites, Michael

Heinz, D. Kalani

[354] *Nā Wahine o nā Āina Kuleana: Assessing the Impact of Colonization on Gender Experience in North Kohala, Hawai'i Island*

While pre-contact gender in Hawai'i has primarily been interpreted in terms of the kapu and its regulation on food, close analysis of multiple ethnographic sources reveal that gender was more complicated than originally realized. Therefore, examination of gender experience in Hawai'i needs to be location specific. My research highlights the value of consulting historical documents and Hawaiian tradition, especially those written in 'ōlelo Hawai'i, as resources for understanding Hawaiian history. I analyze 'ōlelo no'eau, mele, oli, place names, ka'ao, and mo'olelo specific to selected ahupua'a within North Kohala to interpret how gender was conceived within each ahupua'a. Using this interpretation as a foundation for understanding gender experience in these locations pre-contact, I then use it as a means to interpret how the conception of gender changed in Hawai'i, post-contact during the period following the Great Māhele. My research examines the mo'okū'auhau (genealogies) of Land Claim Award recipients in these locations to figure out if foreign conceptions of gender influenced how Land Claim Awards were distributed and later passed down. Through this analysis, I will assess to what degree colonization impacted Hawaiian gender norms, specifically the status of wahine.

Heisinger, Bryan (Texas State University)

[94] *Skiles Shelter (41VV165): A Closer Look at a Long-Term Earth Oven Facility*

Skiles Shelter (41VV165) is located at the mouth of Eagle Nest Canyon, roughly 250 meters northwest from the Rio Grande in the Lower Pecos Canyonlands of southwest Texas. Skiles Shelter is characterized by a fading panel of Pecos River Style rock art, numerous bedrock milling features, and a massive burned rock midden (BRM) accumulation of fire cracked rock (FCR) and cultural refuse. In 2013 and 2014, archaeologists with the Ancient Southwest Texas Project (ASWT) of Texas State University carried out extensive excavations in Skiles Shelter to better understand the rockshelter and how its archaeological deposits formed. Based on the initial excavation results, it was hypothesized that Skiles Shelter was used primarily used as an earth oven facility for the baking and processing of plant and animal foods. This paper further explores the results from the archaeological investigations at the site and takes a closer look at its use as an earth oven facility.

Heisinger , Bryan [211] see Conlee, Christina

Heitman, Carolyn [385] see Martin, Worthy

Heitman, Carrie (University of Nebraska-Lincoln)

[308] *House Society Models in Anthropological and Archaeological Theory: Chaco Canyon and the Prehispanic American Southwest*

In recent years, a growing number of archaeologists have explored the potential of expanding Lévi-Strauss's concept of "house societies" to better understand local as well as regional development sequences. In this paper, I draw on the work of cultural anthropologists as well as archaeologists to create a revised theoretical framework for archaeological application. Taking a broad view of the extant theoretical and ethnographic literature on house societies, the primary goal of this paper is to identify how, cross-culturally, social inequalities are constituted in such societies. The manuscript proceeds in three stages: First, I discuss the history and evolution of house theory over the last 35 years and its development within archaeology; second, I present a revised definition of a house society model; and third, I use ethnographic and ethnohistoric data from Western Pueblo groups (specifically Zuni Pueblo and Hopi) to demonstrate the utility of resuscitating Indigenous house concepts to advance our understanding of Chaco Canyon and the Prehispanic American Southwest.

Heller, Eric (University of California Riverside) and Benjamin Bellorado (University of Arizona)**[313] Photogrammetry and Virtual Reality Visualization of Cultural Landscapes in Southeastern Utah**

Recent technological advances, including photogrammetric capture and virtual reality visualization, offer exciting new means to document, analyze, and reconceptualize archaeological landscapes. Minimally invasive, cost effective, and extremely precise, these methods and technologies provide powerful datasets and investigative tools when applied to the cultural resources of Southeastern Utah. Through photogrammetric capture of features, sites, and entire viewsheds, we extend this technology into the scale of the cultural landscape. By so doing, we situate detailed three-dimensional models of archaeological resources into their social and environmental contexts. In addition, translating photogrammetry products into virtual reality environments allows the intuitive viewing and interaction with archaeological data. This advancement provides innovative pathways toward addressing longstanding and emergent research questions, facilitating collaboration, and enhancing land management practices. Finally, we explore the potential of educational virtual reality experiences to minimize the impacts of site visitation while simultaneously increasing and enhancing public engagement with the archaeology and cultural landscapes of Southeastern Utah.

Helmer, Emily (Washington State University)**[66] Placemaking in Southwestern Oregon**

This study takes a Geographic Information Systems approach to understanding the role of place in determining settlement patterns in southwestern Oregon. Persistent use of settlement locations transforms these spaces to places, or locations where memory and identity become embedded. In order to test how this phenomena influences settlement location, a site suitability model for prehistoric settlement was designed and tested against actual site locations. Rather than relying solely on environmental variables to build this model, site location data was also integrated in order to investigate whether or not proximity to previous settlement locations would increase the likelihood of settling there.

Helmer, Matthew (US Forest Service)**[12] Planning for the Future: Integrated Resource Management and Ecosystem Services**

Resource managers, researchers, and policymakers are increasingly considering ways to integrate across silos for more effective land management in the 21st century. In 2005, the UN Millennium Ecosystem Assessment articulated an international strategy of ecosystem services which aims to holistically measure the cultural and biophysical benefits that landscapes and ecosystems provide to the public. The goals of ecosystem services management include the valuation of resource benefits, the identification of beneficiaries, trade-offs among various land use changes, and others. The 2012 Planning Rule for the Forest Service requires that all national forests now consider ecosystem services in their management planning. While biophysical ecosystem services, such as measurements of soil quality and carbon sequestration are relatively straightforward to value, cultural ecosystem services are often much more difficult to define and measure. As such, management of cultural ecosystem services is less developed. Heritage can play a key role in forging the future of ecosystem services and integrated resource management. This poster provides background information on ecosystem services and how the approach can help heritage managers to improve preservation and to include management of cultural heritage benefits in the broader fulfillment of the National Historic Preservation Act.

Helmke, Christophe [199] see Zralka, Jaroslaw

Helper, Mark [82] see Klehm, Carla

Helzer, Margaret [249] see O'Grady, Patrick

Hemmings, C. (Aucilla Research Institute)**[332] Late Pleistocene Faunal Utilization: Some Current Thoughts on Paleoindian Diet and Tool Source Selection**

Accumulated evidence regarding the range of prey utilization and tools made from animal remains is rapidly growing and overdue for a summary consideration of Clovis and Pre-Clovis sites in North America. This discussion is heavily weighted with data from Florida sites along the Wakulla and Aucilla Rivers, and the Old Vero Site. Recent proboscidean data from utilized mastodon, mammoth, and gomphothere remains are complemented with new information from a tapir kill site and numerous burned freshwater aquatic and marine species found 25 miles inland from the ice age shore.

Hemsley, Samuel (Northern Arizona University)**[120] Down By the River Side: A LiDAR-Based Settlement Survey in the Belize River Valley**

This paper focuses on the use of lidar technology, in combination with traditional pedestrian ground survey methods, to compare ancient settlement patterns and activity areas in contrasting environmental zones, alluvial floodplains and karstic hills, in the upper Belize River Valley. The paper also describes the capabilities and accuracy of LiDAR

technology for use in settlement survey in tropical environments. Landscape archaeology is used as the primary theoretical approach in this study, allowing for an examination of human-environment interactions. Lithic and ceramic analysis from assemblages that were surface collected during the survey are also incorporated in our chronologic and activity centric conclusions for the surveyed settlements in the area of study. LiDAR accuracy rates are examined to evaluate the technologies potential for future research in the area. The collected geospatial data obtained throughout this research contributes to a growing body of GIS-sourced data in the Belize Valley Region and has the potential to inform future research and heritage management in similar geographic areas.

Henderson, Gwynn [419] see Manzano, Bruce

Henderson, Helen

[256] Field Schools and Gender in Archaeology

This paper reflects on the singular importance of field school experiences, such as the semester abroad program of Kenyon College, for supporting students as they come to understand the social context of professional life in Latin American Archaeology and their ability to positively contribute to an eclectic discipline such as archaeology. The formative experiences of living and studying in a foreign country provide opportunities to develop different kinds of cultural competencies that help young investigators develop the confidence and skills to not only handle challenges that arise during field work but also can help navigate academic professional contexts where issues of plurality, diversity, and/or gender differences may not be openly addressed. I want to highlight the importance of teaching and supporting young investigators in field schools as a means to increase our ability to reflect on ethical dilemmas and disciplinary biases, such as androcentrism, and actively work towards a more diverse and inclusive academic discipline.

Henderson, Jon (University of Nottingham UK)

[20] The Legacy of the Oceans: Past Marine Exploitation and the Sustainable Development Agenda

SDG14 Life Below Water recognises the economic and social benefits that sustainable use of marine resources can provide including enhanced food security, sustainable energy generation, and poverty eradication through marine orientated livelihood opportunities. While environmental sciences and ecological approaches have had a major role in the development of solutions, the potential role of marine cultural heritage as a usable resource is not widely appreciated. Providing deep-time data over millennia, the marine archaeological resource has more to offer than solutions based on tourism. For example, coastal management strategies and conservation projects rely on short-term baseline data that, at best, cover little more than a century. As a result, projects and strategies put into place are limited, and do not fully reflect ecosystem dynamics or the relative resilience of different species to the effects of both human activities and changes driven by long term climatic and other environmental factors. This paper will argue that a marine cultural heritage outlook (prioritising human interaction with the sea in all its diversity) could provide the conceptual framework that unites, stimulates and informs interdisciplinary responses to the challenges set out in SDG 14.

Hendricks, L. Renee

[410] Bundles and Bloodletting: An Analysis of Women's Ceremonial Roles in Classic Maya Art

This paper addresses the inclusion of women within Classic Maya works of art, consisting of, for this purpose, private-consumption ceramic vessels and large scale public monuments. Through the use of Feminist and Gender Theory, Performance Theory, and Iconographic Theory, the roles of women in iconographically depicted ceremonial performance is assessed. A Microsoft Access database was constructed in order to look at various aspects of female depiction, including but not limited to, bodily action, costume, and paraphernalia. The context, individual actions, and associated paraphernalia of women performing numerous roles were analyzed, in which women were found to participate in many of the same roles as men, although there are some roles from which either men or women are excluded, and certain paraphernalia items with which women are not associated.

Henebry-DeLeon, Lourdes (Central Washington University)

[326] Born on the Columbia Plateau: Cultural Affiliation for the Ancient One

NAGPRA's preponderance of evidence standard is utilized to demonstrate a relationship of shared group identity between the Ancient One (Kennewick Man) and the Colville, Nez Perce, Umatilla, Wanapum, and Yakama tribes. Data is presented within the evidentiary standard applicable to cultural affiliation determinations under Section 3 of NAGPRA. Scientific certainty is not required but rather evidence demonstrating that the existence of a cultural affiliation is more probable than its nonexistence. Biological data offered the most direct line of evidence in identifying the earlier group. All available, population specific data for the Columbia Plateau within the immediate (7-mile radius) and nearby (55-mile radius) areas of the Ancient One site, shows the Ancient One falls within the variability exhibited on the Plateau at the same time period and throughout time. He was not outside of the norm for the population existing during the Early Cascade period when he was alive and for the populations that followed for which he has a shared group identity. Additional archaeological and geographic data demonstrates the Ancient One was intentionally buried at a location on the Southern Columbia Plateau during the Early Cascade Period.

[293] Discussant

Heng, Piphal [27] see Carter, Alison K.

Heng, Piphal (University of Hawai'i at Manoa)

[300] Between Angkor and Champa: Political Economy of the Buffer Zone

Highland Southeast Asia was historically the domain of ethnic swiddeners, in contrast with the wet rice farmers of lowland states. Recent scholarship has re-envisioned these upland groups as active agents who resisted lowland state domination, rather than viewing them as isolated tribal groups. Highlands located east of the Mekong River in southeastern Laos, eastern Cambodia, and west-central Vietnam form a buffer zone that separated Angkor from Champa, and documentary records suggest complex dynamics between neighbors. The 10th-13th century CE rise of Angkorian power involved a series of battles between Angkor, Champa, their internal rebels, and occasionally, the highlanders. Archaeologists have yet to contribute to this discussion. This paper uses archaeological, historical, and art historical data to explore political economic relationships between Angkor, Champa, and upland groups in the buffer zone. In this model, the buffer zone was neither passive nor remote: it played an important role in the sociopolitical and economic development of both Angkor and Champa. The distribution of Khmer and Cham style temples and inscriptions in the highland during the 7th-14th century CE, and the 16th-19th CE records of politics and economic interactions suggest an interdependent economic system between the highland and lowland communities.

Henkin, Joshua (Field Museum of Natural History), Ruth Ann Armitage (Eastern Michigan University), Donna Nash (UNC Greensboro) and Patrick Ryan Williams (University of Illinois at Chicago)

[290] Phytochemical Characterization of Chicha de Molle Production at Cerro Baúl

Converging evidence from archaeological excavations and ethnographic research in the Peruvian Andes has demonstrated that the indigenous alcoholic beverage chicha de molle has a time depth of at least the Middle Horizon (600 CE – 1000 CE). The most impressive example of large-scale, pre-Hispanic production of chicha de molle hails from an exhumed brewery discovered atop Cerro Baúl, part of a Wari emissarial outpost abutting Tiwanaku settlements in the Moquegua Valley, and the finding has suggested this beverage's importance to Wari elites. Ripe drupaceous fruits of *Schinus molle* L. (Anacardiaceae) are still to this day harvested to produce a sweet, aromatic chicha and are added to maize beer (especially chicha de jora) to improve the flavor and increase the alcohol content. Direct analysis in real time mass spectrometry (DART-MS) was employed to characterize potsherd residues and spent molle drupes recovered from the Cerro Baúl brewery, which were compared to experimental archaeology controls i.e. ethnographically produced modern chichas, including chicha de molle brewed both with and without maize as well as chicha de jora. Monoterpene and triterpenoid biomarkers identified, plus the presence of sesquiterpenoids, the phenylpropanoid safrole, and the aliphatic aldehyde decanal, strongly corroborate chicha de molle production at Cerro Baúl.

Henry, Lauren (University of Wisconsin - Oshkosh), Sarah Ledogar (University of New England [Australia]) and Jordan Karsten (University of Wisconsin - Oshkosh)

[47] Using Avifaunal Trends to Evaluate Environmental Shifts on the Eurasian Forest-Steppe with the Expansion of Agropastoralism

Expansion of agricultural communities during the Eneolithic in Europe likely had an impact on the environment due to a need for land, wood for building houses, and agricultural practices (e.g., slash-and-burn). We focus on the Trypillians (an Eneolithic, forest-steppe group) from Southeastern Europe, and how their agropastoral lifestyles impacted their environment. Bird remains associated with human activity can provide key insights into past environments. Reports on avifaunal remains from archaeological sites were collected to examine changes in bird species availability over three environmental zones (forest, forest-steppe, and steppe) from the Neolithic to the Middle Ages. Data suggests that at sites in forested environments, there are relative decreases in woodland species (19% / 198 MNI in the Neolithic to 6% / 47 MNI of the Iron Age), with small relative increases in steppe species (10% / 198 MNI in the Neolithic to 11% / 47 MNI of the Iron Age). At forest-steppe sites, there are relative increases in domestic and synanthropic species with no marked changes in forest or steppe dwelling species. Our results suggest that groups living in forested environments had more of an impact on their local environment than the Trypillians living in the forest-steppe.

Hepp, Guy (California State University, San Bernardino)

[314] Landfalls, Sunbursts, and the Capacha Problem: The Case for a Pacific Coastal Interaction Community in Early Formative Period Mesoamerica

In the 1960s, Ford argued that the first Pacific coastal Mexican pottery should more closely resemble that of northern South America than of early highland Mexican wares of the Tehuacán tradition. In the 1970s and 1980s, Kelly argued that Colima's Capacha phase represented one of several "landfalls" of technological and stylistic influence emanating from its southern font among Valdivia, Machalilla, or Puerto Hormiga potters. Revisiting of Ford's arguments in the 1990s suggested independent development of ceramics in various parts of the Americas, and determined that interregional similarities are too scant to signify diffusion from South America. Locona pottery from the Soconusco, markedly dissimilar from South American wares, further muddied the waters by suggesting Central American influences to some. Recently, archaeologists applying Appadurai's concept of "disjuncture" have argued for interaction models emphasizing both similarity and difference to better reflect complex interactions fraught with opportunity and tension. In this paper, I consider early Pacific coastal pottery from Colima, Oaxaca, and Ecuador. I find that indicators of interaction exist and suggest at least two major sources of technological influence in Early Formative Mesoamerica. Understanding local implications of these interactions, and thus the actual advent of pottery in several regions, will require more evidence.

[230] Moderator

Heredia Espinoza, Verenice Y. (El Colegio de Michoacan)

[307] *Sculpting the Landscape: Analyzing the Formative-Classic Period Built Environment at Los Guachimontones, Jalisco*

Los Guachimontones is the quintessential and largest archaeological site of the Teuchitlán tradition or culture. Despite this, until recently our understanding of the site has been hampered in part by an overemphasis on excavations in the largest, most monumental guachimontón (or circular architectural groups). However, recent intensive survey and mapping of the site is now providing a more nuanced understanding of this large and complex settlement. In this paper, I report on the results of multiple spatial analyses at the scale of the entire site during the Formative to Classic periods. The results suggest a highly accessible built environment. Specifically, the inhabitants of Los Guachimontones created discrete and socially meaningful spaces (e.g., neighborhoods), where a variety of economic and ritual activities took place. The centers of these neighborhoods were focused on a guachimontón, which served to organize social use of space and their limits were expressed in the form of empty or sparsely occupied zones. The highly repetitive and planned character of the urban landscape sheds light on the internal organization of the site, which provides important insights into its political and economic organization.

[68] Discussant

[307] Chair

Hermes, Bernard [199] see Zralka, Jaroslaw

Hermes, Taylor [196] see Frachetti, Michael

Hermitt, Elijah [373] see French, Kirk

Hernandez, Christopher [24] see Landau, Kristin

Hernandez, Christopher (University of Illinois-Chicago)

[280] *Warfare, Fortifications, and Archaeological Formation Processes: The Case of Mensabak, Chiapas, Mexico*

This paper musters archaeological, ethnohistoric, and ethnographic data to highlight that a greater focus on formation processes and sampling bias is necessary in the archaeology of warfare and study of martial architecture. Fortifications are some of the most important archaeological indicators of past warfare. For example, the myth of a peaceful Maya civilization was shattered through multiple studies that established the presence of martial architecture prior to the Postclassic period (AD 900-1521). Yet, when compared to the amount of Maya sites, a proportionally low number are fortified. Additionally, many known fortifications contain gaps or do not encircle entire sites. The breaks in martial architecture shed doubt on their defensive function. By examining formation processes associated with martial architecture, we suggest that contemporary methodologies lead to an underrepresentation of Maya fortifications. Thus, the study of Maya warfare should bring the issue of sampling bias to the forefront. To build our case, we examine masonry fortifications from two sites in the Mensabak region of Chiapas, Mexico. Our analysis suggests the presence of Maya fortifications is strongly affected by the physio-chemical properties of construction materials (wood and plaster) and bioturbation.

[59] Discussant

Hernandez, Hector (Universidad Autonoma de Yucatan), Mario Zimmermann (Washington State University) and Rani Alexander (New Mexico State University)

[198] *Landscape with Bees: Apiculture in Yucatán after the Spanish Invasion*

In this paper we examine how European colonization and the shift to industrial capitalism altered beekeeping in Yucatán from AD 1600 to the present. Honey and wax produced from stingless bees were circulated throughout the Mesoamerican world system during the Postclassic period. In the wake of the European colonization, honey and wax were in high demand as tribute and repartimiento goods, which shaped new ecologies and communities of practice involving both native (*Melipona beecheii*) and introduced (*Apis mellifera*) bee species. Although traditional apiculture with stingless bees has persisted to the present day, we don't know when European bees were introduced or how apiculture of mixed bee species altered ecologies, vegetative communities, and practices under demands for intensified production of honey, wax, and derivative alcoholic beverages (balché, mead, and distilled spirits like Xtabentún). We examine archaeological, material, ethnobotanical, and soil chemical evidence from the remains of an apiary, likely for *Apis mellifera*, at Hacienda San Pedro Cholul, a henequen plantation situated on the outskirts of Mérida. The importance of this research is underscored by the disappearance of traditional beekeeping and possible extinction of *Melipona beecheii* in the wake of neoliberal globalization today.

[227] Discussant

Hernandez, Jorge (National Park Service) and Susan Snow (National Park Service)**[3] Using STEM to Educate the Public about Cultural Diversity in the San Antonio Missions**

Twice a year Western National Parks Association has a Mexican Art Exhibit featuring pottery from Mata Ortiz at the San Antonio Missions National Historical Park Visitor Center. The pottery from Mata Ortiz follows the centuries-old ceramic tradition of Casas Grandes culture of the Chihuahuan desert. Park interpretive staff wanted to develop a program to link the park's material culture history to the art exhibit in a more tangible way. Using new research on utilitarian pottery from the missions and its ties to prehistoric pottery styles and group ethnicity that has been conducted by Dr. Steve Tomka, a new program was developed. During the three day event, visitors had the opportunity to experience through hands on learning and experimental archeology the similarities and differences between prehistoric and colonial indigenous pottery making techniques, and the traditional pottery techniques of Mata Ortiz. This paper will discuss the development of this program and also the importance of ensuring that new park initiatives designed to appeal to different groups are linked to the park's enabling legislation.

Hernandez, Marianne [280] see Estrada-Belli, Francisco

Hernandez, Patricia Olga [192] see Martínez, Estela

Hernandez, Stevy [89] see Keim Malott, Jillien

Hernandez, Stevy (Fowler Museum at UCLA), Wendy Teeter (Fowler Museum at UCLA), Xochitl Aguinaga (Fowler Museum at UCLA) and Jillien Malott (Fowler Museum at UCLA)**[89] The State of the State of California Curation**

Dr. Wendy Teeter, Stevy Hernandez, and Xochitl Aguinaga from the Fowler Museum at UCLA were part of an implementation committee initiating the California Curatorial Survey which was distributed to professionals from a variety of institutions. The 2018 Society of California Archaeology Curation Committee led the creation and dissemination of this survey to understand who curates archaeological collections and what the needs and standards are of these locations. To ensure survey results adequately represented the reality of curation, those who were asked to participate were affiliated with numerous facility types including state/federal, tribal, CRM, museum, and repository. The responses collected corroborated the existence of a widespread curation crisis. In March of 2018, a round table discussion with the SCA committee members was held. Those in attendance reviewed the survey responses, offered insights, and provided suggestions based on their personal experiences as they related to the presented data. Based upon this discussion and the survey itself, the implementation committee concluded that a follow-up survey was necessary. This new survey tailored questions to facility type, providing a better overview of curation needs. Additionally, to encompass the full scope of California curation, a broader range of regional facilities were invited to participate.

Hernández, Laura (AMBI Lab, History Department, University of La Laguna), Carolina Mallol (AMBI Lab, University of La Laguna), Matilde Arnay (History Department, University of La Laguna), Margarita Jambrina-Enríquez (AMBI Lab) and Antonio V. Herrera-Herrera (AMBI Lab)**[417] Roques de García Rockshelter: Preliminary Results from Micromorphological and Biomarker Analysis from a Combustion Structure**

The Roques de García rockshelter is an aboriginal site located in Tenerife, Canary Islands, Spain. Its archaeosedimentary sequence is characterised by a high presence of combustion structures. In this study we present the preliminary results from a micromorphological and biomarker analysis of one of the structures.

Hernández, Laura (University of Puerto Rico, Río Piedras Campus)**[418] Commercial Activity, Trades and Professions in Barrio Ballajá, 1910 - 1940**

A deeper analysis of the neighborhoods (barrios) of San Juan, the capital of Puerto Rico, during the early 1900's provides a clearer scope of the complexities of population density and work related activities. For instance, Barrio Ballajá, the smallest neighborhood located to the northwest of the walled city, had a population of approximately a thousand people distributed within six urban blocks. This study concentrates on identifying the types of trades and professions of the people who resided in Ballajá, as well as the types of businesses that existed in the area. The information is gathered from population census for 1910 and 1940, commercial directories and registries from the first half of the 20th century. As a result, this study developed a wider picture on the neighborhood's types of jobs and commercial activities. The retrieved data will aid on new interpretations of the material culture and features recovered from archaeological excavations.

Hernandez Espinoza, Patricia Olga (Centro INAH Sonora)**[379] Children of Privilege: Infant Mortuary Practices at Late Postclassical Tamtoc Society**

Funerary practices identified in the Architectural Funerary Complex of La Noria in Tamtoc, SLP, have been interpreted as belonging to a space used to symbolize the social and possibly political importance of the individuals who were buried there during the Late Postclassical period (1350-1521 a. P.). Most of the burials correspond to adults, but there are also burials of children and juveniles, whose mortuary treatment was part of the symbols to

identify their place in the social strata of Tamtoc. In this paper, we presented bioarchaeological evidence we found to interpret that these children were part of a privilege sector of the ancient city of Tamtoc.

Hernandez Garavito, Carla (Vanderbilt University)

[179] The Witching Hour: Demonization of Female Bodies and the (mis)Construction of Gender during the Spanish Evangelization of Huarochirí (Lima, Peru)

In 1660, Francisca Melchora, widow of the lord of the Huarochirí people in the Viceroyalty of Peru, became immersed in a witchcraft criminal case. However, she was not accused of being a witch herself, but instead of hiding accused women and resisting a Spanish lieutenant sent to arrest her. What follows in the written account of this case were testimonies in which women and men incriminated each other by identifying rituals, sacred places, and associations between alleged witches as community leaders. What is compelling about the case is that the women, though simplified as witches by the Spanish authorities, were recognized as counselors to the deceased local lord, and were considered powerful enough to be renowned beyond the boundaries of their small towns. In this presentation, I examine colonial written records and archaeological data to investigate the ritual paraphernalia, places, and activities that identified the so-called witches. I propose that while female bodies were demonized as dangerous, lustful and sinful by the Spanish Catholic clergy, the accounts from Huarochirí demonstrate that gender was not considered in such limited terms by Andean ritual practices, and that women were powerful political actors that held similar status to their male counterparts.

[179] Chair

Hernández Juan, José Ignacio [405] see Celis Ng Teajan, María Andrea

Hernandez Sarinana, Daniela (Department of Anthropology, Boston University) and David Carballo (Department of Anthropology, Boston University)

[373] Building Community Ties Using Archaeology in Tlajinga, Teotihuacan

Teotihuacan is an ancient city located in Mexico that was designated a UNESCO World Heritage Site in 1987. It was the largest city in the Americas during its peak between 100-550 CE and its significance as an early, cosmopolitan center has been demonstrated over decades of continuous study. The Proyecto Arqueológico Tlajinga Teotihuacan (PATT) began in 2012 and has focused primarily on better understanding household and neighborhood organization in a southern district of the city. Two excavation seasons plus four seasons of remote sensing have been completed, along with ongoing artifact analysis. An important facet of the project involves working closely with members of the contemporary community of San Pedro Tlajinga, as contemporary constructions impact this southern sector of the ancient city. Through an initiative of community-based archaeology, we seek to broadly disseminate results of the project and highlight the significance of local archaeological remains while strengthening ties with community members. In this poster, we outline ongoing efforts at promoting awareness of the archaeological value of the area and mitigating concerns of local stakeholders through community-engaged research and evaluation of conservation and dissemination strategies.

Hernández-Gaspar, Carla [417] see R. De Vera, Caterina

Hernbrode, Janine

[43] Are the Tohono O'odham Descendent from the Hohokam and Their Predecessors? A Rock Art Test of Occupation Continuity in Southern Arizona

This paper reports data supporting continuity of Hohokam and O'odham occupation and use at the Cocoraque Butte Rock Art Complex by the Archaic, Hohokam, and O'odham people. Data analyzed are from a comprehensive recording of over 11,000 rock art elements completed in March 2018. Surface artifacts indicate the site was in use from 4000 to 5000 years before present through the early to mid-1900s. The 1007 petroglyphs of anthropomorphs located on one intensely-used hillside at this site appear to represent much of the time frame. The images were separated into three patination and intensity-of-execution levels consistent with the occupations of the Archaic, Hohokam, and O'odham people, and then classed into 9 stylistic types resulting in continuity of style across the time frame. Some archaeologists previously proposed that during the A.D. 1200 to 1500 migrations from Northern Arizona and New Mexico, the Hohokam and O'odham in Southern Arizona were joined by Puebloan immigrants. These data were also compared to anthropomorph style types from Pueblo II, III, and IV.

Herr, Sarah (Desert Archaeology, Inc.)

[163] Discussant

Herrera, Israel [71] see Lizama Aranda, Lilia

Herrera, Roberto (Medgar Evers College CUNY)**[65] Making the Invisible Visible or How Culture History Can Have An Impact**

This paper treats Archaeology as an exercise in revitalizing social memory. In it we detail the current development of the Anthropology degree program at Medgar Evers College CUNY. Emphasizing anthropology and archaeology as a means to promote the underrepresented narratives of marginal groups in the Americas, the program also provides the knowledge required to work within contexts that deal with historically charged cultural dynamics and tensions. Focusing on global citizenship and social justice, Medgar Evers Anthropology engages with its student body to promote a critical evaluation of culture historical phenomena, focusing on heritage, preservation, and the integration of research with sustainable practices in urban and rural settings. We present outcomes from the recent implementation of introductory level classes, special presentations on Latinx and Afro-Latinx identity and the introduction of archaeology classes designed to reach students that may not explicitly pursue archaeology as a profession, but use it to promote productive public discourse. Basic knowledge of the cultural history of New York City and beyond has had significant impact on the perception of shared memory and spaces. This counters the often pejorative view of culture history which overlooks its usefulness as a means to recapture and reintegrate obscured identity and memory.

Herrera Valencia, Karen (University of Puerto Rico, Río Piedras Campus)**[418] Narratives of the Recent Past: La Playa Slum as a Case Study**

The slum of "La Playa" in the municipality of Arecibo, northern coast of Puerto Rico, existed from the late 19th century to the mid-20th century. This study presents the results of researching this type of site using documentary sources that include maps, plans, photographs, population data and newspaper articles. The objectives of this case study are to establish the site delimitation, and identify the approximate number of houses, families and people per household in two selected areas. This information can be used in future archaeological research projects, and to delineate investigations that will center around the people who inhabited these spaces. It will also contribute in creating awareness within the community about their recent past.

Herrera-Herrera, Antonio V. [417] see Buonasera, Tammy

Herrera-Herrera, Antonio V. (Archaeological Micromorphology and Biomarkers Lab, ULL, Tenerife, Spain), Caterina R. de Vera (Archaeological Micromorphology and Biomarkers Lab,) and Carolina Mallo (Archaeological Micromorphology and Biomarkers Lab,)

[417] Development of a Quick, Easy, Cheap, Effective, Rugged, and Safe (QuEChERS) Method for the Analysis of Lipid Biomarkers in Archaeological Sedimentary Deposits

The analysis of lipid biomarkers plays an important role in sedimentological studies because these compounds are representative of particular sources (plants, macrophytes, algae, bacteria, and animals) and are likely to persist after burial. Frequently, their analysis involves methodologies, such as ultrasound assisted extraction, accelerated solvent extraction, Bligh and Dyer method, Folch method, etc., with high consumption of contaminant solvents, time and reagents. Following the principles of Green Analytical Chemistry, agrifood and environmental researchers have developed a particularly important methodology with positive results for analysis of different kinds of contaminants (i.e. pesticides, antibiotics, endocrine disruptors, mycotoxins, etc.): the so-called QuEChERS method (Quick, Easy, Cheap, Effective, Rugged, and Safe). Despite the inherent advantages of the mentioned protocol, it has not been applied to lipid biomarkers in sedimentary contexts. In this work, we investigated the applicability of QuEChERS in this field, optimizing the parameters affecting the extraction efficiency (type, acidity and volume of extraction solvent, amount of salts added, type and amount of sorbents, and humidity of sample) and validating the methodology in terms of linearity, detection limits and recoveries. Then, the methodology was applied to archaeological sedimentary samples and lipids were determined by gas chromatography coupled to mass spectrometer detector.

Herrera-Malatesta, Eduardo (Leiden University)**[421] Contested Landscapes in the Caribbean: Revisiting Colonial Representations of Indigenous Political Hierarchy, Borders and Movement**

What we know today of the Indigenous inhabitants of the Caribbean is the result of a process of cultural interpretation and representation originating from the colonial enterprise. For the island of Hayti, later renamed as Hispaniola by Columbus, the first Spanish chroniclers identified a set of indigenous territories that represented diverse indigenous political hierarchies and cultures. This identification has been repeated through the years, reified in textbooks and histories until it represented the "truth" about the indigenous past for the general public in the Dominican Republic, Haiti, and even worldwide. Using regional surveys and extensive excavations throughout the northern Dominican Republic, the Nexus 1492 project has compiled a database of archaeological information that, provides enough data to critically reflect on the colonial representation of indigenous political hierarchies and to quantitatively explore how the archaeological record may contest or support this narrative. In this paper, we will confront these colonial representations with archaeological data and provide a new image of indigenous landscapes at the time of European invasion of the Caribbean. Most importantly, we will discuss how these results are being used to craft a dialogue with modern descendants of groups whose entire histories were selected, erased, and modified by colonizers.

[421] Chair

Herries, Andy [277] see Blackwood, Alexander

Herries, Andy (La Trobe University, Melbourne, Australia), Matt Caruana (University of the Witwatersrand, South Africa), Alexander Blackwood (La Trobe University, Melbourne, Australia), Matthew Meredith-Williams (La Trobe University, Melbourne, Australia) and Coen Wilson (La Trobe University, Melbourne, Australia)

[277] Reconstructing the Amanzi Springs Acheulian Site, South Africa, 50 Years after Hilary Deacon

The Amanzi Springs Acheulian site in South Africa was first excavated by Ray Inskeep and then Hilary Deacon for his Masters project in the 1960s. Deacon excavated two spring he designated Areas 1 and 2 and this work suggested that Amanzi Springs preserved stratified Acheulian bearing deposits, something rare in the South African archaeological record. The Amanzi Springs Archaeology Project (ASAP) began in 2015 nearly 50 years after Deacon, to clarify the stratigraphy of the two spring eyes, as well as open test excavations in a number of other springs at the site. To date, this work has established the presence of Middle Stone Age materials and that all archaeological deposits are associated with wood and organic remains. Furthermore, ASAP has used photogrammetry to digitize Deacon's original excavations and incorporated co-ordinate data associated with artefacts he collected nearly 50 years earlier, which has produced a comprehensive GIS model for relating Deacon's finds with stratigraphic sections. Lastly, preliminary excavations in Areas 1 and 2 have begun to clarify the stratified nature of Acheulian materials at the site and a comprehensive dating program of the spring eyes will produce ages for the Acheulian and Middle Stone Age occupations at Amanzi Springs.

Herrmann, Edward (Indiana University Department of Earth and Atmospheric Sciences)

[49] Assessing Continuity and Change in Paleoindian Landscape Use through Time in Indiana: Implications for Site Predictive Modeling

The recent completion of the Indiana State Historic Preservation Office's SHAARD database provides researchers with a comprehensive site archive that includes site locations, projectile point typologies, raw material types, and a marginal record of site details. We use Geographic Information Systems (GIS) to analyze the distribution of over six hundred Early, Middle, and Late Paleoindian sites that have been previously recorded in Indiana. We map site distributions relative to regional chert sources and potential travel corridors using least cost paths to highlight likely mobility patterns. These data, combined with local site and projectile point types, support an argument for multiple macrobands in the state and show the process of settling in, particularly during the Late Paleoindian Period. Site distributions along highly productive resource areas, overland travel corridors, and high rates of local chert use suggest that even Early Paleoindians were well aware of local resources.

[49] Chair

Herrmann, Edward [205] see Krus, Anthony

Herrmann, Edward [216] see Cory, Mackenzie

Herrmann, Nicholas [172] see McKeown, Ashley

Herrmann, Nicholas (Texas State University), Christopher Wolfe (University of Nevada, Reno), Krysten Cruz (Texas State University), Despo Pilides (Department of Antiquities, Republic of Cyprus) and Yiannis Vilaris (Department of Antiquities, Republic of Cyprus)

[387] Demography, Health, and Diet of the Hellenistic to Early Christian Burial Samples from Ayioi Omoloyites Neighborhood in Lefkosia, Cyprus

The primary goal of the Ayioi Omoloyites Bioarchaeological Project is to document and interpret the commingled human remains recovered from three Hellenistic to Early Christian rock-cut tombs located south-southwest of the old city walls of Lefkosia, Cyprus. Laboratory research over the past four years has focused on the inventory, assessment, and contextualization of the remains. In 2017 and 2018, the osteological inventories of two of the three tombs (Tomb 47 and 48) were completed and nearly three-quarters of Tomb 49 was documented. Altogether, 7277 skeletal elements have been examined from the three tombs. Minimum Number of Individuals (MNI) estimates based on zonal scores and demographic parameters both suggest varied uses of the tombs. Radiocarbon dates, in combination with stable isotope assays from select elements, provide evidence of the later use of Tomb 49 as an early Christian ossuary and suggest a diverse diet and a potentially a varied residential history of these early Lefkosians. Issues of health, diet, injury, infection, and social interaction are explored in relation to the demographic, isotopic, palaeopathological, and archaeological record of early Lefkosia. These results are also contextualized within the broader Cypriot Hellenistic to Early Christian experience.

Herron, Molly (University of Wyoming)

[322] Camping with Mammoths? Identification of Ivory Fragments at the La Prele Mammoth Site Using Microscopy

While it is well known that Clovis people hunted mammoths (*Mammuthus columbi*), there are few cases in the Paleoindian record where campsites associated with mammoth remains have been found. The La Prele Mammoth site, located near Douglas, Wyoming, is an approximately 13,000-year-old mammoth kill site with an associated camp. While mammoth remains have been found on site, they have not been identified within the camp area. This may be due to the fragmentary nature of the faunal assemblage, which limits traditional means of morphological identification of taxa. However, based on a preliminary analysis, some of these small fragments may be proboscidean ivory. Here I discuss the identification of material type using microscopy. Under magnification, ivory can be identified by its unique characteristics such as Schreger lines and annual rings. The identification of mammoth remains from the campsite area would support the association of cultural deposits contemporaneous with

the mammoth remains at the site. This method could also offer an alternative means to identifying ivory in other sites with fragmentary faunal remains.

Herzog, Nicole (Boise State University), Liz Dolinar (University of Montana) and Anna Prentiss (University of Montana)

[327] Using Micro and Macrobotanical Analyses to Assess Socio-economic Strategies at 48PA551, the McKean Occupation in the Sunlight Basin, Wyoming

Located in the Absaroka Mountains of northwest Wyoming site 48PA551 is unique for its pithouse, rock pile surrounded by deer skull caps with antlers, abundant hearths and pit features, large number of dart points and groundstone, and substantial faunal assemblage. These features and the artifact assemblages associated suggest a winter-sedentism pattern with increasing social complexity. In order to test hypotheses about Middle-Archaic adaptations, specifically related to plant gathering, processing, and food storage, we examined paleoethnobotanical assemblages recovered during the 2018 excavations from multiple features. We report findings from micro- (starch) and macrobotanical analyses in addition to efforts to identify plant foods used in the past via ethnographic inquiry. These data provide a context within which to evaluate alternative hypotheses about Northwestern Plains socio-economic strategies.

Hess, Erin

[241] U.S. Army Corps of Engineers: Emergency Response Adaptive Management

The mission of the U.S. Army Corps of Engineers' (Corps) Regulatory Program is to protect the Nation's aquatic resources while allowing reasonable development through fair and balanced permit decisions. The Corps works with consulting parties to develop appropriate mitigation measures when adverse effects to historic properties cannot be avoided. In emergency situations, there may not be sufficient time to fully develop a mitigation plan. In these situations, it is critical for stakeholders to work together to develop and implement an emergency response plan, which may require adaptive management during implementation. In 2017, the Corps was notified of an emergency project at a state park which would adversely affect a Native American occupation site. The Corps worked with the consulting parties to develop an emergency response and recovery strategy to address adverse effects. The strategy included continuous involvement of archaeologists, tribal representatives, and volunteers to screen and sort through 6500 cubic yards of material in under three months to recover artifacts from the material. This presentation discusses the initial mitigation strategy, adaptive management undertaken during the project, the effectiveness of various artifact recovery techniques attempted and utilized, and the continuous cooperation and collaboration between stakeholders through the course of the project.

[241] Chair

Hester, Thomas R. [316] see Glascock, Michael D.

Hewitt, Anthony [129] see Toney, Joshua

Hicks, Dan (University of Oxford)

[83] Lande: The Calais "Jungle" and Beyond

This talk introduces recent research for the current exhibition at the Pitt Rivers Museum in Oxford looking at the 2015 refugee crisis in Europe through the lens of a contemporary archaeology of the Calais landscape, with special attention to the site of the Calais "Jungle." The talk explores: (1) the material, visual and digital culture of forced migration in Europe and the Middle East; (2) the status of the European ethnological museum after the refugee crisis of 2015; and (3) Contemporary archaeology and activism in the context of the Calais "Jungle" and beyond.

Hicks, Keri (USDA Forest Service Alaska Region), Theresa Thibault (USDA Forest Service Tongass National Forest) and John Kinsner (USDA Forest Service Chugach National Forest)

[237] Planning for Post-1990 Inadvertent Discoveries in the Alaska Region, USDA Forest Service

Post-1990 inadvertent discoveries are not uncommon but visiting a reported discovery is costly, typically requiring personnel to boat or fly to remote locations to verify land ownership as well as age and affiliation of the remains. An additional challenge is the common knowledge that some individuals were buried in boxes and left undisturbed in rock shelters, caves, crevices and other out of the way places. Curious recreationists, as well as vandals and looters, regularly investigate areas that are difficult to monitor. Once State protocols have been followed and the discovery is confirmed to be archaeological in nature, timing of consultation becomes the next challenge.

Determining whether remains are Alaska Native may require analysis, but approval of analysis requires consultation. Add to that our internal challenge of inadequate administrative procedures for extending institutional knowledge to the next generation of staff. To improve our processes the Alaska Region is developing a Comprehensive Agreement per 43 CFR 10.5(f) with Alaska Native Tribes and Alaska Native Corporations that includes protocols for and treatment of discoveries as well as confidentiality protocols and access restrictions.

Hicks, Megan (City University of New York)**[31] Expanding Archaeological Research in Mývatnssveit: Conservation, Politics, and Modernity**

Archaeological research in the Mývatn region of northern Iceland contributed the first regional-scale interdisciplinary archaeological program to Icelandic archaeology (e.g. Lucas 2009, McGovern et al. 2007). Until recently the regional project focused chiefly on the settlement period (beginning in the late 9th century) through approximately the 1300s. This paper details how excavations, surveys, and research since 2008 have broadened the understandings of this key region through the expansion of chronological scope, methodological improvements, and the assessment and sampling of additional archaeological sites. The long-term regional research program has created new opportunities for understanding Iceland's shifting rural economies, histories of resource conservation, and socio-political changes after the middle ages when the island became increasingly enmeshed in long distance political and economic networks.

Higa, Naoki [29] see Welch, David

Higelin Ponce De Leon, Ricardo (Indiana University Bloomington), Pedro Guillermo Ramón Celis (Indiana University Bloomington) and Alex Elvis Badillo (Indiana State University)**[183] Zapotec Funerary Tradition: A Perspective between Bioarchaeology and Landscape Archaeology**

The state of Oaxaca, southern Mexico has a very diverse topography, from highlands to floodplains, where mortuary and funerary patterns have been practiced by the prehispanic indigenous Zapotec for at least 3000 years. From simple graves to very complex and elaborate tombs, the Zapotecs used and reused their mortuary space within the household or specific buildings, like temples. Therefore, in this paper we discuss the relationship between the Zapotec beliefs in the afterlife and how this ideology was stronger than any political barriers and beyond any political loyalties across time.

Our study includes a spatial analysis of 20 Zapotec archaeological sites from the Valley of Oaxaca, Sierra Norte and Isthmus of Tehuantepec, from Early Formative (circa 1600 BC) to the Late Postclassic (circa AD 1521). Focusing on the differences and similarities of architecture, location and grave goods, from mortuary context located across all topographic variation from the plains, the mountains, and the coast, this paper contributes to the dialogue between landscape archaeology and bioarchaeology by exploring compared mortuary analysis and beliefs systems.

[230] Discussant

Higelin Ponce de Leon, Ricardo [197] see Gonzales, Alicia

Higgins, Howard (TRC Environmental Corp.)**[17] Returning the Gift: Scientific Research and Heritage Preservation**

In 1974-76 I conducted ethnoarchaeological research among the Tahltan Indians of northwestern British Columbia. Like many native groups, from the early 1800's into the 1940's, the Tahltan were repeatedly decimated by epidemics. These killed disproportionately- with many old and very young dying. The loss of the elder women (the "Grandmothers") meant the concurrent loss of much of the Tahltan culture. The Grandmothers were the repositories of traditional wisdom. Persons would come to them for guidance in proper conduct and appropriate actions when there were internal controversies.

My research was problem driven, focused on concepts of space, and did not address Tahltan heritage. However, recently the Tahltan have become concerned with loss of their unique culture. They have begun examining their heritage so as to regain some aspects and preserve all of it that they can. As part of this, my primary research documents have been used as a source of information. This paper examines the collection of data useful in the future to local indigenous people. This approach is contrasted with the problem driven scientific approach, the current hallmark of the anthropological professions. The paper concludes with a discussion of the issues involved in such heritage driven data collection.

Higham, Thomas [326] see Becerra-Valdivia, Lorena

Higham, Tom [403] see Hopkins, Rachel

Higley, Jessica**[61] Discussant**

Higuchi, Yosuke [299] see Uchida, Junko

Higueras, Alvaro**[359] Research and Heritage Management in the Southern Caucasus: Future Perspectives in Post-Soviet Scenarios**

The inheritance of Soviet-molded approaches to cultural heritage has seen slow changes in the last three decades in the ex-Soviet South Caucasian countries of Georgia, Armenia and Azerbaijan. The creation of new models of research and management has been heterogeneous in the region. I continue here the trend presented at Vancouver's meeting, where I discerned two specific innovative but unsuccessful endeavors: private management of an archaeological site and documentation in a disputed territory. The heritage scenario is still not ready for drastic innovations: these new trends require a good deal of foresight, as in modeling the future scenarios by which heritage will thrive in the new modern "westernized" societies. So the question is: What is it ready for? What is it doing that contrasts with Soviet patterns? The arrival of the market economy, the rise of nationalism, and the revival of the role of the church (again, heterogeneously among the three countries) have marked the societal steps towards a post-Soviet world or an atmosphere of renegeing on any Soviet inheritance. I discuss the heritage issues in light of the work the researchers in the region are achieving and the narratives they are proposing for understanding South Caucasian history.

[306] Discussant**[359] Chair**

Hildebrand, Elisabeth [32] see Brandt, Steven

Hildebrand, Elisabeth (Stony Brook University)**[140] Discussant**

Hill, April [123] see Johnson, Precious

Hill, Arleen [348] see Burnette, Dorian

Hill, Austin (Dartmouth College), Jesse Casana (Dartmouth College) and Elise Jakoby Laugier (Dartmouth College)**[120] Archaeo-rover: A Low-Cost Robotic System for the Collection of Geophysical Data**

Conventional methods for collection of ground penetrating radar (GPR), magnetic gradiometry, and other archaeogeophysical data generally require precise grid layout ahead of surveys and significant labor to set up and move survey ropes, slowing data collection and creating a hurdle to larger, landscape-scale investigations. Although some commercial systems now employ Real Time Kinematic (RTK) GNSS for precise positioning of instruments during data collection, consistent and high-resolution coverage over large areas remains difficult without preliminary grid surveys, while the cost of such RTK systems is prohibitive to many archaeologists. In an effort to expand the possibilities of RTK-enabled geophysical survey, we built the "Archaeo-Rover": an autonomous vehicle designed to carry a GPR antenna while towing additional geophysical instruments, incorporating a new generation of low cost RTK GNSS tools. The Archaeo-Rover is capable of autonomously surveying areas many times larger than what is possible using traditional techniques, providing consistent, high-resolution geophysical data at a fraction of the cost of commercially available towed systems. This poster presents our ongoing experiments with the Archaeo-Rover as well as results of field testing at archaeological sites in New Hampshire and Illinois.

Hill, Austin [408] see Johnson, Adam

Hill, Brett (Hendrix College)**[246] A Path Forward: Casa Grande as Metaphor**

Two of the most iconic cultural symbols in the American Southwest are the O'odham Man in the Maze and Casa Grande Ruins National Monument. In this paper I illustrate a possible connection between them that might resolve some of their enduring mystery. From the merging of these symbols, a new perspective on the relationship between heritage and archaeology is outlined. Throughout the recorded history of O'odham heritage and archaeological interest in the Southwest, Native perspectives were routinely dismissed as an inferior kind of knowledge. The disappearance of the Hohokam, and other claims of collapse, are metaphors for failure and are supposed to offer lessons, but mostly inspire debate among scholars. In contrast, Native heritage programs approach the past with an emphasis on success and life in an ongoing generational movement. The implications of this approach are taking hold in archaeology as Native insights and premises are integrated into scientific thought. Integration was once suspected of undermining basic principles of knowledge, but rather they suggest a deeper and more accurate sense of the connection between living and ancient people. Looking at the past in different ways illuminates the nature of past societies and our relationships to them.

Hill, Brittany (R. Christopher Goodwin & Associates)**[334] Expanding the Role of Animals in Romano-British Burials**

This work considers the implications of human-animal relationships as they are found in the mortuary record of Verulamium- modern town of St. Albans, England. Once considered to be a major center, the mortuary rites given to its people suggest high variability in the role specific animal species played within the living and death culture of the city. While 480 human individuals were examined, only a small percentage was found to have been afforded the rite of a human-animal co-burial. Of major concern are the treatment of remains, the point at which animals enter into the funerary rituals and the impact this had on the surviving members of the society. Investigations were primarily carried out using zooarchaeological and human osteological techniques, but also refer to literary sources and other data. Analysis is situated in a broader theoretical approach on human-animal relationships adopting a non-anthropocentric view point. It is concluded that within the Romano-British city, there is a mutual participation of certain faunal species (namely cattle, sheep, pig and chickens) in rites that extended beyond the typical agricultural needs. Thus recognizing that different animal individuals within the same species could fulfill roles beyond that of the ultimate purpose of 'food item'.

Hill, David (ASET Siftung), Jan Petrik (Department of Geological Sciences, Faculty of Scie), Karel Novácek (Archaeology Section Department of History Palacky) and Ali Ismail Al-Juboury (Petrology and Mineralogy of Sedimentary Rocks Geol)**[298] Examining Sources of Glazed Ceramics In Mesopotamia in Late Antiquity**

Estimation of provenance in fine ceramics is a challenging task. Documenting the trade in glazed Sassanian and Islamic ceramics into southeast Asia and China has driven an interest in identifying the sources of these ceramics. We have defined three hypothetical provenance groups 1) Greater and Lesser Zab catchment (Arbil area), 2) Tigris, 3) Middle and lower course (Baghdad and/or Basra). Based on comparison of ceramic fabrics with regional geology, reference soil samples, LA-ICP-MS, INAA, and petrography of Mesopotamian glaze-decorated ceramics These provenance groups express possible areas where glazed-decorated ceramics were produced. Compositional difference in the ceramic pastes provide evidence for localized production of glazed ceramics and their circulation across Mesopotamia.

Hill, Erica (University of Alaska Southeast)**[91] Human Interment and Making Memory in Viking Age Iceland**

Over 300 Viking Age (AD 871–1000) human interments are known from Iceland, many with accompanying dogs and horses. Though these interments are similar to those of elites in Scandinavia, inhumation burial in Iceland apparently served a different purpose — to demarcate boundaries in a landscape devoid of hoards, mounds, and other markers of ancestral habitation. Without an existing sacred geography or the possibility of large-scale cremation or ship burial, early colonists adapted Scandinavian funerary rituals to the socio-political and environmental landscapes of Iceland, inscribing land claims and creating memory in spaces devoid of a mythic past.

Hill, Ethan C. [110] see O'Donnell, Alexis

Hill, J. Brett [316] see Clark, Jeffery

Hill, Kim [33] see Wren, Colin

Hill, Mark [70] see Sanger, Matthew

Hill, Matthew [365] see Otarola-Castillo, Erik

Hill, Matthew E. [80] see Wilfong, Faith

Hill, Matthew G. (Iowa State University)**[368] Clovis and the Chronology of Megafaunal Extinctions in the Southern Great Lakes**

Over 40 unpublished AMS results on *Rangifer*, *Cervales*, *Bootheria*, and *Ovibos* combined with ~80 published assays for *Mammuthus* and *Mammut* are used to profile extinction of these taxa in the Southern Great Lakes. At least one result for each of these taxa falls in the Clovis time period, except for *Ovibos*. Numerous dates for *Mammut* and *Cervales* overlap with Clovis. Dates for *Rangifer* either pre-date Clovis by 2-3000 years or fall near the end of the period (and into the Younger Dryas/Holocene).

Hill, Matthew G. [322] see Dalmas, Daniel

Hills, Kendall (University of Illinois at Chicago)**[300] A Morphological Analysis of Sandstone Temples in the Provinces of the Angkorian Khmer Empire**

Archaeological research in Cambodia was traditionally relatively narrow in scope. Our knowledge of the Khmer Empire (9th to 15th century CE) has been primarily informed via two lines of evidence: epigraphic sources, especially in the form of temple inscriptions, and art historical analysis of monumental architecture. Due to the large corpus of monumentality found within the Khmer capital of Angkor, research was also heavily geographically focused on the imperial core. Although a large collection of temples has been documented beyond the capital, scholars generally have not engaged critically with this massive architectural dataset. This paper explores how this architectural data can be leveraged to discuss issues of imperial integration and control, and intermediate elite power in the provinces of the Khmer Empire. Emphasis is placed on a morphological analysis of the sandstone temples to investigate how rigorously the imperial architectural template was applied in the provinces. Through studying temples as artifacts, this paper analyzes the formal and organizational traits of temple models to identify regional variability in temple construction. This analytical approach to temples moves away from the traditional art historical focus of core temples and provides an avenue to test degrees of imperial control.

Hilo, Regina (SHPD Hawaii)**[244] Challenges, Opportunities, and Kuleana: Historic Preservation in Hawaii**

Working and consulting with the community is built into Hawaii's historic preservation laws and statutes. I work for the History and Culture branch of the State Historic Preservation Division, and my main role is mitigating effects to human skeletal remains, iwi kupuna, from burial sites over 50 years old. As a division, the SHPD has many challenges and opportunities, and a kuleana, a responsibility, to protect iwi kupuna to the best of our abilities. This paper will briefly survey a few of our challenges and opportunities at the SHPD, and provide an outlook for our future.

Hinkelmann, Sarah (Ohio State University) and Robert Cook (Ohio State University)**[168] From Formal to Efficient: Variation in Projectile Point Manufacture and Morphology from the Late Woodland to Fort Ancient Period in the Middle Ohio River Valley**

Cultural groups in the Middle Ohio River Valley experienced significant changes in mobility, subsistence, and social organization from the Late Woodland (AD 700 – 1000) to the Early Fort Ancient period (AD 1000 – 1300). Technology changed as well, particularly the production and morphology of projectile points. It is possible that constraints related to changes in subsistence and mobility prompted a shift in raw material use and manufacture, from free-hand reduction to bipolar reduction. Shifts in the learning processes that facilitated cultural transmission appear to have occurred accompanying changes in settlement and mobility, from a guided variation learning strategy to one of indirect bias. The research presented investigates the variability in lithic assemblages between the Late Woodland and Early Fort Ancient periods using two sites from the Middle Ohio River Valley, Clark (33WA124), a late Late Woodland site, and Guard (12D29), an Early Fort Ancient site. The analytical methods used identified the differential presence of high quality raw materials and bipolar reduction and variability in projectile point morphology between the late Woodland and Fort Ancient periods. This study displays how social and cultural changes can be interpreted through technology and reinterprets the trajectory of technological innovation; newer is not always better.

Hinojosa-Balino, Israel [39] see Jurado, Erik**Hinojosa-Balino, Israel (Durham University) and Gerardo Gutiérrez (University of Colorado Boulder)****[192] Vernacular Production of a Mesoamerican Hunting Epoxy Adhesive by a Steam Distillation and Gravitational Decantation: An Ethnoarchaeological Report**

The Nahua inhabitants of Chiepetlán, Guerrero, Mexico, have preserved the knowledge for producing an epoxy resin used to trap birds, as well as to catch insects. This traditional super glue is locally called "liga." The epoxy is prepared from the wood of *Taxodium mucronatum* (ahuehuete) and cured with natural latex extracted from either *Ficus insipida* (amate) or *Jatropha* (torito). The use of hand tools to create an expedient, yet elaborate, vernacular laboratory capable of transforming raw ingredients into complex materials provides a window to understand the production of organic compounds from the low deciduous forest of Mesoamerica. These techniques could also challenge a paradigm in Mesoamerican archaeology as to the presence of Pre-Columbian technologies of distillation pre-dating the arrival of Europeans.

Hiquet, Julien [410] see Begel, Johann**Hiriart, Juan (University of Salford)****[14] Teaching History with Digital Historical Games**

Digital games and simulations based on historical themes or settings have been used in school classrooms for more than 50 years, however, still key questions concerning their representational appropriateness, educational effectiveness, and practical implementation remain largely unanswered. In this paper I would like to give an overview of a research project set to analyse the potential of digital games for historical education. Following an action-research approach, a series of game prototypes based on Anglo-Saxon history were iteratively designed and tested within a primary school. While playing the game, children spontaneously engaged in dramatic exercises of re-

enactment, which revealed as much about their personal identities, lives and world views in the present as about their conceptions of an imagined past. In many cases, their assumptions and naive theories became interrogated and in some instances challenged by their experiences within the game, resulting in dissonances that lead to powerful "teachable moments". Driving from these experiences, I would like to open the debate on the role of digital games in education, focusing on their potential to create affective interactive spaces, capable of involving players/learners emotionally and empathetically with the past.

Hirniak, Jayde [32] see Smith, Eugene

Hirniak, Jayde (Arizona State University), Eugene Smith (University of Nevada, Las Vegas), Racheal Johnsen (University of Nevada, Las Vegas), Shelby Fitch (University of Nevada, Las Vegas) and Minghua Ren (University of Nevada, Las Vegas)

[403] *Using Cryptotephra in Archaeology: Precise Correlations and Improved Age Estimates*

Establishing robust and reliable chronologies at archaeological sites is essential for understanding the sequence and timing of past events. At the Middle-to-Upper Paleolithic site Arma Veirana (AV, Liguria, Italy), robust chronologies are especially important for answering questions regarding the Middle-to-Upper Paleolithic transition in Europe. Because the radiocarbon method has a limit of 50,000 years, this period has not been reliably dated. AV contains deposits with cultural industries attributed to Neanderthals and anatomically modern humans (AMH). Cryptotephra, also known as microscopic volcanic ash, were recently identified at AV in a stratigraphic unit known as the Black Moustierian (BM). AMS radiocarbon dates of charcoal samples collected in the BM were reported as infinite ages. Because these dates are close to the measurement limit of radiocarbon, the presence of cryptotephra provides a way to test these existing dates as well as establish a precise isochron to correlate with other sites. Both major and trace chemistries show unique geochemical signatures and are rare for volcanoes in the central Mediterranean region. With potentially two different populations present, this provides the perfect opportunity to establish unprecedented temporal correlations between other key sites throughout this region, significantly reducing temporal uncertainty within inter-site comparisons.

Hirokawa, Mamoru [299] see Uchida, Junko

Hitchcock, Robert

[26] *Domestic Crop Production among the Ju/'hoansi San of Nyae Nyae, Namibia: Ethnoarchaeological and Ethnographic Perspectives*

This paper examines the oscillations between foraging and farming among the Ju/'hoansi San of Nyae Nyae, Namibia from both ethnoarchaeological and ethnographic perspectives. In addition to a certain amount of foraging, some of the important economic activities of the Ju/'hoansi San Nyae Nyae region are agriculture and pastoralism. Some 27 of the 36 contemporary Nyae Nyae communities had gardens where they raised domestic crops in 2018. These gardens are small, generally less than half an acre, and they are cultivated using hand tools including hoes, digging sticks, and pitch forks. These rain-fed gardens are also irrigated by water facilities provided by the Nyae Nyae Development Foundation of Namibia (NNDFN), the Traditions and Transition Fund, and the Namibian government. A variety of domestic crops are grown in the gardens which in 2018 numbered 18 species. Challenges to the agricultural production systems in Nyae Nyae include spatial and temporal variability in rainfall, periodic drought and floods, limited soil fertility, breakdowns in the water systems, destruction of water points and gardens by wild animals including elephants, and predation of livestock by lions, leopards, and other animals. There are also problems in gardening work due to conflicts among individuals in the communities.

Hitchings, Philip [399] see Banning, Edward

Hixon, Sean (Pennsylvania State University), Kristina Douglass (Pennsylvania State University), Henry Wright (University of Michigan), Brooke Crowley (University of Cincinnati) and Laurie Godfrey (University of Massachusetts Amherst)

[248] *A Critical Review of Radiocarbon Dates Clarifies the Human Settlement of Madagascar*

The timing and subsequent environmental impacts of the human settlement of Madagascar remain key topics of debate in archaeology. Located approximately 250 miles off the East African coast, Madagascar, the fourth largest island in the world, appears to have been one of the world's last large landmasses to be settled by people. Radiocarbon dating of archaeological sites and remains of butchered animals on Madagascar provide important evidence of when the island was first settled and how subsequent settlement progressed. The reliability of existing archaeological radiocarbon dates on Madagascar, however, requires critical evaluation. Here we apply principles of chronometric hygiene to assess existing radiocarbon dates and clarify the island's human settlement.

Hlatky, Nicholas [124] see Birkmann, Joseph

Hlatky, Nicholas**[187] Folsom Technological Organization at the Martin Site, Central New Mexico**

The Martin site is a Folsom encampment located in the Estancia Basin, New Mexico. It was briefly described in a 1967 dissertation, and the resulting assemblage was later re-analyzed in the early 2000s. Previous studies have noted a preponderance of Edwards chert in the assemblage, sourced to over 600 km away in west central Texas, as well as an emphasis on projectile point production. This paper presents data from a formerly unexamined assemblage derived from University of New Mexico field school excavations in 2011. Paired with previous data, new analyses can help to better situate the Martin site within current models of Folsom technological organization. These results are then compared to other Folsom sites in central New Mexico to understand flexibility in Folsom mobility strategies throughout the basin and range province during the Late Pleistocene.

Hlubik, Sarah [115] see Oppenheim, Georgia

Hoag, Elizabeth (Cleveland Institute of Art)**[145] The Shaker Dig: Community Archaeology in Shaker Heights, OH**

For the last four summers the Shaker Historical Museum in Shaker Heights, OH, has been sponsoring a community-based archaeological day camp experience for school-aged children. Through excavations at two local historical sites within the city, the participants of our program have learned the importance of archaeology, history, and preservation in their own communities, making them better stewards for the past. In this paper I introduce the program and the archaeological work we have accomplished highlighting techniques that worked for us, the limitations of working with children, and the positive effects of this program on both participants and the community at large. I explore notions of hybridity in public archaeology (Moshenska 2017), of how we can work with the public and conduct archaeological research that benefits everyone.

[145] Chair

Hockett, Bryan (Bureau of Land Management)**[249] Subsistence Diversity During the Western Stemmed Tradition in the Intermountain West**

We have learned more about Western Stemmed subsistence patterns in the Intermountain West over the past decade than we learned during the previous half century. Remarkable subsistence assemblages recovered from sites such as Bonneville Estates Rockshelter, Paisley Cave 2, Weed Lake Ditch, Little Steamboat Point 1, and the Wishbone Site tell a tale of subsistence diversity associated with Western Stemmed points. Artiodactyls, leporids, sage grouse, waterfowl, fish, and insects were commonly consumed, particularly during the Younger Dryas. Plant consumption is hinted at, but rarely preserved in these assemblages, leaving a noticeable gap that somehow needs to be filled in order to gain a more complete understanding of early subsistence activities in the Intermountain West.

Hodge, Katherine [285] see Seare, Abraham

Hodgetts, Lisa [269] see Goodwin, Rebecca

Hodgins, Gregory [391] see Taylor, William

Hodgkins, Jamie (University of Colorado Denver), Fabio Negrino (University of Genoa), Caley Orr (University of Colorado School of Medicine) and Julien Riel-Salvatore (University of Montreal)**[195] An Overview of the Mousterian and Final Epigravettian at Arma Veirana (Liguria, Northwestern Italy)**

This paper presents preliminary results of the first four years of archaeological investigation at the cave site of Arma Veirana, located near Erli (Savona), in western Liguria. The site has yielded in situ Middle and Upper Paleolithic deposits containing a variety of artifacts. One of the project's principal goals to date has been to clarify the site's stratigraphy, formation history, and chronology. The results we present here indicate that the exposed Mousterian deposits predate 50kya, while the Upper Paleolithic human occupation is likely limited to the Final Epigravettian (13-10kya). In the process of exposing a stratigraphic profile into the Upper Paleolithic deposits, we also encountered the burial of a richly adorned neonate, of which a preliminary synthetic description is provided here.

Hodgkins, Jamie [195] see Miller, Christopher

Hodgkins, Jamie [402] see Keller, Hannah

Hodgskiss, Tammy (Origins Centre, GAES, Wits University)**[15] The Many Meanings of Red: Ochre Use through Time in Southern Africa**

From c.100 000 years ago, ochre pieces were habitually collected and used at Middle Stone Age sites in southern Africa. This earthy iron-rich rock has been continually used since then and still has many applications today, such as pigment, sunscreen or body paint for ritual purposes. Although a range of colors were collected in the past, bright red, and often sparkly, varieties were preferentially used to create colored powder, paint and also on which to engrave designs. But why red? The Middle Stone Age is a period of significant behavioral developments for Homo sapiens, with important cognitive inferences. The appearance of items such as perforated shells, engraved ostrich eggshell and the use of red pigments are perceived as potential symbolic, social and cultural identity indicators. Did red symbolize blood, power or love, as it does today? When considered within the context of the significant technological advances in the Middle Stone Age, social dynamics and interactions of these early modern humans may be explored. By looking at the use and applications of ochre through time in southern Africa, links are drawn between ochre use strategies, color symbolism and social identity indicators.

Hodgson, Wendy and Andrew Salywon (Desert Botanical Garden)**[302] Pre-Columbian Agaves in the Southwestern United States: Discovering Lost Crops among the Hohokam and other Arizona Cultures**

The importance of agaves to Mesoamerica and its cultures has long been recognized, providing food, fiber and beverage. However, their significance to these cultures has overshadowed and distorted the plants' role for indigenous peoples north of the U.S. - Mexico border. Pre-Columbian farmers grew no less than six and possibly as many as eight or more domesticated agaves in Arizona dating to at least A.D. 600. Because of their longevity and primarily asexual reproduction, relict agave clones have persisted in the landscape to the present, providing an opportunity to study pre-Columbian nutrition, trade, migration and agricultural practices. Additionally, these remnant clones present a rare opportunity to examine domesticates virtually unchanged since they were last cultivated within a prehistoric cultural context. DNA sequence data, in addition to plant morphology, suggests that at least three may have originated in Arizona, suggesting this state as a secondary center of domestication. These discoveries underscore the necessity of viewing landscapes and some plant species from a cultural, rather than "natural," perspective that may help discern potential cryptic species veiled by more traditional taxonomic treatments. Understanding these plants and their ecological/cultural roles requires interdisciplinary collaboration between botanists and archaeologists.

Hodgson, Wendy [302] see Salywon, Andrew

Hodza, Paddington [411] see Arksey, Marieka

Hoedl, Lucas [85] see Navenma, Wendel

Hoedl, Lucas (National Park Service), Wendel Navenma (National Park Service) and Jeremy Navenma (National Park Service)**[117] Experimental Construction and Traditional Maintenance: Pathways to Practice in Ruins Stabilization**

Tuzigoot pueblo (AD 1125 – AD 1400) has a nearly 85 year history of ruins stabilization, resulting in 25 different stabilization mortar types and methods of application. In 1998, Tuzigoot National Monument, through the Vanishing Treasures Program, set forth on a program of removing previous stabilization materials and replacing them with a standardized soil cement. While the underlying stabilization goals have remained the same for Tuzigoot pueblo, the underlying practice of ruins stabilization has evolved based on the preservation crews and their experiences. This poster presents how traditional stone masonry maintenance at Hopi, as well as experimental stone masonry reconstruction of a Sinaguan structure helped shape a unique perspective on the practice of ruin stabilization at Tuzigoot National Monument.

Hofman, Corinne L. [37] see Ciofalo, Andy

Hofman, Corinne L. (University of Leiden)**[421] Chair**

Hofman, Courtney [34] see Wellman, Hannah

Hofman, Courtney (University of Oklahoma), Torben Rick (Smithsonian Institution) and Jesus Maldonado (Smithsonian Conservation Biology Institute)**[368] California Channel Islands Micromammals: A Story of Invasion and Extinction.**

Humans have unintentionally and intentionally introduced rodents to islands around the world, sometimes causing local extirpation and extinction of endemic fauna. On the northern California Channel Islands, island deer mice

(*Peromyscus maniculatus*), may have arrived as stowaways on Native American canoes at least 10,000 years ago. Following this introduction, the native deer mouse, *Peromyscus nesodytes*, persisted for several thousand before going extinct. Questions remain about the relationship between humans and the extinct deer mouse, especially the cause of their extinction. Here, we investigate the evolutionary relationship between the extinct and extant island deer mice species, the impact of the introduction of a non-native rodent on *P. nesodytes* and explore the role humans may have played in the extinction of an island endemic. Archaeological, paleontological and genetic data highlight the importance of understanding the impact of ancient invasions on the extinction of island species following the arrival of humans. Since *P. maniculatus* is considered an island endemic today, we also explore the often blurry relationship between past human-environmental interactions and the structure and function of modern day ecosystems.

Hofman, Jack (University of Kansas) and Lawrence Todd (Colorado State University)

[80] Paleoindian Activity in the Washakie Wilderness, Absaroka Range, Wyoming

More than 15 years of systematic surveys in the Washakie Wilderness area by the GRSLE archaeology project in the Shoshone National Forest, northwest Wyoming, has yielded a sample of over 30 Paleoindian projectile points at a mean elevation of 2885m. These specimens provide clues about early prehistoric activity at high elevations in the region. Here we summarize the occurrence of Paleoindian points as to location, inferred activity, and lithic material use in the Washakie Wilderness and compare this with evidence from Paleoindian components in the Big Horn Basin and high elevation sites in adjacent areas. Plains and Mountain-Foothills technologies are represented, including Clovis, Cody, Allen, and Pryor/Lovell types.

Hofman, Jack [322] see Crable, Barbara

Hoggarth, Julie [152] see Jordan, Jillian M.

Hoggarth, Julie [371] see Gillaspie, Amy

Hoggarth, Julie [372] see Levin, Anais

Holdaway, Simon [247] see Iovita, Radu

Holden, Chloe (Indiana University Bloomington), Lana Ruck (Indiana University Bloomington) and Shelby S. J. Putt (Stone Age Institute)

[390] Stone Tool Debitage Fails to Reliably Identify a Toolmaker's Handedness

The classification of stone tool debitage features as right- or left-oriented has become an increasingly common method for assessing knapper handedness in experimental and archaeological lithic assemblages. Replication attempts using these published methodologies, however, have been unsuccessful. We tested the validity of eight flake feature categories, from Bargallo et al. (2017) and Dominguez-Ballestros & Arrizabalaga (2015), assessing their predictive accuracy with an inter-rater reliability analysis on an experimental assemblage of Oldowan flakes produced by 18 knappers (9 left-handed). Three experienced raters independently made blind predictions of knapper handedness using directional skew for each of the eight features, on 344 complete flakes from 43 isolated knapping events. Inter-rater reliability measures (Fleiss' Kappa) showed fair agreement for only two flake features (eraillure scar and impact point locations), with moderate (huckles, ripples, parabolic crack) to poor (ridge, extraction axis, platform inclination) agreement for all other features. All three raters failed to perform significantly better than chance for predicting handedness. These results suggest not only that these flake features are unreliable predictors of a knapper's handedness, but also, that some of these features do not represent objective categories. We therefore urge caution in applying this method to archaeological assemblages pending further independent replication.

Holder, Sammantha (University of Georgia), Laurie Reitsema (Department of Anthropology, University of Georgia), Tasha Dupras (Department of Anthropology, University of Central) and Rimantas Jankauskas (Department of Anatomy, Histology, and Anthropology)

[353] Exploring Cooperation and Hierarchy among Napoleonic Soldiers by Reconstructing Dietary Variation Using Stable Isotope Analysis

Historical evidence indicates that two strategies characterized diet provisioning in Napoleon's Grand Army: rationing and cooperative foraging. Drawing on practice theory, we examine which strategy dominated Napoleonic soldier diet during military service. Although the amounts distributed varied by rank and corps, rations canalized military diet. Conversely, cooperative foraging of local resources during distant campaigns contributed to dietary variation. Military and long-term diets were reconstructed through stable carbon and nitrogen isotope ratio analysis of Napoleonic soldier rib and femoral bone collagen ($n=19$) from the mass gravesite of Šiaurės miestelis, Vilnius, Lithuania associated with Russian Campaign retreat of 1812. These diets were compared to determine whether previously discovered long-term diet variation was maintained during military service through cooperative foraging or whether diet became canalized through army rationing. Mean femoral and rib d13C ratios were -17.64% $\pm/- 0.87\%$ and -19.54% $\pm/- 0.45\%$, and mean femoral and rib d15N ratios were 10.65% $\pm/- 1.86\%$ and 11.15% $\pm/- 1.51\%$. Levene's F-test indicated statistically significant differences in d13C ratios (F-statistic=3.74, df=18, p=0.008), but not d15N ratios (F-statistic=1.52, df=18, p=0.38). These results indicate that diets later in life were canalized around C3 plants

but animal protein consumption varied, suggesting that cooperative foraging was the dominant provisioning strategy.

Holen, Kathleen (Center for American Paleolithic Research) and Steven Holen (Center for American Paleolithic Research)

[115] Human-Induced Percussion Technology: A Synthesis of Bone Modification as Archaeological Evidence

Prey animal bone modification by humans has long been part of the archaeological record; however, debate continues as to whether this evidence alone is sufficient to justify interpretation of technological activity. This is especially true if such evidence is used in support of archaeological sites older than 16 kya in the Americas. This poster synthesizes data that represent over a decade of research including experimental bone breakage and archaeological excavations of proboscidean assemblages. Replicable features of percussion and use wear patterns on bone elements are described along with interpretive methods which demonstrate analogous, concurrent and anomalous patterns that represent human behavior. Geological contexts that rule out alternative causes of percussion breakage are described. We conclude that features of bone modification by percussion can be strong evidence of human behavior when interpreted in the light of experimental reference samples, analogous archaeological sites and geological context. The age and geographic location of a site does not invalidate this evidence.

Holen, Steven [115] see Holen, Kathleen

Holguin, Brian (University of California, Los Angeles) and Scott Sunell (University of California, Los Angeles)

[116] Evaluating Material-Specific Responses to Heat Treatment in the Santa Barbara Channel Region

We evaluate the process by which archaeologists have interpreted heat treatment of lithic raw materials in the Santa Barbara Channel region and present comparative examples of materials to work toward refinement of our understanding of production processes. Relatively little systematic work has been done, even though regional lithic materials are well-suited to improvement via heat-treatment. Current regional approaches to evaluating the use of heat to prepare raw materials for tool production rely on visual identification of heat damage and untested assumptions about the response of various material types to high temperatures. We selected a representative sample of non-archaeological raw materials from sources throughout the region often recovered in archaeological assemblages, from relatively high-quality cherts to silica-rich shales. We subjected the samples to both slow and fast heating to campfire temperatures to assess the local material factors that may have impacted heat treatment techniques. After treatment we evaluated each sample's appearance by eye test, low-power, and high-power microscopy. On this basis we review the accuracy of field identifications and provide a comparison for understanding how archaeological examples of these materials do or do not reflect the production processes to which they were subjected.

Hollenbach, Kandace (University of Tennessee) and Jillian Galle (Thomas Jefferson Foundation)

[295] Use of Plants by Enslaved Laborers at Andrew Jackson's Hermitage Plantation

From 1804 until 1865, The Hermitage was home to Andrew Jackson, his descendants, and over 130 enslaved men, women, and children, often invisible in the historical record, who labored in the fields of Jackson's cotton plantation near Nashville, Tennessee. After emancipation, freed households continued to live in the former domestic quarters. For three decades archaeologists excavated hundreds of thousands of artifacts from twelve domestic sites scattered across three settlement clusters: the Mansion Backyard, the Field Quarter, and the First Hermitage. A collaboration between the University of Tennessee Department of Anthropology and The Digital Archaeological Archive of Comparative Slavery, this paper presents the results of the plant analysis from over 35 contexts from the First Hermitage, the area of the property that was home to the Jackson family and a small group of enslaved laborers between 1804 and 1821. After 1821, the First Hermitage was populated entirely by Jackson's growing slave labor force. Remains of cotton seeds, corn cobs, and sweet potatoes, among other plant remains, provide insights into the ways that the enslaved used plants in their daily activities to supplement rations and to cope with the struggles of life on the plantation.

Hollenback, Kacy (Southern Methodist University)

[291] Behavioral Cosmology and Fictive Kin: James M. Skibo (The Behavioral Golden Child)

In the 1970s, the "founding fathers" of Behavioral Archaeology (BA), Schiffer, Rathje, and Reid expanded the bounds of traditional archaeology to fully integrate ethnoarchaeology, experimental archaeology, and modern material culture studies. Building on the foundations of processual archaeology, BA emphasized rigorous testing of mundane and not-so-mundane aspects of technology and human behaviors. In the quest for stronger inference, experimental archaeology and ethnoarchaeology became key tools in the Behavioral toolkit. Cultivating a familial intellectual environment full of parental favorites, sibling rivalries, and lifelong bonds, the "founding fathers" shaped an intellectual network of behavioral archaeologists that spanned generations. In this (fictive) kinship network, James M. Skibo is central. His methodological work in experimental and ethnoarchaeology has influenced the work of all behavioral archaeologists and many others, as has his theoretical work on technologies. Among his "kin," Jim has been the "golden child," jocular older brother, and goofy uncle. This paper reflects on these origins, as well as Skibo's work, and his lasting influence.

Holley-Kline, Sam**[405] The Beginnings of Archaeological Administration and Labor at El Tajín, Veracruz, 1900-1938**

In the history and ethnography of archaeology, only recently has archaeological labor – both administrative and physical – become an area of interest. In the Mexican context, recent historical research has dated the emergence of institutional archaeology to the dictatorship of Porfirio Díaz (1876-1911). However, there are few site-scale studies that explore the emergence of a heritage management bureaucracy and the labor involved therein. In this paper, I draw upon rarely-consulted institutional archives to discuss the beginnings of administration and labor at the Epiclassic urban center of El Tajín, Veracruz. I argue, first, that the key concerns of conservation and development through tourism date from this period, and are not a result of archaeological research alone. Second, I posit that the mundane exchange of materials, reports, and funds do not just reflect but instantiate the government's interest in the management of the pre-Hispanic past. Third, I discuss the labor of site guards as critical intermediaries between Mexico City and other users of the site. I conclude by arguing for the importance of labor and management in historical terms as a necessary compliment to histories of excavation and interpretation.

Holliday, Vance [187] see Fenerty, Brendan

Holliday, Vance (University of Arizona), Jeffrey Saunders (University of Arizona), Jesse Ballenger (EcoPlan Assoc/University of Arizona), David Bustos (National Park Service, White Sands National Monument) and Aimee Weber**[368] Late Pleistocene Megafauna in the Archaeological Record of the Greater Southwest**

The record of extinct fauna from Terminal Pleistocene archaeological sites in the Southwest is stereotypically characterized as mammoth from kill sites. Mammoth kills certainly are well known from the region, including the highest concentration of such sites anywhere in the Americas, but the remains of other extinct megafauna with evidence for human association also are documented. Most of the sites are in Arizona and most associated with Clovis occupations. Six Clovis kill sites with mammoth (*Mammuthus columbi*) are known from southeast Arizona. One site also includes a *Bison antiquus* kill and another yielded burned bone of black bear (*Ursus americanus*) from a hearth. A post-Clovis kill site with extinct bison is also known. The only other clear in situ evidence for a bison kill is in central New Mexico, although both Folsom and Allen artifact assemblages from surface contexts in the same region produced fragments of bison enamel. Several human/extinct fauna associations in the Southwest are the first for North America. In northern Sonora, Mexico, Clovis artifacts were found in association with Gomphothere (*Cuvieronius*), and in New Mexico at White Sands National Monument, human tracks are documented in association with trackways produced by sloths (either *Nothrotheriops* or *Paramylodon*).

Hollimon, Sandra (Santa Rosa Junior College)**[239] Silenced Undertakers**

Chumash undertakers were third gender persons and postmenopausal women. The Spanish Mission system significantly disrupted traditional practices, especially through sexual violence as a silencing tool. I examine the impacts of the Spanish colonial effort on Chumash mortuary rituals, with regard to the concept of gendercide.

Hollinger, Eric (Smithsonian Institution)**[177] Discussant****Hollingshead, Analise (Florida State University)****[99] Investigations at Half Mile Rise Sink (8TA98): A Submerged Paleoindian Site in Northwest Florida**

Half Mile Rise Sink (8TA98) is located within the Half Mile Rise portion of the Aucilla River in Northwest Florida. This site offers vital clues on Paleoindian lifeways of peoples occupying the Big Bend region of Florida. Here, Paleoindian projectile points and other lithics, faunal remains, and bone tools were recovered during previous investigations from a sandy deposit on the edge of an inundated sinkhole. The projectile points encompass the entire known Paleoindian period in Florida, including Page-Ladson, waisted Suwannee, and Greenbriar types. Formal analysis of these points in comparison with diagnostics from other nearby sites offers further information on these types. In addition, I present information on the geoarchaeological context of Half Mile Rise Sink, examining the site formation processes at this site via core analysis, isotopic analysis, and new excavations. Previous studies of nearby submerged sites in the Aucilla River have proven to offer vital clues on First American studies, and Half Mile Rise Sink has the potential to do the same.

Holly, Donald (Eastern Illinois University), Christopher Wolff (University at Albany) and Stephen Hull (Government of Newfoundland and Labrador)

[10] The Struggle Was Real: The End of the Archaic and the Onset of the Intermediate Indian Period in Eastern Subarctic North America

The transition between the end of the Archaic and the Intermediate Indian Period in the Eastern Subarctic of North America was marked by significant changes in just about all dimensions of Amerindian life—technology, raw material use, exchange networks, social organization, architecture, burial customs, settlement patterns, and subsistence strategies. These changes, coinciding with an apparent reduction of site numbers and site distribution, suggest that this transition was less of a strategic reorganization and more of what we may call a cultural and demographic collapse.

Holly, Donald [308] see Wolff, Christopher

Holmes, Charles [10] see Wygal, Brian

Holsten, Jarrett (First Author), Katherine Brewer, Shannan Rael, Emmanuel Macias and Ashley Harris

[117] Ovens Aren't Just for Food: Experimenting to Determine the Materials Used in a 19th Century Spanish Oven

In the summer of 2018, field school students from the University of New Mexico excavated historical ovens likely associated with the 19th century Spanish village of Tejón. During the course of the excavations, the field school undertook an experiment to determine the purpose of the historical ovens. The experiment was unable to be completed at that time, but samples of soil and local stones found in association with the ovens were taken for further experimentation during the Fall 2018 semester. This poster will show the results and analysis of the second experiment.

Holt Mehta, Haley (Tulane University), Claudia Camacho-Trejo (California State University Los Angeles), Cindy Rodriguez (California State University Bakersfield), Daniel Pierce (University of Missouri) and Dirk Baron (California State University Bakersfield)

[202] Creolization and the Zapotec Diaspora: A Classic Period Zapo-Teotihuacano Settlement in Southern Hidalgo, Mexico

This paper will present the results of a multi-faceted research endeavor at the site of El Tesoro, Hidalgo, Mexico. Previous and recent research have shown that the Classic-period settlement at El Tesoro exhibited affiliations to both Teotihuacan and the Zapotec homeland in the Valley of Oaxaca and was likely related to the Oaxaca Barrio of Teotihuacan. Recent mineralogical (XRD) and chemical (NAA) compositional analyses of pottery from the El Tesoro strengthen the findings of previous research, which indicate that the Classic-period occupation exhibited fluid identities typical of a creolized group. These findings will be contextualized within the broader phenomenon of the Zapotec Diaspora, which is comprised of several sites in central Mexico, including at least two others located in the same region as El Tesoro.

Holtkamp, David (Los Alamos National Laboratory), Karla Sartor (Los Alamos National Laboratory) and Maria Musgrave (Los Alamos National Laboratory)

[90] Identifying Cumulative Impacts from Wildfire and Wildfire Mitigations at Los Alamos National Laboratory

The impacts of wildfire on cultural and natural resources have been discussed and analyzed for many years. Impacts include loss of irreplaceable artifacts, features, habitats, and landscapes due to increased wildfire regimes, as well as climate change. While these analyses provide land managers and resource specialists with information that is important for protecting resources from fire, much of the existing literature does not systematically address the impacts of wildfire mitigations in the same manner. In accordance with the National Environmental Policy Act (NEPA), cumulative impacts analyses are a requirement of federal agencies to take into consideration the potential impacts of a proposed project that has potential impacts similar to other actions in an identified surrounding area. Using the area of the Pajarito Plateau where Los Alamos National Laboratory resides, this poster identifies potential areas of improvement for cumulative impact analyses of both wildfire impacts and impacts from wildfire mitigation

strategies on cultural and natural resources. Potential information for this preliminary analysis will come from the Santa Fe National Forest, the National Park Service at Bandelier National Monument, and Los Alamos National Laboratory operated for the Department of Energy/National Nuclear Security Administration.

Hommon, Robert**[354] *Hinterlands and Mobile Courts of the Hawai'i Island State***

The eighteenth century Hawai'i Island state included more than 400 local communities divided among six districts, each with a resident elite. The king's mobile court of as many as a thousand people frequently moved from one highly productive district core to another. The "capital" was wherever the king resided. Varying in time and space, hinterlands were anywhere the court was not, with the potential for disputes tending to vary with geographical or political distance. Hinterland residents included both commoners who provided nearly all the kingdom's productive work and low-ranked government officials with whom they negotiated the payment of tax in kind, corvée labor on public works, military service, and ritual participation. Commoners negotiated double title to their lands in the form of both inheritance from parents and grants by resident officials. Commoner revolts against greedy kings and insurrections led by factions of district chiefs appear to represent negotiation by other means and may in part evince the emergence of the Hawaiian primary state during which the people's gifts traditionally donated to be redistributed by generous high chiefs became tax revenues collected to fund the governing apparatus of politically powerful kings.

Honeycutt, Linda**[86] *Ten Years Later: A Study of Basketmaker III Black-on-white Bowl Motifs in the Four Corners Region***

This illustrated talk uses photographs of Basketmaker III painted bowls and sherds to illustrate four characteristics of BMIII pottery motifs. The data for this talk is derived from 10 years of study on ceramic collections from more than 100 Basketmaker III sites in the Four Corners Region.

Hood, Larkin (The Pennsylvania State University)**[229] *Moderator*****Hood, Rhea (National Park Service Alaska Region) and Rachel Mason (National Park Service Alaska Region)****[237] *Archaeology and NAGPRA in Alaska: Examples of Intentional Excavation***

Intentional excavation of human remains and associated items subject to NAGPRA occurs rarely. Such excavations are only permitted under particular circumstances and only with approval of lineal descendants (as appropriate) and affiliated tribes. In Alaska, National Park Service staff have facilitated consultation and developed Memorandums of Agreement with Plans of Action for excavating and analyzing human remains, with parties to the MOA including the National Park Service, affiliated tribes, lineal descendants, researchers, and the National Science Foundation. This presentation focuses on two projects on NPS lands in Alaska, where affiliated tribes approved of excavation of human remains for the purpose of research, including non-destructive and destructive analyses of human remains and associated funerary items. In these projects at Bering Land Bridge National Preserve and Kobuk Valley National Park, tribal members also participated in archaeological investigations.

Hookway, Esme (Staffordshire University)**[379] *An Exploration of the Demographics of Non-adults in Medieval Hospital Cemeteries in England (AD 1050-1600)***

During the medieval period (AD 1050-1600) in England, hospitals were associated with the Church and most were governed by Church rule. Distinct types of hospitals were founded: leper hospitals, general infirmaries, and alms houses. These sites provided care, shelter, and spiritual nourishment for those in need. Many hospitals had admission policies, although the extent to which they were followed is debatable. Hospital foundation charters document the refusal of admission to pregnant women, whilst some hospitals were given funds specifically for the creation of wards for the care of pregnant women and children. Little is known of hospital inhabitants however archaeological excavations of medieval hospital cemetery sites and subsequent osteological analysis, is creating a

rich source of information. The cemetery demographics revealed at some hospital sites suggest that high proportions of infants, or alternatively, juveniles and adolescents, were present at particular types of hospital. This presentation aims to highlight current research exploring the demographics of medieval hospital cemeteries, using osteology reports, archaeological finds, and historical documentation. It is hoped that this will enhance our understanding of the different types of hospitals in the medieval period and the people who used them.

[379] *Chair*

Hoopes, John (University of Kansas)

[191] *Evaluating La Guinea/La Ceiba, a Sapoá Period Settlement (AD 800-1300) in the Tempisque River Valley, Guanacaste, Costa Rica*

La Guinea was one of several stratified sites excavated by Claude Baudez when he first undertook the construction of a ceramic chronology for Greater Nicoya in the 1960s. Forty years ago, under the direction of Fred Lange in 1979, it was the location of rescue excavations in the wake of local flooding which recovered portions of the clay floor of a simple structure, human burials, and associated offerings. Subsequent excavations at the contiguous site of La Ceiba revealed additional burials and food preparation areas associated with mortuary rituals. This paper presents new data and interpretations from research on collections from La Guinea/La Ceiba in the context of current knowledge and discusses how additional research in the Tempisque Valley will fill gaps in understanding of the archaeology Greater Nicoya.

Hoopes, John [314] see Masucci, Maria

Hoover, Corey (Pontificia Universidad Católica del Perú) and Kylie Quave (The George Washington University)

[404] *Paleoethnobotanical Remains from Yunkaray (Cusco, Peru)*

Yunkaray, a site located in Cusco Peru and located on the Maras Plain was occupied from approximately 1050 - 1450 principally by the Ayarmaca group. This group lived on the fringe of the Incan political influence and faced differing modes of interaction. This investigation will utilize the analysis of paleoethnobotanical remains recovered from the site of Yunkaray in order to interpret and discuss the influence and interactions between the Ayarmaca group and the Incan sphere of influence through material culture and foodways.

Hoover, Jessie

[169] *Beneath the Surface: A Ground-Penetrating Radar Study at the Mary Rinn Site (36IN29)*

Little is known about the Mary Rinn Site's cultural affiliation. The site is surrounded by better defined cultural groups such as the Monongahela and the Fishbasket complex. Limited excavations and research revealed evidence of possible housing structures and the trace of a stockade line. Surface collected materials from the Boyer Collection, and field school excavations from IUP have provided a preliminary understanding of the cultural materials at Mary Rinn. This research will improve the temporal and spatial understanding of the Mary Rinn Site (36IN29), located along Crooked Creek in Indiana County, Pennsylvania, by means of Ground Penetrating Radar (GPR) and excavation units. This survey seeks to determine the presence or absence of stratification between two large intersecting circular anomalies discovered by a previous GPR survey. These anomalies raise a question about the timeline of site occupation. To further investigate these anomalies, GPR data collection at tighter transect intervals will target where these large anomalies intersect. The results of the GPR data collection will identify the location of excavation units to determine the presence or absence of stratification at Mary Rinn. Understanding the spatial relationships within the Mary Rinn Site will contribute to the understanding of prehistory in Western Pennsylvania.

Hoover, Robert

[9] *Rediscovering Assil: An Ethnohistoric Salinan Village*

Evidence of a large site in southern Monterey County, California, is likely the ethnohistoric village of Assil, chiefly capital of a district of the same name. Part of the site is submerged by the waters of Lake San Antonio. The site

played a crucial role in an 1818 battle between the Yokuts invaders and the Spanish with their Salinan allies. The village provided a major source of neophyte converts to nearby Mission San Antonio de Padua. The history of the village can be tied to several specific events and historic personalities, a rare circumstance in the archaeology of the region.

Hopkins, Maren (Anthropological Research, L.L.C.), Michael Spears (Anthropological Research, L.L.C.) and T. J. Ferguson (University of Arizona)

[16] *O'odham Travel in the U.S.-Mexico Borderlands: Identifying Travel Routes on Organ Pipe Cactus National Monument*

The land encompassing Organ Pipe Cactus National Monument has long been a travel corridor for O'odham groups journeying across the Sonoran Desert to destinations throughout the modern Mexican state of Sonora and the Sea of Cortez. The National Park Service sponsored ongoing research to identify the physical traces of O'odham travel on the Monument and describe the history and legacy of O'odham travel in this region. A team of researchers from the University of Arizona recorded numerous foot trails, wagon roads, and paved highways, comprising 11 travel routes across this remote corner of the Sonoran Desert—four of which have been recommended eligible for the National Register of Historic Places. These routes represent deep cultural traditions of the O'odham people and their long history of land use in the U.S.-Mexico borderlands. The lasting memory and ongoing practices of movement across the land continues to uphold O'odham culture and influence today's generations of O'odham people.

[62] *Discussant*

Hopkins, Maren [84] see Price Steinbrecher, Barry

Hopkins, Rachel (University of Oxford) and Tom Higham (University of Oxford)

[403] *Testing the Danube-Corridor-Hypothesis—New Results from Chronometric Modelling of the Middle-Upper Palaeolithic Biocultural Shift*

The Middle to Upper Palaeolithic biocultural shift is an important turning point for Human Evolution. As Anatomically Modern Humans (AMH) enter Europe, Neanderthals disappear, eventually leaving AMH as the only representative of their species. To understand the trajectory of AMH dispersal, and the processes underlying this biocultural shift, a robust chronology of the period is essential. This doctoral research presents extensive and novel radiocarbon dating and modelling approaches from the Danube corridor – an area that has previously not benefited from recent developments in radiometric dating and analysis, despite its importance in theories of AMH dispersal. The chronology is based on 160 new radiocarbon measurements (anthropogenically modified fauna & osseous points) and 440 published dates. The results demonstrate the validity of the Danube corridor as a conduit for AMH expansion into central Europe, and date the dispersal as early as 50–47k cal BP. Against previous assumptions, this migration did not introduce the Aurignacian technocomplex to Europe. Instead, the biocultural diversity of central Europe appears to have been essential to the emergence of the Early Aurignacian technocomplex at 43–41k cal BP. This chronological framework will have significant implications for the study of cultural 'modernity' and the rise of Upper Palaeolithic industries.

Hoppa, Kristin (Channel Islands National Park)

[240] *Human Adaptations to Environmental Change on the California Channel Islands*

This paper provides an overview of human adaptations to environmental change during 13,000 years of human occupation on the California Channel Islands. In particular, I consider how the range of economically important species shifted with changing environmental conditions and how different foraging strategies for marine and terrestrial resources correlated to fluctuations in sea surface temperature and rates of precipitation. A case study of Middle Holocene (approximately 6500-3500 BP) sites on Santa Cruz Island includes data from faunal and floral (both macrobotanical and starch grain) assemblages alongside stable oxygen isotope data measuring sea surface temperature. This paper also discusses how environmental change will likely impact cultural resources on the Channel Islands in the future, using data on sea cliff retreat and rising sea levels. Finally, I include hazard maps with concentrations of cultural resources at greatest risk for erosion and inundation, alongside a discussion of management strategies.

Hopwood, David (Vancouver Island University)**[200] *Living with the Dead: Burial Practice at Kenan Tepe, Turkey, During the Ubaid Period***

Due to the generosity of Dr. Bradley Parker I had the opportunity to analyse the Ubaid Period burials from Kenan Tepe, Turkey. These burials provide a glimpse into the social dynamics and ritual practice of Kenan Tepe's Ubaid Period community. The burials are divided into two groups: infants buried in courtyards adjacent to building structures and foundation burials interred between phases of construction of domestic structures. Aside from the foundation burials, adult burials--in fact any burial of an individual above the age of two--are absent from the site. This practice indicates that the residents of Kenan Tepe conducted age-based burial practices and that infants were viewed in a separate manner than the other members of the Kenan Tepe community. The practice of foundation burial observed at Kenan Tepe is rarely seen anywhere else during the Ubaid Period in Mesopotamia. In those few cases where it has been suggested the burials were of infants and not adult individuals. The lack of any comparable burials in Mesopotamia during this time makes the foundation burials at Kenan Tepe a unique burial practice and reflect that in some way the dead still had power in the world of the living.

Hopwood, Marie [115] see Ayling, Melissa

Hopwood, Marie (Vancouver Island University)**[200] *Feeding the Household and the Spirit During the Ubaid Period at Kenan Tepe, Turkey***

During the Ubaid Period, a small village overlooked the Tigris River at the site we now call Kenan Tepe. Here, household members carried out activities both inside and around their houses, as well as utilizing roof-top spaces. During its habitation one of the structures burned and collapsed, preserving evidence of daily household activities in a manner only possible through disastrous events of the living. Inspired by work with Dr. Bradley Parker, I use evidence of household activities to craft an ancient taste of place for Kenan Tepe through analyses of food preparation assemblages, with special attention paid to ground stone tools. Cook pots and grinding stones are anything but simple and cannot be interpreted as serving solely practical functions. The imminently durable basalt favored by Kenan Tepe residents shows that one block of stone was used for generations, transformed from one tool to the next as use shaped both its functionality and meaning. Of use for both the living and the dead, ground stone tools of Ubaid Period Kenan Tepe exhibit extreme repurposing over the course of their multiple use lives.

Horan, Robert [94] see Napora, Katharine

Horn, Amy (Museum of Northern Arizona)**[5] *Discussant*****Horn, Jessica (The Public Archaeology Laboratory, Inc.) and Dianna Doucette (The Public Archaeology Laboratory, Inc.)****[46] *Walking the Line: Settlement Patterning in Interior Southern New England as Identified by Utility Corridor Survey***

Although restricted to confined, linear study corridors, archaeological surveys of new and existing utility easements provide an opportunity to take a closer look at Pre-Contact settlement patterning across the interior regions of Southern New England. Cultural Resource Management (CRM) identification surveys and site evaluations within these linear project areas often fall short of clearly defining horizontal site boundaries due to the constraints of the work space. However, by taking a broader and more regional approach to these multi-town and occasionally multi-state corridor projects, we begin to identify patterns associated with landscape, resource, and temporal affiliation. Spatial analyses of data from several linear projects conducted by The Public Archaeology Laboratory, Inc. (PAL) can be applied to predictive modeling and a greater understanding of Native American landscape utilization choices.

Horn, Sherman (Grand Valley State University)**[152] Taking the Thumb Off the Scale: Identifying Local Production in the Middle Preclassic Maya Lowlands**

The Middle Preclassic (1000 – 400 B.C.) Maya Lowlands were peppered with autonomous communities connected by webs of socioeconomic interactions at the local and regional scales. Increasingly complex social relationships were forged in Middle Preclassic centers and later developed into the institutionalized hierarchies of Classic Maya society. Archaeologists have investigated the roles economic relationships played in Maya sociopolitical development, but studies have tended to focus on trade in clearly non-local commodities, such as obsidian or green stone. The production and exchange of goods created from locally available materials has received less attention, and identification of locally produced goods presents several problems. Recent provenance studies of Middle Preclassic pottery illustrate methodological and interpretive issues in defining local economies and their relation to social complexity. The geographic extent of areas defined as "local" by chemical data is large enough to include several independent polities, thus subsuming important interactions between emerging political centers. Microscopic analysis further indicates that presumed "local" pottery comprises a range of material variability, likely reflecting differences in both provenance and practice. The local vs. import dichotomy implied by chemical studies of Middle Preclassic pottery, and its implications for understanding social complexity, must be reassessed.

[284] Discussant**[152] Chair****Hornbeck, Stephanie (Head of Conservation) and Emily Kaplan (Senior Conservator, National Museum of the Americas)****[39] The Field Museum's Colonial Period Polychrome Tiana: A Conservation Study of Materials and Techniques**

The Field Museum's collection holds the only known Colonial era tiana, or carved wooden stool, from Peru. This important object was among the inaugural collections at the Museum, entering the collection at its founding in 1893 just after Chicago's World's Fair, the Columbian Exposition. The remarkable polychromed tiana with two felines carved fully in the round supporting the seat, has been the subject of considerable study by scholars. This rare object has only been loaned on three occasions. The surface decoration is generally recognized as similar to that of Colonial polychromed qeros, or wooden ceremonial vessels, involving pigments mixed with resin and inlaid into shallow carved areas. Yet, the intact nature of the polychromy and the rarity of the object have not allowed for destructive analyses. Consequently, no technical studies have been carried out to date to characterize the pigments and resin. This paper presents preliminary results of non-destructive analysis of the materials and techniques used to make the tiana. We consider the results in the context of recent work on qeros, and discuss implications for the biography of the tiana.

Horning, Audrey (College of William and Mary)**[13] Discussant****Horowitz, Rachel (Appalachian State University)****[165] Discussant**

Horowitz, Rachel [217] see Lytle, Whitney

Horta, Pedro (ICArEHB, Universidade do Algarve), Joao Cascalheira (ICArEHB, Universidade do Algarve) and Nuno Bicho (ICArEHB, Universidade do Algarve)**[144] Neanderthal Ecological Niche in Iberia's Southwestern Edge: New Data from the Gruta da Companheira Site**

Southwestern Iberia is often considered a refuge for what are considered the last Neanderthals. Neanderthals in this region displayed unique behaviors compared to other European and Iberian regions. Among these are particular technological traditions and a high variability in resource exploitation, including marine resources. For this presentation, we aim to highlight important questions such as resource selection, exploitation, and technological and

settlement patterns in this region based on new data from the recently discovered Companheira Cave. The site is a small cave site located in Portimão city (near the Southwestern peak of Iberia), some 50 meters away from the Boina River, an important affluent of the Arade River.

Two one square meter test pits were excavated, revealing several Mousterian lithic artifacts in association with both terrestrial and marine fauna. A preliminary technological analysis, indicating a Levallois technology, revealed distinct patterns from the ones typically found in the region. Despite a lack of absolute dates, the proximity of the site to the river and the exploitation of marine fauna suggest a possible ecological refuge for late Neanderthals in this region.

Horton, Elizabeth (National Park Service)

[9] Vacationing in Wonderland: Archaeology of Tourism in Yellowstone National Park

There is a wealth of historical archaeological resources in Yellowstone, and the development of the park is directly connected to larger socioeconomic changes occurring across America. Recent investigations of refuse dumps associated with late-19th to mid-20th century tourism in Yellowstone National Park provided insight into the various beverages, foods and medicines people were consuming, as well as their participation in local and regional economies. These sites grant us a unique view of leisure and tourism development in a remote park environment over the past 140 years, a viewpoint that is unavailable in most other places in North America.

Horton, Shannon (University of Nevada, Las Vegas)

[209] An Archaeological Study of the Anomalous Sites along Southern Nevada's California Wash

This poster aims to provide a comparative study using the ceramics at three prehistoric sites along southern Nevada's California Wash. Several surveys, test excavations, and some full excavations were undertaken ahead of the proposed Navajo-McCullough Transmission Line Right-of-Way located in Clark County, Nevada. Typically archaeological sites in southern Nevada are clustered around perennial springs, playas, or rivers. The California Wash, however, has none of these. Thus, the presence of prehistoric sites over what appears to be long occupations and different cultural groups including the Virgin Branch of the Ancestral Puebloans, Patayan, and Southern Paiute was unexpected. The intent of this study is to answer questions of site density and site function in order to better understand why and how prehistoric peoples inhabited the area.

Hotze, Karla [99] see Hulse, Eva

Hough, Ian [259] see Markussen, Christine

Houghten, Holly (THPO Mescalero Apache Tribe)

[36] Agave Roasting Pits of the Mescalero Apache

One of the main staple foods of the Mescalero Apache was Mescal or Agave. The heart of the plant is cooked in an earth oven for four days. The plant is then eaten straight out of the oven or dried for storage and supply. Today the roasting of Mescal is still done every year in the spring and there are numerous roasting pits on the Reservation that are still used today, as well as several on public lands that are in the traditional homelands. Roughly 75-200 heads of agave are roasted and eaten on the Reservation every year.

Within the Guadalupe Mountains, the winter traditional homelands of the Mescalero Apache, there are thousands of roasting features. Many of these features were created by the prehistoric Mogollon, but many are also from the Apache, or utilized by both. In this presentation, I will provide a look at the modern construction, use, and reuse of these pits. This ethnographic look at earth ovens will allow a better understanding and stress the importance of these archeological features that are so prominent throughout the southwest.

[5] Discussant

Houk, Brett A. [63] see Gallarreta Cervera, Tomás

Houk, Brett A. (Texas Tech University)**[199] *The San Pedro Maya and the Western Frontier of British Honduras***

Having fled the violence of the Caste War in Mexico, the San Pedro Maya occupied nearly two dozen small villages in the forests of western British Honduras and northeastern Petén from the 1850s to the 1930s. Archaeological and archival information attest to the fact that the western "border" of British Honduras was a colonial concept of little concern to the San Pedro Maya. Because the colonial administration had no ability to police this frontier zone, the San Pedro Maya moved freely between Mexico, Guatemala, and British Honduras. Ultimately, however, the colonial concern for the frontier and the San Pedro Maya's disregard for it, among other factors, led to the forceful eviction of the Maya from their villages. In this paper, we present archival and archaeological data related to Kaxil Uinic and other San Pedro Maya settlements to explore how the Maya interacted with the border between Guatemala and British Honduras.

[164] *Discussant***Houle, Jean-Luc (Western Kentucky University)****[154] *Resilient Herders: Continuity and Change in Pastoral Household Life in Mongolia***

Understanding how human societies interacted with environmental changes is a major goal of anthropological archaeology. In this paper, we assess human-environment interactions at the household level in three regions of Mongolia during the Bronze and Iron Ages. We review shifting environmental conditions and the continuities and discontinuities in household life and the nature and intensity of the human occupation in an attempt to more actively integrate archaeology with ongoing environmental discussions of mobile pastoralist responses to the effects of environmental change in Mongolia.

[154] *Chair*

Houle, Jean-Luc [154] see Égüez, Natalia

Housse, Romuald (Université Paris 1 - Panthéon Sorbonne)**[143] *Conquer the South: From the First Contacts to the 'Integration'. Study of the Defensive Settlement Patterns' Evolutions and Modifications between the Late Intermediate Period and the Late Horizon in the Tacna Region***

In the south Central Andes, in the upper basin of the Sama River, the fortresses built during the Late Intermediate Period to deal with the endemic conflicts that affected the Andes between the 14th and 15th centuries appeared to have undergone many modifications and to have been re-used when the Incas arrived in the region. As in other regions of the Andes, the first contacts with the Incas are still poorly understood, but the excavations have shown that some fortified sites were abandoned very early when, on the contrary, others seem to have experienced an important Inca occupation. The region of Tacna seems to have been a true strategic crossroads between the regions of Moquegua, the altiplano and northern Chile but it also appears to have been little marked by its integration into the empire. This paper will try to understand the strategies put in place by the pre-Hispanic populations during this transition period.

Howard, Alex (Logan Simpson) and Mark Hackbarth (Logan Simpson)**[189] *Late Nineteenth and Early Twentieth Century Hispanic Communities in the Salt River Valley***

Comparison of archival and archaeological data from contract investigations of Hispanic residences and commercial loci provides an opportunity to investigate multiple strategies for economic survival in the Phoenix Basin. Late nineteenth century agricultural and urban settings are examined from Tempe and Phoenix to identify similarities and differences between the residents of several additions.

Howard, Steven**[176] Ancestral Ohiyo Haudenosaunee Ceramic Styles and Technology**

Ongoing investigations at the Bockmier One Site in southwestern New York State are providing new insights into the lives of the Ancestral Ohiyo Haudenosaunee, who lived in the upper Allegheny Valley from around AD 800 to around AD 1350. This paper will focus on ceramics thus far recovered from the site, which indicate at least two temporally distinct settlements, possibly about 200 years apart. Comparative analysis reveals similarities with known sites described through salvage operations in the 1960s and 1970s at sites downstream along the Allegheny, and may hint at the movement of individual potters and their families. The pottery at Bockmier One and other sites offers us a better understanding of the range of ceramics produced in the valley, the production techniques, and the methods of maintenance and upkeep.

Howe, David**[281] Moderator****Howe, Mark (US State Department - USIBWC)****[264] Smelertown: A Community Lost to Time along the U.S – Mexico Border**

In the late 1880s in El Paso, Texas, the establishment of a copper and lead smelter on the Rio Grande later brought about the rise of a community called Smelertown. This community of workers, families and Mexican nationals from across the border established a thriving community. Located at the intersection of both land and water borders of the U.S. – Mexico international border positioned to the west and south down the Rio Grande. Its location on the Rio Grande at this convergence of Texas, New Mexico and the Country of Mexico makes this a nexus of history as a demarcation of Mexican and U.S. History. In 2017, re-construction to the American Canal on the western edge of Smelertown unearthed features, artifacts and foundations. This presentation will show how Smelertown was a thriving community, until leveled in 1972 due to lead contamination in Smelertown and environs. This will examine the artifacts that comprise culture from both sides of the border and predicts what will be found, as Smelertown is still there – buried, even if the people are not.

Howell, Eleanor (The College of Wooster) and Paul Nick Kardulias (The College of Wooster)**[386] Stylistic Inconsistency and Artistic Intent in Viking Age Oval Brooches**

This study examines stylistic and thematic variation as seen in a sample of P51 type Viking Age (approx. AD 700-1100) oval brooches excavated mostly from burial contexts in central Sweden. As examples of applied art heavily reproduced through casting and imitation, paired oval brooches have the potential to reveal a great deal about how artisans perceived their products and how these perceptions developed and spread within the trade. In particular, replicated works may reveal which aspects of the applied art held symbolic significance, and which were simply aesthetic features expected by patrons. I examine both general stylistic variation and the development of a persistent “sea monster” motif that separates itself from otherwise stylistically consistent metalwork. I investigate the processes and phenomena that drive variation in heavily reproduced applied art as well as those that could affect the persistence of certain motifs despite changing styles and geographic distance. I outline a series of those which apply to the sample and which may be used to analyze similar stylistic elements in future studies.

Howell, Wayne and Eric Force**[420] The Late Holocene Geomorphic History of Montezuma Canyon and the Puebloan Agricultural Landscape**

Our study identified four depositional packages in our Montezuma Canyon study area, the older two of which formed the Ancestral Puebloan canyon bottom agricultural landscape. The older unit began accreting during the mid-Holocene and was formed by a meandering channel that periodically overflowed its banks, filling the canyon from wall-to-wall with multiple interbedded flood deposits. This was the environment encountered by the first Ancestral Puebloans to settle the canyon. A dramatic erosional event opened a deeply incised arroyo in this floodplain sometime during the late A.D. 800s to the early A.D. 900s, and a new floodplain began forming within the arroyo. Puebloans adapted by placing their settlements at localities favorable for agriculture, either along the arroyo edges where the narrower floodplain was accreting nearby or at side canyons where tributary alluvial fans grew out onto the floodplain. This formed the Puebloan agricultural landscape from the mid-A.D. 900s until abandonment in the

late A.D. 1200s.

Howey, Meghan [77] see Palace, Michael

Howey, Meghan (University of New Hampshire)

[239] *Great Lakes Enclosures and Un-silencing the Midewiwin Ceremonial Complex*

The Midewiwin is a ceremonial complex whose importance among the Algonquin-speaking peoples of the Great Lakes Region was noted frequently throughout the historical era. Various scholars have interpreted this ceremonial complex as an exclusively post-contact phenomenon, as a medicine society that evolved in relation to European-introduced diseases. This interpretation relies on a Euro-centric understanding of the indigenous concept of "medicine" resulting, then, in the silencing of the socio-spatial breadth and temporal depth of this indigenous ritual system. Various lines of archaeological evidence indicate a precontact origin to the Midewiwin. One such line of evidence comes from the circular enclosures indigenous communities built across the Great Lakes during Late Precontact. I have argued these enclosures embed deep and complicated social and religious histories, histories that were implanted in them. Here, I explore connections among enclosures at a large geographic scale in order to contribute to an un-silencing of the foundational, deep-time, and potentially, pan-regional significance of Midewiwin in the centuries prior to colonialism.

[344] *Discussant*

Howey, Meghan [401] see Mierswa, Emily

Howie, Linda (HD Analytical Solutions / The University of Western Ontario)

[152] *Seeing the Forest for the Trees: Some Observations on Petrographic Indicators of Residential Mobility Patterns in Canadian Great Lakes and Arctic Regions*

The manufacture and consumption of material goods by households and communities is shaped significantly by residential mobility patterns, and the reasons why people moved around the landscape in the past are as varied, as they are today. A variety of kinds of mobility have been recognized in the archaeological record, ranging from household relocations to the seasonal or cyclical movements of hunter-gather and herder groups over long and/or short distances, to large scale population migrations. These movements of people, objects and ideas shaped daily life and practice. A nuanced understanding of the material manifestations of different kinds of mobility is required to unravel how they did. Petrographic studies and pottery assemblages offer a means of recognizing and tracing the movement of objects and people, through the identification of raw material source locations on the geologic landscape. This paper compares the petrographic evidence of different kinds of mobility, drawing on examples from the Great Lakes and Arctic regions of Canada. It illustrates the kinds of insight that can be gained into resource use and the timing and seasonality of pottery production and people's movement, and discusses how mobility patterns affect the conceptualization and interpretation of local production.

[152] *Chair*

Howland, Matthew (UCSD Anthropology Department) and Thomas E. Levy (UCSD Anthropology Department)

[134] *Digital Deforestation: DTM Generation with Agisoft Photoscan*

Applying digital photogrammetry to archaeological sites is a well-known approach. Also fairly common is photogrammetry's combination with low-altitude aerial photography (LAAP) in order to generate three-dimensional data and produce GIS outputs such as orthophotographs and digital elevation models (DEMs). DEMs are widely useful for a number of spatial analyses and a LAAP-photogrammetry workflow is one of the easiest ways to produce these datasets. However, DEMs produced by these methods often include vegetation, as photogrammetric systems are not able to distinguish between true ground surfaces and the tops of trees. This paper describes a processing technique using point cloud classification that allows users to remove some types of vegetation and architecture in photogrammetric models from consideration when generating a DEM. By doing so, researchers can generate digital terrain models (DTMs), a subset of DEM which factors in only the Earth's surface and eliminates vegetation and architecture from elevation measurements. These DTMs are better basis for contour generation and various spatial

analyses including slope and water flow calculations.

Howson, Jean [357] see Speal, C. Scott

Hppner, Annalisa

[91] *Alaskan Legacy Collections Outside Alaska: Challenges, Opportunities and Potential*

Alaskan “legacy collections” are housed at many American institutions outside of Alaska. These collections contain great potential for object-focused analysis, looking toward specific object classes, or even individual objects for in-depth review. This poster will present a summary of the locations of Alaskan legacy collections in the “Lower 48,” and a brief review of which types of resources are available in those collections. Using the collections of the Laboratory for Circumpolar Studies at the Haffenreffer Museum of Anthropology as a case study the poster will explore the challenges of working with legacy collections, the HMA’s approach to overcoming these challenges, and a small exploration of the sewing kit components present in the Circumpolar Laboratory collections, and a discussion of their potential as an artifact class to conduct engendered and feminist archaeology in the northwest arctic.

[138] *Discussant*

Hrncir, Vaclav [65] see Kvetina, Petr

Hruby, Zachary [103] see Powell, Lindsay

Hruby, Zachary (Northern Kentucky University)

[255] *A Comparison of Lithic Caches from Ucanal and Xunantunich: Is It Possible to Identify Eccentric Traditions as Communities of Practice at the Regional Level?*

Two recently discovered ritual deposits from the eastern Maya Lowlands seem to reveal similarities in the kinds of eccentricities used in Late Classic Maya caches from different political centers. Upon closer examination, however, they do not replicate all of the interred forms. This paper examines these two caches in terms of style, technology, and morphology, and also attempts to identify broader spheres of eccentric flint and obsidian traditions in the Maya world. If these objects can be found to constitute an “eccentric sphere,” then it brings up the possibility of identifying communities of practice that supersede political boundaries as may be seen in ceramic types, or art and architecture styles.

[255] *Chair*

Hu, Lorraine (Washington University in Saint Louis), Fiona Marshall (Washington University in Saint Louis), Henry Saitabau (National Museums of Kenya), Angela Kabiru (National Museums of Kenya) and Stanley Ambrose (University of Illinois Urbana-Champaign)

[82] *Of Fire and Stone: Cremation and Secondary Burial Practices at Noomparrua Nkosesia, a Pastoral Neolithic Site in Southwest Kenya*

The spread of food production in East Africa c. 5000-1000 BP involved peoples with diverse subsistence patterns, material culture repertoires and identities. Pastoral Neolithic burial traditions include monumental pillar sites in northern Kenya, cremations in rockshelters in the southern highlands of Kenya and northern Tanzania, and widespread cairns. Little is known about the social landscapes and the diversity of mortuary practices of Neolithic-era peoples of the southern highlands. In 2016, members of a Maasai community near the Tanzanian border in Kenya discovered and exhumed a unique Neolithic mortuary site named Noomparrua Nkosesia (GxJg2). This 3.5 x 3.5 m rock crevice chamber held the remains of five cremated individuals in a matrix of soil, ash and powdered red ochre, associated with approximately 90 ground stone bowls and 44 obsidian artifacts. However, unlike all other known cremation sites, grindstones, ornaments and pottery were absent. We report on the chronology, stratigraphy and formation processes of this site. Geoarchaeological analyses show a distinct lack of ash or burned sediment despite the presence of burned bones, artifacts and cobbles. Noomparrua is the first cemetery containing only secondary burial of cremated remains in East Africa and increases the diversity of known Pastoral Neolithic

mortuary practices.

Hu, Xiaonong [361] see Zhao, Chao

Huamán López, Oscar

[356] Estilo Cerámicos del Horizonte Medio en Quilcapampa

Excavaciones arqueológicas en el sitio de Quilcapampa. Arequipa, dieron como resultado el hallazgo de fragmentos cerámicos del Horizonte Medio cuya iconografía y estilos tienen estrecha relación con la cultura Wari, el hallazgo incluye a formas de vasijas y diseños de la época 1B y 2A (estilos Chakipampa, Robles Moqo, Viñaque y estilos locales) que al parecer llegaron desde espacios culturales próximos a la costa sur. La variedad iconográfica y tecnológica de estos hallazgos en Quilcapampa pueden ser comparados con aquellas registradas en la costa sur por Dorothy Menzel, y la sierra sur por Justin Jennings y Willy Yépez. Este estudio cerámico también ha permitido observar áreas de actividad, reocupaciones y posibles ofrendas semejantes a las registradas en el sitio arqueológico de Conchopata y Wari en Ayacucho.

Huang, Cindy Hsin-yee (Arizona State University)

[112] From the Lab to the Cave and Back: 3D Modeling Finger Flutings

Finger flutings are lines and markings drawn with the human hand in soft sediments in caves and rock shelters throughout southern Australia, New Guinea, and southwestern Europe that date back to the Late Pleistocene. Over the last two decades, Kevin Sharpe and Leslie Van Gelder developed a method to determine characteristics of the creators, such as age, sex and group size. However, research on finger flutings is still constrained by physical challenges and limitations of the cave environment. 3D scans of the fluting panels would allow researchers to conduct measurements and other analysis in the lab. In order to determine the most appropriate method of 3D documentation, I conducted an experimental project in which I created and scanned replica panels using three different 3D scanners. I compared the process and results of each digitization method based on how well each accommodated for the challenges posed by the flutings and the cave environment.

Huang, Jennifer (Bureau of Reclamation)

[190] Out From the Center: Rock-Art of the Chaco World

Chaco Canyon contains multitudes of petroglyphs and pictographs, yet rock art has not been a prevalent line of evidence in the archaeological study of that pre-contact culture. More than 15,000 Ancestral Puebloan elements attest to the importance of the role of iconography within the canyon. And the Chaco World extended far beyond what today is called Chaco Culture National Historical Park. Certain Chacoan architectural components found in more than 230 habitation sites outside the canyon - including great houses, great kivas, roads, and earthworks - are used to identify those sites as related to the Chaco Center. Rock art has not been identified as a Chacoan trait. But data for more than sixty known outlier communities indicate that 23 contain rock art imagery. As no single trait is found at every outlier, and trait frequencies generally don't exceed one third of all sites, the presence of rock art imagery at 10% of great house communities containing other Chacoan traits could indicate iconographic relationships and trends both temporally and regionally. Polly Schaafsma's great gift to rock art research includes her ability to recognize the big pictures of the past. This paper touts rock art imagery as a viable line of evidence in the study of Chaco on a Polly-esque scale.

Huang, Tsuimei (Professor at Tainan National University of the Arts, Taiwan)

[141] Jade Ear Ornaments with Human-Animal Motif from Prehistoric Taiwan — Design, Technology and Symbolism

Jade ear ornaments with human-animal motif, dating to 2800-2300 BP, have been the most distinctive jewelry from prehistoric Taiwan. Since the first ear ornament of this kind became known in 1982, a total of 41 pieces of such items have been unearthed from 9 archaeological sites. These objects are comparable in composition, i.e. an animal image of a boar or a deer on top of the heads of a group of two frontal human figures placed side by side. These two groups of ear ornaments, those consisting of a boar image and of a deer image, can be differentiated according to

the size relationship between the human image and associated animal figures in the composition, carving techniques, and geographic distribution that also suggest the evolution of these artifacts in time and space. It is believed that these human-animal images were representations of the triumphant return of brave tribal hunters with their prey; these objects not only are faithful records of a long-standing hunting tradition but also serve as the visual evidence for studying the production, circulation and symbolism of jade ear ornaments in prehistoric Taiwan.

Huang, Wanbo [361] see Li, Yinghua

Huchim, Jose (INAH)

[173] Avances y perspectivas de la conservación de edificios monumentales en Uxmal

Sin lugar a duda Uxmal fue el sitio más importante de la región Puuc desde el siglo VIII hasta el X. Cuenta con un área amurallada de 2.6 km², en los que se distribuyen 11 grupos de arquitectura monumental. A principios del siglo XX la lógica de conservación fue intervenir los edificios que tenían en pie hermosas fachadas de mosaicos de piedra. Más adelante, influyó el interés de los presidentes Lázaro Cárdenas y Miguel Alemán, estos criterios dieron como resultado que a los ojos del visitante Uxmal se percibiera como una serie de edificios inconexos. A partir de 1992, se planteó una estrategia para recuperar Uxmal, entendiéndola como una ciudad con espacios dedicados a diferentes actividades y diseñada para captar el agua de lluvia y dirigirla hacia los reservorios localizados al poniente del asentamiento. En esta presentación hablaremos de los procesos de restauración que nos han permitido hacer una intervención integral de los monumentos y recuperar los espacios que los rodean. Haciendo énfasis en las técnicas de exploración, la recuperación de saberes antiguos sobre el uso de la cal y la aplicación de nuevas tecnologías en el registro del estado de conservación de cada monumento.

Huckell, Bruce (University of New Mexico)

[316] Clovis Use of Obsidian in the Southwest

The role of obsidian in Clovis technological organization in the US Southwest and northwestern Mexico is investigated. The distribution and typology of obsidian artifacts from excavated sites as well as surface contexts is reviewed. Projectile points appear to be the principal, and nearly only, tool for which obsidian was used, in contrast to chert and other siliceous materials that served for the manufacture of multiple tool types. Compositional studies by Steve Shackley indicate that, Clovis groups exploited several different primary obsidian sources within the region, which offer piece sizes ranging from large nodules to small marekanites. Secondary sources—nodules available in Quaternary alluvial deposits—along major drainages were also likely exploited. Use of marekanites and small nodules from secondary contexts is particularly interesting because small piece sizes restrict the sizes of projectile points that can be made. Small obsidian points are common at Clovis sites in southeast Arizona and south-central New Mexico, and analysis of their dimensions and those of Clovis points of other materials are presented. Reasons for the organizational decisions to select, transport, and use these small pieces of obsidian are explored.

[187] Chair

Huckell, Lisa (UNM)

[25] New Life for Old Samples: Investigating the Paleoethnobotanical Record from Tijeras Canyon

University of New Mexico field school excavations carried out at Tijeras Pueblo in the Sandia Mountains by Jim Judge and Linda Cordell from 1971 to 1976 left a legacy of more than 2,000 botanical samples, consisting of maize, flotation samples, wood samples, and macrobotanical specimens. Apart from a single preliminary paper produced by a field school staff member, the potential of this archive has remained untapped for more than 40 years. The use of Tijeras flotation samples for student projects for a UNM class in paleoethnobotany has provided the opportunity to initiate a new phase of investigation that has expanded on the limited contexts sampled for the earlier study to include all room blocks and both major occupation periods defined by Cordell. This paper presents the results of the current semester's analyses in combination with previous data to offer new insights into the subsistence economy created by the Tijeras Pueblo residents.

Huckleberry, Gary [8] see Steinbach, Erik

Huckleberry, Gary (Geoarchaeological Consultant)**[312] *The Importance of Sediment: A Selection of Julie Stein's Contributions to Geoarchaeology***

Of Julie Stein's many contributions to geoarchaeology, her publications regarding sedimentology and stratigraphy with respect to site formation have been particularly influential. By employing earth science methods to elucidate the history of archaeological sediments in a diversity of environments and cultural settings, her work has helped archaeologists better interpret the context of material culture and thus better understand past human behavior. In honor of Julie's scientific contributions to the profession, I will review three geoarchaeological case studies from the North American Southwest (Arizona) and Northwest (Washington) where strategies borrowed from her published work were used to elucidate the history of sediments from cultural contexts and address archaeological questions. Julie's research demonstrates the importance of the sedimentary matrix in the archaeological record and is a reminder of the value of interdisciplinary scientific collaboration.

Huddart, David [38] see Gonzalez, Silvia

Hudgell, Gemma-Jayne, Ellen Cowie (Northeast Archaeology Research Center, Inc.) and Robert Bartone (Northeast Archaeology Research Center, Inc.)**[400] *A Well-Travelled Route: 7,500 Years of Occupation along the Missisquoi River, Northwestern Vermont—The Vermont Agency of Transportation Route 78 Project***

Vermont Route 78 follows the Missisquoi River into its floodplain and out to Lake Champlain, and in doing so crosses a rich archaeological landscape. Since 1999, archaeological excavations have been undertaken in advance of safety upgrades to this major east-west route, and although necessarily a narrow slice along the road corridor, the results document continuity in Native American occupation over approximately 7,500 years. This paper focuses on the Headquarters and Porcupine sites, which underwent phase III data recovery in 2013. The integrity of these sites is exceptional, with cultural features, living surfaces, and artifacts preserved in a sealed, layered alluvial setting. These extensive, stratified sites contain intact components dating to the Middle and Late Archaic, the entire span of the Woodland period, and the early Contact and early historic Euroamerican settlement periods. Archaeological evidence includes virtually the entire range of Vermont Native ceramics (over 300 separate vessels), remnants of a Native American longhouse dating to ca. A.D. 1200, and products of horticulture including maize, beans, squash, tobacco, and sunflower, suggesting the presence of a village of considerable size. The project also provided an ideal setting for a substantial Public Education and Outreach program given project accessibility and visibility.

Huerta, Danielle (University of California, Santa Cruz)**[204] *Analysis of Late Rio Grande Glaze Wares from a Post-Revolt Jemez Pueblo***

For 400 years Rio Grande Glaze Ware played an important role in Pueblo life, from feasting and ritual acts to everyday life as serving vessels. What is interesting though, is that regardless of its said importance and the specialized nature of technical knowledge required to produce glaze ware, it appears that Pueblo potters stopped making glaze ware sometime after the Pueblo Revolt of 1680 for reasons that Southwestern scholars have speculated on. This paper presents petrographic, chemical characterization, and isotopic data from the analysis of Rio Grande Glaze Ware Glaze E & F ceramic sherds from the post-Revolt Jemez Pueblo of Patokwa (LA 96). Jemez oral traditions and ceramic evidence suggest that Patokwa was the place the Jemez settled following their departure from Walatowa after the Revolt and when the Spaniards returned to New Mexico in 1692, this is where they found the Jemez living (Liebmann 2012). These analyses were carried out to investigate the procurement, production, and movement of late glaze wares and their raw material constituents in hopes of revealing some broader information about how Pueblo people reorganized and remade their lives after the Spanish were driven out of New Mexico.

[204] *Chair*

Huey, Samuel [251] see Britt, Tad

Huffman, Thomas (University of the Witwatersrand) and Frank Lee Earley (Emeritus Faculty at Arapahoe Community College, Li)

[252] *The Smell of Power: The Apishapa Pilgrimage Trail*

Abstract rock art formed part of a pilgrimage trail that led from the lower Apishapa Canyon to the Spanish Peaks near Trinidad, Colorado. Hunter/gatherer ethnography from the Great Basin makes sense of abstract engravings in the canyon at sites such as Cramer, Canterbury, and Snake Blakeslee. The Apishapa Canyon leads from these and other sites up to the volcanic-like Spanish Peaks, an igneous stock well-known for its unusual series of radial dykes. According to Great Basin ethnography, shamans should lead pilgrims along sacred trails to such volcanic intrusions because they were sources of supernatural power, or puha. In the Great Basin, pilgrims should stop along the way at igneous intrusions so that neophytes could gain spirit helpers. Between the canyon and peaks, the trail leads past a dyke with small artificial platforms, as well as flake scars and random peck marks on tumbled boulders not suitable for tool production. Moreover, experimental bashing did not produce loud sounds or echoes, but it did produce a sulfurous odor. Since hot springs in the region also emit sulfur, and since hot springs are another source of puha, neophytes may well have bashed the boulders in order to acquire supernatural power in another form.

Huftalen, Cameron (Bates College) and Colleen O'Loughlin (Bates College)

[123] *Identification and Classification of the Environmental Microbiome of the Temyiq Tuyuryaq*

This pilot study aims to culture and monitor bacterial species from a specific range of archaeological samples from Temyiq Tuyuryaq, a multigenerational village in northern Bristol Bay, Alaska. Goals of this study are to test our ability to identify variability and consistency of the microbial species present in conditions of food storage areas, cooking features and household floor contexts. Bacteria, like any life form, compete for resources. Although the numbers of microbial competitors are vast in any given environment, favorable conditions are heavily influenced by existing nutritional sources. Relying on the resource ration competition model, the predominance of different taxa are heavily influenced by availability, individual demand, and rate of consumption of nutrients. Bacteria, like humans, display a range of relationships with each other; from competition, coexistence, and cooperation. The ability to explore bacteria colonies from samples collected at Temyiq Tuyuryaq creates opportunities in support of less invasive field methods (e.g. core extraction vs. excavation). This research contributes to a growing interest in Indigenous archaeology; one that prioritizes the interests and ideas of descendants. Less invasive methods allow for opportunities to bridge the divide between traditional archaeological interests and community interests facilitating respectful and equitable collaborative relationships.

Huggett, Jeremy (University of Glasgow)

[77] *Is Digital Data Different?*

Archaeological data is notoriously tricksy: while we appreciate it is always incomplete, frequently unreliable, often replete with unknown unknowns, we nevertheless make the best of what we have and use it to build our theories and extrapolations about past events. Are data in a digital environment any different? Is there any reason to think that digital data alter this complicated relationship with archaeological data? If it does, how, and what are the implications for our use of such data? And if not, why does the shift to an infinitely more flexible, fluid digital medium not change the character of our data? As we are increasingly subject to algorithmic agency, this paper seeks to unpick the nature of digital data, a prerequisite to rational and appropriate digital data analysis.

[177] *Discussant*

Hughes, Elaine (Museum of Northern Arizona)

[21] *Archaeological Collecting at the Museum of Northern Arizona: Then and Now*

The Museum of Northern Arizona (MNA) is a private institution, yet 89% of its archaeological holdings are from federal, tribal, and state lands. The story of how MNA acquired these collections is rooted in its founding in 1928 by a group of local citizens under the leadership of Dr. Harold S. and Mary-Russell Ferrell Colton. The idea for the museum grew out of Dr. Colton's correspondence with an amateur archaeologist and custodian of Wupatki National Monument. They both felt that cultural and natural science resources from Arizona should be preserved in Arizona rather than in large Eastern museums. Dr. Colton encouraged local collectors to donate their prehistoric collections to MNA for greater accessibility to the public, while he continued a systematic archaeological survey begun in 1916 to document sites in northern Arizona. There have been many changes since these early days with the passage of

laws that affirm federal ownership and tribal claims to archaeological resources from their lands. In line with this, MNA has developed and will discuss its current policy and protocol for accepting archaeological materials from private entities as well as partnerships with local tribes for re-homing artifacts.

Hughes, Elena [121] see Radford, Britney

Hughes, Karissa [253] see Wright, Sterling

Hughes, Kate [261] see Hughes, Tyson

Hughes, Katherine (Crow Canyon Archaeological Center), Leigh A. R. Cominiello (Crow Canyon Archaeological Center), Jamie Merewether (Crow Canyon Archaeological Center) and Kari Schleher (Crow Canyon Archaeological Center)

[86] No Stone Unturned: Rock Technology from the Basketmaker Communities Project

The stone artifacts recovered from the Basketmaker Communities Project study area in southwestern Colorado resemble broader technological and social trends documented in the San Juan region during the Basketmaker III time period on the Colorado Plateau. Do the residents of the BCP study area represent a convergence of Western and Eastern Basketmaker II populations? In this paper, we examine the variation in chipped and ground stone technologies from the BCP and use these data to attempt some clarity on the origins of the residents of the study area. Lithic materials recovered from the Dillard community center and smaller Basketmaker sites represent not only adaptation to local resources but suggest interactions and social connections with the greater Southwest. Stone technologies represented at these sites suggest some continuity with Basketmaker II populations in the area and the beginnings of Pueblo social and material culture.

Hughes, Richard (Geochemical Research Laboratory)

[257] Critical Dimensions in Obsidian Provenance Analysis

Geochemistry, geology, and archaeology all conjoin contemporary provenance studies. Geochemistry provides the chemical signatures of parent geological materials and the requisite data to support attributions of archaeological artifacts to "source" (chemical type), geology provides the overarching context for understanding the formation of the geological parent materials, while archaeology informs on the human time-space-function dimensions of material use. Recent "big picture" synthesis of regional obsidian use in archaeology have drawn on artifact-to-source assignments from a variety of literature with minimal attempt to evaluate the accuracy of the source assignments themselves. This paper will address epistemological challenges arising from this narrow view of obsidian provenance designations, suggesting that confidence in synthetic results will require a common reporting "language", adherence to rigorous analytical standards, sensitivity to geological issues, and in-depth knowledge of the advantages and disadvantages of different instrumental and data manipulation methods.

Hughes, Tyson (Crow Canyon Archaeological Center), Kate Hughes (Crow Canyon Archaeological Center) and Bruce Bradley

[261] Curated Lithic Tools from the Lakeview Group

Current excavations at the Lakeview group in southwestern Colorado have sparked interest in a fresh look at the Ida Jean site and Wallace Ruin collections. The Ida Jean and Wallace sites, part of the Lakeview group, are two Chaco-style great houses that were occupied during the Pueblo II and III time periods (AD 900-1300). However, both sites have many projectile points, bifaces, and knives that appear to have much older origins. We take a look at the technology, lithic materials, and provenience of these older tools in an attempt to understand this connection through time and space.

Hull, Bryna (University of California, Davis), Reba Fuller (Tuolumne Me-Wuk), Jelmer Eerkens (University of California, Davis), Eric Wohlgemuth (Far Western Anthropological Research Group, Inc.) and Carly Whelan (California State University, Chico)

[110] *Stable Isotope Analysis of Humans, Pine Nuts, and Acorns from the Central Sierra Nevada, CA*

In stable isotope analysis of human remains, $\delta^{13}\text{C}$ enrichment is often interpreted as a marine or C4 contribution to the diet. There are instances when neither of these interpretations is supported by the archaeological evidence, such as in the central Sierra Nevada of California. Archaeological evidence for this region suggests that pine nuts and acorns provided the bulk of the plant-based diet, while deer constituted most of the meat. Here we present $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of bone collagen from ancient human inhabitants of this region. We compare $\delta^{13}\text{C}$ values of archaeological pine nuts (*Pinus sabiniana*, *Pinus lambertiana*) and acorns (*Quercus* spp.) from within the same region to help elucidate $\delta^{13}\text{C}$ differences among these two important dietary genera. Our research suggests that fundamental differences between these two genera of trees may account for $\delta^{13}\text{C}$ enrichment observed in some individuals.

Hull, Bryna [110] see McNeill, Patricia

Hull, Kathleen (University of California, Merced)

[19] *Recognizing Post-Columbian Indigenous Sites in California's Colonial Hinterlands*

Land-use patterns of seasonally mobile hunter-gatherers present a particular set of challenges to archaeological recognition of post-1492 indigenous residential sites in the colonial hinterlands of California. The relatively short duration of site use, frequent re-use of sites episodically occupied in the more distant past, and fine temporal scale often required for archaeological study of cultural practices in the wake of colonialism necessitate a multifaceted approach. This research strategy entails: (1) creative and exhaustive use of diverse data sources, including documents, images, and material evidence; (2) innovative approaches to inferring site formation, chronology, and organization; and (3) a formal iterative method that feeds data back into the identification process and builds on often subtle differences between components dating before and after 1492. This paper illustrates this research strategy via examples from studies in Yosemite National Park that also have relevance to archaeological identification of post-1492 indigenous sites elsewhere in North America, including areas where very different land-use practices were pursued.

Hull, Ron [402] see Belmaker, Miriam

Hull, Stephen [10] see Holly, Donald

Hulse, Eva (Archaeological Investigations Northwest)

[99] *Prairies and Meadows: A Continuous Record of Upland Settlement in SW Washington State*

Recent research in SW Washington State has provided evidence for intensive use of upland prairies and meadows by Native people. People visited prairies and meadows seasonally in order to take advantage of diverse resources in grasslands, forests, and streams. These sites provide the longest continuous record of settlement in SW Washington State, beginning in the Archaic and continuing until the Contact period. This long record allows us to examine changes in population density and resource intensification over time.

[99] *Chair*

Humphreys, Stephen (Durham University)

[6] *Discussant*

Hundman, Brittany (DirectAMS), Alyssa M. Tate (DirectAMS) and Jonathan Heile (DirectAMS)

[115] *Oops, I Touched It Again: Debunking Myths and Misconceptions of Radiocarbon Dating Sample Collection*

Established field sample collection procedures have fostered misconceptions of the vulnerable nature of organic materials destined for radiocarbon dating. To address common contamination concerns and debunk these misconceptions, wood samples of known age were intentionally exposed to a variety of substances found in the field and the lab, including coffee, human hands, cleaning solvent, aluminum foil and low-density polyethylene film. Experimental samples were then subjected to a standard acid-base-acid (ABA) pretreatment protocol with the aim of examining the effectiveness of removing exogenous carbon. Results indicate that the standard procedure for the pretreatment of organic materials effectively removes common exogenous carbon contamination, and thus reduces handling and curation concerns after excavation.

Hundman, Brittany [182] see Osborn, Jo

Hundtoft, Brooke, Christopher Schwartz (Arizona State University), Adrian Chase (Arizona State University) and Ben Nelson (Arizona State University)

[81] *Uncovering a Globalized Past with the Connections Project: Highlighting Challenges Associated with Exploring Long-Distance Interaction between the Southwest US and Mexico*

The Connections Project is a long-term research venture focused on documenting material indicators of interregional interactions amongst people that inhabited an area ranging from the US Southwest and Mexican Northwest (SW/NW) to Central America from 800-1540 CE. Data relating to distantly traded goods and materials indicative of relations across space were collected and collated from archaeological reports, publications, and cultural resource management records. The long-term goal of this project is to create an open access research and reference database for storing evidence of material and iconographical interactions amongst peoples who inhabited the SW/NW and Mesoamerica. However, there remain a substantial number of obstacles to data curation and analysis. In this Knowledge Development Framework (KDF) paper, we address three things. First, we delve into what the Connections Project is and what data we use. Second, we highlight an example of an obstacle to data analysis that was overcome through collaboration. Third, we discuss an issue that we are actively working to overcome—namely the challenges associated with digitally curating archaeological data. By discussing these obstacles, we hope to create a dialogue regarding the challenges of collecting, curating, and using archival data for large scale analysis.

Hungerford, Mark [108] see Stokes, Robert

Hunt, David [258] see Ham, Allison

Hunt, Terry [365] see Lipo, Carl

Hunter, Andrea (Osage Nation)

[293] *Discussant*

Hunter, Raymond (University of Chicago)

[143] *Periodizing Andean Colonialism: A Comparison of Archaeological and Historical Data From Markaqocha, Cusco, Peru*

This paper assesses the problem of materially distinguishing between the Andean Late Horizon Inka Empire (ca. 1450-1532 CE) and ensuing Spanish Colonial Period (1532-1824 CE) in contexts that lack overtly colonial artefacts. The arrival of Spanish conquistadors in the Andes, and subsequent conquest and colonization of the region, is frequently framed as a cataclysmic rupture, a singular historical event, or a rapid transition. This paper uses data from the Cusco area site of Markaqocha to examine such characterizations. A comparison of archaeological, historical, and paleo-environmental data from Markaqocha demonstrates that while the population living at the site

participated in drastic cultural change under colonialism, these changes were not always materialized in ways that align with the historical events that dominate periodization, and were accompanied by notable continuities in practice. This suggests that for Markaqocha's residents, the "rupture" of the colonial transition was experienced by fits and starts for centuries after the arrival of colonizers. These data emphasize the importance of considering the variability of historical transitions at local scales, accentuating that what constitutes chronological rupture, historical event, or material transition is highly dependent on daily lived experience.

Hunter-Anderson, Rosalind (University of New Mexico)

- [29] *Paleo-sediment Coring Studies in Micronesia: A Review and Critique*

Paleo-sediment coring studies by archaeologists, pioneered in Micronesia by Steve Athens and colleagues, including myself, in the 1980s, are reviewed and assessed for their contributions to archaeological science in the western Pacific within a CRM context. It is suggested that while data generated by these studies comprise a major advance over the narrow perspective of culture history long dominant in Pacific archaeology, using a priori narratives and ad hoc statements about past human behavior to guide and to interpret the research findings is a serious methodological error leading to embarrassing revisions and reversals, as also happens to culture historians when contradictory observations come to light. An alternative approach is illustrated.

Huntington, Yumi (Framingham State University) and John Warner (University of Southern Florida)

- [64] *Monumental Structure, Sacred Landscape, and Cosmology: The Late Formative Period Peruvian Site of Jequetepeque-Jatanca*

How does architectural construction relate to the surrounding landscape and a broader cosmological framework? This paper discusses the relationships among architecture, geography, and cosmology at the site of Jatanca in the Jequetepeque Valley on the northern coast of Peru. This site was occupied mainly during the Late Formative Period (approximately 500 BCE to 100 CE) by local coastal populations, resulting in the construction of six monumental architectural compounds located on a relatively undifferentiated flat plain. Only one partially elevated structure exists at the site, a unique Acropolis that radiocarbon tests and excavations indicate was the very first building constructed there. This Acropolis seems to form a focal point for the local architecture and its relationships to the surrounding sacred mountains and even celestial bodies. We argue that the Acropolis exhibits a specific cosmological relationship with the nearby mountain Cerro Cañoncillo, creating an almanac based on alignments of solstices and equinoxes that connected the site's inhabitants to a larger cosmic framework. This paper will discuss the rationale behind Jatanca's geophysical location and spatial considerations for its ritual practices, including analysis of its surrounding environment and irrigation canal system.

Huntley, Ashley

- [400] *Assessing Our Impact: An Examination of the Role of Historic Preservation in the Gentrification of Urban Centers in the Midwestern United States*

Over the past few decades urban centers, especially in the Midwestern United States, have experienced "revitalizations" that have completely altered the socio-political and ethnic make-ups of these cities. While historic preservation does not always play a role in the gentrification of cities—especially in urban locations where the emphasis has been placed on modern builds—preservation efforts have contributed to the pattern of displacement that is often seen during the gentrification process. This can be partly attributed to the selective emphasis on a neighborhood's history that sometimes occurs. This paper will examine how historic preservation has traditionally caused displacement and what can be done to shift the focus to not only preserving historic structures, but also preserving established communities in historic neighborhoods.

Huntley, Deborah [122] see Baxter, Erin

Huntley, Deborah (Tetra Tech, Inc.) and Suzanne Eckert (Arizona State Museum)

- [188] *Unroofed Great Kivas, Post-Chacoan Great Houses, and Aggregation: Kintigh's Legacy as Viewed from the Lion Mountain Community*

As graduate students, Keith Kintigh shaped each of our careers in significant ways. Keith introduced us to the archaeology of the Cibola region, a place that remains dear to us. He also inspired an enthusiasm for the use of statistics, particularly for ceramic typological seriation and chemical provenance studies. And his interest in the spatial organization of Ancestral Pueblo communities and the role of public architecture in those communities are themes we continue to explore. Our current archaeological work in the Lion Mountain area on the Cibola National Forest near Magdalena, New Mexico, allows us to combine these tools and interests. Over the past two summers we have documented over 50 sites in an area covering about 2 square miles -- sites that include ceramic types indicating a largely late Pueblo II-Pueblo III occupation with close ties to the Acoma and Zuni regions, grid gardens, public architecture that we are calling post-Chacoan great houses and an unroofed great kiva, and a possible Chacoan outlier. This paper presents preliminary results of our ongoing research and discusses how we have adapted Kintigh's model of aggregated post-Chacoan great house communities to an area much farther afield than originally included in his research.

Hurcombe, Linda and Theresa Emmerich Kamper (University of Exeter)

- [20] *The Materiality of Human-Animal Relationships: Animals as Hides, Furs, Fibres, Sinew, and Tools*

Human relationships with animals include materials not just food. Animal products provide strong resistant materials for tools, and flexible ones for clothing and containers. Humans can wrap themselves and sleep warmer because they have turned animals into clothing, bedding and shelters. The tools made from them can enable hunting, food processing, and the preparation of other craft materials. We present a broad perspective looking at the way both wild and domesticated animals have been used by humans. Based on our practical knowledge of many kinds of animal materials and products, we outline the ways in which the finished artefacts can have smells and textures that are a combination of the original animal and the way humans have chosen to process it. Inherent knowledge of species-specific characteristics influences animal selection and therefore hunting and herding practices. Differences between species and within one species (sex, age, condition) can cause humans to exploit one animal over another to align to a specific purpose. Awareness of the effect of exploitation patterns can manipulate the availability and suitability of animals into the future. In all these ways animal-based material culture is a tangible expression of human-animal relationships.

Hurst, Heather (Skidmore College)

- [39] *Chemical Indices as a Key to Context: The Use of pXRF to Reassemble Maya Mural Fragments from San Bartolo, Guatemala*

The dissemination of wall paintings from the Late Preclassic period Maya site of San Bartolo, Guatemala, have focused on the in situ north and west walls of the buried chamber named Sub-1A. In contrast to their excellent preservation, the east and south walls of the temple were intentionally broken and buried by the Maya as part of its ritual termination in the 1st century. It took several years to recover over 3000 mural fragments during archaeological excavations of the Sub-1A chamber, and then slowly piece sections back together based on iconographic and stylistic characteristics. However, the relationship among reassembled scenes remained unclear. Compositional analysis characterizing the finishing plaster of the reassembled scenes provides an innovative technique with which to assess their spatial distribution and aid further reassembly. Building on an integrated study of wall substrates, painting techniques, and artistic practice of the in situ walls, this new analysis uses pXRF to identify specific finish plaster compositional groups of the fragments. Plaster compositional groups provide non-visual data informing spatial reconstruction of the original east and south wall narrative sequence. This paper uses chemical indices of mural manufacture to aid contextual analysis of new images from the San Bartolo paintings.

Hurst, Heather [219] see Clarke, Mary

Hurst, Stance [147] see Litwinionek, Luc

Hurst, Stance (Museum of Texas Tech University), Eileen Johnson (Museum of Texas Tech University) and Doug Cunningham (Museum of Texas Tech University)

[400] *Constructing Heritage along the Eastern Escarpment of the Southern High Plains Northwest Texas*

The removal of the Comanche from northwest Texas in the early 1870s opened the Southern High Plains eastern escarpment region to new pastores (Spanish sheepherders from New Mexico) and Anglo-Americans, who created order out of the landscape through construction of built cultural heritage. An Unmanned Aerial Vehicle (UAV) was used to document the built cultural heritage of pastores, buffalo hunters, cattle ranchers, and early homesteaders occupation of the region from ~1877-1914. Images from the UAV were used to create 3D models using photogrammetry for analysis. Results indicate that the pastores relied upon unmodified caliche boulders and cobbles in the construction of corrals. In contrast, Anglo-Americans used sandstone that was easily modified for dressed and coursed walls in constructing corrals and buildings. A variety of different rock types from local cobble deposits were incorporated as decorations into the exterior walls of a homesteader's rock house. The variation in the types of rock used in construction demonstrates changing perceptions of the surrounding landscape as Spanish and Anglo-Americans moved into northwest Texas.

Hurst, Winston (Bohunk Inc.)

[313] *Ruminations on Puebloan Ethnic Diversity and Ceramic Specialization in the Ancient Western San Juan*

Though traditionally perceived as representing two distinct Puebloan subcultures, San Juan Red Ware and Tsegí Orange Ware are best understood as representing a single ceramic tradition whose production geography shifted several times between the eighth and fourteenth centuries, independently of associated gray ware and white ware ceramic traditions. That history suggests that red ware production was restricted to a well-defined, persistent group of production specialists who occasionally moved as a group between cultural territories. The late-11th century shift in red ware production from San Juan Red Ware in the Mesa Verdean northern San Juan to Tsegí Orange Ware in an empty quarter of the Kayentan territory to the southwest, coincides with a proliferation of great houses and associated Chaco-connected features and institutions in the north and may reflect a “voting with the feet” response of red ware producers to the expanding great house system. This presentation presents the hypothesis that ancient red ware production was tied to a branch of ancestral Keres-speaking Pueblo people, citing circumstantial archaeological, linguistic and ethnohistoric evidence.

Hurst, Winston [313] see Willian, James

Hurt, John Duncan (University of Texas at Austin)

[114] *GIS-Based Approaches to the Study of Castro Architecture*

The term “Castro Culture” refers to a set of evidential trends encountered in the archaeological record of Galicia and northern Portugal from roughly 900 BCE – 200 CE. Conventional definitions of the Castro Culture rely heavily on the architectural characteristics of the castros, a type of hillfort which is thought to represent the primary form of settlement in the imagined “culture.” The essence of the Castro Culture is therefore defined in part by the idea that castro communities held certain architectural practices in common, seen for example in their preference for circular forms and extensive stonework. Yet studies of castro architecture are few and far between, and many dimensions of the evidence remain unexplored. Here I apply GIS to the visible remains of a few castro sites in northwestern Portugal, providing new insight on the organization of space within these settlements. I explore the implications of my findings for discussions of concepts such as urbanism, “Romanization,” and political power in the context of the Castro Culture. Ultimately this is an exercise in critical inquiry as well as in spatial analysis: What can we conclude from the form of these settlements, and how does it challenge conceptualizations of the Castro Culture?

Hurtubise, Jenna (University of Alabama)

[236] *Casma Occupation at Pan de Azúcar de Nepeña: Findings from the 2017 and 2018 PIAPAN Field Seasons*

In 1968 and 1973, Donald Proulx conducted surface surveys of the Nepeña Valley, registering sites spanning different time periods and cultural occupations. One of these sites, registered as PV31-29, is Pan de Azúcar de Nepeña, a Casma site consisting of a fortified hill topped by an adobe stepped platform surrounded by 13 mounds and three cemeteries. Since 2014, research by the author has focused on understanding the Casma occupation at this site based on preliminary surface surveys, photogrammetry, and excavation. Aside from the evident Casma

occupation, evidence suggests a Chimú presence based on a multiplicity of findings including commingled Chimú-Casma material culture as well as prevalent amounts of isolated elite Chimú material. Based on our findings we suggest that Casma-Chimú interactions existed at Pan de Azúcar de Nepeña, before, during, and after the time of Chimú conquest around A.D. 1350. This paper centers on findings from the 2017 and 2018 field seasons and explores Casma occupation at Pan de Azúcar de Nepeña in examining architecture, ceramics, and burial practices as well as providing preliminary interpretations for the extent and degree of Casma-Chimú interactions in the western end of the Nepeña Valley.

Hussey, R. Scott (University of Florida)

- [295] *Dungeons, Altars, and Slaves: The Subterranean Material Culture of Christian Slaves in Early Modern Morocco*

The treatment of European Christians held in servitude in Early Modern North Africa continues to be the subject of contention. Robert Davis argues that, out of the million or so Christians brought to North Africa between 1530 and 1780, most were never ransomed and died as slaves. Nabil Matar questions Davis' claims, in part, because of an absence of corroborating material evidence. Structural evidence is rare, likely destroyed by time and urban expansion. One of the few sites to remain is a subterranean dungeon for European Christians in Northern Morocco: the Mazmorras of Tetouan. In this presentation, I examine the material culture of enslaved Christians in the Mazmorras through its sacred spaces, ceramics, and its carceral function. My research considers the dungeon interior and its relation to the city above together as an object of incarceration. The mechanisms of incarceration is a consistent theme with primary source accounts, including an emphasis on the iron barrier demarcating the transition between free and unfree space. Additional themes in the historical accounts are the presence of sacred spaces and the use of ceramics. My research provides support for these historical accounts through architectural evidence and the identification of ceramics within the Mazmorras.

Huster, Angela [56] see Morehart, Christopher

Huster, Angela (Arizona State University) and Christopher Morehart (Arizona State University)

- [374] *The Burial Artifacts of Epiclassic Los Mogotes, Basin of Mexico*

The hilltop, Epiclassic period (ca. 600-900 CE) site of Los Mogotes (ZU-ET-12) sits on the boundary between the northern Basin of Mexico and the southern Mezquital valley. Hence, it is well-placed to understand local and regional transformations between the fall of Teotihuacan (ca. 650 CE) and the rise of Tula (ca. 900 CE). In this paper, we examine burial goods from several excavations by the Northern Basin of Mexico Historical Ecology Project associated with four residential structures and one monumental structure at the site. Burial goods are compared to their respective household assemblages and to data on regional patterns of offerings from burials and other ceremonial contexts. Compared to local household assemblages, burial ceramics include unique vessel forms and higher percentages of stylistically non-local types. This pattern is also reinforced in the iconography on several burial vessels as well as other offerings, which exhibit symbolic depictions of coastal environments. The ritual use of non-local items for burial offerings is common during the Epiclassic period in central Mexico, which sheds light on the complex nature of social and cultural transformation.

Huston, Ann and Kristina Whitney (National Park Service)

- [124] *Interpreting a Temporary Buffalo Soldier Camp in Chiricahua National Monument*

Interpretive park rangers share the stories of Chiricahua National Monument, but sometimes some stories can slip through the cracks. That happened at Faraway Ranch, where one of the chimneys is composed of stones hand carved by Buffalo Soldiers stationed in Bonita Canyon during the "Indian Wars" in the 1880s. While the history of the chimney has been shared on tours, it wasn't until recently that rangers began to delve into the stories of the soldiers themselves, and share these stories with visitors. Since 2017, rangers have added programs, web pages, and visitor center displays focused on the Buffalo Soldiers, their role in the complicated Indian Wars, and what the men did before and after their time in Bonita Canyon. During African American History Month, a ranger-led walk explored the archaeology site, and incorporated photographs of Buffalo Soldier artifacts found in Bonita Canyon. With the help of the park archaeologist, curators at the Western Archaeological and Conservation Center (WACC) and the Arizona Historical Society and Museum, and the Interpretive Division, the stories of Buffalo Soldiers in southern Arizona

have gained a much wider audience.

Hutcheson, Neal [373] see French, Kirk

Hutson, Scott (University of Kentucky), Daniel Vallejo Caliz (University of Kentucky) and Shannon Plank (University of Kentucky)

[100] *Partialities of Power at Uci, Yucatan, Mexico*

Beginning in 2008, the Uci/Cansahcab Regional Integration Project has investigated the causes and consequences of the construction of an 18km long causeway that connected four ancient Maya sites with monumental architecture in the Late Preclassic period. This paper presents the results of recent excavations at Ucí, the largest site along the causeway and the likely capital of a micro-polity. Our excavations suggest that Uci benefitted from its position at the top of the site hierarchy and created lasting links with its smaller neighbors, but did not exert major influence. Though Ucí thrived across millennia, its history was uneven. Social memories span disjunctions. By the time of the Spanish Conquest, the capital had shifted 3km southward to Motul, seat of the Cehpech province and current municipal center, though Ucí was never fully abandoned.

Hyde, David (Western State Colorado University) and Lauri Martin (Center for Tropical and Archaeological Studies)

[345] *Veneration and Pilgrimage at a Hinterland Shrine: Evidence from the Medicinal Trail Community, Northwestern Belize*

Data recovered from excavation of the residential Tapir Group at the Maya hinterland site of Medicinal Trail provides evidence for ancestor veneration and pilgrimage. For veneration, the Maya incorporated ancestors into their built environment through the ritual practice of physically including them in the architecture as burials within or beneath the structures. Pilgrimage is defined as a social process or an act of visiting a sacred place for practical and/or spiritual purposes. Postclassic pilgrimages are of particular interest in light of the Classic Period Collapse of the southern and central lowlands beginning around AD 900. The abandonment left the ancestors in large ceremonial site centers as well as hinterland communities. Pilgrimage theories have proposed that these journeys were perhaps multipurpose, and that they were combined with veneration. This paper will demonstrate that the eastern structure at the Tapir Group functioned as an ancestral shrine and that a pilgrimage occurred at the shrine.

Hyde, David G. (UC Berkeley)

[107] *Culture Contact and Change in the Industrial American West: Examples from the 19th Century Samuel Adams Lime Kiln Complex, Santa Cruz, California*

Archaeological investigations of historic industrial sites in the American West have long been dominated by questions surrounding power, resistance, and the emergence of class structures and ideologies. While these questions are still relevant, these sites offer the potential for a much wider range of anthropologically situated research that extends beyond this relatively narrow scope of research foci. In this paper, I position early western industrial sites as dynamic pluralistic communities. From this perspective, work at these sites offers great potential to contribute to conversations surrounding culture contact, change, and hybridity. As an example of this potential, I will present findings from archaeological investigations at the Samuel Adams Lime Kiln complex, a 19th century company town located outside Santa Cruz, California. Situated at the social and geographic nexus of dramatic technological and demographic change, findings suggest this industrial operation was the site of emergent practices that continually contested and transformed notions of labor and community, with lasting social implications. It is hoped that this conversation both complements and contributes to more traditional investigations of power, resistance, and class, highlighting the tremendous potential for historic industrial sites to serve as ideal test areas for a wide range of anthropologically situated archaeological investigations.

Hyde, David M. [30] see Dodge, Robyn

Hylkema, Mark (California State Parks)**[231] Middle Holocene Projectile Points from the Santa Cruz County Coast of Northern Monterey Bay, California**

A group of Middle Holocene aged archaeological sites along the Santa Cruz County Coast have produced a large number of chert and obsidian projectile points. Sites SCR-3, SCR-7, SCR-10 and SCR-40 have the same range of point types and materials, and are all within 10 miles radius of each other. The diversity of types and materials indicate that ancestral Native Americans of the region were highly mobile hunters who also opportunistically harvested marine mollusks, fish and sea birds while hunting on the coastal terraces. Ranging between the southern San Francisco Bay, over the Santa Cruz Mountains and onto the open Pacific Coast, these mobile hunters eventually became territorially circumscribed and with the advent of the Late Holocene the emphasis was on managing resources within a narrower territorial range.

Hylkema, Mark [231] see Lightfoot, Kent

Iannone, Gyles (Trent University)**[300] Towards an Integrated Socio-ecological History for Residential Patterning, Agricultural Practices, and Water Management at the Classical Burmese (Bama) Capital of Bagan, Myanmar (11th to 14th Centuries CE)**

The IRAW@Bagan project is striving to generate an integrated socio-ecological history for residential patterning, agricultural practices, and water management at the Classical Burmese (Bama) capital of Bagan, Myanmar (11th to 14th centuries CE) across a range of significant ecological, climatic, economic, socio-political, and religious changes. This objective is being achieved through a settlement archaeology study within the peri-urban (mixed urban-rural) settlement zone immediately surrounding Bagan's regal-ritual epicenter, which is still clearly defined by remnants of its original walls and moat. The significance of this ongoing program of survey, excavations, and geo-spatial inquiry is grounded in addressing the continuing bias toward upper echelons of Bagan society, namely high-ranking nobles and religious institutions. This program of settlement archaeology will ultimately: 1) generate a more nuanced understanding of Bagan as a dynamic capital city; 2) provide insights into the unique characteristics of early urbanism in the tropics; and, 3) contribute to considerations of resilience and vulnerability in contemporary tropical metropolises.

[199] Discussant

Iannone, Gyles [300] see Macrae, Scott

Ibarra, Bebel [55] see Washburn, Eden

Ibarra, Eugenia (Universidad de Costa Rica)**[314] "Rich" Men: Caciques in Trade and Exchange in the Polyglottal Southern Central American World (16th Century)**

This paper will explore the relationship between "rich" men and trade and exchange, particularly in polyglottal Costa Rica and Panama in the sixteenth century. It will focus on these caciques' social organizations, their representatives, their political responsibilities, their power exertions, and their rivalries and conflicts. I will also underline how their status and power was nurtured by the possession of particular material objects and non-material knowledge. In sum, this paper will explain the dynamics between "rich" caciques, social organization, and political displays within trade and exchange networks in the polyglottal, sixteenth century, southern Central America.

Ibarra, Georgina [38] see Solleiro-Rebolledo, Elizabeth

Ibarra, Thania (Proyecto Arqueológico Tepeticpac - Centro INAH Tlaxcala), Lane Fargher (Cinvestav Unidad Mérida) and Aurelio López Corral (Instituto Nacional de Antropología e Historia Tlax)

[68] *Thread Production in Ocotelulco, Tlaxcallan, Mexico*

Archaeological excavations undertaken by the Tlaxcallan Archaeological Project have recovered an important sample of spindle whorls from Late Postclassic – Early Colonial (1420 -1540 A.D.) domestic contexts in Ocotelulco, a subsection of the urban site of Tlaxcallan, Mexico. In this paper, we present the results of the analysis of identified whorl types and group proportions to better understand local thread production. These results are then compared with a sample from Tepeticpac, another subsection of Tlaxcallan. In this latter sample, we previously recorded a high proportion of whorls associated with processing fine and short fibers, such as cotton. We discuss the socioeconomic and technological implications of these results, as well as provide a wider panorama for textile production in Tlaxcallan.

Ibarra Asencios, Bebel

[396] *Ancestor Veneration or Funeral Practices? An Examination of Recuay Mortuary Variability in the Basin of Puccha (Ancash) between AD 200-900*

Mortuary studies have followed different perspectives, such as ancestor veneration mostly based on intrasite analysis. This paper examines the regional distribution of Recuay's funeral practices and its implications for ancestor worship studies. Radiocarbon dates available for the valley show an occupation between AD 200-900, and it correlates with the presence of kaolin ceramics, associated with Recuay style. Excavations in funeral and ceremonial contexts from three sites reveal the existence of different types of tombs, such us subterranean chambers, chulpas or above ground tombs, and cists. The variation of tomb architecture is very substantial but changes in civil/public architecture and ceramics are minimal. Particularly, I will present the results of excavations in Huamparán a patio group complex that had important modifications to its architecture, such as incorporation of cist tombs ca AD 500, that can be understood as the inclusion of ancestors in political life. The building and use of several types of tombs suggest the existence of diverse funerary practices, not all of which relate to ancestor veneration.

Ibarrola, Mary (University of Florida)

[414] *Purposeful Unpatterning: Investigating Maroon Site Distribution In Colonial Florida*

During the colonial era, Spanish Florida built a reputation as a refuge for self-liberated people escaping from slavery in the Carolinas and Georgia. However, following the Treaty of Paris in 1763, Florida was passed from one government to another and the Maroons' freedom was under constant threat. Florida Maroons were constantly on the move and their communities were ultimately disrupted and displaced by the U.S. government. Consequently, a low density of materials, deficiency of known sites, and lack of contemporary Maroon presence plagues Maroon archaeology in Florida, and Maroons have been largely relegated to a supporting role in Florida history. However, I argue that by turning our attention away from the sites themselves, and placing Maroon sites within a comparative framework, we will be able to identify significant spatial relationships between known Maroon sites and Euro-American and Native American sites, as well as recognize patterns in Maroon movement through the region; ultimately creating an opportunity to reinterpret the role played by self-liberated Africans and African descendant peoples in Florida's history.

Ichikawa, Akira

[330] *Double-Headed Serpent in the Southeastern Maya Frontier: Late Classic Deposit Unearthed from San Andres, El Salvador*

This paper aims to report a new ritual deposit dated to the Late Classic (A.D. 600-900), unearthed at San Andres, El Salvador. The items in the ritual deposit include vessels, *Spondylus* shells, and two pieces of jade artifacts, one of which was decorated with a double-headed serpent. In this paper, I present new data obtained from our recent excavation and tentative iconographic interpretations in comparison with the 1940s excavation data from the site. According to the excavation and iconographic interpretation, these artifacts were carefully buried in the central axis of the monumental architecture known as La Campana, and were possibly an offering dedicated to one of the construction phases of La Campana. These data will provide a better understanding about the symbolism of the regional political center in the Southeastern Maya Frontier, which remains poorly understood.

Iglesias, Christina (California State University, Los Angeles) and Michael Prout (California State University, Los Angeles)

[360] *Reinterpreting a Sacrificial Ossuary at Chichen Itza*

During the widening of the air strip at Chichen Itza in 1967, a small subterranean chamber, located some 300 m north of the Cenote of Sacrifice, was discovered. The feature, variably called a cave or a chultun, contained two small chambers, the larger of which was only 4 x 5 m. These chambers contained human skeletal material, a portion of which was removed and the collection divided between Chichen Itza and Merida. The collection was finally reunited by the creation of the Physical Anthropology Laboratory at the Centro Regional del Sureste and analyzed by Lourdes Marquez after 1980. Despite the small size of the feature, Marquez identified 109 individuals, 97 of whom were subadults. During the 2018 season, the Gran Acuifero Maya project interviewed the discoverer of the chamber in order to obtain additional details on the archaeological context of the material. Additionally, investigations of similar features allows us to clarify the context of the find.

Iizuka, Fumie (University of California, Merced), Pamela Vandiver (University of Arizona), Kazuki Morisaki (Agency for Cultural Affairs), Masami Izuho (Tokyo Metropolitan University) and Mark Aldenderfer (University of California Merced)

[416] *Ceramic, Lithic, and Settlement Variability of the Incipient Jomon Sites on Tanegashima Island, Japan*

Although conventional thinking has associated the advent of pottery with farming, sedentism, and groundstones, more recent research suggests that emergence contexts vary. Case studies on intra-regional variability are required to better understand the timing and behavioral context of the adoption of pottery. In this study, we provide the case of the first pottery on Tanegashima Island of southern Kyushu, Japan dated to ca. 14,000/13,500 Cal BP, during the Incipient Jomon period. We visually analyzed ceramics from the Incipient Jomon of the Onigano and Okunonita sites on Tanegashima to infer technological and behavioral variability. We also obtained data on chipped and ground stone technology and archaeological features for comparison. Results suggest that whereas Onigano contains non-local ceramics, Okunonita pottery does not have a signature of non-local production. The manufacturing technique is similar, a slab technique, but Onigano tends to have thicker and larger slabs. The degree of sedentism inferred from stone tools are similar although Onigano has chipped stone tools that are non-local. We suggest that the local production of pottery and stone tools occurred at both sites but Okunonita had more access to non-local products.

Iizuka, Yoshiyuki (Academia Sinica)

[141] *Nephrite Jade Mapping in Southeast Asian Prehistory: Petrological and Mineralogical Study of Stone Artifacts*

On-site and laboratory geochemical analyses have been carried out on jade and jade-like artifacts including unfinished pieces in the mainland of Southeast Asia by p-XRF and SEM-EDS respectively. In Vietnam, the results from more than 100 analyses show that the lingling-Os and double animal-headed pendants from central Vietnam are made of various colors of nephrite. So far only two lingling-Os show geochemical fingerprints of Taiwan's green nephrite. On the other hand, slit rings and a lot of worked disks are made of tremolitic white nephrite from northern Vietnam. Up to now, in Myanmar, 15 worked disks and bangles are made of actinolitic (green) nephrite from stone workshop and settlement sites in the central plain area. In Thailand, actinolitic nephrite artifacts were recognized from the Malay Peninsula area. A series of geochemical analysis indicates that there were at least two major nephrite sources that existed in prehistoric Vietnam, excluding Taiwan's green nephrite. And at least a potential nephrite source is expected from the metamorphic geological region in northern Myanmar. Some results may suggest long-distance and multiple cultural interactions were occurring in mainland Southeast Asian Prehistory.

Iizuka, Yoshiyuki [299] see Uchida, Junko

Ikawa-Smith, Fumiko (McGill University)

[74] *Changing Perspectives for the Palaeolithic Research of the Japanese Archipelago*

Apart from sporadic finds of human bones and artifacts, systematic research on the Palaeolithic began in Japan with the Iwajuku excavation in 1949. In spite of the relatively short history of 70 years, and the negative impact of the "Fujimura Scandal" of 2000, which resulted in nullification of nearly 200 "Early" and "Middle" Palaeolithic sites, the

Palaeolithic Period is represented by over 15,000 assemblages, and Palaeolithic research is thriving in Japan. It is, however, taking a new direction in recent years. The earlier emphasis on artifact typology and the search for Japanese ancestors is being replaced by an endeavor to elucidate hominid behaviour during the Quaternary Epoch through a variety of inter-disciplinary approaches. The Palaeolithic assemblages of Japan are being placed in the context of the circum-Japan–Sea interaction sphere, and in the broader global perspectives of out-of-Africa dispersal of the behaviorally modern humans.

Ikehara-Quebral, Rona (Int'l Archaeological Research Institute, Inc.), Judith McNeill (Int'l Archaeological Research Institute, Inc.), Michele Toomay Douglas (Int'l Archaeological Research Institute, Inc.) and Michael Pietruszewsky (Dept. of Anthropology, University of Hawai'i-Manoa)

[29] *Apotguan Revisited: A Bioarchaeological Analysis of Latte Period Burials from Guam*

Cultural Resources Management studies in the Mariana Islands have consistently expanded opportunities for in-depth bioarchaeological research. Burial assemblages originating from historic preservation compliance obligations generally derive from one of three contexts: displaced fragmentary remains; isolated burials; or cemeteries. For example, the ancient inhabitants of Apotguan Village, Guam, unearthed during construction of the Agaña Beach Condos in 1990, represent a relatively large cemetery-derived sample. Over 150 Latte Period individuals were recovered by International Archaeological Research Institute, Inc. Since then, research related to this site has generated technical reports, conference papers, journal articles, and book chapters, expanding understanding of the ancient Chamorros and their culture. The original bioarchaeological study, completed in 1992, analyzed the Apotguan burial assemblage as a single statistical sample. Recent archaeological research has identified burial subgroups, which motivated a re-examination of the burial assemblage. By integrating the newly designated Apotguan subgroups with the osteological record, this paper focuses on discerning familial ties and spatial variability in health and biocultural practices.

Ikehara-Quebral, Rona [29] see Rieth, Timothy

Ikeshoji-Orlati, Veronica [310] see Zori, Davide

Iles, Louise

[363] *Chair*

Ingalls, Teresa and Danny Gregory (New South Associates, Inc.)

[65] *Is Digital Always Better? Metrics for Evaluating and Understanding Digital Methods*

"Paperless archaeology" is becoming increasingly normal. Professionals in both academic and corporate spheres have turned to digital methodology as a means to organize and manage their projects and collect data. Normal field equipment now includes tablets and laptops using customized databases, apps for creating spatial data on site, digital cameras, and a host of pre-loaded digital reference materials for field use. But how do we measure the success of implementing a digital methodology? How do we know that the digital way of doing things is a better way? In this presentation, we will look at the digital methods we've implemented at New South Associates and discuss the metrics we are developing to quantify their effectiveness. While we are just beginning to track these metrics, we believe understanding and measuring our digital initiative is key to both meeting our business objectives as a CRM company and ensuring that we manage the archaeological resources to the best of our ability.

Ingalls, Victoria (The University of Texas at San Antonio)

[345] *Community Formation through Movement: Focal Nodes and Community Landscapes of the Mopan River Valley, Belize*

Movement is often implicitly assumed when exploring the ancient makeup of communities. We conceptualize movement at different scales of interaction – at the hyperlocal through households, as well as between and across communities, polities, and landscapes. Here, I will explore how movement to/from focal nodes on a landscape may

shape community identity through the creation of space/place. Public spaces are focal nodes for local community- and regional polity-making processes, embedding social hierarchies, ideologies, and social memories into the physical landscape. However, relatively little attention has been given to public spaces within rural communities. Using the ancient community of San Lorenzo, Belize, this paper focuses on movement to expand our understanding of how access to and through specific places changed over time. The dynamics of how focal nodes form within a landscape is examined by analyzing the potential for movement and interaction across the built and natural environments of the San Lorenzo community and the surrounding Mopan River Valley.

[345] *Chair*

Ingleman, David

[212] *Pre-Contact Hawaiian Animal Burials: Interspecies Interactions and Embodied Experiences*

Zooarchaeological analyses of pre-contact Hawaiian midden deposits have yielded significant information on subsistence practices and, to a lesser extent, associated foodways practices. Archaeologists have also occasionally excavated burials of non-human domesticated animals, including dog, pig, and chicken. These ritual deposits provide unparalleled opportunities to reveal osteobiographical information about animal husbandry practices and taphonomic information about cause of death and mortuary treatment. At the time of European contact, humans and non-human domesticated animals in the Hawaiian Islands led imbricated lives and shared household living spaces, as well as food resources. This multi-species ontological similarity may have contributed to the maintenance of Hawaiian epistemologies, which blur distinctions between humans and non-human animals. Thus, analyses of non-human domesticated animal burials may also potentially provide important proxy information about the lived experiences of humans. Macroscopic analyses of a sample of pre-contact non-human domesticated animal burials are presented in osteobiographical format, and contextualized with ethnohistorical information, to shed light on interspecies social interactions and embodied experiences.

Ingram, Scott [9] see Axelrod, Ella

Ingram, Scott (Colorado College) and Shelby Patrick

[188] *A Comparative Synthesis of Depopulation in the North American Southwest, 1100 to 1450*

Given the urgency of local to global sustainability problems, archaeologists must make progress toward understanding and interpreting for the public and policymakers the dramatic population declines that occurred in the North American Southwest during the 12th through 15th centuries. Southwestern-scale syntheses that seek insights beyond the particularities of our sub-regional interests and expertise are rare but have the potential to generate insights beyond the Southwestern past for the future. This presentation offers the first results of a systematic cross-case comparative study of the initial conditions of demographic decline (collapse) throughout the Southwest. Initial conditions investigated include the extent of conflict, resource depletion, demography, immigration, inequality and other variables that are often considered causal factors of depopulation. The aim of the presentation is to demonstrate the potential of Southwest-scale comparative studies, to generate hypotheses for more specific testing, and to provide one example of synthetic analyses Keith Kintigh and others have recently advocated "to advance science and benefit society."

Ingvoldstad, Megan [129] see Maeyama, Kimberly

Inomata, Takeshi [79] see Golden, Charles

Inomata, Takeshi (University of Arizona)

[309] *Overview of Archaeological Investigations in the Middle Usumacinta Region*

The Middle Usumacinta Archaeological Project started investigations in the Department of Tabasco, Mexico, in 2017. Its main objectives are to examine the relationship between the residents of the Maya lowlands and those of the Olmec region and to trace social change during the Preclassic period. The research began with the analysis of

LiDAR data obtained by the Mexican governmental institution of INEGI for the entire study area of roughly 3000 km². An area of 110 km² was selected for a higher-resolution LiDAR survey. We identified the site of Aguada Fénix, which contained a large platform and other formal ceremonial complexes of the Middle Preclassic period, which we called the Middle Formative Usumacinta pattern. In the 2017 and 2018 season, we conducted excavations at Aguada Fénix and La Carmelita. These data show that the Middle Usumacinta region participated in active inter-regional interaction during the Middle Preclassic period.

Inwood, Jamie [32] see Mercader, Julio

Inwood, Jamie [2] see Lee, Patrick

Inwood, Jamie (University of Calgary)

[278] Molecular Starch Degradation and Their Fingerprints: Insights from Modern African Taxa

Ancient starch analysis is a controversial technique, as the polymer's chemical survivability over long periods of time is not understood. Our objectives are to establish the molecular composition of starch granules from sub-Saharan taxa of ethnobotanical relevance subjected to diagenetic processes, and to determine if these byproducts have diagnostic potential. Starch was placed into solution with an amino acid and reacted under heat and pressure in order to mimic diagenesis. The end stage of this process created melanoidins, stable high molecular weight compounds resistant to degradation. Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FTCIR-MS) was utilized to analyze the molecular composition of the products of this reaction. Laboratory degradation resulted in a range of compounds. Discrete chemicals are exhibited, varying in functional groups and cyclic structure. As the reaction progressed, more breakdown products and smaller compounds formed. These are more stable than their precursors, and it is expected that they might have increased survivability in archaeological time scales. The structure of melanoidins and other breakdown products have the potential to become fingerprints to identify the presence of starch in ancient contexts.

[278] Chair

Ion, Rodica-Mariana [88] see Turcanu-Carutiu, Daniela

Iovita, Radu (New York University), David Braun (George Washington University), Matthew Douglass (University of Nebraska), Simon Holdaway (University of Auckland) and Sam Lin (University of Wollongong)

[247] Revisiting the Evolutionary Significance of Stone Tools

Because lithics preserve better than almost any other trace of human existence in the deep past, they receive the lion's share of attention from Pleistocene archaeologists. In this paper we explore the theoretical and practical limitations of using lithics as subjects of evolutionary analyses. We base our discussion on rejecting the notion that lithic aggregates as found (or defined) in the course of archaeological work can be interpreted as reflecting intentionality or even 'average behaviors'. This is because the co-occurrence of artifacts (recovered as and defined traditionally as an 'assemblage' from an excavation) is the result of fragmented multiple actions by often unrelated and chrono-spatially distinct agents (including the researcher who undertakes the analysis). We then revisit key concepts such as 'adaptation', 'cultural transmission', and 'behavioral complexity' in the absence of detectable intentionality and 'cultural norms'. For this exercise, we distinguish between two scales of analysis: the artifact as 'extended phenotype' (Dawkins 1982) and the aggregate as record of human behavior and discuss the way selection, fitness, adaptation, cultural contact and acculturation, and others apply differently at these two scales.

Irvine, Benjamin (BIAA (British Institute at Ankara))

[359] Howdy Neighbour – Transgressing Borders and Peering over the Fence to Examine the Application of Isotopic Analyses to Bioarchaeology in Anatolia

Stable isotope analyses contributing to archaeological research in Anatolia was a relatively late bloomer, beginning in the early 2000s and only gathering pace in the last 5-10 years. Currently research into dietary habits, subsistence

practices, and mobility has focused on early proto-sedentary and sedentary agricultural populations in Anatolia and in later historical periods. This has resulted in ca. 5-6000 years of prehistory being relatively untouched by such quantitative scientific techniques. Instead, research in these intervening periods has focused primarily on material culture, where artefacts are studied individually, largely detached from their surrounding environment and social, cultural, technological, and economic contexts. This is starting to change now in conjunction with the realisation of the importance of bioarchaeology as an encompassing field, providing a holistic approach to examining prehistoric populations.

This talk will discuss the importance and valuable contribution of stable isotope analyses in better understanding dietary and subsistence practices, and mobility. Furthermore, how when applied in conjunction with human osteological, archaeozoological, and archaeobotanical analyses we can begin to greater understand human interactions on an inter-population level and pan-regionally, as well as on a more local and intra-population level in these pivotal periods of societal development in Anatolia, and further afield.

Irving Pease, Evan [20] see Dimopoulos, Evangelos

Isbell, William (SUNY - Binghamton), Barbara Wolff (Montgomery College), Ismael Perez Calderon (Universidad San Cristobal de Huamanga), Gonzalo Rodriguez Carpio (Huari Urban Prehistory Project) and J. Alberto Carbajal Alegre (Huari Urban Prehistory Project)

[250] *Investigating Huari Urban Residences: An Overview of the 2017-18 Excavations*

Excavations in an ancient non-elite area of Patipampa, Huari reveal remarkable new information about vernacular environments of the early city. Architectural remains consist of a limited range of very distinctive buildings, where life was probably ground-oriented, and experience of the city emphasized dark and enclosed spaces communicated via labyrinthine routes. However, residents ate well, probably feasting frequently in elaborate social and religious rituals. Quotidian life may have been organized around mortuary rooms where local ancestors were interred, although none of these tombs have been found intact. Huari residential buildings experienced complex histories of occupation, abandonment, and re-purposing that resulted in deep stratigraphy, complex sequences of floors and multiple occupation surfaces. Water was apparently a problem in the city, and carefully constructed canals are found below numerous floors. What was probably "common space" in patios shows multiple remodelings, suggesting dynamic processes governing some kinds of space, through time. These new characterizations provide a basis for comparing Huari residential buildings at other Wari and non-Wari architecture.

Isbell, William [250] see Antonio, Luz

Iseminger, Bill (Cahokia Mounds)

[22] *Five Decades of Public Archaeology at Cahokia Mounds*

During nearly five decades of working in public archaeology at Cahokia Mounds State Historic Site, I have witnessed and experienced the importance of public awareness of archaeology and American Indian cultures and found the need to overcome stereotypes the public has about both. This has been accomplished at Cahokia through exhibits, public field schools, on- and off-site presentations, special events, lecture series, publications, social media, and events with Native American participation. I will review the philosophy and planning behind these various approaches and how they have evolved over the years.

Ismail Al-Juboury, Ali [298] see Hill, David

Issavi, Justine [388] see Twiss, Katheryn

Iversen, Rune [196] see Kroonen, Guus

Ivory, Sarah [247] see Thompson, Jessica

Ixer, Rob [233] see Ogburn, Dennis

Izaguirre Pompa, Aldo [346] see Kita, Yuko

Izuho, Masami (Tokyo Metropolitan University) and Jeffrey R. Ferguson (MURR Archaeometry Laboratory, Research Reactor Cen)

[392] *Temporal Changes in Obsidian Procurement Strategy during the Upper Paleolithic on Hokkaido*

Reconstruction of obsidian procurement strategies based on systematic obsidian sourcing analysis in the Upper Paleolithic on Hokkaido will provide an important basis for examining several key issues of human evolutionary history, including how modern humans adapted to the cold, harsh environment of the north, and how these adaptations allowed for the possible migration to the Americas. Here we discuss temporal changes in obsidian procurement patterns between the early Upper Paleolithic and the middle Upper Paleolithic on Hokkaido. We examine these temporal changes by comparing site-based reconstructions of procurement patterns from two different regions, the Ishikari lowland and the Tokachi plain, where lithic raw material environments are quite different.

Izuho, Masami [416] see Gillam, J. Christopher

Jackson, Charles P. [381] see McCrackan, Jennifer

Jackson, Gary [22] see Smith, Claire

Jackson, Kendal (University of South Florida)

[99] *Of Marsh and Mangal: Political/Historical Ecology in Tampa Bay's Coastal Wetlands*

Today, dense mangrove forests dominate the intertidal wetlands of the Tampa Bay Estuary System in west-central Florida. Following the publication of seminal ecology studies in the 1960's, sub-tropical mangrove forests became a major focus of coastal environmental protection and restoration initiatives in Florida. Recent GIS-based historical research by the U.S. Geological Survey suggests that Tampa Bay's coastal wetlands converted en masse from salt marsh to mangrove forest since the late-19th century. In this study, I explore the historical and political ecologies of this wetland conversion by ground-truthing historic survey mapping through geoarchaeological analyses of sediment cores, and by reconstructing how the americanization of the region has interacted with climate change and sea-level rise to produce an industrial seascape that is often mistaken and marketed as 'natural'.

Jackson, Sarah (University of Cincinnati)

[161] *Crafting Human/Hieroglyph Relationships in Classic Maya Contexts*

The study of Classic Maya hieroglyphic writing (ca. AD 250-900, Mexico and Central America) has yielded rich understandings of texts in recent years through increasingly nuanced ways of reading, contextualizing, and interpreting hieroglyphs. Beyond examining hieroglyphic texts as culturally contextualized documentary sources, however, they also must be understood as "made" materials, crafted and created, and subsequently related to. This sense of texts as crafted requires not only connecting to their materiality and their involvement with the objects on which they appeared, but also understanding processes of writing (and reading) as culturally-moored productive acts (that is, ways of making), with attached beliefs and practices. In visual representations on painted ceramic vessels, we see examples of hieroglyphs leaving the boundaries of "text" and crossing over to enter human territory, indicating that we need to understand hieroglyphs as materialized and real in a human world. This paper looks closely at how Maya texts were understood to inhabit human spaces and how humans (textual writers and readers)

saw themselves as related to or positioned in social relationships with writing. These discussions impact our modern methodological stance by shifting understandings of key ideas related to written evidence such as authorship, production, literacy, and textual control.

[161] *Chair*

Jackson Legare, Lora (Four Corners Research Inc.) and David Greenwald

[413] *Implications of Socio-economic Organization Based on Architectural Associations and Modified Sherds from Ricochet Village, White Sands Missile Range, New Mexico*

Archaeological investigations of the western portion of Ricochet Village (LA 76465), a late Mesilla to Dona Ana phase site at White Sands Missile Range, encountered clusters of structures and pit features and recovered a sizable assemblage of modified sherds, comprising 3.2 percent of the assemblage. Patterns within structure and storage pit spatial arrangements indicate that residents organized themselves within finite areas defined by feature layout, or household clusters. Modifications of ceramics represented specific tools and functional forms. Production methods included rough flaking, minimal-to-extensive edge grinding/smoothing, perforations (uni- and bi-directional), and incising to produce forms such as scoops/dippers, plates, "paint palettes," pottery scrapers, "spoons," awls, discs, whorls, gaming pieces and objects of unknown function. De facto refuse on house floors included several large vessel fragments that may have served as plates or trays, or were used for parching/food preparation. This paper examines socio-economic implications of the architecture and the modified sherd assemblage, making comparisons with assemblages from other regional sites.

Jacobi, Keith [325] see Simpson, Diana

Jacobs, David (Arizona State Historic Preservation Office) and Douglas Craig (Northland Research, Inc.)

[246] *Portals to the Past: Public Architecture and Storytelling Traditions in Hohokam Society*

Culture is adaptive, and defined as a group's learned, shared set of beliefs and behavior patterns that are transmitted across generations. Research at Hohokam sites indicates the presence of long-term well-established residential groups who tend to reside next to public spaces, the location of platform mounds in the Classic Period. This spatial circumstance creates the ideal situation for storytelling traditions and their ritual performances that integrate and maintain the community. The architecture, spatial design, and associated features of platform mounds demonstrates the creation of special places where ritual performances can be performed for the community.

Jacobs, Jennifer [87] see Austin, Anne

Jacobs, Jordan

[178] *Discussant*

Jacobs, Loe [95] see Van Gijn, Annelou

Jacobson, Nicole (University of Wyoming)

[207] *Mobility in the Big Horns: GIS Analysis of Upper and Lower Canyon Creek and the Implications for Prehistoric Movement*

Least cost pathway research focuses on creating a baseline model of human movement constructed on defined variables. The stark landscape of the Bighorn mountains, from a Plains or Basin perspective, can be incredibly steep and difficult to navigate, without high cost or risk. The study uses GIS to identify least cost pathways as possible routes of migration through Upper and Lower Canyon Creek, between plains and alpine ecological zones on the western flank of the Bighorn mountains in Wyoming. This research is conducted using an archaeological landscape consisting of over 100 previously identified sites ranging from Paleoindian to Protohistoric temporal periods, across

80,000 acres, and tests the least cost pathway and the veracity of this analysis to model human movement. The assessment of how prehistoric peoples exploited and settled the landscape was aided by using a comprehensive analysis of site assemblages, site locations, and GIS models.

Jadot, Elsa [349] see Testard, Juliette

Jaekel, Ulla (FU Berlin - Berlin Graduate School of Ancient Studies [LAA] and Harvard University)

[65] *The Intention of Actions—A Cross-Cultural Study on Ancient Backfilling Processes*

During the last few decades, the study of ancient entombment processes at prehistoric sites has aroused research interest: besides the architectural features, the surrounding layer structure came into focus. A fundamental distinction is made between natural layers and deliberately deposited material. In contrast to geological erosion or debris layers, the fill consisting of very uniform and presumably carefully laid out material, is assumed to be the result of intentional human action.

In this paper, this phenomenon, also known as e.g. "Temple Entombment", will be discussed based on ritual sites of the Central Andes as well as case studies from other cultural areas of prehistoric times. While on all those sites conscious entombment processes and the active preservation of architectural structures seem to be a common feature, I will be focusing on the similarities and differences in the "intentional" process of entombment of monumental structures. Specifically, the question of tracing intentionality will be addressed. How can concepts of conscious and deliberate actions be identified in archaeological contexts? Are different levels of intentional actions visible? This paper seeks to offer the formulation of some possible motives and interpretations of this practice.

Jaillet-Wentling, Angela (PENNDOT)

[61] Moderator

[292] Discussant

Jalbert, Catherine (Memorial University of Newfoundland/Moore Archeological Consulting, Inc.)

[149] "The Chilly Climate Is Not Warming as the Old Guys Leave": Identity-Based Discrimination in Archaeology, an Example from Canada

Research that considers the ways current socio-political issues affect our understanding of the past and our interactions with each other in the present are not new to the field of archaeology. However, a renewed focus on 'turning our gaze inward' has revived the dialogue regarding equity-based issues in the archaeological workplace, and importantly, is providing a significant opportunity to expand and build upon this area of inquiry in more intersectional ways. This includes examining how traditional modes of archaeological education and practice, as well as our interactions with fellow practitioners, might be operating at multiple levels to marginalize and exclude a variety of underrepresented, equity-seeking groups. With this in mind, this paper will present results from my Ph.D. research that broadly focuses on areas where participants felt they were impacted by identity-related discriminatory attitudes/practices and the ways in which these interactions affected their experiences in archaeology. Conducted through a mixed-methods research design that collected both survey and interview data, I will present results that illuminate the current status and demographic composition of archaeologists in Canada before further contextualizing these data through individual, narrative responses.

Jambrina-Enríquez, Margarita [417] see Hernández, Laura

Jambrina-Enríquez, Margarita (Archaeological Micromorphology and Biomarkers Lab, ULL, Tenerife, Spain), Antonio V. Herrera-Herrera (Archaeological Micromorphology and Biomarkers Lab), Lucia Leierer (Archaeological Micromorphology and Biomarkers Lab), Gilbert Tostevin (Department of Anthropology, University of Minnesota) and Carolina Mallol (Archaeological Micromorphology and Biomarkers Lab)

[417] Molecular and Compound-Specific Stable Isotope Analysis of FAMEs on Charred Plant Tissues: A Comparative Approach of Experimental and Archaeological Evidence

GC-C-IRMS analysis of FAMEs has been used successfully to distinguish among different animal fat groups. However, plant oils from different tissues (with the exception of seeds) have not been widely investigated even

though organic residues from leaf, root, and wood tissues are preserved at archaeological sites (e.g. sediments from combustion structures). By applying molecular and compound-specific stable isotope analysis to different anatomical parts of modern and fresh plants, to charred plant tissues in controlled laboratory heating sequences, and to sediment from experimental fires, we infer aspects related to the temperature of combustion and biomass burning. This information is compared with charred organic residues from combustion structures from two Middle Palaeolithic sites: El Salt (Spain) and Crvena Stijena (Montenegro), providing valuable information related to combustion substrates and combustion residues.

James, Steven (California State University at Fullerton)

- [319] *Zooarchaeological Research at Pueblo Grande: Preclassic and Classic Period Hohokam Hunting and Fishing Patterns*

In the late 1930s, a Works Progress Administration (WPA) crew under the direction of Albert H. Schroeder excavated Trash Mound No. 1, a Preclassic Colonial period deposit (A.D. 775-950) at the extensive Hohokam site of Pueblo Grande along the Salt River in Phoenix, Arizona. This material remained largely unanalyzed at the Pueblo Grande Museum and results of the analysis are presented here. Comparisons are then made with a large Classic period (A.D. 1150-1400) zooarchaeological assemblage (26,000 specimens) recovered elsewhere at Pueblo Grande and analyzed by the author in another study. Although there are contrasts between the two assemblages that are the result of different recovery methods, other differences appear to be related to habitat degradation and overexploitation of animals in the vicinity of Pueblo Grande. Due to these considerations, the Hohokam inhabitants made changes in their subsistence strategies with regard to animal protein acquisition during the Classic period. The WPA excavations in Trash Mound No. 1 also recovered intrusive domestic chicken bones from the very late prehistoric or early historic period. Based on modern AMS radiocarbon results, this may be one of the earliest chickens reported from the American Southwest.

James, Sydney (Coastal Carolina University), Jonathan Reeves (George Washington University), Matthew Douglass (University of Nebraska, Lincoln) and David Braun (George Washington University)

- [390] *The Influence of Raw Material Availability on Lithic Assemblage Variability in the Koobi Fora Fm. (Kenya)*

A defining feature of human tool use compared to our closest living relatives is the transport of tools. This distinction is most evident in the Early Stone Age where transport is a feature of even the earliest industries. Spatial variability in raw material proportions has often been assumed to reflect transport patterns; however, these measures must be considered with respect to other factors that influence raw material accessibility. Raw material availability is usually characterized by estimating the distance between primary raw material sources and archaeological sites. This measure is accurate for localities limited to primary sources. However, secondary sources (e.g. rivers) change their location and carrying capacity over time. Thus, more nuanced methods for characterizing availability are needed. Here we estimate landscape-scale raw material availability in the Koobi Fora Formation of Kenya. We use a systematic survey to characterize raw material abundance across relatively synchronous land surfaces. We use inverse distance weighting interpolation to estimate the availability of stone at known archaeological localities. These availability estimates were then compared to measures of reduction intensity at different localities. Measures of stone tool utilization often track raw material availability; however, there appear to be significant deviations that need further inquiry.

Jamieson, Alexandra (University of Oxford) and Greger Larson (University of Oxford)

- [20] *Adventures of the Mountain Hare: An Ancient DNA Study*

Mountain hares today can be found from Scandinavia to Eastern Russia with isolated populations in Ireland, Scotland and the Alps. While their modern distribution is well understood, the extent of their past range and interactions with humans remains unknown. The primary aim of my research is to assess the natural and human-aided distribution of mountain hares across their circumpolar region. I am employing an ancient DNA approach to assess the geographic and temporal shifts in mitochondrial haplotypes. The study initially focuses upon the westernmost edge of their range, the Western Isles of Scotland. Mountain hares are thought to be a non-native species to the islands and their place of origin is unknown. They first appeared in archaeological deposits of the Mesolithic period. I will present here initial results showing where these mountain hares may have originated and how they came to be on the fringe of Europe. This not only informs us more about the species itself. It may even give us insights into the Mesolithic people's trade routes or possibly even the origins of the people themselves. This is only a start to my investigation into the movements of mountain hares and their interactions with past people.

Janes, Stephen and Michael Cloud

- [220] *Ground Survey Evidence for a Regional East to West Chacoan Road Passing through the Southern San Juan Basin New Mexico and across the Chuska Mountains into Arizona*

Ongoing large scale archaeological ground surveys are being conducted primarily in the southern San Juan Basin of New Mexico to determine if regional Chacoan Roads connect various great house outliers there. These surveys identified a series of linear sherd scatters following an east to west trend between the Standing Rock Great House Community and the Peach Springs Great House Community. Following this discovery, a series of north to south survey transects were conducted and confirmed that linear sherd scatters define a Chacoan Road crossing the southern basin and extending into the Chuska Mountains. Additional surveys conducted in Arizona indicate that this road crosses the Chuska Mountains and extends into Arizona at least as far west as the Second Mesa in the Hopi Nation.

Janetski, Joel (Brigham Young University) and Charmaine Thompson (US Forest Service)

- [420] *Puebloan Patterns in Montezuma Canyon: Insights from the Nancy Patterson Ruin*

The Nancy Patterson Ruin is one of several large, multi-component pueblos, positioned at the mouths of side canyons draining into Montezuma Creek. Although occupations at Nancy Patterson span at least Basketmaker III through late Pueblo III, the most visible occupations are late Pueblo I and mid-Pueblo III. Unique features include a 16 m diameter, benched Pueblo I plaza in the upper ruin, a probable multi-storyed Pueblo II great house on the northwest corner of the lower ruin, and an unusual Pueblo III kiva on the southeast corner of the upper ruin. Modest excavations over four seasons focused on comparing household units from the late Pueblo I and late Pueblo III periods and found stark contrasts in architecture, treatment of space, and subsistence. The architectural patterns combined with subsistence data suggest shifts in regional interaction and dietary stress resulting in site abandonment by AD 1275 or so.

Janetski, Joel [420] see Matheny, Ray

Janik, Liliana (University of Cambridge)

- [74] *New Approaches to Jomon Dogu: Case Studies from Eastern and Western Japan*

This paper presents a study of the clays used in the manufacture of ceramic figurines, or dogu, from the Jomon period of Japanese archaeology. Analyses of clays in dogu from sites in Niigata (eastern Honshu) and Okayama (western Honshu) using a handheld XRF machine will be discussed in the context of current approaches to the circulation of commodities in Jomon Japan. The great majority of the over 20,000 known dogu are from eastern Japan, with a much smaller number known from the west. Recent and current work in western Japan, however, including the development of a Western Jomon Database at Ritsumeikan University in Kyoto, is casting new light on our understanding of the Western Japanese Jomon. Comparisons will be made to studies of Palaeolithic figurines from Siberia, where specific materials were selected to represent particular forms of figurine.

Jankauskas, Rimantas [353] see Holder, Samantha

Janssen, Marco [33] see Wren, Colin

Janulis, Clint (University of Oxford), Cory Stade (University of Southampton) and Mansoor Ahmad (Oxford Palaeotechnology Society)

- [186] *Give Me Shelter: Reverse Engineering a Paleolithic Home*

Humans today are ubiquitous shelter makers but despite this, relatively little is known about the construction of the earliest shelters built by palaeolithic humans. While there is possible evidence for earlier shelters, archaeological evidence in Europe and Asia indicate shelter construction had become habitual by the Upper and Epi-Palaeolithic,

coinciding with the extreme climate of the Last Glacial Maximum. Most of these data result in 2-Dimensional footprints of fire hearths, activity locations, post holes, and possible thatching material. This provides a rough shape and indicates what materials were used but leaves the method of construction of these shelters to be largely hypothetical in nature. Looking to understand the interwoven nature of shelter, subsistence and thermoregulation at the end of the Last Glacial Maximum, the authors set out to construct a shelter that would match the archaeology of Upper Palaeolithic sites. Setting as conditions a shelter which would require a minimal time investment, retain heat effectively, repel moisture, and be constructed using stone age tools and materials, the authors used ethnographically derived examples of shelters constructed in colder climates. The process, methodology, and implications of effective shelter building for human evolution are discussed in this presentation.

Janusek, John (Vanderbilt University)**[24] Living Landscapes of Night in Tiwanaku, Bolivia**

Most treatments of Andean urbanism and urban life emphasize the acts and rhythms of daily life. Ethnohistoric documentation of life in Cuzco, nevertheless, details a rich corpus of ritual sequences and domestic activities that ideally took place under cover of night. In Tiwanaku today, night is an ontological domain in which dangerous nonhuman beings and powerful, ancient carved monoliths may awaken. Recent research on Pre-Columbian centers in the Lake Titicaca basin has demonstrated the importance of nightly observations of the sky and the central role of celestial movements and rhythms in ordering monumental landscapes. In this paper, I draw on these rhythms but redirect attention back to the urban landscape of Tiwanaku itself. I muster evidence from spatial arrangements, routes of human flow, the placement of carved monoliths, and common objects, such as ceramic burners, in an attempt to specifically address nighttime ritual practices and domestic activities. I suggest, among other things, that night was critical for the animacy of carved monoliths that occupied some of Tiwanaku's most important monumental spaces.

Janusek, John [290] see Bowen, Corey

Janz, Lisa (Trent University)**[415] Why Choose Small Packages When There Are So Many Big Packages Around?**

The trajectory of diet change in Northeast Asia, is distinct from that in the Near East, whose archaeological record has shaped our most enduring models for changes in human diet. Traditional optimality models, as applied to the archaeological record, predict that small game will only significantly contribute to diet when the availability of large game declines. This is typically taken to mean that an increased focus on small prey is related to resource depression – either through overhunting due to increased population density or due to environmental degradation. Neither case seems to hold true for the intensified use of small game and seeds across Northeast Asia, which rather correspond to a continued abundance of large game, relatively low population density, and climatic amelioration. Here, I reconsider the idea of optimality and investigate how changes in the distribution rather than quantity of resources may increase demand for small packages when there are still plenty of big packages around.

Janzen, Anneke (Max Planck Institute for the Science of Human History), Mary Prendergast (Saint Louis University) and Katherine Grillo (University of Florida)**[82] Early Herding Practices in Tanzania Revealed through Strontium Isotope Analysis**

East African pastoralists today rely on extensive social networks through which livestock are exchanged to maintain herds. The role of such animal exchange networks among ancient pastoralist communities can be revealed through stable isotope analysis. Pastoral Neolithic sites are broadly distributed across southern Kenya and northern Tanzania. Luxmanda is the largest and southernmost known Pastoral Neolithic site, and its early date signals a rapid expansion of PN herding groups across the region. Here we present the first strontium isotope data from livestock teeth from Tanzania, which clarify how the earliest herders in Tanzania used the landscape, as well as their participation in livestock exchange networks with herders elsewhere. Strontium isotope ratios from sequentially sampled livestock teeth are generally high and extremely variable, reflecting the region's diverse geology. However, one cattle specimen exhibits highly distinct $^{87}\text{Sr}/^{86}\text{Sr}$ ratios compared to other livestock at the site, suggesting this non-local individual arrived through exchange. The individual closely matches those from some Kenyan PN sites which were herded on much younger geologies, and it may be possible that cattle were a medium of exchange used to maintain connections with herders elsewhere. However, we caution that additional research is needed, especially in northern

Tanzania.

Jarboe, Chandler, Emily Schach (Arizona State University), Jane Buikstra (Arizona State University) and Donna Nash (University of North Carolina at Greensboro)

[290] Differential Diagnosis of Tuberculosis in a LIP and Late Horizon Skeletal Sample of Southern Peru

The Moquegua Valley of southern Peru is known for multiple studies regarding the presence, origin, and evolution of tuberculosis in the pre-contact Americas. These studies have primarily focused on tuberculosis in Middle Horizon and Late Intermediate Period contexts and the continued presence and evolution of the disease during the end of the Late Intermediate Period and Late Horizon has yet to be examined. Initial differential diagnoses of vertebral lesions identified during analysis of a skeletal collection excavated as a rescue project during the construction of a new bus station in Moquegua, Peru is presented here. Tombs at this site contain decorated ceramic styles consistent with the later part of the Late Intermediate Period and the Inka defined Late Horizon. A skeletal sample containing 250 individuals was analysed during 2018, with ten individuals exhibiting vertebral lesions possibly consistent with tuberculosis. Here we present differential diagnoses of these individuals, four of whom possess lesions most resembling tuberculosis. Since this sample from the Terminal Terrestre dates largely to the latter half of the LIP and Late Horizon, the presence of TB in this sample shows that this disease continued to be present in the Moquegua valley during these time periods.

Jarrett, Jordan (United State Forest Service) and Erin Hegberg (University of New Mexico)

[189] Analysis and Interpretation of the Bandelier Landfill Site: Determining the Information Potential of a Multicomponent Historic Trash Site

The Bandelier National Monument landfill site represents a historic period artifact scatter containing many diagnostic artifacts. In the 1930s, workmen belonging to the Civilian Conservation Corps (CCC) camped at this site while tuff stone was quarried from mesa top outcrops for use in the construction Frijoles Canyon Historic District. Evidence of this includes spoils piles of tuff refuse as well as charcoal from campfires, but no diagnostic artifacts from this era have been documented at the site. Surface artifacts seem largely to belong to the 1940s-1960s time frame, during which Mrs. Evelyn Frey operated the Frijoles Canyon Lodge, feeding and housing overnight visitors to Bandelier National Monument. Refuse from the lodge includes dishware that she designed and special ordered herself as well as glass receptacles for foods she cooked and served. Although the parcel of land within which the landfill is located belonged to the Atomic Energy Commission between 1942 and 1961, no artifacts which are evidence of the Department of Energy activity at this location have been observed. The present study aims to determine the information potential of this site and to contribute to what is known about the park and its visitors during the historic period.

Jaskowski, Clay [320] see Golitko, Mark

Jatmiko, [247] see Veatch, Elizabeth

Jazwa, Christopher (University of Nevada, Reno), Kyle Jazwa (Duke University) and Stephen Collins-Elliott (University of Tennessee, Knoxville)

[35] Applications of the IFD and IDD to Complex Societies

The Ideal Free and Ideal Despotic Distribution (IFD/IDD) models have become increasingly popular in the archaeological and anthropological literature because of their flexibility to be applied at a variety of geographic scales. With some exceptions, however, most of the applications of the models have been to hunter-gatherer or horticultural populations, with less attention given to more complex urban and agricultural populations. This paper demonstrates the breadth of IFD/IDD by expanding their applications. We provide examples of settlement in Bronze Age (ca. 3100-1050 BCE) Greece over rising complex palatial society and northwest Morocco before and after its annexation by the Roman Empire (ca. 200 BCE – 500 CE). In these regions, settlement patterns are consistent with the predictions of the IFD/IDD. We also discuss changes in settlement consistent with a transition from the IFD to an IDD among these populations and complex hunter-gatherer-fishers in California. This study demonstrates the flexibility of the IFD/IDD models not only at different geographic scales, but for different population sizes and

degrees of social stratification. These applications are promising for future avenues of ecological research and the use of Human Behavioral Ecology models, especially in the case of complex societies like those around the Mediterranean basin.

[240] *Chair*

Jazwa, Christopher [70] see Sunell, Scott

Jazwa, Kyle [35] see Jazwa, Christopher

Jefferies, Richard [145] see Moore, Christopher

Jeffries, Peter [305] see De Koning, Sarah

Jenkins, Dennis [47] see Lubinski, Patrick

Jenkins, Dennis (Museum of Nat. & Cult. Hist., University of Oregon)

[249] *Dating the Western Stemmed Tradition in the Northern Great Basin*

Recent University of Oregon investigations at the Paisley and Connley Caves have resulted in 300+ radiocarbon ages including coprolites with human DNA. Earliest human occupations have been established at the Paisley Caves by stone tool cut marks on bone dated to $12,380 \pm 70$ 14C yr B.P. Western Stemmed Tradition (WST) points are present in deposits dated between $12,760 \pm 35$ 14C yr B.P. and $10,200 \pm 35$ 14C yr B.P. Obsidian hydration dating of WST points supports the radiometric assessment that they are likely 14,000 years old at the site. New radiocarbon dates associated with WST points at the Connley Caves range from $11,104 \pm 45$ 14C yr B.P. to 9171 ± 40 14C yr B.P. WST points are the only types found in the oldest deposits at both the Paisley and Connley Caves.

Jenks, Kelly [122] see Ferrales, Esmeralda

Jenks, Kelly (New Mexico State University), Shannon Cowell (New Mexico State University) and Hannah Dutton (New Mexico State University)

[208] *Tracking Broken Pots across Paraje San Diego, New Mexico*

Paraje San Diego is a historic campsite situated on El Camino Real de Tierra Adentro National Historic Trail in Doña Ana County, New Mexico. Documents from the Spanish colonial, Mexican, and American periods indicate that travelers regularly stopped at this site to collect water and rest before continuing their journey. Archaeological survey, evaluative testing, and surface collection projects conducted at this site in 1991, 1994, and 2017 produced collections of ceramic artifacts discarded by early travelers. This poster combines ceramic and spatial data from all three projects in order to identify and interpret patterns of ceramic use and discard at this site.

Jennings, Justin (Royal Ontario Museum)

[356] *Understanding Quilcapampa*

As the papers in this session have demonstrated, the site of Quilcapampa La Antigua in a previously isolated region of southern Peru is notable for its long-distance connections, strong Wari influence, and brief occupation during the tenth century AD. In this closing paper on our excavations, I want to summarize some of the project's key findings and attempt to answer a deceptively simple question: what was "Wari" in this particular context? Outside of Moquegua, Quilcapampa boasts the strongest evidence for being founded by Wari-affiliated settlers. What, though, was the relationship of these settlers to the Wari state? To the greater Nazca region that they likely came from? To

the local population in the Sihuas Valley who likely help build the site? Although definitive answers to these and other questions cannot yet be given, we suggest that the Quilcapampa data point to more dynamic, often fraught, relationships linking settlers, distant homelands, and contacted people--all attempting to navigate life amidst the tumult of a new cultural horizon.

[23] *Discussant*

[356] *Chair*

Jennings, Thomas [325] see Smallwood, Ashley

Jensen, Anne (University of Alaska Fairbanks/Bryn Mawr College)

[251] *We Can't Save Them All: Thoughts on Prioritization*

Archaeological sites are important sources of data on past human behavior and as valuable resources for paleoenvironmental reconstruction. They can also inform attempts to adapt to environmental change in a sustainable way. Equally importantly, they are part of the tangible cultural heritage of descendant communities, and of humanity writ large. Just as new methods increase our ability to access information from these sites, accelerating environmental change poses a dire threat. The scale and urgency of the threat requires new models for funding, education and recruitment of staff, engagement with the public and long-term curation of rescued samples. One critical issue is how to prioritize salvage of sites, since we cannot save them all, or even come close. A variety of approaches will be highlighted, in hopes of fueling subsequent discussion.

[31] *Discussant*

[251] *Chair*

Jerbic, Katarina (Flinders University, Adelaide, SA, Australia)

[240] *Connecting Survey and Fieldwork: Archaeology of the Core*

Based on a PhD research case study in the Croatian Adriatic, the paper demonstrates a step further into investigating coastal and submerged archaeology. Seabed mapping methods adopted from marine geology, such as side-scan and multi-beam sonar surveys and shallow water sub-bottom profiling are now considered the standard in maritime investigations. Whether on the basis of economics, politics, culture, or other reasonable grounds and unfortunately for continental shelf archaeology, this is often the moment when most fieldwork research stops. In the rare cases when the research is continued further, it involves diving and excavation. These investigations represent a stressful risk for both the archaeologists and the investors, not only because it involves diving and underwater excavations, but also because of the high likelihood of a negative archaeological result, regardless of the promising preliminary surveys. The paper proposes a research-based and tested interdisciplinary method: a combination of geological, environmental and archaeological fieldwork and laboratory techniques, under the colloquial term "Archaeology of the Core." Seabed coring provides an insight into the submerged environment, and of the cultural layers of a mapped site. Therefore, the risk of "empty" trenches is minimized, and the sediment contents represent a wholesome connection between archaeological survey and fieldwork.

Jeremiah, Kristen (Public Archaeology Laboratory, Inc. [PAL])

[169] *Written in Stone: Lithic Analysis at the Acushnet LNG Site*

The Acushnet LNG Site is a multicomponent Native American campsite located on the Brayton Point peninsula in southeastern Massachusetts. Brayton Point extends into Mount Hope Bay and is at the confluence of the Lee and Taunton rivers, an area with numerous documented Native American sites. The Public Archaeology Laboratory, Inc. (PAL) identified the Acushnet LNG site and determined it to be a minimum of 71,000 square meters in size. Diagnostic artifacts and the results of radiocarbon dating indicate that the site was occupied from the Early Archaic through Middle Woodland Periods. The recovered artifact assemblage consists of lithic tools and debitage, fauna and flora remains, fire-cracked rock, and raw materials manuports. Recovered chipped stone tools were predominately bifaces with lesser amounts of projectile points, utilized flakes, scrapers, an adz, drill, knife, and preform. In addition, nearly 7,000 pieces of lithic debitage and non-chipped stone tools, including a plummet, abrader, nutting stones, a grinding stone, and groundstone fragments, were recovered during the investigations. The

Acushnet LNG site is a significant Native American campsite during the pre-contact period, and a valuable resource with the potential to provide new information about Native American settlement patterns along the Mount Hope Bay.

Jerrems, William and Richard Rosencrance (University of Nevada, Reno)**[274] *Paleoindian Osseous Barbed Weaponry in the Intermountain West: Distribution, Chronology, and Function***

Some have suggested that osseous projectile weaponry preceded that of stone—that bone, antler and even ivory barbed points and sagaie (osseous rods) might have been the hunting and fishing weapons of choice for the earliest peoples. Early technology using meticulously fashioned barbed osseous materials for weaponry takes us back to Katanda, Zaire 95 kya, is prevalent in the Upper Paleolithic of Europe and the terminal Pleistocene/early Holocene in North America, and was used into the Holocene on several continents. Unfortunately, however, there are only rare occasions that this organic material survives in the archaeological record. In this presentation we examine the distribution of these osseous weapons in the Intermountain region of North America, focusing on the northern and western Great Basin where the majority of osseous barbed points and rods have been recovered. The few radiocarbon dates associated with barbed technology in the region suggest primary use during the Younger Dryas, while distribution suggests use as hafted fishing/hunting projectiles. In sum, we believe that this industry is quite old in the New World and played an important part in hunting and fishing at the end of the Pleistocene and possibly earlier.

Jervis, Ben [351] see Sykes, Naomi

Jeu, Michael (Eastern New Mexico University) and Heather Smith (Eastern New Mexico University)**[117] *A Spatial Analysis of a Knapper's Replication of Debitage Debris from Hunter-Gatherer Camp and Hunting Sites***

As hunter-gatherer groups manufacture and rejuvenate stone tools at hunting and residential sites, they left behind traces of these behaviors in the form of spatial patterns of discarded lithic debris. GIS modelling of the spatial organization of debitage provides a useful tool for comparing lithic reduction episodes from various hunter-gatherer site types. This poster presents an experimental analysis testing models of lithic-discard behaviors that occurred at hunting versus habitation sites. Stone cores were reduced at "sites" recreated to mock prehistoric arrangements of site furniture and settings. Morphology and provenience data was recorded for the lithic debris and spatially modeled using ArcGIS. Results were compared to previous models of artifact spatial distribution and reports documenting lithic spatial data recorded at a variety of sites to test the utility of these experimental models for interpreting site-specific past human lithic reduction behaviors.

Jewett, Roberta [231] see Grone, Michael

Ji, Youngbae (Harvard Yenching Institute)**[361] *The Study of Early Neolithic Tombs in Korea***

Analysis was conducted on 88 tombs on the southern coast of the Korean. Human remains in these tombs have traces of malnutrition and repetitive work. The burials have a small numbers of burial goods but show differences in the number of grave artifacts. I grouped the number of burial artifacts and tomb construction behavior into groups and examined their correlation. Based on this, tombs were grouped in order by giving scores based on the number of burial artifacts, the degree of burial behavior, the variety of burial goods. These groups examined the layout of tombs, age, sex, aspects of infant graves, and position of behave and position of birth. Burial goods were concentrated in tombs of adults in their 20s and 30s. Burial goods in infant graves were more than those in burials of old age individuals. Concerning gender, there was a clear tendency for men to be buried with higher numbers of different tools. I also explore the burial treatment of infants and burial ornaments, which have different characteristics depending on material type, damage status and burial methods. I argue that Neolithic society of the Korean is not simply egalitarian but complex society with an early phase of inequality.

Jia, Xiaobing [361] see Lyu, Peng

Jiang, Zhilong

- [130] *Recent Research on the Settlement Sites of the Dian Culture of Yunnan: Excavations at Xueshan and Shangxihe Sites*

The Dian culture of Yunnan is known for production and use of bronze artifacts exhibiting remarkable artistic and technical features. However, for most of the 20th century our understanding of Dian culture was based mainly on materials from burials around Lake Dian. Meanwhile, little was known about the settlement areas relevant to these mortuary materials. The lack of Bronze Age settlement data in the Dian basin and in other areas in Yunnan have impeded progress of archeological research on this culture until recent decades. At the end of the 20th century, the Institute of Cultural Relics and Archaeology of Yunnan province began to investigate issues on the habitation sites of the culture; research projects have been established on topics regarding the origin of the culture. Following the discovery of settlement sites at Citongguan (Yuxi district) in 1990 and Tianzimiao (Xishan district, Kunming city) in 2005, recent excavation of the Xueshan site (Chengjiang county) and Shangxihe site (Jinning county) have now added a new chapter to Dian culture settlement studies. This work will present the results of recent research on these two new sites.

Jijon, Juan and Marcos Labrada

- [350] *Arqueología y Comunidad en la provincia de Manabí, dos casos de estudio*

Tabuga, pequeña comunidad agrícola del norte de Manabí corresponde a un importante sitio arqueológico de la cultura Jama-Coaque (500 ac - 1650 dc). Ante años de expolio por huacueros, del bloqueo del acceso al mar por el narcotráfico y de la falta de interés por las autoridades locales, la comunidad de Tabuga ha decidido enfrentar estos obstáculos con la recuperación de su memoria ancestral. La activación turística basada en el atractivo arqueológico del sitio se muestra como una salida viable para su desarrollo sostenible. Liguiqui, comunidad ancestral de pescadores y campesinos, situada en el litoral central de la provincia de Manabí, próximo a la ciudad portuaria de Manta, enfrenta actualmente un abandono demográfico alarmante. El poblado actual se sitúa sobre un antiguo y complejo sitio arqueológico relativamente principalmente a la cultura Manteña (700-1532 dc.) La comunidad de Liguiqui, ante los desafíos que presentan la modernización y el éxodo rural, se ha movilizado para recuperar su memoria ancestral y ser participes de un turismo arqueología y comunitario como vía durable para el desarrollo.

Jin, Yingxi [361] see Lyu, Peng

Jing, Yaqin [389] see Chen, Liang

Johal, Mannat (University of Chicago)

- [399] *Timely Attributes: Rethinking Medieval Ceramics from South India*

This paper offers a preliminary attribute analysis of archaeological ceramics excavated at Maski (northern Karnataka) to enable an understanding of the routine and embodied practices that were productive of temporal scale in medieval (ca. AD 500-1600) south India. Ceramics have often fallen through the cracks of a disciplinary division of labour between archaeologists and historians of the long medieval period in the region. Ubiquitous elements of the archaeological record, ceramics labelled 'medieval' are known for their plainness and mark a perceived continuity through time. These sherds have long functioned as indexical of a poorly understood chronological period, a heuristic device that obscures the temporalities that potentially coalesce in acts of making and using ceramics. At an empirical level, the findings presented here build from an analysis of the first excavated assemblage of medieval ceramics in south India. In calling attention to relations between ceramics and time beyond the diagnostic act of identification, this paper engages with a growing attention to questions of memory and historical consciousness in scholarship on precolonial India. It seeks to demonstrate how a critical analysis of archaeological materials productively problematizes narratives about periodization, temporality and historicity.

Johansson, Lindsay [84] see Richards, Katie

Johansson, Lindsay (University of Colorado Boulder)

- [311] *Horses and Hares: What Analysis of Museum Collections Can Tell Us About Life in the Protohistoric American Southwest*

Like many museum collections, the fauna recovered from LA38 was not systematically collected, yet it can still provide interesting and important information regarding life, diet, and practices of the individuals who occupied the area in the past. This paper focuses on both the expected and unexpected results of faunal analysis of the material recovered during previous excavations at LA38.

Johnsen, Racheal [32] see Smith, Eugene

Johnson, Adam (Southern Methodist University), Mark McCoy (Southern Methodist University), Jesse Casana (Dartmouth), Austin Hill (Dartmouth) and Thegn Ladefoged (University of Auckland)

- [408] *Expanding Our Remote Sensing Toolkit: The First Application of UAV Aerial Thermography in the Hawaiian Islands*

Geospatial technology has allowed for significant advances in archaeological practice in Hawaii and Oceania as the equipment, software, and datasets have become more affordable and widely available. Remotely sensed data, notably aerial LiDAR and terrestrial laser scanning, are used in research and applied archaeology for site prospection and mapping throughout the region. Recent research has focused on developing methods for the automated identification and extraction of archaeological objects from LiDAR data. Remote sensing techniques not yet widely used in Oceania include visible light photogrammetry and aerial thermography from unmanned aerial vehicle (UAV) platforms. The potential of these is discussed using the results of a visible light photogrammetry and aerial thermography survey of portions of Lapakahi State Historical Park on the island of Hawaii. In particular, we explore machine learned identification and extraction of features from these datasets.

Johnson, Amber (Truman State University), Tanigha McNeillis (Truman State University) and Anthony Scimeca (Truman State University)

- [26] *Differentiating Ecological Contexts of Plant Cultivation and Animal Herding: Implications for Culture Process*

Over the last few decades archaeologists around the globe have documented a much more variable pattern of prehistoric foraging and food production than was previously imagined. We have also made great progress understanding the macroecology related to variation in hunting-gathering subsistence and social organization. Data recorded from archaeological literature on locations with evidence for the earliest emergence of plant cultivation, plant or animal domestication, or animal herding are used to identify ecological parameters of settings of earliest food production. These data are then used to test logical propositions deduced from patterns in data on ethnographically recorded hunter-gatherers. This allows us to make some broad generalizations about conditions under which foragers become food producers, anticipate locations which are more likely to have food production focused on plants versus animals, and raise questions for future research.

Johnson, Beverly [123] see Chalfin-Smith, Eliot

Johnson, Eileen [147] see Litwinionek, Luc

Johnson, Eileen (Museum of Texas Tech University)

- [368] *Prey and Predators on the Late Pleistocene Llano Estacado*

Humans are among the major predators on the Llano Estacado (Southern High Plains, USA) during the late Pleistocene in competition with a diverse carnivore guild that included the now-extinct giant short-faced bear, saber-tooth cat, American lion, and dire wolf. Direct evidence on bone in the form of cut marks and bone fracture patterns are used in identifying human prey animals and the procurement strategies. Among the now-extinct large game

animals utilized by people are the typical four – Columbian mammoth, western camel, horses, and ancient bison and the atypical short-faced bear. Bone data indicate fresh carcass processing (probably hunting) and stiffened carcass processing (found carcass; scavenging). The large carnivores are focused on specific taxa within the large herbivore guild that enabled them to minimize competition among themselves. The typical four animals for humans also are prey for the large carnivores, bringing humans into direct competition that most likely affected the procurement strategy employed at any one time, but also may have encouraged a diverse rather than a focused diet breadth. Along with technological advantages (stone weapons, fire), food security and personal/group safety had to be contributing factors in addressing competition with the large carnivores and minimizing danger.

Johnson, Eric (Harvard University)

- [204] *Consumer Agency beyond Identity: Indigenous Demand and Euro-American Wampum Production between New Jersey and the Plains*

The popular “object-biography” approach to commodities generally focuses on hegemonic material culture in the hands of unintended consumers, such as the analysis of “European” goods found in “Native” contexts. What this fails to capture, however, is a kind of consumer agency that extends beyond the politics of identity. In other words, what are the structural effects of colonial consumption on trajectories of capitalist production? This study compares assemblages from two Euro-American shell bead production sites in northern New Jersey: Stoltz Farm (1750-1830), a small-scale, Dutch household, and the Campbell Wampum Factory (1850-1900), famous for its mass production facilitated by “wampum drilling machines.” Shell bead styles produced at these sites—including wampum, hair pipes, and gorgets—were traded with indigenous consumers from the Great Lakes to the northern and southern Plains. Both sites were excavated in the early 20th century, but have not yet been analyzed archaeologically. This project reconstructs sequences of production, estimates efficiencies, tracks the number and quality of bead styles, and measures degrees of standardization between sites. Preliminary conclusions suggest that the demands of distant indigenous actors structured the local trajectory of capitalism in northern New Jersey in ways that complicate the traditional hallmarks of an “industrial heartland.”

Johnson, Erlend (Tulane)

- [256] *Ixtepeque Obsidian and the Polity: a Network and Boundary Approach in Southeastern Mesoamerica*

Edward Schortman and Patricia Urban (2012) borrow theoretical approaches from Bruno Latour (1996), Giddens (1984), and Bourdieu (1977) to highlight networks of shared inter-elite interaction in southeastern Mesoamerica that interpenetrate ethnic and political boundaries. The following paper builds upon Schortman and Urban’s work by considering the role of boundaries in addition to networks (Campbell et al. 2009) for reconstructing interaction networks in Southeastern Mesoamerica. Specifically, the paper examines the results of pXRF sourcing studies of obsidian in the Cucuyagua and Sensenti valleys of southeastern Honduras consider what role, if any, the polity of Copan played in distributing Ixtepeque obsidian. Previous obsidian sourcing studies have claimed that the Copan polity directly controlled Ixtepeque distribution and limited its spread to regions under its suzerainty (Aoyama 1999). A critical analysis of past work combined with sourcing studies from the Cucuyagua and Sensenti valleys cast doubt on the idea that the Copan polity directly controlled the Ixtepeque source and failed to find significant drop-offs in Ixtepeque obsidian when crossing the Copan polity’s boundaries. Rather, Ixtepeque obsidian may have been transported along networks of individuals that existed parallel to and cross-cut political identities and boundaries.

Johnson, James (University of Wyoming)

- [196] *Assessing Connections between the Spoked Wheel and Bronze Age Elite Social Identities*

The wheel may be the greatest, and most enduring, technological innovation in human history. Certainly, the wheel transformed the potential and efficacy of transportation technologies, trade and exchange systems, not to mention human mobility. The innovation of the wheel produced previously unknown socio-economic possibilities, including traveling more and farther, increased speed and cargo load weight, as well as additional opportunities for culture contact and cultural transmission. What is dramatically under-studied are the long-term representational, or symbolic, connections between innovations in wheeled technologies and those in social structure and organization. This paper assesses the improved technological performance with the introduction of the spoked wheel and its association with changes to elite social identities and their place in regional cosmological orders. I seek to improve current qualitative and quantitative knowledge of how, when, and where spoked-wheel technology and its representations were integrated into various regional complex elite social systems. To do this, I assess changes to the materiality of the chariot and spoked wheel as these technologies moved from the southern Urals regions of the

Eurasian steppe, c. 2100-1100 BC, to other regions such as the Mediterranean and the Near East.

[196] *Chair*

Johnson, John (Santa Barbara Museum of Natural History)

[358] *"Shadow of the Whale:" West Coast Rituals Associated with Luring Whales*

Native peoples along the Pacific Coast of North America exploited stranded whales that washed ashore, providing abundant meat and oil for consumption. Many rock art sites along the coast between Alaska and Acapulco contain images of whales and other cetaceans, and portable effigies also depict these marine mammals. According to ethnographic information from the Chumash and Northwest Coast tribes, the whale effigies were used by shamans in rituals designed to summon the whales to beach themselves in one's territory. At least some whale depictions in rock art may have been created in similar rituals.

Johnson, Keith

[222] *Sandals and the Basketmaker Occupation at Antelope Cave, Northwestern Arizona*

Antelope Cave is a large limestone cavern sunk beneath the undulation hills of the Uinkaret Plateau in Northwestern Arizona. Native Americans lived in the cave intermittently for 4000 years during the Archaic and Puebloan periods. This paper focuses on the Basketmaker materials, particularly the sandals, recovered by UCLA archaeologists at Antelope Cave in the 1950s. The sandals will be described followed by a discussion of several related issues. These include radiocarbon dating, age demographics, storage facilities (or lack thereof), and the BMII-BMIII transition.

[222] *Chair*

Johnson, Kyra (University of Minnesota-Twin Cities), Emily Sponsel (University of Minnesota-Twin Cities) and Gilliane Monnier (University of Minnesota-Twin Cities)

[115] *A Comparison of the Surface Variation of Burned and Weathered Bone*

Burned and weathered bones play an important role in understanding the taphonomy and possible behavior of an archaeological site. The processes can sometimes be difficult to distinguish from one another due to the similarities in the overall degradation of the bone. This study attempts to further develop methods of quantifying surface texture variation in burned and weathered bones to understand how the processes compare to each other by using the average roughness parameter Ra. To do so, seven cow ribs were burned at 100°C increments from 100°C to 700°C for three hours and compared to 10 weathered bones selected from the University of Minnesota collections. Images of the bone surfaces were taken at 80x magnification using the Leica stereomicroscope at three points along the surface and 2.5mm long profiles were extracted from the images using the Mountains software. The resulting data were analyzed using univariate statistics such as ANOVA in order to assess differences in surface roughness across the specimens. These analyses reveal patterns of outer cortical surface degradation and overall depth averages. If expanded upon, this pilot study has the potential to be a useful supplementary tool in the identification of which process an archaeological skeletal element has undergone.

Johnson, Matthew

[180] *Temporal Continuity in the Petrified Forest Expansion Lands*

Petrified Forest National Park contains one of the most diverse assemblages of prehistoric pottery on the Southern Colorado Plateau. For decades archaeologists have relied on characteristics of ceramics in order to assist in dating many sites throughout the southwest where the availability of absolute dates for prehistoric sites is rare. Using data from the 2013-2015 Expansion Lands Survey this paper provides an overview of the kinds of wares and types of ceramics present at sites identified within the expansion lands. Using the temporal designations for each site, the ceramic assemblage from several sites is then compared in order to investigate the validity of ceramic cross-dating within Petrified Forest.

Johnson, Matthew (Northwestern University)**[310] Bodiam Castle: Lived Experience and Political Ecology**

This paper discussed the results of buildings and landscape survey at Bodiam Castle, SE England, 2010-2015. Bodiam is a much discussed site, a classic case study in the 'defense versus status' debate in castle studies. Our project moved beyond this false and misleading binary framing of a tired 'controversy' to engage with more meaningful anthropological issues. It focused on understanding the lived experience and political ecology of Bodiam. We sought to place Bodiam in its landscape context, and understand its importance as a place over the very long term, from prehistory to the present. We worked at a series of scales, for example: building survey and digital reconstruction of the appearance, details and furnishings of the interior; tracing the landscape of work and daily routines that surrounded the castle through topographical and geophysical survey; to identifying flows of goods, animals and humans around the regional and maritime context of SE England and beyond. The theoretical framing of the project thus linked the immediacy of lived experience on the one hand to the long-term political ecology of the site in its landscape context on the other.

Johnson, Melyssa (Petrified Forest National Park)**[180] Dots on the Landscape: Analysis of Site Distribution at Petrified Forest National Park**

Situated in a variety of environmental settings, over 1300 archaeological sites dot the Petrified Forest National Park Landscape. Though the position of many of the sites within the park appears to be almost random, human behavior dictates that there must be an advantageous reason for the placement of a particular site in one location or another. Using tools in ArcGIS, this paper analyzes the distribution of sites throughout Petrified Forest in order to determine if any patterns emerge. In particular, it will investigate how sites relate to one another, and how they relate to the landscape.

Johnson, Nadia (Penn State)**[373] Erosion and Agricultural Resilience in the Formative Teotihuacan Valley**

During the Formative Period, the Teotihuacan Valley's population was dispersed in small farming settlements in the piedmont slopes surrounding the valley bottom. The end of this period witnessed a dramatic population shift, with the Valley's inhabitants clustering near perennial streams on the valley floor, along with thousands of new migrants. Erosion is suspected to have been a major pressure leading to the piedmont's Classic Period abandonment, but little is known about the agricultural strategies employed by Formative farmers or their erosive potential. This study uses the EPIC model, a modern agronomic model developed by Texas A&M's AgriLife Institute to simulate a variety of likely Formative Period cultivation strategies and model their ecological effects in terms of erosion and soil depletion. The intent is to determine the true erosive potential of Formative agriculture and to better understand the ecological constraints placed on early Central Mexican farmers.

Johnson, Phyllis (Vanderbilt University)**[392] Potential Applications for Agent-Based Models in Obsidian Studies**

Archaeologists have been using agent-based modelling (ABM) to re-create prehistoric social, economic, and political processes, along with prehistoric environments since the first publication of the model commonly known as "Artificial Anasazi." Very few archaeologists have attempted to model prehistoric lithic technology, however, and the handful of existing models have examined only raw material procurement and the formation of lithic assemblages. While not every aspect of lithic technology may be appropriate to model, the present paper describes the potential for ABM to further our understanding of many aspects of obsidian technology and the post-depositional movement of stone tools and debitage.

[392] Chair

Johnson, Precious (Bates College) and April Hill (Bates College)**[123] Cultural Identity, Subsistence, and the Potential for Epigenetic Research in Togiak, Alaska**

The contemporary village of Togiak, and the old village site, Temiyq Tuyuryaq (Old Togiak), together represent a multigenerational Yup'ik village in northern Bristol Bay, Alaska (K. Barnett 2018). Cultural identity has been, and continues to be, heavily influenced by subsistence. Throughout the past 1300 years the region has experienced ecological variation and the encroachment of colonial marketplace, along with other colonial impacts, that have impacted subsistence and dietary practice. The emerging field of epigenetics is providing new avenues for exploring the effects of generational effects of colonialism, environmental factors, and their resulting modification to DNA. Temiyq Tuyuryaq provides a unique opportunity to explore these question in an archaeological context. The outcomes of this research seeks to identify relevant intersects between Indigenous archaeology and epigenetics that can make considerable contributions to current village concerns and long term community goals that address issues of health and well-being, education, and subsistence practices.

Johnson, Rachel (Tulane University) and Jason Nesbitt (Tulane University)**[288] An Analysis of Ceramic Compositions from Canchas Uckro, Ancash, Peru: Implications for Trade in the Formative Andes**

Canchas Uckro (ca. 1100-850 BC) is a large monumental platform situated above the Puccha River approximately 25 km north of Chavín de Huántar. Recent excavations have revealed monumental features that suggest the Canchas Uckro played an important role within the political landscape. Ceramic analysis has likewise linked the site to broader economic spheres of interaction and the Amazonian ceramic styles known from other eastern highland sites, such as Kotosh. This study further assesses the potential economic relationships between Canchas Uckro and its eastern neighbors through the study of ceramic pastes and a consideration of those sherds with more Amazonian traits. 327 sherds were selected from the total assemblage for the descriptive paste analysis, which details the mineral non-plastic inclusions, clay characteristics, and superficial decorative elements. 83 sherds were further analyzed and photographed using a handheld Dino-Lite microscope. The majority of the sherds notably share a similar composition, with varying pastes comprised of principally of quartz, muscovite, feldspars and hornblende, while other ceramics feature non-local schist inclusions, indicative of distant economic ties. We tentatively argue that Canchas Uckro's ceramic pastes further support initial hypotheses of eastern trade relationships during the Formative Period.

Johnson, Robyn**[46] Landscape and Elements: A Comparison of Four Rock Art Sites in the Bennett Hills, Idaho**

A number of sizable rock art sites occur along the ephemeral drainages of the Bennett Hills located in the Snake River Plain of south central Idaho. The Bennett Hills are a range of tangled ridges, canyons and drainages that trend east-west for over 60 miles. This poster session will highlight four of those rock art sites (Thorn Creek, Grasshopper Cave, Hidden Sheep Watering Hole, and the Bathtub Site) recorded as part of a Bureau of Land Management (BLM) Challenge Cost Share Program (CCS). I will focus on the similarities of both the physical aspects of the landscape and specific rock art imagery. Illustrative photographs will highlight these landscapes (i.e., ephemeral springs with watering holes lined by basalt outcroppings and large boulders) and some of the similar rock art elements that occur at all of the designated sites. In addition, an Optically Stimulated Luminescence (OSL) date was procured from a hunting blind feature at the Hidden Sheep Watering Hole site that provided a general age for the site's occupancy.

Johnston, Susan [196] see Campana, Douglas

Johnston, Susan (George Washington University)**[266] Dun Ailinne and Its Meaning in the Context of Irish Identities**

The notion that, historically, Ireland was a homogeneous society situated on the edge of Europe and passively receiving cultural influences has long been implicit in the larger context of European archaeology. And yet Irish society and culture were neither passive nor homogeneous at any point in the island's history. This is evident through both material culture, which shows active choice in terms of incorporating foreign elements, and through documentary sources, which indicate some of the internal variation among contemporary communities in Ireland. In

this paper, these issues are explored in the context of recent research at the archaeological site of Dún Ailinne, a ceremonial site in Co. Kildare. In the Iron Age, Dún Ailinne was an important place in terms of both local identity and island-wide expressions of power, and this continued into the subsequent early medieval period but in significantly altered ways. Dún Ailinne thus provides an interesting case study to explore the interaction of similarity and difference in the context of island society and culture in the past.

Jojola, Deborah (Tijeras Pueblo Archaeological Site)

[25] *Tiwa Mural/Map Project: The "Tiwa World"*

The Tijeras Pueblo Archaeological Site Mural/Map Project is intended to place Tijeras Pueblo in context with the many Tiwa-speaking Pueblos of the Rio Grande Valley in the fourteenth and early fifteenth centuries. It offers a broad perspective on the environment and interrelationships of the Tiwa world of the time. Collaboration with the Pueblo of Isleta Cultural Committee has been invaluable with the sharing of stories and archaeological records.

Jolivette, Stephanie [312] see Taylor, Amanda

Jones, Catherine (University of Wisconsin-Milwaukee)

[60] *Moderator*

Jones, Christine (Texas A&M University Central Texas) and Elizabeth Church (Boston University School of Medicine)

[112] *Archaeology in 3D: Exploring Differences in Photogrammetric Models Created with Popular Structure-from-Motion (SfM) Archaeological Software from both Drone and Terrestrial Photography*

In this study, Structure-from-Motion(SfM) photogrammetric 3D models were created of mid- 19th century historic house ruins. Tyler house (Mound, TX) and Eyrie house (Holyoke, MA) have similar stone construction but dramatically different environmental contexts. The aim of this study was to compare point-cloud differences in, and the benefits and drawbacks of, popular SfM archaeological software. Specifically, comparisons were done through both metric and interpretive output, also addressing the difference in rendered models by acquisition method: drone and terrestrial photography. AgiSoft's PhotoScan (v. 1.4) and Autodesk ReCap Photo (v. 19) were employed and CloudCompare (v. 2.9.1) was used to compare cloud-cloud distances. The average distance between points and standard deviation were calculated between model pairs, and a Gaussian distribution was fit to each comparison to examine the distribution of points. For the paired models, clouds were accurate to within 0.03 cm, but had varying degrees of standard deviation. This is likely due to differences in methodology, such as degree of overlap in photos between acquisition methods, and slight differences in the rendering parameters of each program. These results may help the archaeological community in selecting software, increasing awareness of point-cloud and user-induced variations, and acquisition method when recording archaeological sites.

Jones, Emily [260] see LaZar, Miranda

Jones, Emily Lena [25] see Kirk, Scott

Jones, Emily Lena (University of New Mexico), Jonathan Dombrosky (University of New Mexico) and Laura Steele (University of New Mexico)

[257] *Measuring Change in the New Mexican Early Spanish Colonial Period: A View from the Isleta Pueblo Mission Convento Fauna*

The Spanish colonization of New Mexico unquestionably transformed indigenous populations, New Mexican environments, and the Spanish settlers themselves. The details of how and when these changes unfolded, however, have remained elusive, particularly in the Early Spanish Colonial Period (AD 1598 – 1680). Many of the challenges to identifying change in this time and place are rooted in problems related to units of analysis. In this paper, we use

the 17th century faunal assemblage from the Isleta Pueblo Mission Complex (Bernalillo County, New Mexico) to present a snapshot of foodways in a mission environment in the Early Spanish Colonial period. In doing so, we both illustrate and propose solutions to the challenges of identifying change associated with Spanish colonization.

[415] *Discussant*

Jones, Emma (Center for American Archeology), Zoe Doubles (Center for American Archeology), Esmeralda Ferrales (New Mexico State University), Kenzie May (Illinois State University) and Jason King (Center for American Archeology)

[176] *Monumentality and Time at the Golden Eagle Site (11C120)*

The Golden Eagle site (11C120), Calhoun County, IL, is located on the edge of the Deer Plain Terrace, 8 km upstream of the confluence of the Mississippi and Illinois Rivers. First documented by William McAdams in the late nineteenth century, Golden Eagle is the only Illinois River Valley mound site to include a ditch-and-embankment enclosure. The site is traditionally thought to date to the valley's Middle Woodland (Hopewell) period based on its architectural features, particularly the enclosure and mounds; however, artifacts recovered from the site can be dated from the Archaic to Mississippian periods. Since 2013, archaeologists at the Center for American Archeology have conducted fieldwork at the Golden Eagle site in order to better understand construction sequences and to place the site within its proper temporal context. In 2018, students in CAA field schools excavated 16 1x2 m units to test for the presence of embankment fill north of Mound 1. Evidence from these units indicate that this portion of the enclosure was constructed during the Late Woodland period. In this paper, we present these results and those from previous seasons and discuss their implications for construction and use of Golden Eagle.

Jones, Eric (Wake Forest University) and Martin Welker (Penn State University)

[153] *Spatiotemporal Analysis of Regional and Sub-regional Dog Size Data in Pre-Columbian North America*

Recent genetic research (Letholair et al. 2018) showed that dogs were introduced into North America over as many as four migration events. The first two were by Native Americans and the third and fourth by Europeans. In light of these findings, our research seeks to describe and explain the regional and sub-regional patterning in the sizes of domesticated dogs in Pre-Columbian North America. To do this, we use a dataset of dog skeletal data from archaeological sites across the continent. Initial coarse-grained spatial analysis has shown significant variation in dog body size between regions where dogs were used as a source of labor (e.g., the Intermountain West and Plains) and those where they were not (the Great Basin and Southeast). Our work builds upon this research, and examines variation in dog size on multiple geographic scales and through time to describe trends in animal management. We offer explanations for these patterns using a combination of the recent genetic data, archaeological data, and ethnohistoric information.

Jones, Eric E. [11] see Watson, Caroline

Jones, George (Hamilton College)

[257] *Discussant*

Jones, Gwendolyn

[11] *A Preliminary Exploration of a Modest Massachusetts Homestead*

Massachusetts has long been at the center of historic archaeology in the United States, but there is a clear focus on the land and lives of upper class families. Through my research at MacLeish Field Station, an over 200-acre plot of land in Whately, Massachusetts owned by Smith College, I seek to provide a look at the daily lives history has ignored. During the summer and fall of 2018, I am conducting an archaeological assessment of a modest homestead, dating to the late 18th – early 19th century, located within MacLeish. This homestead has been overgrown by new forests since its abandonment in the early 20th century. By using archival material from the Whately Historical Society and the Hampshire County Archives as well as digital methods (such as LiDAR, GIS, photogrammetry, and potentially GPR), my research will shed light on this nearly forgotten homestead. This poster presents the results of this preliminary archaeological investigation - exploring archival materials, a timeline of land

ownership, and mapping of the site both manually and digitally.

Jones, Jeffrey [125] see Walker, Emiliano

Jones, John G. [254] see Loven, Jeremy

Jones, Megan (University of Wyoming)

- [47] *Climate and Migration: Using Radiocarbon Date Frequencies to Identify Population Movement in the Bighorn Basin of Wyoming*

By analyzing radiocarbon date frequencies, it is possible to look at the prehistoric archaeological record on a wider plain, assessing how people dealt with large-scale changes in climate. While radiocarbon date frequencies have often been used to pinpoint time periods of population growth and decline, relatively little is known about how or why these changes occurred. Climate can affect population size, the collapse of civilizations, and/or site abandonment. Five significant population increases and subsequent declines spanning the Holocene have been identified within the Bighorn Basin of Wyoming through previous work by Kelly and associates in 2013. These periods of population change closely follow drought cycles; with the largest declines in population occurring during times of extreme aridity and increased temperatures. This research examines whether declines in population indicate migration events. This is achieved by looking at the frequency of radiocarbon dates through time in adjacent regions using non-parametric statistical analysis. These results are then compared to paleoclimate models for the region in order to determine at what point climatic extremes cause people to leave their familiar landscape.

Jones, Mica (Washington University in St. Louis) and Steven Brandt (University of Florida)

- [82] *Delayed-Return Hunter-Gatherers in the Horn of Africa? Faunal and Radiometric Data from the Guli Waabayo Rock Shelter in Southern Somalia*

Environmental changes during the African Humid Period (~11,000-5,000 BP) are associated with the emergence of new social and economic strategies among some hunter-gatherers in northern and eastern Africa. In response to Early Holocene climatic amelioration, foragers in southwestern Libya and the Lake Victoria Basin decreased their mobility and adopted delayed-return subsistence practices focused on certain wild, local resources. The range and extent of this move toward sedentism and resource localization among African hunter-gatherers, however, is unclear. Preliminary faunal evidence from Guli Waabayo, a Terminal Pleistocene/Early Holocene rock shelter site in southern Somalia, suggests foragers increasingly focused on net hunting and trapping small, territorial mammals such as dik-dik and hyrax throughout the site's occupation. This paper presents detailed faunal data, artifact densities and new radiocarbon dates to investigate whether a trend toward small game hunting corresponds with decreased mobility and elevated rainfall levels observed regionally in the Early Holocene. Findings from this study will contribute to broader discussions about the range and prevalence of increasingly delayed-return hunter-gatherer strategies in northern and eastern Africa and their relationship to environmental transformations during the African Humid Period.

Jones, Noel (California State University, Chico)

- [323] *Land Use in the High Desert of Northwestern Nevada: Analyzing Settlement Patterns of the Bare Allotment*

Mobility has long been seen as a key strategy for foragers in marginal environments, where movement around the landscape sought to take advantage of natural resources that often have narrow windows of availability. While mobility has often focused solely on obsidian conveyance in the Great Basin, ethnographic accounts suggest that food resources were more scarce and more influential to migration routes and timing. This study explores the land use strategies employed by prehistoric populations within the Bare Allotment, a BLM managed land located between Surprise Valley and Black Rock Canyon in northwestern Nevada. Our dataset includes a combination of over 100 records of existing and newly documented sites with chronological diagnostic markers spanning from the Paleoarchaic to the Late Prehistoric Periods. We explore the relationship between site locations and natural resources to develop a fine-grained analysis of land use and how it changed over time. The results of this study have the potential to contribute to our understanding of land use mobility patterns within this area, but also to the region as a whole.

Jones, Terry [142] see Schwitalla, Al

Jones, Travis (University of Georgia, Center for Applied Isotope Studies)

[147] Huff Village Revisited: A New Radiocarbon Chronology for a Pivotal Time

The large, heavily-fortified Huff village site in North Dakota is a quintessential Late Prehistoric plains village within the Middle Missouri region of the Northern Plains. Since the 1940s, attempts to establish Huff's occupational history and absolute placement in time achieved only coarse-grained or inconclusive results, suggesting village occupations between AD 1300-1500. A new analysis including Bayesian modeling of 20 previous and 17 new radiocarbon assays established a high-resolution site chronology that constrains the occupation to only one or two generations during the mid-1400s. Based primarily on architectural and ceramic data, previous investigators suggest Huff marks the beginning of large-scale sociopolitical transitions in the region. These changes are characterized by regional population aggregations into heavily-fortified villages and intervillage competition underwritten by long-distance exchange and warfare. Some investigators also posit simultaneous shifts in social configurations eventually developed into the historic Mandan and Hidatsa clan structures observed by Catlin, Lowie, and Bowers in the 19th and 20th centuries. However, without an absolute site-level chronology, the exact tempo and timing of these society-wide transitions remained tentative. The new Huff village chronology suggests these processes began abruptly in the mid-1400s and evolved quickly.

Jordan, Jillian M. (University of New Mexico), Jaime Awe (Northern Arizona University) and Julie Hoggarth (Baylor University)

[152] Practice and Place: Ceramic Technology and Social Boundaries in the Late to Terminal Classic Belize River Valley

Ceramic provenance studies often focus on resource acquisition to address the question "what is local?", overlooking the role that practice plays in vessel manufacture. Potters must learn to create viable ceramic vessels, engaging with learning networks that extend beyond conventionally cited political, social, and economic boundaries. This paper explores shared practice among potters using macroscopic analyses, thin section petrography, and Scanning Electron Microscopy (SEM) on unslipped jars recovered from house mounds at Baking Pot. The data indicate that potters living in the Belize River Valley (c. AD 700-900) were not part of individual communities that produced ceramic vessels that are distinguishable from another based on a set of discrete technological and morphological characteristics. Rather, shared practice existed at the level of the region and potters in different locations engaged in regular interaction and shared information on resource acquisition, raw materials processing, and vessel form. A narrowly defined approach to provenance does not adequately capture the importance of both place and practice in understanding locally pottery. Extending the concept of local to include practice acknowledges the importance of interaction in pottery production thereby more accurately representing what is means to be local to a specific place.

Jordan, Keith (California State University, Fresno)

[304] Pumas and Vultures and Wolves, Oh My! The Appropriation and Alteration of Teotihuacan Processing Predators at Tula

This paper examines the predatory animals on the relief friezes of Pyramid B at Tula, clearly based on Teotihuacan models originally expressed in different media and contexts--murals in interior spaces--and the possible reasons for both Tula's borrowing of this imagery and its redeployment in sculpture in the public space of a monument dedicated to the legitimization of rulership. Recent evidence from Teotihuacan in the form of fragmentary reliefs of jaguars eating hearts on the adosada added to the Pyramid of the Sun around 300-400 CE, suggests that part of this shift may have already started at Teotihuacan, but the context of the animal iconography remains quite different from its use at Tula. I interpret the transfer of imagery formerly used mostly in domestic spaces at Teotihuacan to more public buildings at Tula as reflecting a strategy of equating the monumental spaces of Tula Grande with domestic spaces linked to ancestry. The Pyramid B carnivores probably represent lineages of claimed Teotihuacan descent as well as warrior sodalities of Teotihuacan origin, ruling in coalition with the figures depicted on the Pyramid B pillar reliefs.

Jordan, Kurt (Cornell University)**[19] Small Sites as Evidence for Seneca and Cayuga Settlement Expansion, circa 1640-1690**

Sites in Haudenosaunee (Iroquois) territory that yield small numbers of artifacts diagnostic of Postcolumbian indigenous occupations typically are treated as ephemeral occurrences: travel stop-overs, resource-procurement stations, and the like. Concentration on obvious diagnostic artifacts such as glass beads or Christian-themed items neglects other less-flashy, temporally ambiguous materials (such as lithic debitage, faunal remains, or iron tools) that could demonstrate more substantial Postcolumbian occupation. Moreover, many of these small sites cluster in time to the mid-to-late 1600s. This paper uses examples from Seneca (Onöndowa'ga:) and Cayuga (Gayogohó:no') territory to argue that seventeenth-century Haudenosaunee nations expanded occupation with small-scale settlements and agricultural endeavors in a way that archaeologists have not previously recognized. This expansion likely was related to a peak period in Haudenosaunee political-economic power and prosperity. Small-scale settlements appear largely to have been abandoned when a series of French invasions swept through Haudenosaunee territory in 1684-1696. Subsequent Haudenosaunee territorial expansion in the eighteenth century had a very different spatial footprint.

[73] Discussant

Jordan, Kurt [145] see Bridges, Dusti

Jordan, Regulo [253] see Fehren-Schmitz, Lars

Jorgensen, Katherine [116] see Bishop, Caitlin

Jorgeson, Ian (Southern Methodist University), Ryan Breslawski (Southern Methodist University) and Abigail Fisher (Southern Methodist University)**[127] Evaluating Chronological Hypotheses by Simulating Radiocarbon Datasets**

Evaluating chronological hypotheses using complex radiocarbon datasets is challenging. Sources of variability, including measurement error, interlab variability, uncertainty associated with the radiocarbon calibration curve, the inherent randomness of the physical processes of radiocarbon formation and decay, and potential mismatches between the dated event and the desired event (old wood effects, redeposition, etc.), all can compound in ways that are difficult to predict or account for. To overcome this challenge, we generate expected calendar ages for a given hypothesis, simulate radiocarbon measurements of those expected ages, and then compare the distributions of the simulated datasets with the distributions of observed radiocarbon datasets. These simulated datasets incorporate the known sources of variability in the observed datasets, providing insight into the expected dispersion and structure of a radiocarbon dataset. We demonstrate simulations for three chronologies: (1) a synchronous event, the Laacher See volcanic eruption in Germany approximately 12.9ka; (2) a hypothesized synchronous event at 12.8ka, the Younger Dryas boundary; and (3) an "old wood" effect on Valdez Phase (A.D. 1050 to A.D. 1225) dates in Northern New Mexico. Results demonstrate that simulation is a valuable method to evaluate whether a given radiocarbon dataset was produced by a hypothesized chronology.

Jorgeson, Ian [127] see Aiupalasit, Michael

Joseph, J. (New South Associates)**[22] Science, Circumstance, Dollars and Cents: Perspectives on the Public Benefit of Archaeology**

Opening with an introduction to a fictional (as of this writing) federal agency seeking to mine the public value of our nation's archaeological legacy, this presentation pivots to a consideration of the origins of precontact versus historical archaeology and our subfield's interactions with the public. I then present three contexts for the public benefit of archaeology: 1) fostering identity and authority for disenfranchised communities, 2) serving as a vehicle and platform for STEM education, and 3) serving as mode for job training and societal reintegration. I suggest that an activist approach using archaeology as a mechanism for public benefit can enhance our public value and expand

on the ways in which archaeology is in the public interest.

Joseph, Willky (Bates College) and Sofie Sogaard (Bates College)**[123] E-Week: Youth Collaboration within an Indigenous Framework**

Community driven approaches to archaeological research have provided the discipline with new and creative opportunities for engagement and dialogue. This poster explores the benefits of community engagement in the context of the k-12 classroom as part of a the NSF funded research, Temyiq Tuyuryaq; a collaborative archaeology the Yup'it way (Barnett 2018), a collaboration between the village of Togiak, AK and Bates College. This poster explores knowledge not only as co-produced, but also co-learned. Based on outcomes from experiential learning week (E-week) at the Togiak school in 2017 and 2018, we moved beyond a "flipped classroom" to "flipped archaeology". This project prioritizes active participation in its design, empowering youth, elders, and community members to engage in a meaningful way that archaeology often struggles to facilitate, linking together community goals with project outcomes. This poster highlights the role of Togiak youth participation, addressing both its challenges and benefits.

Joy, Brandy**[295] "Where's the Beef?" and Other Meat-Related Questions: Pre- and Post-Emancipation Foodways on James Island, South Carolina**

Archaeological evidence, historical documentation, and oral histories are used to compare the diet of individuals enslaved on Stono Plantation with those of the tenant-era population of James Island. Pre-emancipation data indicate a high level of livestock consumption supplemented primarily by fishing, but also by some degree of trapping and/or hunting. Poultry consumption seems relatively low prior to emancipation, but may have increased through time. Preliminary evidence for the tenant-era suggest a diet based on produce along with home-raised poultry, locally caught seafood, and minimal livestock consumption.

Joy, Jody (University of Cambridge)**[50] A Miniature Brooch and Gaming Pieces: The Story of the Smaller Objects from the Late Iron Age Elite Burials of Southern England**

Two iron firedogs, a tripod for a cauldron, a small amphora of Graeco Italian type, a bronze jug, glass vessels and Samian dishes. These are the objects selected for a catalogue record and for inclusion in the historic museum display of the 30 or so objects discovered in a Late Iron Age burial at Stanfordbury, Bedfordshire in southern England. But what about the five stone gaming pieces or the miniature bronze annular brooch also from the grave? It is contended in this paper that the dominant narrative of this type of burial – that they are the graves of a local elite with elite status expressed in graves by presenting the deceased as the host of a feast – has acted to obscure the importance of smaller, more personal objects also included in these graves. I will explore these issues by examining the grave goods from Stanfordbury, and several other burials from southern England, as collections in order to give objects of all sizes equal status in mortuary analysis. The dead do not bury themselves and the objects selected for burials like Stanfordbury have their own individual biographies which will be pieced together through careful interrogation of the evidence.

Joy, Shawn [325] see Smith, Morgan

Joyce, Arthur [197] see Borejsza, Aleksander

Joyce, Arthur [394] see Meehan, Pascale

Joyce, Daniel [127] see Gonzalez, Carolina

Joyce, Rosemary (University California Berkeley)**[316] *The Active Materiality of Obsidian***

When Steve Shackley informed me that over 90% of obsidian samples from Puerto Escondido, Honduras, that he had analyzed came from an unidentified source, presumably nearby, he started a process of re-education that led me to a place where he may not be comfortable, but that I deeply appreciate. This involves a reconsideration of the way that obsidian manifests today to us, as archaeologists, and the degree to which it may have presented itself differently to the people in the past whose lives we study. Drawing on theoretical work broadly called “new materialism”, I examine how volcanic glass is distributed across the landscape of northern Honduras, what the way material use by people in Honduras before 900 BCE might suggest about how they perceived obsidian glass as bounded and located, as mobile and circulating. I argue that the combination of chemical compositional analyses valued for their accuracy and not organized in falsely precise ways with social theories that ask us not to take the essential nature of something like obsidian for granted is consequential in understanding political, economic, and social relations in Honduras, in ways faithful to the example Steve provided in his own work in the US Southwest.

[161] *Discussant***Juarez, Santiago (Colgate University)****[146] *The Late Preclassic Households of Noh K'uh, Chiapas Mexico***

The Late Preclassic (400 B.C. – A.D. 200) site of Noh K'uh is located in the Mensäbäk basin, over 30 kilometers west of the Usumacinta. Within this understudied region, the site of Noh K'uh was an important ceremonial center during the Late Preclassic, and was composed of several hilltop aggregates that clustered around a moderate monumental core. The site's location on the western edge of the Maya lowlands placed residents of Noh K'uh near contemporaneous civilizations in the Isthmian sphere. Preliminary data from archaeological excavations and survey demonstrate both a material culture heavily influenced by cosmological symbolism and ritual practices that may have been shaped by outside influences. Ongoing research reveals how the households of Noh K'uh integrated cosmological rituals into their daily practices.

Juárez, Ariana [375] see Rangel, David

Juengst, Sara L. [286] see Bythell, Abigail

Juengst, Sara L. (UNC Charlotte)**[353] *Bodies of Power: The Bioarchaeology of Cooperation***

Power differences and status are most commonly associated with hierarchy; however, heterarchy, or horizontal power differentiation, is another common way of organizing complex communities. Rather than the vertical ranking commonly associated with hierarchy, heterarchy may include differential or shared access to power at various times based on labor, gender, or age, among other possibilities and may contain hierarchies within these categories. Cooperation and consensus are often crucial to heterarchical systems, as people invest in cooperative (rather than competitive) relationships to achieve common goals. Political and social relationships are inscribed on our bodies through our daily activities, access to resources, and social interactions. In particular, risk and experience of stress and disease, access to food, and trauma experiences are closely linked with power relationships. Bioarchaeology is thus well situated as a discipline to investigate the diversity of cooperative and competitive relationships in the past, although researchers have often not recognized this interpretive potential. This paper provides a theoretical platform about how hierarchy and heterarchy affect human bodies and investigates how archaeology and bioarchaeology have engaged with this topic to date. Providing an introduction to the rest of the session, the paper will also suggest new avenues for exploration.

[353] *Chair*

Jurado, Alexander and Tatsuya Murakami (Tulane University)**[406] Social Status and Ritual Practice at a Middle Formative Residential Complex at Tlalancaleca, Puebla**

Fieldwork recently undertaken at Tlalancaleca, Puebla, explored a residential complex dating to the Texoloc phase (650 – 500 BC) of the Middle Formative period. Horizontal excavations exposed a residential platform and several wattle and daub rooms flanking a central patio. This paper presents interpretations regarding: (1) the status of inhabitants; and (2) domestic rituals and quotidian practices carried out within the complex. Interpretations are based on multiple lines of evidence, which include analyses of construction debris, personal adornments, and figurines. The assemblage, practices, and occupational history of this residential complex are compared with those of a contemporaneous, higher status residence at Tlalancaleca to elucidate the nature of social differences at this early urban center.

Jurado, Erik [39] see Sanders, Mariana

Jurado, Erik, Mariana Sanders (University of New Mexico), Gerardo Gutiérrez (University of Colorado Boulder) and Israel Hinojosa-Balino (Durham University)**[39] Pigment Composition and Color Structure and Usage in the Lienzos De Chiepetlan, Guerrero, Mexico: A Non-destructive Analysis**

The community of Chiepetlan, Guerrero possesses six colonial lienzos. One manufactured during the 16th century, and four manufactured during the 18th century and used as legal documents in colonial land disputes. The current study contains two primary objectives: (1) to identify specific pigments used in the manufacture of the Chiepetlan Lienzos; (2) to interpret the significance of color use in Chiepetlan's broader cultural and historical context. Towards the first aim, this study makes use of three non-destructive techniques: portable X-ray fluorescence (pXRF), fiber-optic reflectance spectrometry (FORS), and multispectral imaging (MSI). Towards the second aim, this study draws on archaeological and ethno-historical evidence, as well as theories of materiality. In addressing the above objectives, this study furthers our understanding of pigment technology, as well as our methodologies for studying pre-Columbian and historical documents. It stands to elucidate social and political transformations following the Spanish conquest of Mesoamerica in which colonial documents and lienzos played a central role in indigenous identity and heraldry, and in negotiations between indigenous communities and European authorities.

Juska, Ieva [37] see Berman, Mary Jane

Kabata, Shigeru [406] see Murakami, Tatsuya

Kabiru, Angela [82] see Hu, Lorraine

Kaeding, Adam**[367] Colonial and Caste War Continuities in the Beneficios Altos Province of Yucatán**

The Caste War of Yucatán has been referred to as "the most successful Indian revolt in New World history." Scholars have attributed the origins of this important conflict to a variety of causes, including circumstances that arose as Mexico established its independence from Spain; late colonial period political reforms; policies in place throughout the colonial period; and even long-standing indigenous practices that predated the arrival of Europeans. Given their focus on potential causes of the conflict, these discussions naturally end in the late 1840s when the revolt begins. Drawing from archival and archaeological data, this paper focuses on the processes, structures, and events of the Caste War itself and its immediate aftermath. With this shift in perspective, this paper will further explore the relationship between the Caste War and the long history of the region characterized by resistance to and persistence of colonial period policies and practices.

Kaeppler, Adrienne [153] see Przelomska, Natalia

Kahn, Jennifer (The College of William and Mary) and John Sinton (University of Hawai'i, Manoa)

[316] WDXRF Analyses and Understanding Variability in Time and Space: Trade in the Complex Society Island Chiefdoms

Our WDXRF sourcing program of geological and archaeological specimens (n=177) from the Society Islands, outlines the dynamics of inter- and intra-archipelago exchange over an 800 year period. Adzes from 21 sources were identified. Those traded in from the Marquesas Islands, an over 1,400 km voyage, are found with low frequency (3%), augmenting known extra-archipelago imports by sixfold and illustrating inter-archipelago trade post-dating the 15th century. Four Moorean sources have "broad" island-wide reach; two represent quarries and two represent probable working floors. Nearly half of the analyzed artifacts are from non-local sources demonstrating widespread intra-island exchange in the pre-contact period and the development of a local prestige goods economy. Adzes from Tahiti Island quarries have the broadest reach, found on all three islands studied (Maupiti, Rai'atea, and Mo'orea), while adzes from Maupiti were also traded into Mo'orea. Evidence suggests two main mechanisms for adze exchange from the mid-15th century onwards. Trade and exchange of raw material and adze preforms and blanks amongst high status tahua, or adze specialists, likely accounts for non-local imports recovered at adze quarries and working floors. Trade and exchange amongst high status priests and secondary elites likely accounts for non-local imports recovered at elite ceremonial sites.

[354] Discussant

Kaingang, Jozileia Daniza [2] see Machado, Juliana

Kakaliouras, Ann (Whittier College)

[317] Theorizing an Anti-colonial Bioarchaeology

Since the 1970's bioarchaeology has become both a valid specialization within archaeology as well as a standalone discipline with its own analytical and institutional traditions. Archaeology, though, enjoys a much more robust mosaic of competing theoretical frameworks than does bioarchaeology. From the processual to the postprocessual—to the feminist, radical and postcolonial—contemporary archaeologists have plenty of theoretical locales to inhabit. In bioarchaeology we have certainly weathered the "bioarchaeology of behavior" vs. "contextualized bioarchaeology" divide, tried hard to both become biocultural and understand "the body as material culture," and started to use social theory more frequently in our interpretations of past lives. Bioarchaeologists, though, typically need not articulate theoretical commitments in their work, although some certainly do. This paper contends that in order for bioarchaeology to innovate within archaeology in the next decades, our theory should be generative, not just interpretive; that is, we must ground ourselves in theory rather than simply use theory. I first explain why bioarchaeology, historically, has lagged behind archaeology theoretically. I then propose a decolonization of bioarchaeology, one situated within established anti-colonial theoretical traditions. Can bioarchaeology try to shed its settler-colonial past and perhaps even reach for a transformation of its intellectual project?

Kakos, Peter

[403] Explaining the "Venus Figurines" of the Upper Paleolithic: Macronutrients and the Effects of Endocrine Responses

For over a century the so-called "Venus Figurines" have inspired a plethora of scientific discourse and speculation regarding their meaning and function in the Upper-Paleolithic. This paper examines a more down-to-earth explanation regarding their forms and features that most likely reflects the food resources utilized by Upper Paleolithic cultures rather than the more popular assertion that they represent fertility figures and/or associated fertility cults per se. There seems to be a continuing and erroneous assumption about prehistoric diet, which is not supported by more recent physiological studies of nutrition, hormonal responses to specific macronutrients and female body fat. This paper proposes that the "Venus Figurines" represent a female body type caused by specific nutrient consumption and not merely an abstract concept of female fertility or art form. The climatic conditions of the Upper Paleolithic, site location, available resources, and the effects of macronutrients on the endocrine system on female body fat will be examined.

Kale, Amanda [413] see Thibodeau, Alyson

Kamenov, George [168] see Williamson, Kylie

Kamph, Molly

- [122] *Ralph S. and Rose L. Solecki Papers and Artifacts Project: A Case for Collaboration between Archival and Artifact Collections*

In 2017, the Smithsonian Institution's National Museum of Natural History's Department of Anthropology began a two-year collaborative project through the Smithsonian's Collections Care and Preservation Fund aiming to connect the archival and artifact collections of paleo-archaeologists Drs. Ralph S. and Rose L. Solecki, known for their work at Shanidar Cave in northern Iraq from 1951-1960 and other sites throughout the Near East. Through the integration of these collections, the project aims to set a precedent by assuring that the association between archaeological collections and metadata is preserved in a way that increases their value to future researchers and the public at repositories collecting and preserving the collections of archaeologists. The poster will highlight the Ralph S. and Rose L. Solecki Papers and Artifacts Project's goals, methodologies, and challenges and encourage discussion about the preservation, physical and intellectual accessibility, and legacy of archaeological artifacts and records.

Kamp-Whittaker, April (Arizona State University)

- [83] *Communal Spaces and Ideas of Belonging in a WWII Japanese Incarceration Center*

The World War II incarceration of Japanese Americans was based on a questioning of national allegiance and the role of minority groups within this nation. This paper looks at the development of communal spaces at the Amache Incarceration Center in southeastern Colorado and explores the ways these areas express ideas of national and cultural identity. Communal facilities created by internees demonstrate the dual cultural heritage of the population at Amache by incorporating Japanese and western elements. Constructed at both a neighborhood and site-wide level these community spaces may have helped mitigate some of the negative impacts of detention by helping create new social ties and a sense of belonging. The communal experience of unjust incarceration has had a continuing impact on how these sites are interpreted and their role in our national narrative surrounding Japanese American Incarceration.

Kandler, Anne [175] see Crema, Enrico

Kaneko, Akira (INAH)

- [173] *La excavación monumental en Yaxchilán e Iglesia Vieja, Chiapas, México*

La liberación por el medio de excavación y consolidación de los monumentos prehispánicos tiene una larga historia en la arqueología mexicana. Los métodos de las excavaciones de los conjuntos arquitectónicos de los sitios arqueológicos a cual definimos como la excavación monumental. Presentamos los procesos de excavación monumental de la Acrópolis Oeste de Yaxchilán (1989-1991) y los grupos B y C de Iglesia Vieja (2003-2018) en el estado de Chiapas, México. La excavación monumental no solo significa la dimensión grande o espacio amplio del área de excavación que proporciona los datos e informaciones más completas para la interpretación arqueológica, sino también que los edificios restaurados se convierten a las zonas arqueológicas abiertas al público que sirviera al desarrollo socio-económico de la región, asimismo los monumentos prehispánicos se conservan eternamente hacia el futuro como los patrimonios culturales en la historia de la humanidad.

Kaner, Simon (Sainsbury Institute and University of East Anglia)

- [74] *Stories from the Riverside: Metastability in the Shinano-Chikuma River System, Central Japan*

This paper discusses the significance of the archaeology of the Shinano and Chikuma River system, the longest drainage in Japan, an area of very high environmental activity, situated on the Fossa Magna. The paper focuses on

the Jomon period, when the region had the highest density of early ceramic sites (Incipient Jomon, c 12,000 BP) and produced some of the most elaborate ceramics of the whole Jomon tradition (Flame pots c. 5000 BP). These are highlighted in the current Japan Heritage (Nihon Isan) initiative, designed to situate specific heritage assets in longer-term regional narratives appealing to the general public. Additionally, a number of Jomon objects from the region have in recent decades been designated as National Treasures, and Jomon obsidian mines are involved in the world's first international 'twinning' of archaeological sites. Short-term and longer-term archaeological sequences are interpreted in terms of metastability, providing a framework for understanding the continuity of tradition in the context of ever-changing landscapes.

Kang, Bong (Gyeongju University)

- [267] *Reconsideration of the Relationship between Complex Societies and Dolmen in Northern Part of Korea and Manchuria*

Dolmen is one of the principal mortuary programs in the Korean Bronze Age (ca. between 1000 and 300 B. C.). A number of dolmens have been discovered almost everywhere in the Korean peninsula as well as Manchuria, China. A great amount of research has been conducted by Korean and Japanese archaeologists concerning this style of burial. Some scholars became interested in a social reconstruction and they have asserted that Korean dolmen society reached chiefdom in association with both mortuary offerings like mandolin-shaped (also known as Liaoning type) bronze daggers and especially energy expenditure. This issue has been one of the hottest research topics in Korea for a long time. Many researchers have taken it for granted that Korean dolmen society witnessed a centralized political organization. This interpretation has been printed in Korean National History Textbook. Consequently, there is no way for the majority of Korean students to think otherwise. This paper, based on the analyses of spatial distribution of dolmen and artifacts recovered from the burials located in northern part of Korea and Manchuria, will argue that the dolmen society in the study region did not reach complex society (e. g., Old Joseon) but remained egalitarian.

Kang, Chang Hwa [156] see Park, Geun Tae

Kang, Jirye

- [388] *Understanding Stylistic and Technical Variation in Middle Chalcolithic Painted Pottery Decoration—A Test from Tel Tsaf*

This research explores the social interaction between Tel Tsaf and northern Mesopotamia through pottery decoration similarities. This ongoing research questions another possible connection between northern Mesopotamia and Tel Tsaf in the central Jordan Valley, representing one of the most southern sites discovered. The Middle Chalcolithic (5600-4500 BC) site of Tel Tsaf is located in the central Jordan Valley near Beth Shean, Israel. The site is believed to have influences from the Ubaid in northern Mesopotamia during the Chalcolithic period. This assertion is fundamentally based on the recovery of distinctive pottery sherds, Tel Tsaf ware, after decades of excavations (Gophna 1970s; Garfinkel 2004-2007; Rosenberg 2013-Present). To reconstruct the context, analysis of the pottery decorations will be mainly used to broaden the interpretation of the site through a consideration of all relevant Tel Tsaf pottery. X-ray Fluorescence (XRF) studies will be conducted on the pottery colorant in order to provide a better understanding of provenance of colorant components. Through examining the stylistic and technical variations of the Tel Tsaf ware as well as XRF analysis of the Ubaid-like pottery decoration, this study compares to Tel Tsaf with the sites in northern Mesopotamia, Ubaid interaction zone.

Kangas, James [36] see Wohlgemuth, Eric

Kangas, Rachael (Florida Public Archaeology Network), Sara Ayers-Rigsby (Florida Public Archaeology Network), Jeffrey Moates (Florida Public Archaeology Network) and Brenda Altmeier (Florida Keys National Marine Sanctuary)

- [251] *Smoke on the Water: Addressing the Burning Issue of Threats Climate Change Poses for Submerged Historical Sites in Florida*

Underwater archaeological sites are often omitted from sea level rise and resiliency discussions, but these resources, which attract tourists and provide critical information about the past, are at risk. Lack of personnel,

difficulty with routinely accessing sites coupled with the “out of sight, out of mind” mentality make submerged historical sites vulnerable. Increasing ocean temperatures result in increased storm activity, while ocean acidification impacts the delicate equilibrium of a submerged site. Documenting these changes and related impacts can help archaeologists understand how these factors impact site integrity over the long term. The Florida Public Archaeology Network (FPAN) partnered with the Florida Keys National Marine Sanctuary (FKNMS) to create a submerged historical resource monitoring program as part of the successful Heritage Monitoring Scouts (HMS) Florida initiative, launched by FPAN in 2016. Heritage Monitoring Scouts encourage the community, dive shops, and visitors to embrace submerged historical resources and learn how they can effectively identify changes and threats while routinely monitoring sites. Discussion includes the launch of the Submerged HMS Florida program, shipwreck trails, potential for HMS and similar programs addressing climate change and submerged resources to provide valuable data before it goes up in smoke.

Kansa, Eric [77] see DeMuth, Robert

Kansa, Eric (Open Context / UC Berkeley) and Sarah Whitcher Kansa (Open Context / UC Berkeley)

[87] Data Literacy and Public Engagement in Archaeology

This paper will explore the need to cultivate deeper and broader data literacy in archaeology. Data and algorithms shape the actions of virtually every institution in modern society. In archaeology, data involve significant conceptual, modeling, and ethical challenges (including cross-cultural intellectual property issues). For data to be meaningfully preserved and used in intellectually rigorous ways, they need to be integrated fully into all aspects of professional practice, including ethics, teaching, and publishing. To succeed over the long term, we need to strengthen the human and community capacity to use data effectively and appropriately. To broaden and deepen our capacity to make better use of data, we need to strengthen instructional and public outreach programs that merge humanistic traditions of critique and wider cultural and historical perspectives with technical competencies. To put these ideas in practice, we propose combining elements of reproducible research, that make data and analytic steps clear and open for review and reuse, with engaging narratives so that data and analyses become more broadly accessible and meaningful to broader audiences.

[177] Discussant

Kansa, Sarah Whitcher [87] see Kansa, Eric

Kansa, Sarah Whitcher [87] see Wells, Joshua J.

Kansa, Sarah Whitcher (AAI / Open Context)

[344] Moderator

Kantor, Loni (Arizona State University)

[81] Landscape Meaning and Materiality among the Indigenous Wixárika (Huichol) People of Jalisco, Mexico

Landscapes are more than just where people subsist: landscapes are inherently social entities. People create landscapes in their interactions with the environment and with each other; they conceptualize landscapes in various ways; they mediate their relationships with one another through the landscape. It is the social nature of landscapes that makes them an essential component of anthropological inquiry. Ethnographic study of landscapes reveals their role in subsistence, ritual, social organization, and identity, and may also provide insights for evaluating ancient landscapes. In this paper, I present results of an ethnographic study of landscape among the present-day Wixárika, carried out under the supervision of Ben Nelson. I describe the meanings and content of a Wixárika landscape and also suggest how they may aid our approach to the past. In short, the Wixárika landscape is imbued with a prevailing concept of dwelling which entails key practices and a materiality that is archaeologically informative.

[81] Chair

Kappers, Michiel, (QLC Inc. - InTerris Registries), Christina Giovas (Department of Archaeology, Simon Fraser University) and Kelsey Lowe (School of Social Science, University of Queensland)

[170] Preliminary Investigations on a Coastal Caribbean Island: A Multi-proxy Environmental Study at the Sabazan Amerindian Site, Carriacou, Grenada

The Amerindian, enslaved African, and European peoples who successively settled the Caribbean island of Carriacou beginning AD 400 encountered a distinctive environment marked by recurrent drought, few terrestrial fauna, and the largest reef system in the region. Evidence suggests Carriacou's ecology was altered dramatically by humans, reflecting efforts to adapt to and transform the island's environment. While not fully understood, deforestation, erosion, species introductions, and extinction are among the known legacy effects. To better understand human-environment interaction and landscape history through time, the Carriacou Ecodynamics Archaeology Project (CEAP) is pursuing long-term, high-resolution records for habitat modification and biotic change at the Sabazan archaeological site using zooarchaeology, geoarchaeology, and geophysical survey. Sabazan is the location of an Amerindian village (AD 400 – 1400) and historic sugar plantation (1772 – late 19th century) that retains well-preserved, artifact-rich pre-Columbian deposits, the remnants of stone plantation buildings, a 19th century cemetery, and historic well. Here we report on the results of the 2018 pilot field season, including mapping, ground penetrating radar, and magnetometry applications. These show numerous anomalies indicative of past human occupation, including pits and hearths, and depth of the shell midden deposits which assist in understanding Sabazan's site formation history.

Kaplan, Emily [39] see Hornbeck, Stephanie

Kaplan, Emily (National Museum of the Americas)

[39] The Technical Study of Two 16th Century Mexican Pictographic Documents in the NMAI Collection

Two mid-16th century Mexican pictographic documents in the collection of the National Museum of the American Indian, a codex on amate paper from the Valley of Mexico and a lienzo on a large cotton textile from Puebla, have been well studied by historians and archaeologists yet have never been the subjects of a technical study. This paper presents the preliminary analytical results of a study that aims to holistically understand the object's biographies, from manufacture and use through accession and conservation. In addition to technical analysis, this project looks to re-contextualize the codex and lienzo by strengthening our understanding of their relationships to historic and contemporary indigenous documentary traditions in Mexico.

[39] Chair

Kardulias, Paul Nick (College of Wooster)

[8] The Ethnoarchaeology of Stone Craft Production in Athienou, Cyprus

The town of Athienou in Cyprus lies at the southern edge of the fertile Mesaoria Plain. In addition to its agricultural focus, the region has been home to many traditional crafts, such as the making of lace and cheese. In addition, artisans have fashioned a variety of objects from the local limestone called "the stone of Athienou". Ancient sculptors made extensive use of this material to fashion statues, many of which formed the foundational assemblage of the fledgling Metropolitan Museum in New York. Excavation of a rural sanctuary at Malloura by the Athienou Archaeological Project (AAP) has recovered over a thousand sculptural pieces made of the local material. Use of these stone quarries has persisted to the present. This study focuses on the nature of work at the local quarries as documented through interviews with current stone workers. These individuals extract the stone and shape several types of vessels (bowls and basins), millstones, and construction materials. The AAP survey revealed the sources of bedded limestone and gypsum. The interviews provide details about quarrying procedures and the structure of the labor force. These investigations offer insights into an important local industry that thrived from antiquity to the recent past.

Kardulias, Paul Nick [118] see Kreuzwieser, Clare

Kariwiga, Jason [129] see Stephen, Jesse

Karlsson, Elinor [352] see Lord, Kathryn

Karsten, Jordan [47] see Henry, Lauren

Kashanipour, Ryan

[96] *Discussant*

Kassabaum, Megan (University of Pennsylvania), Anna Graham (University of North Carolina, Chapel Hill), Alexandria Mitchem (Columbia University), Arielle Pierson (University of Pennsylvania) and Rebecca Dolan (Drexel University)

[168] *Exploring the Unexpected Early Woodland Occupation at Smith Creek, Wilkinson County, Mississippi*

Smith Creek (22Wk526) is a multi-component Native American mound site in the Natchez Bluffs region of the Lower Mississippi Valley. Surface collections and excavations from 2013–2016 clearly demonstrated a dense Mississippian (AD 1200–1500) occupation at the site and suggested a Late Woodland (AD 750–1200) date for the construction of the mounds. However, excavations during Summer 2018 revealed an unexpected Early Woodland (500 BC–AD 1) component underlaying these later deposits. We examine the distribution of Early Woodland artifacts and features across the Smith Creek landscape before focusing our attention on a large circular structure in the northeast sector of the site. We compare this structure, and the artifacts recovered from it, to those from the small number of excavated Early Woodland sites in the Lower Mississippi Valley. In addition, we discuss the implications our excavations have for understanding the pace of soil development in the Natchez Bluffs and how this may affect the visibility of Early Woodland and Archaic components on later sites.

Kassianidou, Vasiliki [363] see Ting, Carmen

Kate, Emily (Pennsylvania State University), J. Heath Anderson (Minnesota State University, Mankato), Douglas J. Kennett (Pennsylvania State University) and John Krigbaum (University of Florida)

[111] *A Preliminary Study of Epiclassic Human Mobility at La Mesa in Tula, Mexico Using Stable and Radiometric Isotope Analyses and Radiocarbon Dating*

In this poster, we present preliminary mobility data for individuals recovered from La Mesa, an Epiclassic hilltop settlement in Tula, Mexico. For decades it has been hypothesized that the Tula area may have experienced an influx of immigrants from northwestern Mexico during the Epiclassic period, and that these newcomers played an important role in the rise Tula Grande. Results presented here provide an important step forward towards testing the long-held migration hypothesis. Analyses of modern and archaeological faunal remains were conducted to establish local baselines for oxygen ($\delta^{18}\text{O}$) and radiometric strontium ($87\text{Sr}/86\text{Sr}$) and lead ($20\text{nPb}/204\text{Pb}$) ratios for the Tula Grande region. These baseline values were then compared to human $\delta^{18}\text{O}$, $87\text{Sr}/86\text{Sr}$, and $20\text{nPb}/204\text{Pb}$ values, derived from the analysis of tooth enamel, to identify individuals who may have migrated to the Tula Valley during the Epiclassic. For all individuals included in this study, bioarchaeological, mortuary, AMS radiocarbon dating and stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) data are also assayed to contextualize the migration data. These new mobility data, in conjunction with other bioarchaeological results, will provide further insight into the population patterns of the pre-Toltec Tula Valley, especially when compared with data from other Epiclassic sites.

Katz, Jared (Denver Art Museum)

[270] *The Sound of Music: Performing Archaeomusicological Research in Museums*

This paper will discuss the methodology used to study archaeomusicology in a museum setting, which involves 3D scanning and modeling artifacts, playing and recording them (if permitted), and various other data collection techniques. To demonstrate the methodology used, I will discuss typologies of precolumbian ocarinas documented

at various institutions throughout Mesoamerica and the United States. The typologies created are based on technological, stylistic, and tonal attributes. I will also discuss how ancient music can be used as an effective topic for outreach classes in a museum setting, creating multisensory and engaging experiences for museum guests.

Katz, Monica (Hispanic Society of America)

- [39] *Local Color: The Visual Analysis of a South American Colonial Lacquered Gourd from the Collection of the Hispanic Society Museum & Library*

The Hispanic Society has a small but very fine collection of colonial Spanish American lacquered objects, which are decorated with one of the more widely known indigenous lacquer techniques, barniz de Pasto. The Hispanic Society's objects date from the 2nd quarter of the 17th century to 1800 and were made using native materials and techniques for a European aesthetic which mimicked Asian lacquer and demonstrate the extraordinary craftsmanship of these anonymous artisans whose techniques are still in use today in Colombia. Using only inexpensive and readily available lenses for a smart phone, this study of a mid-17th century barniz de Pasto gourd in the collection analyzes the decorative elements and hopes to identify their sources to show that artisans regularly substituted local flora and fauna in place of the stylized motifs in Asian lacquer as well as incorporating designs from European sources into these ornate objects. Relying on original sources as well as analyses conducted on similar pieces, the study will also identify pigments used to create the lustrous effects.

Katzenberg, M. Anne [258] see McConnan Borstad, Courtney

Kaufmann, Cristian A. [285] see Gutierrez, Maria

Kaviani, Kelsi (University of North Texas), Anna Prentiss (University of Montana), Emma Vance (University of Montana), Ethan Ryan (University of Montana) and Haley O'Brien (University of Montana)

- [327] *The McKean Complex Occupation in the Sunlight Basin, Northwest Wyoming: An Updated Assessment of Cultural and Geological Stratigraphy at Site 48PA551*

Site 48PA551 is a widely recognized winter camp originally dated to Middle Archaic (McKean Complex) period. Original investigators described the McKean occupation as a singular unit within a 30-90 cm thick sedimentary stratum beginning at the ground surface. Original radiocarbon dating placed the occupation range at ca. 3800-4400 radiocarbon years B.P. In this poster, we discuss results of new research at the site designed to clarify our understanding of the McKean Complex occupations. We offer new data to suggest that there are actually two periods of occupation consistently represented across the site. We also provide preliminary consideration of spatial variability in occupation materials that includes evidence for two new pithouses, cooking and storage features, and possibly dump areas for faunal remains.

Kay, David (University of Cambridge)

- [82] *"The Land is now OK": Three Centuries of Marakwet Settlement on the Elgeyo Escarpment, Northwest Kenya*

Situated within the Great Rift Complex of northwest Kenya, the Elgeyo Escarpment and surrounding region has been home to Marakwet communities for the last three hundred years. Many of these communities inhabit settlements which span diverse ecosystems, from semi-arid bush to highland forests. In tandem with changes in local lifeways and social/ecological relationships, the location of these settlements has shifted across the landscape since their original foundation. Drawing on archaeological and ethnographic research conducted over the past three years, this paper will explore these changes in settlement form and location, alongside the cultural and environmental variations that are interwoven with such trajectories. Combining survey, geoarchaeological and interview data, it will argue that such settlements should not be interpreted as discrete 'villages', but rather as inhabited zones within broader parcels of landscape in which a variety of human activities and relationships have played out over time. These parcels roughly correspond to 'clan territories', but are cross-cut by inter-clan land-use agreements, marriages, trading relations, irrigation networks and modern infrastructure. Taken as a whole, these networks highlight the intrinsically historical-cum-ecological nature of Marakwet settlement, and serve as a potential guide for archaeological investigations of more ancient contexts throughout eastern Africa and beyond.

Kay, Evan and Alexander Kurota (Office of Contract Archeology, UNM)

[413] Favorite Things: An Overview of Ornaments Used by the Jornada Mogollon in the Tularosa Basin, New Mexico

Recent UNM Office of Contract Archeology evaluations and surveys at numerous sites on White Sands Missile Range (WSMR) and White Sands National Monument (WSNM) offer new insight into the use, manufacture and trading of diverse objects of adornment by the Jornada Mogollon during the Doña Ana and El Paso phases. A wide variety of artifacts made from turquoise, shell, travertine, serpentine and argillite is presented. This paper also discusses two rare ornaments: a tubular bead made from the shell of a *Vermidae* species (a marine invertebrate commonly called a 'worm snail') and lacustrine shell beads made from locally available snails. A size-specific typology of disc beads is also presented.

Keach, Levi [366] see DiBenedetto, Katelyn

Keach, Levi (Bureau of Land Management)

[366] Chair

Kealhofer, Lisa, Kaseka Phon (Royal Academy of Cambodia), Peter Grave (University of New England), Miriam Stark (University of Hawaii) and Darith Ea (APSARA)

[27] Centralized Power/Decentralized Production? Angkorian Stoneware and the Southern Production Complex of Cheung Ek, Cambodia

Historically, international archaeological research in mainland Southeast Asia (MSEA) has been typically site-focused and 'origins' oriented (e.g., agriculture, metalworking). Theoretical framing has been inductive, frequently emphasizing the role of migration in culture change. More recently, interest in the dynamics of MSEA economies has introduced regional-scale investigations and different theoretical emphases. This paper highlights the potential of large-scale approaches for understanding regional economic development in the Angkorian Empire (c. 9th-15th c CE). A central feature of the Angkorian economy was the relatively rapid development of sophisticated craft industries. Of the multiple crafts servicing this empire, stoneware production stands out for two reasons: distribution (consumption) of Angkorian stoneware appears to map directly onto the empire's geopolitical extent; and transport networks closely articulate with the location of stoneware production complexes best known east of Angkor. New data from Cheung Ek, a southern kiln complex near Phnom Penh, expand the number and range of large-scale ceramic production complexes beyond the Angkorian core (and Buriram). In addition, the identification of Cheung Ek stonewares at consumption sites reveals extensive exchange networks (e.g., Thala Borivat). These preliminary results reveal a more integrated Angkorian network of production and exchange than previously supposed.

Kearney, Amanda [252] see Brady, Liam

Kearns, Timothy (Independent Scholar)

[86] Basketmaker III on the Chuska Slope, Northwest New Mexico

The centuries-long Ancestral Pueblo Basketmaker period occupation of the Chuska Slope in northwest New Mexico was marked by intervals of relative stability punctuated by long and short distance residential moves. Basketmaker settlement and material culture data are examined relative to key aspects of the occupation including 1) the origin of Basketmaker III communities along the Chuska Slope, 2) relationships with more distant Basketmaker III communities, and 3) changes that mark the end of the Basketmaker III interval in the study area. Although Basketmaker settlement of the entire Chuska Slope is addressed, the emphasis is on Tohatchi Flats and the southern portion of the Chuska Slope, areas where most of the research has been conducted.

Keegan, Deanna

[279] *Adaptive Pastoralism and Climate Change in the Irish Chalcolithic – Early Bronze Age: Adding Evidence from Termon, Co. Clare*

The Burren, a karstic region located in Western Ireland, has seen intensive farming practices since the Neolithic. Local proxies throughout the west coast of Ireland have indicated periods where the environment shifted to colder and wetter conditions in two key phases during the late 3rd and early 2nd millennia BC. A comparison of the archaeological record at Burren site Roughan Hill to proxy signals has shown probable evidence that the prehistoric occupants of the Burren were impacted by climate change. This paper seeks to explore and compare evidence of climate change and adaptive pastoralism at the Chalcolithic – Bronze Age site of Termon, located at the center of the Burren. The archaeological record of Termon will be explored in relation to local proxy signals in effort to understand how its occupants were responding to the shifting environment. Further, a comparison to the archaeological evidence at Roughan Hill will be given in relation to Termon in effort to support the notion of social adaptation over collapse during the Bronze Age.

Keegan, William (Florida Museum of Natural History) and Michael Pateman (Turks & Caicos National Museum)

[37] *Archaic Age Bahamas? New perspectives from Long Island*

It has long been assumed that the Bahamas were colonized by Ceramic Age peoples who began their expansion into the Caribbean islands from northeastern South America about 500 BC. The widespread occurrence of pottery in the Bahamas (Palmetto Ware), and the timing of initial ‘Lucayan’ settlement in the Bahamas is dated to AD 700-800 (dates that coincide with the Ostionoid and Meillacoid population expansions) have been used to support this assumption. Yet archaeological research conducted since 2016 on Long Island in the central Bahamas is revealing a much different confluence of elements. Instead of large agricultural villages, the archaeological sites on Long Island are small and short-lived with multiple activity areas in the same general location. Lucayan sites are directly on the coast, buried beneath beach sand on the lee shore and backed by a mangrove swamp; or they are eroding from Atlantic coast dunes. Neither location is well suited for intensive agriculture. In addition, special purpose sites are common. Palmetto Ware occurs in low frequencies suggesting it was not the primary method of cooking; and at least three earth ovens, spanning 400 years, have been excavated. This presentation is an overview of recent investigations on Long Island.

Keegan, William [37] see Pateman, Michael

Keegan, William [37] see Snoeck, Christophe

Keegan, William [170] see Woodcock, Rachel

Keehner, Steven (University of Iowa)

[80] *Beyond the Borders of Archaeological Taxonomy: A Ceramic Case Study from the Central Plains*

This paper presents a problematic ceramic taxonomy for the Late Woodland period (AD 500–1000) in the Central plains. The focus is on two archaeological taxonomic designation units: the Sterns Creek phase and the Grasshopper Falls phase. Through the lens of literature review, archival site records, and analysis of material collections curated at the Kansas State Historical Society (KSHS) and the University of Kansas (KU), I present documentation discrepancies, problematic taxonomic units, and identical ceramic assemblages designated as Sterns Creek Ware and Grasshopper Falls Ware. After presenting the evidence, I propose that the two ceramic wares should be consolidated under one name—Sterns Creek Ware—and further comparative analysis is necessary to identify other wares present in Grasshopper Falls phase assemblages. Archaeological taxonomic designation units and artifact typologies are important analytical tools. However, when archaeologists define taxonomic units confined within modern state borders, without adequate reference to existing data and literature, they construct flawed manifestations. In our attempts to make inferences about peoples past activities, especially complex social practices/interactions through material culture, we need to look beyond the borders of archaeological taxonomy and towards comparative syntheses.

Keene, Joshua (CSFA, Texas A&M University), Michael Waters (Center for the Study of the First Americans, Texas) and Thomas W. Stafford Jr. (Stafford Research Laboratories)

[48] *Archaeological, Paleoenvironmental, and Geoarchaeological Investigations of Hall's Cave, Texas*

Hall's Cave, located in central Texas, contains a 4 m thick geological record extending back to 20,000 cal yr B.P. Within these sediments is an archaeological record dating from the historic period to approximately 10,500 cal yr B.P. with living surfaces containing artifacts and animal bones associated with hearths. Over 60 hearth features, including over 40 from recent excavations in 2018, have been identified and 30 have been radiocarbon dated. Below the artifact-bearing layers is a paleontological record extending to 20,000 cal yr B.P. with bison, horse, dire wolf, and saber-toothed cat. In addition to these studies, our team is investigating the paleoenvironmental and paleoclimatic record preserved in the cave sediments through the analysis of preserved DNA with the sediments.

Kehoe, Alice

[163] *Moderator*

Keim Malott, Jillien (Fowler Museum at UCLA) and Stevy Hernandez (Fowler Museum at UCLA)

[89] *Research Opportunities in Archaeology at the Fowler Museum at UCLA*

The Fowler Museum Archaeology Collections is the largest repository of Los Angeles history. It has maintained the research materials and excavations of UCLA academics and local researchers since 1941. The collections consist of approximately 1.5 million artifacts ranging from prehistoric to historic with provenances that span the globe. The majority of these items have not been examined since their initial excavation, providing ample research opportunities that have proven fruitful for an array of researchers. A significant amount of this research has culminated in published articles, theses, dissertations, and manuscripts. These publications as well as primary documents are kept with corresponding accessions for future research reference. In addition, the Fowler Museum at UCLA has the original archives of numerous archaeologists including Clement Meighan, Henry B. Nicholson, and Charles Rozaire.

Keller, Angela (Statistical Research, Inc.)

[345] *Directed Movement at Ancient Maya Centers*

Is there a right way to enter a Maya center? A correct order to the viewing and experiencing of the place? How did the physical act of moving through a center inform the understanding of that place, its leaders, oneself? This paper presents the results of several seasons of fieldwork at the Belizean sites of Xunantunich and Actuncan, which was focused on the identification of site access, flow patterns, and plaza use as these illustrate site planning strategies to attract, entertain, and control a large populace. My work has combined extensive structural excavations with rapid systematic data collection, soil chemistry, macro- and micro-artifact analysis, remote sensing, and targeted excavations. One of the guiding themes for this work has been movement. People moving into, out of, and through site centers. By focusing on architecturally directed movement as a problem to be solved, fragmentary plaster floors, unimpressive alignments of stone, subtle soil chemistry variations, and artifact patterning combine to let us see movement as a significant activity in its own right.

Keller, Hannah [390] see Butts, Clancey

Keller, Hannah (University of Colorado, Denver) and Jamie Hodgkins (University of Colorado, Denver)

[402] *A Tale of Three Substrates: Effects of Trampling on Ostrich Eggshell and Applicability to the Archaeological Record*

Few taphonomic experiments have considered Ostrich eggshell, despite its ubiquity at archaeological sites in Africa and Asia. This experiment seeks to fill some of the gaps in taphonomic knowledge by determining the effect of trampling on ostrich eggshell. Ostrich eggshell fragments were photographed, distributed across the surface of sand, soil, or gravel, and trampled for a period of ten minutes or two hours. To create a significantly robust sample, each

experiment was replicated ten times. The more intense trampling and increasingly compact substrate yielded a higher number of fragments, and lower average length. An increased number of marks were noted after trampling, however, the appearance of these trampling marks were indistinguishable from marks observed on eggshells before trampling. Discoloration of fragments subjected to two hours of trampling was significantly higher, although this result varied between substrates. Comparison with ostrich eggshell recovered at a Middle Stone Age site in South Africa suggests that the surface modification observed was not caused by trampling, because no analogous marks were observed on the trampled assemblages. Further studies should consider additional taphonomic effects, including the effects of trampling on artifacts below the surface.

Kellett, Lucas (University of Maine at Farmington), Alcides Berrocal Gonzales, Patricia Allcca Osorio, Jacob Legere and Jhoan Romero Escobar

[46] *Long-Term Puna Landscape Use in the Chanka Heartland of Andahuaylas, Southern Peru*

This poster examines the enduring role that puna landscapes played across time and space in the Andahuaylas region of southern highland Peru. Results from a recent archaeological landscape survey, entitled the Andahuaylas Puna Project, confirms that the expansive puna to the south of the main Chumbao Valley was intensively used and intermittently occupied for over two millennia from the late Formative period through modern times, with the most intensive occupation occurring during the Chanka phase (~AD 1000-1400). The survey of a 40 km² tract of puna (~3600-4400 m.a.s.l.) recorded a range of water sources (e.g., springs, cochas, and bofedales) and 158 archaeological sites, including single and multiple corral structures, residential pastoral sites, cist tombs, chullpas, small ritual enclosures, and paths/roads among others. Taken together, preliminary survey results indicate that the lower puna region in Andahuaylas played a number of important roles for local polities by serving as an economic region for intensive camelid pastoralism, but also as a ritually charged landscape (for the living and the dead) and a corridor/connector between lower valleys (e.g., suni, quechua) and higher puna regions.

Kelley, Alice R., Bonnie Newsom (Department of Anthropology, University of Maine), Arthur Spiess (Maine Historic Preservation Commission, Augusta), Anne Spezia (School of Earth and Climate Sciences) and Kate Pontbriand (Department of Anthropology, University of Maine)

[49] *Maine Midden Minder Network: Collaborating to Save a Cultural Resource*

Maine's coastline hosts over 2,000 Native American shell middens. Composed of clam and/or oyster shells, faunal remains, and artifacts, these sites record over four thousand years of cultural and paleoenvironmental information. However, virtually all of these rich archives are eroding in the face of climate change-induced sea level rise and altered weather patterns. The Maine Midden Minder Network is being developed to bring archaeologists, geologists, tribal partners and citizen scientists together to create strategies to assess what remains of these threatened sites, and how to best use limited resources to recover precious data. Our initial program involves working with conservation organizations to document shell middens on their properties and create volunteer monitoring programs. Additionally, we are creating a website that will allow individual citizen scientists to monitor shell middens near their homes. Information produced by these activities is archived in a dedicated database that is designed to protect site location and land-owner privacy, but allow regional and local analysis of midden destruction.

Kelley, Shawn

[62] *Discussant*

Kelley, Shawn [254] see Laurila, Erick

Kellner, Corina [206] see Kerhusky, Sarah

Kelloway, Sarah [285] see Kennedy, Sarah

Kelly, John

[293] *Moderator*

Kelly, Mary Kate [122] see Paredes, Hannah Julia

Kelly, Robert L. [207] see Craib, Alexander

Kelly, Robert L. [248] see Robinson, Erick

Kelly, Robert L. (University of Wyoming)

[249] *Discussant*

Kelsey, Brady [32] see Brandt, Steven

Kembel, Silvia Rodriguez (University of Colorado)

[315] *Plumb Line, Laser Line, Time Line, Punch Line: John Rick and the Archaeology of Architecture at Chavin de Huantar, Peru*

John Rick has been leading research at Chavin de Huantar for a remarkable twenty-five years. Much of his work has focused on the site's monumental buildings. This paper addresses Rick's early years of investigating the site's architecture, focusing on mapping, excavation, and chronology. As part of these efforts he mentored numerous undergraduate and graduate theses, supporting his students' endeavors with technological innovations, creative thinking, and humor.

Kemp, Brian [9] see DeSilva, Upuli

Kemp, Brian M. [416] see Bingham, Brittany

Kemp, Lindsey [251] see Maher, Ruth

Kendrick, James (National Park Service)

[85] *Discussant*

Kennedy, Cayla (Utah State University)

[209] *Relative Dating of Classic Vernal Fremont Rock Art in Cub Creek, Dinosaur National Monument*

Located in Utah's northern Uinta Basin, the Cub Creek area of Dinosaur National Monument contains examples of Fremont pithouses, upland roasting features, diverse artifact assemblages, and panels of Classic-Vernal-style Fremont rock art. The Classic Vernal rock art style is characterized by geometric patterns, animals, and heavily stylized anthropomorphic figures in both petroglyph and pictographic formats. Using a robust record of 41 radiocarbon ages, the Fremont pithouses in Cub Creek were built and occupied around 750-1050 CE. Understanding the correlation of the Cub Creek rock art to the dates of pithouse construction could contribute to the understanding of emergent leadership within Fremont society, especially if these results are replicable to other

regional pithouse and rock art sites. With the eventual goal of developing an absolute chronology, in this poster I use relative dating methods to create a timeline that compares the window of pithouse construction in the Cub Creek area of Dinosaur National Monument with the creation of local Classic Vernal rock art. These results have implications for the age and meaning of other rock art and pithouse sites found in the northern Uinta Basin, as well as for the emergence of leadership in transitional agricultural societies.

Kennedy, Jason (Central Michigan University)

[200] Come for the Harvest, Stay for the Beer: Alcohol Production in an Ubaid Household in Upper Mesopotamia

In New Perspectives on Household Archaeology, Bradley Parker and Catherine Foster urged archaeologists to approach households as a dynamic location of repetitive actions and gestures that shaped the formation of the personal, economic, social, political and ideological trajectories of the community. In his contribution to the volume, Bradley sought to marshal multiple lines of archaeological evidence to provide a comprehensive account of the activities that occurred within an Ubaid household at Kenan Tepe on the Upper Tigris River in southeastern Turkey and explored how these actions were connected to broad changes in social integration and political complexity throughout Greater Mesopotamia during the fifth millennium BCE. In this paper, I will reexamine Bradley's conclusions using new data provided by a use-alteration analysis of the ceramics from the Ubaid household. This analysis has revealed evidence for the household production and consumption of alcohol, most likely beer, during the late 5th millennium BCE. This paper will explore the nature of alcohol production at the site and connect it to the activities identified in Parker's analysis of the structure as well as the social and political relationships formed during the consumption of alcohol at Ubaid Kenan Tepe.

[200] Chair

Kennedy, Sarah (University of Pittsburgh) and Sarah Kelloway (University of New South Wales)

[285] The Utility of Portable XRF for Preliminary Site Prospection at Contaminated Colonial Period Mining Sites (Puno, Peru)

Field portable x-ray fluorescence spectrometry (pXRF) has seen an increase in use for testing potentially toxic levels of heavy metals in modern mining and industrial waste sites. Understanding the spatial variation of pollutants in soil is necessary for identifying proper prevention measures for soil contamination and long-term effects on human health. While this technique is popular in modern contexts, it has seen little applicability in archaeological contexts. In this poster, we present the results of a pXRF surface soil survey conducted at the site of Trapiche Itapalluni, a Spanish Colonial silver refining mill (AD 1650-1750) located 15 km southwest of Puno, Peru in the northwestern Lake Titicaca Basin. High levels of mercury (Hg), lead (Pb), and arsenic (As) were identified in surface soils, necessitating the relocation of planned excavation units. Soil contamination results were combined with systematic surface artifact collection to identify activity areas in locations where excavation would have been hazardous. This study highlights the applicability of rapid, in-situ pXRF analysis of surface soils in contaminated industrial archaeology sites to assess: 1) potential effects on human health; 2) relocation of excavation units; and 3) activity areas and site usage, using a combination of surface collection and soil chemistry analyses.

Kennedy Richardson, Karimah (Autry - Historic Southwest Museum - UCR)

[210] Examining Site Functions and Relationships: The Value of Small Ridgeline Sites on Pimu/Catalina Island

Several decades of field reconnaissance have identified nearly one thousand archaeological sites on Catalina Island. The relationship between these coastal bluff villages, interior occupations, and smaller ridgeline sites are recognized via pathways, but not fully explored. In our efforts to better understand settlement patterns on this island the Pimu Catalina Island Archaeology Project (PCIAP) has developed a geographic spatial study to test the relationship between ancient occupations and the pathways along ridges that attest to human relationships on the landscape. Here we present findings from our excavations and survey of the coastal bluff sites at CA-LAN-3593, 3594, 3596 and recent radiocarbon assays. This analysis is a benchmark in our efforts towards a new synthesis and analysis of settlement patterns and subsistence practices on Catalina Island.

[177] Discussant

Kennett, Douglas J. (Penn State)

[33] *Discussant*

Kennett, Douglas J. [111] see Kate, Emily

Kennett, Douglas J. [153] see George, Richard

Kent, Jon [147] see Farmer, Reid

Kepecs, Susan (University of Wisconsin-Madison)

[198] *Lies the Spaniards Told*

The Spaniards characterized the northeast corner of Yucatán state as being demographically depleted and possessed of unhealthy terrain and a lack of exploitable minerals. This picture has been perpetuated by historians, who lack independent lines of evidence against which to check it. Yet archaeological information from extensive regional and full-coverage surveys, combined with a close reading “against the grain” of relevant native and Spanish documents, reveals the Spaniards’ claims as fictions aimed at gaining additional lands, labor, and rights to resources as well as covering up Spanish cowardice. By examining multiple strands of evidence I am able to reveal a much different picture of this region in the colonial epoch, with higher population than the written record suggests, very fertile lands, rich mineral resources – and rebellious natives who fought the Spaniards and their scions tooth and nail, essentially driving them out of the area for over three centuries.

Kerchusky, Sarah (University of California, Santa Barbara) and Corina Kellner (Northern Arizona University)

[206] *Understanding Nasca ‘Trophy Head’ Individuals from the Site of Zorropata in Peru Using Isotopic and Biochemical Methods*

Myriad factors shaped cultural practices such as ‘trophy head’ taking in Andean prehistory. Zorropata, located in the Las Trancas Valley, Nasca, Peru, was a large domestic site with likely ceremonial function occupied relatively continuously from the Late Nasca period (c. AD 450-600) until the early Middle Horizon/Loro period (c. AD 600-1000). Archaeological survey conducted by Katharina Schreiber in the 1990s at Zorropata identified at least one and possibly two adobe compounds that were like structures described by Julio C. Tello at Huaca del Loro, the largest Las Trancas site and local hub dating to the Middle Horizon. At both Huaca del Loro and Zorropata these structures appear to be barbacoa style tombs. Excavations conducted at Zorropata in 2014 recovered eight ‘trophy head’ individuals from the largest cell (Structure 21) of the adobe compound. ‘Trophy head’ individuals were analyzed using isotopic and biochemical data to investigate this practice just prior to and concurrent with Wari influence in the Nasca Region. These individuals shared stylistic similarities with other Nasca samples but also differed in important ways (e.g., the majority were non-local). These results illustrate that the Nasca experience with environmental and sociopolitical challenges differed between valleys within the Southern Nasca Region.

Kerr, Stanley (NV5), Christina Chavez (Sandia Labs) and Toni Goar (NV5)

[259] *Correlations between Structural Sites and Topographic Features Dating from the Late Developmental to Early Coalition*

During the Developmental period into the Early Coalition, agricultural settlements formed along drainages, such as the Tijeras Arroyo in Coyote Canyon, Arroyo del Coyote, the Rio Grande, the Lower Jemez River, and the Rio Puerco. This change in settlement patterns, along topographic features, near water sources was evidence for the exploitation of different ecological zones, where a variety of resources could be exploited. The valley bottoms and alluvial fans made agriculture possible as water was available, in seeps, rain run-off, and springs. Pit structure occupation along or near water sources through the Late Developmental into the Early Coalition include Dinosaur Rock site, LA 138465, the Pithouse Site, Two Dead Junipers site, Cobble Pueblo, the Bravo Pueblo, the Airport Hamlet, the Sedillo site, Coors Road site, the Denison Site, the second pit structure near Zia Pueblo, Meade Avenue Site, LA 151618, and the Artificial Leg Site 111. Evidence of pithouses and pit structures suggest residential stability

at these locations, suggesting a year-round occupation, but also were located in areas where a variety of resources were available.

Kersel, Morag (DePaul University)**[77] Big Data and Diplomacy: Aerial Images and U.S. Department of State Cultural Property Bilateral Agreements**

Big data in the form of aerial imagery gathered from drones, satellites, and archival spy images provide an historical time line of change over time of archaeological landscapes. The images of sites negatively affected by agriculture, development, looting, and urban growth are compelling and convincing in their documentation of destruction. Demonstrating the pillage of archaeological sites has never been easier. Any country that can establish that their cultural landscapes and objects are at risk as a result of demand in the United States can request a bilateral agreement under the 1983 Convention on Cultural Property Implementation Act (19 United States Code 2601 et seq). Big data generated from drones are used to offer proof of in-country looting, evidence fulfilling Determination # 1: that the cultural patrimony of the State Party is in jeopardy from the pillage (19 U.S.C. 2602 (A)(1)). This case study will illustrate the power of big data in diplomacy.

Keur, Mitchell**[341] Discussant****Keyes, Cassandra****[272] A GIS Predictive Model of Early Archaic Site Locations on the Taos Plateau**

The archaeological record within the recently designated Rio del Norte National Monument is the subject of on-going investigations. This presentation will discuss the use of Geographic information Systems (GIS) in predicting the locations of Early Archaic sites within the monument, which straddles the Rio Grande on the Taos Plateau in northern New Mexico. GIS is used to explore the relationship between site location and environmental, topographic, and physiographic variables. These data are combined with existing site location data to demonstrate where Early Archaic sites are likely to occur and to determine how the distribution of sites relates to lithic sources on the Plateau. The model addresses questions regarding the availability and distribution of lithic resources in the region, and how the distribution of these resources influences site location. The result is a raster surface that indicates high and low probability areas for Early Archaic site occurrence. The presentation will explore the utility of GIS in predicting site presence by comparing the model results with Early Archaic site locations that were recorded during the 2018 field season near the No Agua Peaks obsidian source within the western portion of the monument.

Keyser, James (Oregon Archaeological Society) and Linea Sundstrom (DayStar Research)**[369] Ambrose Bierce's Indian Inscriptions: Biographic Art Along the Bozeman Trail**

In 1866 Ambrose Bierce accompanied the Hazen expedition whose tour inspected military outposts in the Department of the Platte. During cartographic work, Bierce recorded two "Indian inscriptions," one petroglyph on the Powder River near Ft. Reno, and an arboglyph on the Yellowstone River upstream from Pompey's Pillar. His recordings are detailed enough that we can decipher these narrative drawings. The petroglyph shows the aftermath of an attack on a lumber wagon, while the arboglyph shows two war expeditions, one against a Mackinaw boat on the Yellowstone River and the other against a group of Metis and their Red River cart.

Keyte, Shawn**[9] Discovery of A Lost Seminole War Fort: Fort Shackelford**

Fort Shackelford was built in February of 1855 on what is now the Big Cypress Seminole Reservation in South Florida. It was one of several forts built by the U.S. Army used to scout near the Big Cypress and Everglades regions during the U.S. Government's efforts to pressure the Seminoles into leaving the area. In late 1855, the fort was found burned and since then, the location of the fort has been shrouded in mystery. In December of 2017, new evidence was uncovered during excavations that could potentially be remnants of the lost fort. By determining the precise location of Fort Shackelford, it will help the Seminoles tell their story about an important site within their

community.

Khaksar, Somaye and Gilbert Tostevin (University of Minnesota, Twin Cities)**[115] Is It Only the Blank Size That Matters? The Effect of Edge Segmentation on Lithic Blank Cutting-Edge Efficiency**

Lithic blank/tool efficiency has been the subject of some experimental research in the last two decades. However, most of the research has largely been focused on the general morphology of the edge (straight, convex, or concave), or on some specific characteristic such as angle or the length of the cutting portion. What has not received attention is the small-scale variation in the edge morphology that is created by sharp projections and concavities in the edge and that define what portion of the blank can be used for cutting at any given time. This “segmentation of edge” can turn an otherwise long straight edge into multiple shorter segments. This means blank size, which is usually measured as “the maximum span of the flake parallel to the cutting edge” (Key & Lycett 2014:141) is not sufficient to assess the efficiency of a blank’s cutting edge. Here, we report on an experiment to evaluate the overall effect of segmentation on cutting edge performance with the hypothesis that longer segments are more efficient, in terms of time, than shorter segments. We also attempt to show how the cuts created by flakes with unsegmented edges are different from those whose edges are segmented.

Khalsa, Sant Mukh (CUNY Graduate Center)**[91] Everyday Objects and the Lived Experience: Inhabiting Gufuskálar, a Late Medieval Icelandic Fishing Station**

Early Icelandic fishing stations are understood primarily through the shifting role of fishing within the Icelandic economy and the importance of fish provisioning within the North Atlantic. Thus, less focus has been placed on studying the lived experiences and domestic lives of people who worked at and inhabited these sites. The 15th-17th century site of Gufuskálar has produced material culture that offers a rare glimpse at the durable everyday objects used by non-elite Icelanders before the Early Modern period. The extensive collection of everyday objects from Gufuskálar – such as hair pins, padlocks, candle holders, cutlery, cooking pots and gaming pieces – gives us insight into the personal and embodied daily lives of inhabitants. This poster will examine the material culture from Gufuskálar to explore tensions between narratives of the economic and the personal at Gufuskálar.

Khan, [252] see Olsen, Sandra

Khatchadourian, Lori (Cornell University)**[359] Discussant**

Kiahtipes, Christopher [82] see Schmitt, Dave

Kieffer, C. L. (Museum of Indian Arts and Culture, University of New Mexico)**[89] Museum Manners: Brushing Up on Research Etiquette by Learning from the Mistakes of Others**

Following rules and common courtesy go a long way in the realm of research, and museums research is no different. Yet, the museum world is so different from the field and most degree course work typically does not cover how to conduct museum based research. Therefore you either have to learn the ropes first hand or from a colleague. These learning methods have a heightened risk of being ill prepared and more likely to make an etiquette faux pas. This poster aims to inform archaeologists of museum etiquette for all stages of research including finding research collections, scheduling your visit, how to conduct your research while at the museum, and what is expected of you after you complete your research.

[89] Chair

Kienon-Kabore, Timpoko Hélène (University of Félix Houphouët-Boigny of Cocody, Department of History), Galla Guy-Roland Tié Bi and Arouna Yéo

[277] *Archaeological Research on the Ancient Iron Metallurgy in Côte d'Ivoire (2003-2016)*

Since the year 2003, programmed research is carried out on the old iron metallurgy in Ivory Coast. Documentary research, field surveys and archaeological excavations have discovered ancient sites of iron metallurgy from 2003 to 2016. In a large part of the regions of Côte d'Ivoire, sites were discovered, studied then dated. The northern zones (Korhogo, Mbengué, Kaniassa, etc.) and those of the South (the Eotilé Islands, Issia) of Côte d'Ivoire have yielded various remains (extraction wells, reduction furnaces, clinker habitat related to the ancient metallurgy of iron etc.). The dating obtained after excavations on the sites of forest and coastal zones (V-XIII^e centuries) and savannah (X-XI^e centuries) are between the fifth and twentieth century. A variety of technical traditions characterize these ancient techniques and show the wealth of these skills. Our objective in this study is to present a summary of the results of this research from 2003 to 2016. The written documentary data, the results of the surveys and the archaeological documents are analysed and allow to have important data.

Kiers, Roger [357] see Wilson, Jennifer

Kilby, David (Texas State University)

[187] *The Hunters Were Here First: Paleoindian Research in the Greater Southwest*

In attempting to work out the chronological relationship between a newly discovered mammoth kill and plant processing sites in southern Arizona in the 1950s, Emil Haury succinctly concluded, "the hunters were here first." In the ensuing decades, it became clear that underlying the relatively conspicuous archaeological record of the agricultural Southwest is an abundant record of Paleoindian occupations, with a correspondingly abundant history of significant discoveries and insights regarding late Pleistocene hunter-gatherers in western North America. This presentation reviews the role of the Greater Southwest in past and present Paleoindian research, and serves as an introduction and context for the papers that follow in The Paleoindian Southwest symposium.

[187] *Chair*

Kilgore, Gertrude (University of Kentucky)

[371] *Examining Early Maya Public Architecture at Gallon Jug, Belize*

Recent trends in archaeological research in the Maya lowlands focus on developing understandings of the nature of the entangled relationships between urban centers and peripheral populations. The Preclassic origins and development of centralized political authority at the urban center of Chan Chich in northwestern Belize is currently understudied in relation to its surrounding minor centers. During the 2018 field season, the Belize Estates Archaeological Survey Team began the first intensive investigations at the site of Gallon Jug, a minor center located in the northeastern periphery of Chan Chich. Following the distribution patterns of Preclassic material observed in preliminary testing conducted by Guderjan and colleagues (1991), testing uncovered a possible Preclassic structure beneath the western end of the site's final-phase main plaza. This buried monumental platform provides a starting point for considering the form and function of early public architecture at this minor regional center and comparing peripheral public architecture's formal and functional devices to the patterns observed in excavations of early phase architecture in the monumental site core of Chan Chich.

Kilic, Nihan [34] see Wellman, Hannah

Killebrew, Ann E. [388] see Skinner, Jane

Killgrove, Kristina [111] see Maxwell, Ashley

Killick, David [106] see Chiu, Scarlett

Killick, David (University of Arizona) and Edwin Wilmsen (University of Texas, Austin)

[298] Petrographic Perspectives on Ceramic Technology and Provenance in Northern Botswana

Over the last 45 years, Wilmsen, James Denbow, and others have recovered ceramics from nearly thirty excavated sites, in the northern half of Botswana. Together with Phenyo Thebe and Ann Griffiths, Wilmsen has also sampled clays and sands throughout the region, has obtained samples of raw materials, and prepared pastes and pots from multiple village potters. To date, Killick has made qualitative petrographic descriptions of more than 700 thin-sections samples from these materials. This brief presentation provides a selection of our findings. We document some unusual choices of temper (charcoal, bone) and of clay, including a distinct preference in parts of eastern Botswana for preparing pastes directly from weathered granites. Many prehistoric pots in northwestern Botswana were clearly made from clays obtained from the inland Okavango Delta, as they contain spicules from freshwater sponges and/or plant phytoliths. We can also show that some pots were transported for at least 600km. Some of these appear to relate to the southward migration of pastoralists into northwestern Botswana around 200 CE; there was a second migration into this region around 700 CE, this time of metal-using agropastoralists with very different ceramics.

[363] Discussant

Kim, Alexander (Harvard University Dept. of Anthropology), Tatyana Savenkova (Krasnoyarsk State Medical University), Svetlana Smushko (Stockholm University Dept. of Zoology, Sweden), Yevgenia Reis (Arkheologicheskoye Proyektirovaniye i Izyskaniya) and David Reich (Harvard Medical School Dept. of Genetics)

[253] Genome-wide Ancient DNA from Historical Siberia as a Lens on Yeniseian Population History

The relevance of ancient DNA to debates in language prehistory is a noteworthy strand in Eurasian archaeogenetic research, where much effort has gone towards relating these data to Indo-European. We relate new genome-wide ancient DNA data from a historical Siberian individual to Yeniseian, an enigmatic and isolated language "microfamily" at the center of numerous controversial proposals in historical linguistics and cultural interaction. Yeniseian's sole surviving representative is Ket, a critically endangered language of Central Siberia's Middle Yenisei region. In sharp contrast to the present-day situation, Russian imperial records, combined with hydronyms and other argued loans and substrate influences in non-Yeniseian languages, indicate that Yeniseian speakers formerly had a much broader presence in the Siberian taiga, further south in the Altai-Sayan region, and perhaps even further afield. The consilience of these proposals with genetics is problematic and faces a major obstacle in the lack of samples from known speakers of Yeniseian languages other than the Kets, who have had complex ongoing interactions with non-Yeniseians such as the Samoyedic Selkups. We underline the special value even of comparatively recent Siberian aDNA samples, orienting our analyses in a broader landscape of concordance, discordance, and uncertainty at the interface of diachronic linguistics and genetics.

Kim, Geon Young

[338] Latrine Use and Human Waste Management in East Asia: Configurational and Depositional Approach

Latrines have been excavated in East Asia dating back to the second century BCE. To tackle with the fact that the number of latrines that have been reported does not match with the one of settlement sites, this paper provides possible solutions of detecting a latrine with the configurational approach and the depositional approach. Excavated cesspits, cesspools and flushing type latrines made of bricks and wood, as well as the mortuary pigsties and latrines from Han Dynasties' tombs, suggest possible architecture structures of latrines. Artifacts such as hygiene sticks and wood ash can be used to determine the presence of latrines. Also, the anaerobic condition makes sediment analysis be possible. Considering the geologic condition of this region, some insects, macrobotanical remains, parasites, phosphate, coprostanol, and vivianite can be used as indicators. Latrine structures, in relation with the context concerning the surrounding environment, provide information of latrine use, human excrement and waste management, and reveal people's idea towards latrines and human waste in ancient East Asia.

Kim, Ha Beom (University of Oregon)**[156] Examining Recent Archaeological Findings at the Bronze Age Korean Settlement of Jungdo Using an Economic Perspective**

Recent archaeological excavations at the Jungdo site, Chuncheon, Korea have revealed a rare ditch-enclosed Bronze Age settlement in which more than 1,000 pit houses and 100 dolmens were found. As a large-scale complex settlement with evidence of spatial demarcation that divides the site into residential, production, storage, and burial areas, the Jungdo site provides valuable information on the lifeways of inhabitants at Bronze Age settlements and their interactions. The site is therefore very important for the Bronze Age settlement studies in Korea. This study presents the general findings of the archaeological excavation and archaeobotanical analysis at the site since 2013. While preliminary, the study also examines potential economic interactions occurred between Jungdo and other Bronze Age settlements present in the North Han River basin through the use of GIS and other computational analysis.

[156] Chair**Kim, Lynn (University of Texas at San Antonio)****[46] The Materialization of an Inka Colonial Landscape: Exploring the Road Network in the Camata-Carijana Valley**

Colonial encounters with the Inka Empire led to social changes reflected in the landscape. A hallmark of Inka landscapes were their roads. I explore if the road network in the Camata-Carijana Valley materialized broader forms of state or local control through its distribution and construction. In particular, I investigate how the design of road system influenced movement of people and goods through the Valley. The poster focuses on my use of costs path analysis and Tobler Hiking Function to explore the time of travel and the movement of llama caravans. Analysis suggests that the pre-Hispanic road in the Camata-Carijana Valley was designed to (1) connect people from the highlands to the lowlands and (2) move people to the major Inka settlements in the Valley. Indeed, small local settlements were bypassed by the roads; Thus, the road network supported imperial trade and exchange between groups and discouraged (limited) local trade and exchange.

Kim, Nam [300] see Allard, Francis

Kim, Sophorn [300] see Bhattacharyya, Tiyas

Kimball, Larry R. [120] see Bradley-Lewis, Neeshell

Kimbrell, Caroline (University of London), Sara Lunt (The Cusichaca Trust) and David Drew (The Cusichaca Trust)**[306] The Cusichaca Archive: History, Contents and Research Potential**

In 1977, Dr Ann Kendall established the Cusichaca Trust, registered in the UK, to oversee her archaeological project work. Today the Cusichaca Archive documents forty continuous years of one of the largest multi-disciplinary projects ever mounted in the Peruvian Andes. Beginning with archaeological excavation in the Cusichaca valley near Machu Picchu, the Trust's involvement expanded to include ethnography, ethno-history, and environmental studies. The Trust pioneered 'Applied Archaeology'-initial archaeological investigation leading to collaboration with local farming communities in the restoration and re-use of pre-Hispanic systems of irrigation canals and agricultural terraces. Success here led to similar commitments across a wider area. The paper will summarize Cusichaca's history and the work of London University's Senate House Library to accession, describe, digitize and secure the long-term legacy of the Trust's work. Most of the manuscripts, typescripts, maps, thousands of photographs, and extensive primary field records remain unexplored and unpublished. The Library has pioneered an approach involving student archivists from Ann Kendall's alma mater University College London, to process and accession the archive, using the records as teaching material and completing the structuring and cataloging using a dedicated Project Archivist before running a competition to provide the records in digital form.

King, Eleanor (Howard University), Neil Hansen (Brigham Young University), Richard E. Terry (Brigham Young University, Emeritus), Christine Taylor (Maax Na Archaeology Project) and Michael Brennan (SEARCH Inc.)

[30] *Soil Differences and Their Implications for Plaza Function and Site Organization at Maax Na, Belize*

In 2016 the Maax Na Archaeology Project systematically tested the soils of two major plazas at Maax Na, a large prehispanic site located in the Three Rivers Region of Belize. Tests in the West Plaza sought to determine whether phosphorus levels there supported its identification as a marketplace during the Late Classic (C.E. 600-850). Similar tests at other sites have suggested that regular, linear distribution of high soil phosphate levels could signal an ancient market area, in conjunction with other marketplace indicators. Sampling of the North Plaza, thought to be the main ceremonial plaza at the site, was aimed at testing this proposition by determining if phosphate levels were consistent or varied across the site. Also of interest were data on heavy metal concentrations, which can signal different activities. Recently completed geochemical analyses of the samples reveals the two plazas had strikingly different chemical signatures, giving new insights into plaza functions and site organization.

King, Jason [176] see Jones, Emma

King, Jason (Center for American Archeology), Jane Buikstra (Arizona State University) and Robert Pickering (University of Tulsa)

[185] *Ontology, Time Travel, and Transformation in the Lower Illinois Valley*

In this paper, we explore the implications of time travel (Holtorf) and ontology (Viveiros de Castro, Latour, Pedersen) for bioarchaeological perspectives of Middle Woodland (Hopewellian) peoples of the lower Illinois River valley (LIV), who occupied this region two millennia ago. Following Pedersen's advice concerning reflexivity, conceptualization and experimentation, we argue that these Hopewellians became primordial beings during both unique and repetitive events that ensured balance across their worlds. We argue that people of all genders assumed ancestral and animal forms in their temporal travels anchored calendric, repetitive and multi-community rituals draped across monumental landscapes. The varied, richly productive landscape offered many potential animal familiars to those who traveled far to acquire shiny obsidian, gleaming copper, or the transparent mica that invited those Hopewellians no longer living to pass into the world below, a parallel universe from which life itself would come again. No less significant were the seasonal gatherings where participants recreated the world, sharing abundance and wisdom as they crossed impermanent boundaries between the cultural and the natural.

King, Julia

[133] *Sea Level Rise, the Chesapeake Bay Bolide, and Managing Threats to Archaeological Sites in Coastal Maryland*

A study commissioned in 2015 by the St. Mary's County, Maryland Historic Preservation Commission sought to measure the impacts of residential and commercial development on the county's archaeological resources. The study's findings revealed minimal impact by development but a stunning threat from sea level rise compounded by the land subsidence caused by a 35-million-year-old meteor event. Because these sites (identified and unidentified) are not threatened by development, resources are limited for documenting and managing them. To address this deficit in the state's low-lying coastal plain, archaeologists might consider two things: one, a return to wide-area surveys using sophisticated GIS-based modeling and two, linking these surveys not only to climate change but to addressing important historical, social, and cultural questions.

King, Stacie (Indiana University) and Shanti Morell-Hart (McMaster University)

[197] *Preserving Oaxacan Foodways in the Face of Conquest: The Seed Bank at Cerro del Convento*

The rich culinary traditions of Oaxaca were both enhanced through and catastrophically disrupted by Spanish incursions during the Colonial Period. However, in spite of many radical transformations in cooking techniques and ingredients, indigenous people of Oaxaca persisted in their use of certain foods and practices. This persistence sometimes required extraordinary effort, especially in times of physical and spiritual insecurity. A specialized storage feature excavated in a rockshelter at Cerro del Convento, in the Sierra Sur region of Oaxaca, represents just such efforts. Remarkably, this one small rock and daub bin contained over 120 different plant taxa in less than one liter of

sediment. We argue that Cerro del Convento was used as both a physical retreat and a location where seeds of treasured food plants, i.e. agricultural futures, were deliberately curated. While seed banking is well represented in the modern world (e.g. Svalbard Global Seed Vault), the Cerro del Convento collection is the first of its kind in Mesoamerica and the richest find to date in the pre-Hispanic and Colonial Americas. The deposit indexes the importance placed on preserving foodways in times of crisis and highlights ingredients and practices of Oaxacan cuisine that persist to this day.

[256] *Discussant*

Kingston, Lauren (National Park Service)

[16] *Discussant*

Kinnear-Ferris, Sharyl

[237] *Recovery of Inadvertent Discoveries along the Lost Coast of the King Range NCA*

Recovery and reburial of inadvertent discoveries of exposed pre-Columbian human remains has repeatedly occurred at a remote archaeological site along the Lost Coast of the King Range National Conservation Area, managed by the Bureau of Land Management-Arcata Field Office. The site is located in a remote area, subject to ocean wave action and seismic activity. It is within a congressionally designated wilderness area, and is accessible only by backpacking. BLM has consulted with the Bear River Band of the Rohnerville Rancheria (BRBRR), the geographically proximal Federally-Recognized Tribe regarded as the Native American representative, and the California State Historic Preservation Office (CA SHPO). These consultations resulted in the completion of a Native American Graves Protection and Repatriation Act (NAGPRA) Plan of Action (POA) and a Treatment Plan. The Section 106 compliance process resulted in a Memorandum of Agreement (MOA) between BLM and CA SHPO (expires October 2019). The BLM CA State Director authorized reburial of recovered remains. An internal BLM funding request for FY19 proposes a data collection project to better understand the erosion rate of the Lost Coast marine terrace and assess the vulnerability of significant cultural resources. The data set will inform a mitigation plan.

Kinsner, John [237] see Hicks, Keri

Kintigh, Keith (Arizona State University)

[225] *Moderator*

[188] *Discussant*

Kinyanjui, Rahab [115] see Oppenheim, Georgia

Kirakosian, Katie (UMass Amherst)

[136] *Out of Site, Out of Mind: Women's Hidden Labor and the Making of Modern American Archaeology*

While some work has been done over the past few decades to uncover the roles of female archaeologists who supported their husband's careers with little acknowledgment, less work has been done to explore the diversity of forgotten women's labor that helped support American archaeology since the late 19th century. Institutions such as Harvard's Peabody Museum of Archaeology and Ethnology and the Robert S. Peabody Museum of Archaeology benefited from countless female clerks, stenographers, secretaries, librarians, and other staff. At Harvard University, many archaeology graduate students who had young children benefited from an informal economy of female caregivers that lived on campus as well. Although different in many ways, the 21st century has seen a stark increase in non-tenure track faculty, who account for over 70% of faculty in American universities, or 1.3 million out of 1.8 million professors. Of these 1.3 million professors, it is estimated that between 51% to 61% of contingent faculty are women, who feel the effects of uncertain futures in Higher Education all too well.

[226] *Discussant*

[136] *Chair*

Kirch, Patrick [34] see Swift, Jillian

Kiriatzi, Evangelia [363] see Lis, Bartłomiej

Kiriatzi, Evangelia (Fitch Laboratory, British School at Athens)

[363] *Discussant*

Kirk, Scott, Emily Lena Jones (University of New Mexico), Caitlin Ainsworth (University of New Mexico) and Jana Meyer (University of New Mexico)

[25] *The Community at the Crossroads: Insights into Connectivity from the Tijeras Pueblo Fauna*

Tijeras Pueblo lies at a crossroads. It sits at the junction of two canyons, one north-south and one east-west, and occupies a boundary between two distinct culture areas—the Pueblos to the west and the Plains to the east. This position on the landscape may have created both challenges and opportunities for the residents of Tijeras Pueblo in terms of subsistence. Previous studies of the Tijeras Pueblo fauna have focused on the marginality of Tijeras Canyon for maize agriculture. However, the large number of environmental zones accessible from this spot, as well as the cultural connectivity suggested by the Pueblo's location, would afford residents access to an abundance of wild resources. In this paper, we discuss preliminary results from our analysis of the fauna from Tijeras Pueblo, with a particular focus on what they suggest about cultural connectivity and resource richness.

Kirk, Scott [337] see Rosa, Alexander

Kirkland, Brenda [97] see Renson, Virginie

Kirkley, Samantha (Utah Project Archaeology) and Jeanne Moe (Project Archaeology)

[184] *Classroom to Camp: Implementation and Assessment of Archaeology K12 Curriculum at a Girl Scouts Camp in Southeastern Utah*

Project Archaeology is a heritage education organization dedicated to teaching scientific and historical inquiry, cultural understanding, and the importance of protecting our nation's rich cultural resources. It is a diverse network of educators that make archaeology education accessible to students and teachers nationwide through high-quality educational materials and professional development. Project Archaeology: Investigating Shelter, its' award-winning curriculum guide, is a complete archaeological investigation that aligns with Common Core and Next Generation Science standards, and is endorsed by the National Council for the Social Studies.

Due to interest in enhancing informal education, Project Archaeology adapted its' Investigating Shelter curriculum for a Girl Scouts archaeology camp. For the past 3 years, the camp was held in Southeastern Utah allowing scouts to visit Ancestral Puebloan sites and learn from Ute and Navajo educators. In an effort to measure implementation effectiveness, pre- and post- tests were administered in association with the June 2018 camp at Bears Ears National Monument. Results of the camp assessments compared with assessments previously administered in classrooms around the country will help to improve future informal education programs.

Kiss, Viktória [126] see Giblin, Julia

Kissel, Marc (Appalachian State University) and Agustin Fuentes (University of Notre Dame)

[247] Extending Paleoanthropology with the Extended Evolutionary Synthesis

Discerning the patterns and processes of human origins has been mostly centered on a gene-eye's view of fitness landscapes. This interpretive structure is partially undermined by modern biological thought that emphasizes a more holistic approach to evolution. We suggest that the broader framework of the Extended Evolutionary synthesis allows for a better interpretation of paleoanthropological data. Some scholars have suggested that Niche construction blurs the boundaries between ultimate and proximate drivers of evolution. However, while thinking in terms of proximate and ultimate causation is useful, the two cannot always be separated while discerning relevant processes in ecosystems. In this paper, we emphasize the role of niche construction and suggest its value can be strengthened by firm footing in semiotic theory and the Extended Evolutionary Synthesis. We argue that the niche (and the concept of Umwelt) is a useful way to understand the organism—environment interface and apply this theoretical framework to two specific examples: 1) hominin evolution and 2) the processes of modern human origin. Using new results from aDNA, fossils, and archaeology we show that models which incorporate the Extended Evolutionary Synthesis are better fits for the current data that emphasizes hybridization and the expansion of the human niche.

Kistler, Logan [153] see Przelomska, Natalia

Kistler, Logan (Smithsonian Institution)

[302] The Evolution of Domestication in Cassava Unraveled through Historical Genomics and Archaeobotany

Cassava ('manioc' or 'yuca' regionally) is a staple food for 800 million people worldwide. It was domesticated in the southwestern Amazon ~7,000 years ago, and archaeobotanical evidence suggests that it dispersed widely, including through Central America, shortly thereafter. In the present day, it is most widely grown in Brazil and throughout sub-Saharan Africa. However, we know surprisingly little about its fundamental biodiversity and the domestication process. Here, we present new genomic data from historical collections which, combined with archaeobotanical records, begin to elucidate the evolution of domestication in cassava.

[302] Chair

Kita, Yuko (Instituto de Arquitectura, Diseño y Arte, Universidad Autónoma de Ciudad Juárez), Miguel Domínguez Acosta (Instituto de Ingeniería y Tecnología, Universidad), Aldo Izaguirre Pompa (Instituto de Ingeniería y Tecnología, Universidad), Patricia Girón García (Instituto de Geología, Universidad Nacional Autónoma) and Alberto Peña Rodríguez (Instituto Nacional de Antropología e Historia)

[346] Identification of Earthen Construction Techniques in the Casas Grandes Region, Chihuahua, Mexico

This study compares pre-Columbian earthen construction techniques in three archaeological sites of the Casas Grandes region: Paquimé, Arroyo Seco, and Cueva de la Olla. These sites are found in different geological and geomorphological setting, although they present similar architectural typology. Their construction techniques were examined by archaeometric characterization, such as particle-size analysis, thin-section petrography, X-ray diffraction, and X-ray fluorescence analysis. These analyses were performed on samples from walls of archaeological constructions and samples from local material banks previously identified as potential original material source banks. The study demonstrates the local origin of earthen construction materials, and the techniques particularity for each site, which reflects their adaptation to the local geological and geomorphological context.

Kitagawa, Keiko (University of Tübingen, Germany), Dario Massafra (Museo della Pristoria di Nardò, Italy) and Filomena Ranaldo (Museo della Pristoria di Nardò, Italy)

[144] Neanderthals in Porto Selvaggio, Southern Italy

Porto Selvaggio of southern Italy is where the Uluzzian culture was first identified and documented, providing key insights into the transition of the Middle to the Upper Paleolithic. The area has also yielded evidence of continuous Neanderthal occupations spanning MIS 5-3. Situated in the Natural Park of Porto Selvaggio, several sites were excavated by Brozatti von Lowenstein in 1960's and 70's. As a part of research initiatives at the Museo della Preistoria di Nardo, we began to revisit the artifacts and fauna recovered from these sites. Based on the analysis of

the production sequences and techno-functional classification of the lithics, we document the development of Levallois technique prior to the end of MIS 4 when this lithic technology purportedly emerged in this region. In addition, the reanalysis and correlation of chronostratigraphic, paleoenvironmental, and zooarchaeological data provide us clues into the role that this region played as a possible refugium for Neanderthals during unfavorable climatic conditions.

Kitchel, Nathaniel (Dartmouth College)**[235] Discussant**

Kitchel, Nathaniel [324] see Rockwell, Heather

Kitterman, Anya**[282] Discussant**

Kiura, Purity [316] see Dillian, Carolyn

Klamm, David [112] see Perkins, Jeremiah

Klassen, Sarah [81] see Russell, Will

Klassen, Sarah (Arizona State University)**[300] Emerging Epicenters and Complementary Centralized and Decentralized Water Management Strategies at Medieval Angkor, Cambodia**

Recent research at Angkor has aggregated over 20 years of archaeological map data, which is providing important new perspectives on the agricultural production system of the polycentric low-density urban complex. Much scholarly attention has been directed towards the functional vs. ritual nature of the huge reservoirs and channels (Van Lier, 1980). However, smaller, community-based agricultural units were likely important components of the agricultural system. In this paper, I trace the chronological and spatial development of two types of settlement patterns: 1) formally-planned dense urban zones that are termed epicenters and 2) lower-density settlement units comprised of temples and associated reservoirs and occupation mounds that are termed temple communities. Building from the work of Evans et al. 2013, this paper argues that groups of non-producers that lived in the epicenters would have been highly dependent on agricultural surplus produced by temple communities utilizing local and state hydraulic features. To determine if new temple communities are built near state-sponsored hydraulic infrastructure, nearest neighbor analysis and point density analysis are conducted. Results suggest that temple communities cluster around state-sponsored hydraulic features.

Klaus, Haagen [258] see Ham, Allison

Klehm, Carla (University of Colorado Boulder), Mark Helper (University of Texas at Austin) and Elisabeth Hildebrand (Stony Brook University)**[82] From Mineralogy to Monuments: Place-Making through Personal Ornamentation in Mid-Holocene Turkana, Kenya**

Beads play a prominent role in personal ornamentation in life and death: desired, exploited, and widely traded throughout prehistory. Although manufacture and use provide important social context, evaluating the materials used and their source locations is a crucial component of understanding how these industries arise. This paper features an unusual stone bead industry from Lake Turkana, Kenya associated with the first pastoralists in East Africa 5,000

years ago that rivals the mineralogical complexity of its global counterparts. Excavations at the sites of Lothagam North and Manemanya suggest these were mortuary monuments built by mobile pastoralists people who exploited a number of geological sources extensively to adorn their dead without the direction of dictation of a ruler or state. Stone beads found at these sites, in tandem with previously curated collection from another nearby site, Jarigole, provide contrast to the bead industries that emerge in agricultural and state societies. Through an examination of the mineralogy and sourcing of the beads, we argue this bead making phenomenon represents a significant investment in material elaboration when social values were under renegotiation, with a time, location, and context not currently considered in archaeominerological literature.

[140] *Moderator*

[140] *Discussant*

Klein, Cecelia

[304] *Eagles, Falcons, and Vultures: The Birds on the Platform of the Eagles and Jaguars at Chichen Itza*

All sixteen birds carved on the sides of the Platform of the Eagles and Jaguars at Chichen Itza have been traditionally identified as eagles. Because each pair of birds flanks a large relief of a seated jaguar holding a heart, it has been assumed in the past that the platform celebrated military orders like those honored by the later Aztecs, whose most valiant warriors were associated with either the eagle or the jaguar. Arguing that not all of the sixteen birds are eagles, and exploring the implications thereof, this paper proposes a new interpretation of the platform's meaning and function.

Klein, Terry

[4] *Discussant*

Kleist, Mari [185] see Whitridge, Peter

Klembara, Nathan

[179] *Queer Eye for the Cave Guy: Exploring Non-Normativity in Upper Paleolithic Burials*

Studies of Upper Paleolithic burials in Europe have illuminated several aspects of Upper Paleolithic lifeways, from health and diet, to status and social organization. These studies, while recognizing the rarity of Upper Paleolithic burials, interpret the Upper Paleolithic burial record as inherently normative. However, the intentional burial of people within cave and rockshelters was a non-normative practice. To date, fewer than 100 burials are known from the Upper Paleolithic in Europe. This practice, and the individuals contained within these burials, were not only rare, they were non-normative – they were queer. These buried individuals lived outside what was likely considered “normative” in the Upper Paleolithic, and it is for this reason they were singled out for burial. In this paper, I argue that analyzing these Upper Paleolithic burials through an explicitly queer lens will enhance our understanding of these burials, the individuals contained within them, and issues of Upper Paleolithic identity and embodiment more broadly. These buried individuals were challenging the norms of the Upper Paleolithic, and by analyzing them as radically queer, rather than the more politically and analytically inert “rare”, we can begin to push against our normative understandings of the past.

Klemmer, Amy (University of Wisconsin-Milwaukee) and Valentina Martinez (Florida Atlantic University)

[285] *Zooarchaeological Analysis of a Guangala Pit at Rio Chico, Ecuador (N4C3-170)*

The Rio Chico site on the central coast of Ecuador was occupied almost continuously for 5000 years (ca. 3500 BCE to 1532 CE) in a region of coastal South America that is heavily influenced by climatic events such as El Niño Southern Oscillation (ENSO). Archaeological records and historical documents written by the Spanish provide evidence that by the Manenyo phase (500 to 1532 CE) the coast of Ecuador was inhabited by a maritime culture of long-distance trade merchants who were highly skilled at boat building and ocean navigation. However, the preceding Guangala phase (100 BCE to 800 CE) is less understood. This poster presents the results of a zooarchaeological analysis of a sample of faunal remains from a large Guangala phase pit feature (Feature 733)

excavated by Florida Atlantic University (FAU) field school in 2003. All remains were identified to the class level and a subset of this sample was identified to the family level. These identifications serve as the basis of this analysis. This analysis contributes to an understanding of the subsistence strategies and environmental conditions on the coast of Ecuador during the Guangala phase from which the highly skilled Manteño culture developed.

Klesner, Catherine [211] see MacDonald, Brandi

Klesner, Catherine (University of Arizona), Brandi MacDonald (Archaeometry Laboratory, University of Missouri Re) and Pamela Vandiver (Department of Materials Science and Engineering, U)

[389] *Regional Production and Trade of Glazed Ceramics in Medieval Central Asia along the Silk Road*

Analyses by NAA and LA-ICP-MS of 106 ceramics excavated from archaeological sites in southern Kazakhstan has demonstrated local production of lead-glazed ceramics during the Early and Middle Islamic periods in Central Asia. The sherds, including both glazed (n=39) and unglazed ceramics (n=67), were excavated from seven medieval sites dated from the 9th to 15th c. CE and located north of the Tien Shan mountains. Compositional analysis of the ceramic pastes by NAA indicates that there are three distinct compositional groups for the lead-glazed ceramics. Comparison of the glazed ceramic NAA data to more than 1300 previously analyzed ceramics from Southwest Asia, Central Asia, and China indicates both an active local production of lead-glazed ceramics, and trade of specialty and glazed ceramics into the region from Southwest Asia. While the paste composition of the glazed groups is well defined, LA-ICP-MS data of the major, minor, or trace elements of the glazes does not distinguish the same compositional groups. Characterization by SEM-EDS and EMPA of examples of ceramics from the three lead-glazed compositional groups examines the technological variation within and between the locally produced Central Asian and imported Islamic lead-glazed wares.

Klimowicz, Janis [368] see Haynes, Gary

Klunk, Jennifer [131] see Dhody, Anna

Knell, Edward (California State University, Fullerton)

[249] *Current Perspectives on the Western Stemmed Tradition and Clovis in the Mojave Desert*

This paper summarizes the spatial and temporal distribution, technology, and subsistence patterns of Clovis/fluted and Western Stemmed tradition sites and isolates in the southern Great Basin, particularly the Mojave Desert. Fluted and Western Stemmed Tradition (WST) points/sites occur throughout the Mojave Desert, though WST points (primarily the Lake Mohave and Silver Lake varieties) are more widely distributed and occur in greater numbers than fluted points. Many, but not all, of these points were found near shorelines of now dry lakes. After summarizing the distribution, technology, and subsistence trends at the regional-scale, I consider these same trends at the local-scale using my ongoing research around pluvial Lake Mojave (today's Soda and Silver dry lakes) as a case study. Despite the limitations of a largely surface record, important insights are gained about the lifeways of Paleoindians in the Mojave Desert and, more generally, those in the Intermountain West.

Knight, Terry [244] see Shurack, Nichol

Knight, Terry (Ute Mountain Ute THPO), Jessica Yaquinto (Living Heritage Anthropology) and Nichol Shurack (Ute Mountain Ute THPO)

[313] *Ute Ethnographic Cultural Landscapes in Southeast Utah*

The Nuche, or Ute people, have been in their homelands across Colorado and Utah since time immemorial. Southeast Utah formed part of the larger movements of the Ute bands with connections to the area, which in turn formed part of the overall Ute movements across the entire Ute homeland. The cultural landscape of southeast Utah serves as a microcosm of Nuche lifeways as a whole. The Abajos of southeast Utah, for example, not only provide

nourishment of wild animals the Utes hunt, plants they gather, and crops they farm downstream, but also provide spiritual nourishment and cultural continuity. It proves vital then to not only consider specific archaeological sites, but how the entire cultural landscape formed a necessary part of Ute lifeways. A Utah BLM funded ethnographic study is showing the depth and variety of 32 tribes' connections to southeast Utah, but this talk will specifically focus on Numic, both Ute and Southern Paiute, cultural landscapes in southeast Utah. Included in this discussion will be an overview of interdisciplinary ethnographic and archaeological documentation being conducted at a Numic petroglyph site, as well as how tribes and archaeologists can better collaborate to reach mutually beneficial outcomes.

Knipper, Corina [386] see Fisher, Lynn

Knobloch, Patricia (RA, Institute of Andean Studies)

[250] *Discussant*

Knudsen, Garrett (Institute for Northern World Science and Anthropology) and Joseph Pnewski (Institute for Northern World Science and Anthropology)

[269] *Innovation, Intensification, and "Maritimeness" 4,500 Years Ago at Chignik, Alaska*

On the south side of the central Alaska Peninsula, close to culture-history's boundary between "Eskimo" and "Aleut," lies Chignik. Most archaeological investigations and explanations in the broader region have emphasized the overwhelming importance of resources derived from the sea. But at Chignik, evidence of a divergent facet of maritime adaptation has been identified, one physically oriented away from the coast and focused on salmon. Recently, large, stratified cultural deposits were incidentally uncovered within the Village of Chignik Lake during infrastructure improvements. These deposits sat below well-known volcanic tephra, yielded diagnostic projectile points and tools, and produced charcoal samples for which AMS dates were generated. These data prove substantial human occupation at Chignik much earlier than previously-confirmed for the region, one that occurred nearly 5,000 years ago and shared some characteristics with the Arctic Small Tool Tradition. This paper explores culture-history, maritime adaptation, and salmon intensification to discuss human adaptation as technological innovation at Chignik, in the broader context of regional Holocene climate models.

Knudsen, Pauline [251] see Walls, Matthew

Knudson, Kelly [206] see Greenwald, Alexandra

Knudson, Kelly [111] see Scaffidi, Beth

Ko, Jae Won [156] see Park, Geun Tae

Kober, Brent, Suzanne Hayden and Martin McAllister

[135] *Why Is There No American Convention on the Protection of the Archaeological Heritage?*

The question posed in the paper title will be addressed by presenting arguments for the development and adoption of an American Convention on the Protection of the Archaeological Heritage similar to the existing European convention on heritage protection. Using the European convention as a model, important components of an American convention will be considered, recognizing the unique heritage protection issues faced in the Americas, particularly the multi-cultural heritage of the western hemisphere. It will be argued that an important component of the convention should be positive actions to increase government, corporate and public support for protection of heritage resources by strengthening the concept of "ownership" of these resources by these groups beyond the acknowledged interests of concerned resource professionals including archaeologists, cultural resource managers and museum specialists. Recent considerations of this issue by European heritage professions will be reviewed to support the essential need for this non-professional involvement in heritage protection. Finally, this paper will recommend a potential strategy for developing a draft American Convention on the Protection of the Archaeological

Heritage and moving it toward adoption by governmental entities of the Americas.

Kocer, Jacqueline**[213] *Gallina Ceramics: A Multi-site Pilot Study on the Composition of Gallina Sherds in Thin-Section***

The Gallina (AD 1100-1300) people of northwestern New Mexico produced both Black-on-Gray and utility ware ceramics. Gallina ceramics appear to be produced at the household level with no evidence for specialization. Little is known about Gallina ceramic production practices and few compositional analyses have been conducted. This pilot study examines ceramics in thin-section using Petrography and the Electron Microprobe Analyzer illustrating paste composition from three sites. Results from this analysis suggest the use of grog temper, a practice not yet documented in the Gallina area. Comparing Gallina paste composition across three sites lends insight to similarities and differences in communities of practice.

Koch, Allan [147] see Farmer, Reid

Koenig, Alex (New Mexico State University)**[208] *Contextualizing Campsites: Survey Results and Comparisons from Two Parajes along El Camino Real de Tierra Adentro***

As part of ongoing projects relating to El Camino Real de Tierra Adentro, NMSU students surveyed the North Fork Paraje, a campsite near a section of the Camino Real in southern New Mexico. These ephemeral sites are generally difficult to locate, with many sites attested to in archival documents still undiscovered, resulting in a general lack of scholarship relating to them. The recent survey supports a conclusion by an earlier study that placed the heaviest period of use for the paraje in the 18th century. Furthermore, during the colonial period, the paraje appears to have been used primarily by travelers moving north from Mexico. Artifact and spatial analyses reveal differences between the North Fork site and the nearby Paraje San Diego, demonstrating the non-uniformity of this site type. These differences reflect the various ways the trail was used and experienced over time.

Koenig, Charles [36] see Lawrence, Ken

Koenig, Charles (Texas State University, Shumla Archaeological Research and Education Center)**[36] *Assessing Earth Oven Intensification in the Lower Pecos Canyonlands of Southwest Texas***

Earth oven baking begins in the Lower Pecos Canyonlands of southwest Texas around 10,000 years ago and becomes a prominent component of hunter-gatherer life throughout the Holocene. We know plant baking played an important role within Lower Pecos lifeways because earth oven facilities (EOFs)—the locations where hundreds to thousands of earth ovens were constructed over millennia—are the most common archaeological features in the region. However, given the ubiquity and outwardly invariant nature of Lower Pecos EOFs, little research has been directed at assessing intensification and changes in long-term earth oven use, or evaluating the social impacts of earth oven construction and plant baking. Recent excavations at four rockshelters in Eagle Nest Canyon, a short box-canyon tributary to the Rio Grande, provide an opportunity to address these research issues. Focusing primarily on intensive radiocarbon dating, rigorous stratigraphic documentation, and estimates of the total number of constructed earth ovens, we assess earth oven intensification, long-term use, and the potential social dynamics of earth oven construction within the four rockshelters in Eagle Nest Canyon. These data can be used to address the potential implications for broader regional mobility and landuse studies.

[36] Chair

Koenig, Viola (Ethnologisches Museum)**[198] From Narrative Picture Writing Bands to Pseudo Cartographies. How Native Scribes Invented Powerful New Media after the Conquest**

Scholars have always believed that maps and cartographies did exist in preconquest Mesoamerica. The large amount of early colonial Native maps seems to be evidence for such geographic media. But as yet, no pre-Hispanic lienzos and maps have become known. However, the earliest lienzos do show pre-Hispanic elements in their structure, iconography, and content, albeit in varying degrees. There are many indications that the authors were familiar with prototypes. With the creation of the Lienzo as a modern-looking new medium they were able to integrate mythical and real history known from the pre-Hispanic codices as a process in the flow of time. Transferred to the new medium they do not express any rupture that occurred when the Spaniards arrived and seized power; they rather integrate that event. In the paper, typical cases will be exemplified by the examples of the Codex Vienna, Lienzos Seler II/Coixtlahuaca II and Tlapiltepec from Oaxaca, and other documents. Their central theme is the pre-Hispanic legitimization of power, changing concepts and claims to territory while the media, structure, and style of the documents are subject to change, and reflect the reception habits at the time.

Koeppel, Christopher (US Forest Service) and Doug Stephens (USDA Forest Service)**[75] Creative Mitigation and Collaborative Outcomes in Section 106 Planning**

Too often the Section 106 process for archaeological historic properties follows a formal checklist, and mitigation of archaeological sites through intensive Phase III excavation is the assumed outcome. However, Phase III excavation may not be the most desired outcome for the people that have deep emotional and spiritual connections to these archaeological resources. Alterations or impacts to sacred sites or cultural resources that represent community cohesion are not mitigatable in the traditional sense, and Phase III excavation would not be desirable. We will present several examples from Federal civil works, transportation, and USDA Forest Service projects of creative mitigation that benefited both the agencies' missions and the interests of consulting parties and Native American tribes. If we include consulting parties and tribes during scoping and project design, rather than wait until later Section 106 or NEPA stages, we can create a collaborative planning process that avoids adverse impacts to important archaeological resources. This enhances the meaning and relevancy of the NHPA-based planning decisions by identifying collaborative, value-added cultural resource stewardship outcomes, while allowing agencies to plan and engage with cultural resources in a less reactive manner.

Koerner, Shannon (Colorado State University, CEMML) and Bretton Giles (Colorado State University, CEMML)**[147] An Assessment of Central Plains Tradition Ceramic Variation in the Flint Hills Region of the Eastern Plains, USA**

The Central Plains tradition (CPt) encompasses a variety of Late Prehistoric adaptations in the eastern Plains between AD 1100 and 1400. Cultural taxa within the CPt often are defined by certain pottery types within defined areas along the Kansas and Missouri River valleys. The Smoky Hill phase is a CPt taxon for the Flint Hills region in the Kansas River valley. Recent studies of particular Smoky Hill phase sites by the authors in the vicinity of the Fort Riley Military Installation have prompted us to reassess their pottery assemblages and temporal placements. Our studies have uncovered a mix of traits in these CPt ceramic complexes that make it difficult to understand whether certain sites reflect an in-situ development, long-distance influence, population intrusion, or multiples of these factors. This paper assesses some of the variation within CPt pottery in the Flint Hills region with a focus on documenting the composition of these assemblages and how their variability relates to recent radiometric dates for the sites.

Kohanski, Neil (California State University, Los Angeles) and Jeffery Rosa Figueroa (California State University, Los Angeles)**[360] The Ritual Requirements for Opening a Maya Cave**

In 1966 a cave near Chichen Itza was reported to the Instituto Nacional de Antropología e Historia (INAH) by Maya living in the area. The cave was investigated by Victor Segovia Pinto, after which the sinkhole entrance was filled with rocks. When archaeologists from the Gran Acuífero Maya opened the cave 52 years later, workers on the project demanded that a ritual be performed that would protect the workers and the entire archaeological crew. A mesa or altar was constructed at the site and offerings of atole, liquor, cigarettes, and honey were made. The ritual

specialist purified the area by sprinkling liquor in the four cardinal directions surrounding the cave entrance. In the Maya lowlands, caves are ubiquitous features in the landscape. The ceremony described here reflects the fact that features like caves are deeply embedded in Maya cosmology and that the investigation of such features is considered to hold potential danger. Observations reported by the archaeologists were consistently seen as holding deep magico-religious significance by the Maya.

Kohler, Tim (WSU/SFI/CCAC)

[31] *Discussant*

Kohler, Tim [86] see Bocinsky, Kyle

Kohut, Betsy (Millsaps College)

[227] *Discussant*

Kohut, Betsy [372] see Brownstein, Nathan

Kohut, Lauren (Bowdoin College)

[18] *Constructing Difference: Defense, Sensory Experience, and Social Difference at a Late Prehispanic Hillfort (Arequipa, Peru)*

The fortified settlement of Auquimarka was one of many hilltop fortifications built during the Late Intermediate Period (1000 – 1450 CE) in the Colca Valley of the southern Peruvian highlands. While most fortifications fell into disuse following Inka expansion into the region, Auquimarka continued to grow and became a modest administrative center. The hilltop promontory location and numerous defensive walls are among the most striking features of the settlement. While crucial for defense, these features were also important in ordering the construction of homes and public spaces and in shaping the sensory experiences of residents as they moved through the settlement. Survey and excavations at the site indicate growing social differentiation between residents over time; differences that were often structured in relation to the settlement's defensive features. Capitalizing on the excellent architectural preservation at the settlement and a high-resolution digital terrain model captured from UAV imagery, this paper examines how social differences were mediated through experiences of visibility and mobility. The long history of occupation at Auquimarka offers insights into how social and political changes brought about by Inka rule were enacted in relation to earlier Late Intermediate Period experiences of war and settlement nucleation.

Kolar, Miriam (Five College Associate)

[315] *John Rick: Archaeoacoustics Maverick*

The research and conservation program directed by Dr. John Rick at Chavín de Huántar, Perú was one of the earliest major archaeological projects to invite and support integrative archaeoacoustics. Since 2008, Chavín archaeoacoustics has been featured in venues and publications across disciplines including archaeology, anthropology, acoustics, audio engineering, ethnomusicology, music archaeology, and the international science community, while simultaneously garnering attention in popular press. Among the driving factors for a sustained and comprehensive archaeoacoustics presence in Chavín archaeology has been Rick's collaborative commitment. Rick's interest in physics-based archaeoacoustics conforms with his archaeometric approach and strategic adaptation of novel technologies, regardless of their field of origin or typical application. Rick is an advocate for customizing digital tools, essential to the archaeometric archaeoacoustics at Chavín, directed by Miriam Kolar. Bringing archaeoacoustics directly into an archaeological research project—and by conducting the first in-situ impulse response measurements of architectural acoustics himself, using a toolkit and procedure developed with colleagues at Stanford's Center for Computer Research in Music and Acoustics (CCRMA)—Rick has demonstrated a commitment to innovative archaeology, and a willingness to work across disciplinary boundaries that typically preclude such collaborations. Archaeoacoustics is novel, and John Rick is one of its maverick early adopters.

Kolb, Benjamin (SUNY Binghamton)**[169] Learning to Knap: Apprenticeship Systems in the Early Woodland**

Tools are frequently conceived of as finished products rather than processes in and of themselves. Studying stone tool production allows for greater insight into pre-historic social systems, particularly that of apprenticeship, due to the development of criteria for detecting skill through lithic analysis. This project looks at Herrick Hollow I, a lithic scatter site in Delaware County, New York, in the context of the Meadowood phase of the Early Woodland period of the Northeast. The project includes observations of formal stone tools and debitage analysis in order to determine the presence of skill differential at the site and the possibility of a community of practice surrounding flintknapping. This is put in the larger context of the political economy of the Meadowood and comparative work on apprenticeship and learning.

Kolb, Charles (National Endowment for the Humanities (Retired))**[38] In the Beginning: TVP and TMP -- Reflections on the Classic Teotihuacan Period Survey in the Teotihuacan Valley, 1962-1964**

In June 1960, Eric Wolf organized an NSF-sponsored conference of 11 American and Mexican archaeologists held at the University of Chicago to evaluate the status of previous anthropological studies focusing on the Basin of Mexico and to coordinate future research. This led to two analogous long-range plans beginning in 1962. 1) René Millon's Teotihuacan Mapping Project (TMP), based at the University of Rochester, centered on the Classic period ceremonial center at Teotihuacan (ca. 100-650/750 CE) and its surrounding urban area (ca. 20 km²). 2) William Sanders' Teotihuacan Valley Project (TVP), based at The Pennsylvania State University, concentrating on identifying and mapping rural settlements (505 km²) from all time periods (Paleoindian-Colonial), which transformed into the larger Basin of Mexico Project (BMP) with five survey regions (totaling ca. 7,000 km²). The TMP and TVP focused initially on two issues: 1) precisely defining chronological periods and phases by ceramic analyses (pottery, figurines, candeleros, etc.) and 2) field-by-field ground survey using aerial photographs to plot the extent of urban and rural settlement areas. As a Penn State student, I worked on the TVP for my dissertation and was also hired by the TMP and will discuss the ensuing cooperation, competition, and problems.

Kolb, Michael [321] see Balco, William

Kolb, Michael (Metropolitan State University of Denver) and William Balco (University of North Georgia)**[321] Never Built in a Day: Contextualizing Urbanism in Iron Age Western Sicily**

The Iron Age was a transformative period in western Sicily, introducing the indigenous Elymian populations to Aegean and Levantine colonists who brought their own languages, crops, technology, materials, social customs, and ritual systems. Concomitant to the arrival of these foreigners was a transformation of indigenous lifeways. We examine this transformation by comparing settlement layout, housing styles, fortification systems, population densities, and the production of pottery, textiles, and agricultural products between the Late Bronze Age and the Iron Age, couched within a theory of urbanization. This transformation is interpreted as the result of local responses to broader social, political, and economic developments coupled with contact and sustained interaction with the newly arrived foreign colonists. Consequently, the Iron Age Elymi represent one case study where local responses partially aligned Elymian populations with their new neighbors, yet maintained elements of their indigenous heritage.

Kolb, Michael [337] see Rosa, Alexander

Kolbenstetter, Marie**[412] Politics along the Rivers: An Example from the Gulf of Fonseca, Honduras**

The relationship between environment, politics, and economies has often been observed in the archaeological record. In the Gulf of Fonseca, where archaeological sites concentrate around mangrove swamps, rivers and estuaries; politics were intricately tied to the affordances of riverine systems. Based on the ceramic record of different regional sites, we argue that the location of a site alongside a river offered the possibility to make foreign connections and integrate a site in different economic spheres. In the Gulf area, waterways would have been a

determining factor in establishing political relationships: it seems that sites along the same river often exhibit more similarities in their assemblages than sites located in close proximity from one another. Distance herewith becomes an irrelevant factor in the determination of political affinity; rather riverine systems would have bound or isolated sites to and from economic spheres and barter systems. In return, isolation from sites along the rivers reflects a local political choice to reject foreign influence.

Koldehoff, Brad H. [357] see Betzenhauser, Alleen

Koller, Jared (Boston University) and Stephen Acabado (University of California, Los Angeles (UCLA))

[408] *Expansion Modeling and Dating the Ifugao Agricultural Terrace Systems Through Volumetric Analysis and Energetic Modeling*

Archaeological dating of agricultural terraces is complicated due to the nature of its technological foundation and use. Various methods have been proposed for dating agricultural features, but the issue of stratigraphic disturbance persists. In this paper, we highlight our work in the UNESCO-listed Ifugao Rice Terraces as a case study to address the limitations of model-free stratigraphy-based dating and also to serve as an example for future energetic studies that utilize 3D volumetric analysis. We present a methodology that incorporates multiple datasets, which include ethnohistorical, ethnographical, and spatial, to establish terrace construction sequence and development over time by assessing the amount of time, energy, and organization that would be required to create the modern landscape through remote sensing image classification and energetic reconstructions within 3D environments. Utilizing archaeological datasets acquired by the Ifugao Archaeological Project from four Ifugao sites and previous archaeological research in the region, we argue that wet-rice cultivation in the highlands of the Philippine Cordilleras is a recent phenomenon that coincided with contact with the Spanish, one that supports the argument that the emergence of wet-rice cultivation in the highland region was an indicator of influx of lowland populations avoiding the Spanish colonization.

Kollmann, Dana

[160] *Hot, Cold, Above and Below: Enhanced Survey Methods in the Detection of Clandestine Graves*

Ground-based methods of searching for clandestine graves and surface remains have been utilized by law enforcement and search and rescue personnel for years. When ground conditions and the technique of search are appropriate for the circumstances of the case, results are often successful. However, weather, terrain, acreage, foliage and efforts to conceal remains are among the factors that can complicate or even hinder the efforts of search teams. This paper explores enhanced methods of searching for human remains, including the use of areal forward infrared looking radar, drone photography and ground penetrating radar.

Kollmann, Dana [160] see Grant, Evelyn

Kovel, Renee (Independent)

[366] *Characteristics of an Upland Cypro-PPNB Ground Stone Assemblage*

The diverse ground stone assemblage at Ais Giorkis in western Cyprus is comprised of tools typically associated with early Neolithic sites. Certain tool categories however, appear to be underrepresented. The dearth of grinding slabs, querns, large mortars, and handstones (typically associated with food processing) may, in part, be attributed to the site's proximity to the Paphos Forest in the Troodos Mountains, and a possible preference for wooden tools. Other explanations may be gleaned from the archaeobotanical record which alludes to the transport of processed cereals to the site. Answers to these questions will be formulated in concert with other site data.

Komp, Rainer [155] see Ruby, Bret

Komulainen-Dillenburg, Nancy (USACE)**[241] USACE St. Paul District Regulatory (Corps) Commitment to Open and Transparent Communication and Consultation with Tribes**

St. Paul District Regulatory (Corps) implemented measures to build upon and improve relationships with our Tribal Nations and ensure open and transparent communication. A multi-year effort occurred in stages to assess tribal concerns and needs, and develop and share tools and materials to address those concerns and needs. The result has been a more transparent, open relationship. Tools and materials shared with Tribes by the Corps Tribal Liaison in 2018 include an online WebMap Viewer and a Shared Communication Protocol. The Shared Communication Protocol contains a Shared Statement of Understanding that commits both the Corps and Tribe to early, open, and transparent communication in a joint effort to preserve and protect historic and cultural resources. The innovative online WebMap Viewer displays pending permit applications within the Corps. This pilot platform is protected by username and password, for use exclusively by Tribes, and does not replace formal consultation; however, the Viewer provides sufficient information about pending permit applications to allow the THPO to quickly identify concerns about potential impacts to significant historic or cultural resources unknown to Corps Cultural Resources Managers.

Konwest, Elizabeth (Indiana University, Bloomington)**[192] Rural Exchange Networks in Postclassic Oaxaca**

In 1523, Spanish colonizers, alongside their native allies and African slaves, arrived in Nejapa to find people already relatively accustomed to the social upheaval brought about from foreign entries into their territories. During the Late Postclassic, Zapotec and Aztec armies had followed existing trading routes along the camino real through Nejapa, Oaxaca to reach the resource rich isthmus. This paper will focus on the various trade networks accessed by the residents of the Nejapa valley site of Greater La Amontonada (GLA) while also referencing other Postclassic period sites in the region. Residents of GLA participated in an informal and decentralized, but robust region-wide network to exchange locally produced ceramics. Though imported in extremely limited quantities, local potters also had knowledge of wider Oaxacan and Mesoamerican styles, and considered those "exotic" styles desirable for imitation. The exchange of obsidian and other imported goods contrasts sharply with the ceramics and was much more restricted. Residents of contemporaneous settlements in Nejapa engaged with different networks of traders. Although living in a rural area between larger, more powerful geographic regions, the ceramics and obsidian at GLA demonstrate a people enmeshed into the larger Mesoamerican world.

Kooiman, Susan (Michigan State University)**[291] Functioning at Full Capacity: The Role of Pottery in the Woodland Upper Great Lakes**

James Skibo's seminal works on pottery function created a valuable model for assessing the role of pottery in the lives of past peoples. While this approach has broad applicability for ceramic assemblages worldwide, its efficacy has been demonstrated through a series of studies on ancient pottery assemblages from coastal sites in Michigan's Upper Peninsula. Both technical properties of ceramic cooking pots and their associated use-alteration traces, particularly interior carbonization, indicate differences in vessel construction and use by local Middle Woodland (200 BC – AD 500/600) and Late Woodland (AD 500/600 – AD 1600) cooks. Vessel shape, temper size, and patterning of interior carbonized food residues suggest a shift in preferred cooking techniques over time. These alterations may be responsive to environmental shifts, social change, or culinary trends spread from interaction with other groups. Overall increase in vessel size could reflect changes in settlement patterns and socio-ideological interactions but may have also provided a functional cooking advantage. The contributions of this work to Upper Great Lakes archaeology demonstrate the strength and utility of Skibo's framework.

[291] Chair**Kooistra, Marty****[151] Utilizing Cumulative Viewshed Analysis to Explore Virgin Branch Ancestral Pueblo Settlement Choice**

Prehistoric habitation structures located in the Mount Trumbull region of northwest Arizona are constructed across a diverse topographic landscape. Several archaeological site records for the Mt. Trumbull region allude to the exceptional views from habitation structures despite their often non-obtrusive locations. The following study utilizes Geographic Information Systems (GIS); Cumulative Viewshed Analysis (CVA); and site suitability analysis to

facilitate understanding of patterns and relationships among archaeological habitation sites located in this exceptionally diverse landscape. Using CVA, this study endeavors to characterize habitation sites as linked in two ways. The first is geographic. Are habitation sites intervisible? The second means of connection concerns material remains. Do habitation sites share material similarity based on temporal phases? This research seeks to improve current knowledge of Ancestral Pueblo settlement patterns and determine if the geographic location of habitation sites predicts the structure of their material remains; and if so, would this provide evidence for the existence of prehistoric communities? Based on the results from several viewshed analyses, data suggests that the placement of known habitation sites across the landscape significantly differs when compared to sample "non-site" locations suggesting that known habitation sites were constructed in areas of the landscape that favored intervisibility.

Kooistra, Marty [191] see Caro, Carlos

Koons, Michele (Denver Museum of Nature & Science) and Mark Mitchell (Paleocultural Research Group)

[17] Community Archaeology at Magic Mountain, Golden, Colorado

Nestled in the foothills along Apex Gulch in Golden, CO, Magic Mountain is proclaimed to be one of the most important archaeological sites on Colorado's Front Range. The earliest artifacts date back to 5000 BCE, when the site would have served as camping grounds for mobile hunter-gatherer groups. Later remains, such as ceramics and stone structures, indicate that through time it became a semi-permanent residence that was inhabited until at least 1000 years ago. Although previously explored by archaeologists, in 2016 the Denver Museum of Nature & Science and Paleocultural Research Group initiated a new round of work through a community-based effort. Over the last two seasons (1.5 months total), 133 volunteers helped excavate and give public tours. We served 121 youth from Boys and Girls Clubs and other organizations with programming, and nearly 3,000 people experience hands-on archaeology through public tours. Additionally, we contacted all tribes with historical affiliation with the state and invited them for an organized intertribal day. We had representatives from five different tribes attend over the last two years and communication with many other tribes about the project. This paper will discuss the goals of the project and our work with the various stakeholders.

Koons, Michele [89] see Nash, Stephen

Koons, Sheila

[403] The Middle to Upper Paleolithic Site of Abri des Merveilles in Southwestern France: An Assessment of the Integrity and Research Potential of an Historically-Excavated Museum Collection

As museum shelves buckle under the weight of virtually forgotten boxes of artifacts, many institutions are questioning the future curation of these historically excavated materials. Much of this material is comprised of Paleolithic artifacts excavated during the infancy of American archaeology abroad. This project was undertaken to evaluate the integrity of a prehistoric lithic collection and to examine the efficacy of utilizing the resulting data for larger research questions. It begins with a detailed history of the site of Abri des Merveilles and the prehistoric environmental context within which the site was formed. Abri des Merveilles was one of the few sites in the Vézère Valley containing both Middle and Upper Paleolithic layers of deposition. Thus, a thorough description of this site contributes significantly to the understanding of the distinction between these two periods throughout the region. The most important aspect of this undertaking was the analysis of the Merveilles lithic collection currently in curation at three American museums. The lithic analysis tested the soundness of the site's historically designated cultural layers and elucidated the positive and negative effects of past excavation and curatorial methods. The analysis also provides a comparative data set for future research in the region.

Kopperl, Robert (Willamette Cultural Resources Associates), Eleni Petrou (University of Washington), Lorenz Hauser (University of Washington), Dana Lepofsky (Simon Fraser University) and Dongya Yang (Simon Fraser University)

[312] Ancient Herring DNA from the Burton Acres Shell Midden (45KI437) and Pacific Herring Population Dynamics in the South Salish Sea

Pacific herring (*Clupea harengus pallasi*) is an important forage fish and staple food of many Northwest Coast indigenous peoples. Archaeological evidence throughout the south Salish Sea extends this ecological relationship

back at least several millennia, but the presence of herring in archaeological deposits is often considered a single-dimensional seasonal indicator of past herring harvest. Modern fisheries studies define multiple herring stocks in the south Salish Sea, and recent genetic analysis of these stocks shed light on important aspects of population diversity and a much richer mosaic of different life histories between herring stocks. An on-going study of ancient DNA from archaeological specimens provides the first direct link between ancient and modern herring populations, including diachronic information over the past ca. 1,000 years at the Burton Acres shell midden on Vashon Island in the south Salish Sea. Our results suggest that Native American fisheries here primarily targeted herring populations spawning in late winter and early spring, although there also were a small number of samples originating from late-spawning populations. The Burton Acres site occupants accessed herring from multiple stocks within the diverse ecological portfolio of herring populations in the south Salish Sea.

Kornfeld, Marcel (PiRL - University of Wyoming)

[329] Structure and Formation of a Paleoindian Deposit: The Hell Gap Site, Wyoming

A key question for interpreting both human behavior and the Paleoindian cultural sequence, the two pillars of significance attached to the Hell Gap site, concerns the nature of site formation. This term, however, is ambiguous. Site formation begins when people carrying on daily activities discard and lose objects. Once lost, the objects are subject to various surface geomorphic processes (wind, water, plant and animal behavior) and eventually under conditions of aggradation become buried in the sediment. Objects buried in the sediment, whether originally left by people or brought in by various geomorphic processes, form patterns that may be informative of cultural behaviors, geomorphic processes, and in most if not all cases, both. In this presentation I examine the vertical and horizontal structure of the Hell Gap site at several scales to begin the assessment of Hell Gap site formation.

[329] Chair

Kornfeld, Marcel [329] see Ward, Naomi

Koromo, Samson [2] see Lee, Patrick

Kosakowsky, Laura (University of Arizona)

[284] Discussant

Kosciuk, Jacek [233] see Ziolkowski, Mariusz

Kosiba, Steve (University of Minnesota) and Bruce Mannheim (University of Michigan)

[18] Ancient Andean Scalarity

Scholars of the Andes often assume that the social units they study—residence, community, and region—are monotonically scaled, nested from smaller to larger. This suggests universal correspondences between the analytical and observational objects through which social units are known; hence individual buildings may stand in for households, intermediate social units, or broader publics. Yet this assumption does not hold in Southern Quechua, the language of the Inkas, wherein relevant social units are often non-scalar, or inherently linked to other units: for instance, *wasi* (sometimes translated as “house structure”) presupposes a larger social unit *llajta* (a cluster, a hamlet or even a country). Southern Quechua spatial orientation greatly differs from prevailing archaeological models of domestic space and settlement, which suggest scalar gradations in size and function from house, to hamlet, to center and hinterland. How can we analytically model scalarity in Inka social organization, particularly with respect to such units as *wasi*, *llajta*, and *ayllu*? Archaeological data from settlements in Cusco, Peru (e.g., Rumiqolqa, Ollantaytambo) reveal that Inka notions of domestic space were (as today) centered less on scalable physical structures and more on the situated configurations of labor, people, plants, and soils that together defined social units and scales.

Kosiba, Steve [114] see Rodriguez Osorio, Daniel

Koski-Karell, Daniel

[276] Tortuga - Haiti's Ile de la Tortue - Prehistoric and Buccaneer Archaeology

The Ile de la Tortue, Haiti, is perhaps more famously known as Tortuga for its association with the seventeenth century's Buccaneers. It was settled in prehistoric times by multiple cultural groups, given its Spanish name by Columbus, depopulated by enslavement of its indigenous population, settled by English Puritans, liberated by French Huguenots, became a port of ill-repute for Buccaneers, includes multiple shipwreck sites, was developed into French colonial plantations, became a place of relief or death for sickly French soldiers and Napoleon's sister Pauline, liberated again by Haitian revolutionary forces through amphibious invasion, and on and on and on. All in all, it's a pretty interesting place, but not easy to get to and life there is tough. This paper provides a summary of the author's archaeological investigation of the island.

Koster, Anne (ERDC-CERL)

[241] Impacts to Archaeological Deposits by Heavy Equipment and Protective Site Hardening Techniques

Heavy equipment, whether from construction, agriculture, or other varied situations, can significantly and negatively affect surface and subsurface archaeological deposits, be it from direct or indirect contact with machinery. In-situ protective "site hardening" techniques have potential to mitigate some of these impacts, if designed appropriately in response to expected types of heavy equipment, and in context with site environmental properties. This paper and presentation will draw from various studies, conducted from experimental work performed by the author as well as examples found in literature, to provide parameters on potential damage from such site impacts. Site environmental parameters will be presented as modifying factors, and various types of equipment will be covered. This paper and presentation will also provide information and insight into in-situ protective "site hardening" strategies that take advantage of the existing environmental properties of each site to preserve and protect from damage in a variety of situations. A range of both bioengineering and land engineering techniques will be covered. Applications relative to heavy equipment impact scenarios will be discussed to provide assessments for potential success of site protection efforts.

Kosyk, Katrina (McGill University)

[374] Sonic Places: Preliminary Acoustic Analysis in Early Colonial Tepeticpac, Tlaxcala

Everyday places that bodies inhabit are rarely without sound. Sound has a material impact in structuring the relations between people and their surroundings through the vibrations that occur as a response to an activity or event in a given space and time. The auditory system receives this structured sensory information and rhythmically encodes the body with sound that is specific to the place. The place develops a unique sonic fabric that has the potential to influence how people consciously and unconsciously dwell in a space. I demonstrate how sonic fabrics can be recovered from an archaeological site in the neighbourhood of Cerro Coyotepetl in Tepeticpac, Tlaxcala, established in the 13th-14th centuries and existing at the time of the Spanish conquest. The site is composed of over 40 terraces and two possible centralized plaza areas that would have supported non-elite residences. A primary objective of my research in Tepeticpac is to explore the ways in which the processes that produce sound converge with numerous temporalities and spaces to produce an experience of place. Specifically, I examine how everyday sound making practices contribute to a sonic character that is unique to the space.

Koszkul, Wieslaw [199] see Zralka, Jaroslaw

Kotegawa, Hirokazu (Universidad Nacional Autónoma de Honduras)

[405] Un centro secundario Olmeca: Estero Rabón

El sitio arqueológico de Estero Rabón fue uno de los centros secundarios de San Lorenzo y probablemente también de La Venta durante el Preclásico Inferior y Medio. Según los estudios previos de la cultura olmeca, los centros secundarios de estas capitales tenían su propia finalidad para sostenerlas. Así, Estero Rabón también se ubicó en un punto estratégico geográficamente para el comercio, la comunicación y tal vez para el control político. En el

presente estudio, se mostrarán la función y la importancia que tenía el sitio arqueológico de Estero Rabón en la sociedad olmeca. Este sitio no ha mostrado alguna evidencia directa excavada con el contexto arqueológico sobre la ocupación preclásica aunque hay varios datos indirectos, como la ubicación geográfica, los recursos naturales rodeados al sitio y la presencia de varios monumentos escultóricos, que nos apoyarán comprender el papel que jugaba este sitio durante el Preclásico Inferior y Medio.

Koterová, Anežka (Department of Anthropology and Human Genetics, Charles University), Rebeka Rmoutilová (Department of Anthropology and Human Genetics, Charles University), Vlastimil Králík (Faculty of Mechanical Engineering, Czech Technical), Pavel Ružicka (Faculty of Mechanical Engineering, Czech Technical) and Jaroslav Bružek (Department of Anthropology and Human Genetics, Charles University)

[386] Evaluation of an Impact of Different 3D Surface Scanning Protocols on Sex and Age-at-Death Assessment from Os Coxae in Bioarchaeology

In the contemporary bioarchaeology and anthropology in general, 3D imaging technologies are being used more frequently. They offer many new possibilities, among which we can mention for instance a possibility of permanent documentation, an easier and faster sharing of data among institutions or new opportunities of data analysis. 3D surface data may be acquired with laser or structured light scanners. The present contribution investigates two important questions: (1) whether data acquired by different scanning devices are comparable and (2) whether potential differences may affect anthropological analyses, such as age-at-death and sex estimation. 3D models of pelvic bones ($n=29$) were acquired by laser (NextEngine) and structured light (HP 3D Structured Light Scanner PRO 2) scanners. Resulting 3D models from both scanners were subjected to age-at-death (Stoyanova et al., 2017 quantitative method) and sex (DSP 2) analyses. Furthermore, for a small sample ($n=5$) we created reference surfaces with RedLux Profiler device providing high-quality scans to which the outputs from both scanners were compared using surface deviation and color maps. Our preliminary results suggest that in spite of differences between the two scanners, this fact does not have a significant effect on biological profile estimation.

Koutlias, Lauren [371] see Riegert, Annie

Kovác, Milan [384] see Safronov, Alexander

Kovacevich, Brigitte [199] see Callaghan, Michael

Kovacevich, Brigitte (University of Central Florida) and Kazuo Aoyama (Ibaraki University)

[255] Middle Preclassic Chipped Stone Caches at Ceibal and Holtun, Guatemala

During the late Middle Preclassic period (700-350 B.C.) at Ceibal, common objects in ritual deposits in the public plaza shifted from greenstone celt caches to other artifacts, including obsidian prismatic-blade cores. Like greenstone objects, exhausted polyhedral obsidian cores deposited in cruciform arrangements along the east-west axis of the central E-Group plaza were used as symbols and markers of the center and four cardinal directions within the Maya cosmos. Nevertheless, eccentrics were not part of Preclassic behaviors at Ceibal. In comparison at Holtun Middle Preclassic period caches lack greenstone and focus primarily on obsidian cores, blades, and debitage with additional material including river cobbles and shell, sometimes in ritually charged numbers. Source analysis for the cached obsidian suggests possible restriction of El Chayal obsidian to elite and ritual sectors of the site. Like Ceibal, chipped stone caches at Holtun during the Middle Preclassic period were focused on the E-Group ceremonial plaza.

Kowalewski, Stephen (University of Georgia)

[307] Discussant

Kowalski, Jeff (School of Art, Northern Illinois University)**[28] *Feathered Serpents at Uxmal: Creation, Cosmos, Cosmopolitanism, and Kingship***

At Uxmal, Yucatán, monumental plumed snakes appear in the sculptural program of the Main Ballcourt and Nunnery Quadrangle. These feathered serpents express complex concepts connected to their pan-Mesoamerican role as a demiurge associated with dawning light, life force, and cosmic order emerging from pre-creation watery darkness and chaos. The feathered serpents correlate with other aspects of these structures' plan and iconographic programs that refer to aspects of creation mythology. The appearance of fully-feathered serpents at Uxmal reflects growing political contacts and trade between northern Yucatán and greater Mesoamerica during the Epiclassic/Terminal Classic periods, when regional rulers such as Chan Chaak K'ak'hal Ajaw of Uxmal sought to bolster claims to divinely mandated authority by combining Classic Maya religious imagery with that of the feathered serpents as "Toltec" symbols that emerged at Teotihuacan and were reformulated at Epiclassic/Terminal Classic centers, as well at Tula, Hidalgo and Chichén Itzá. Uxmal's plumed snakes and other creation-related and "Toltec" symbolism represent a specific expression of a broader Mesoamerican ideological template that grounded sociopolitical order and historical events in a divine matrix, linking polity formation and royal dynasties to the creative energy and political authority represented by the feathered serpent.

Koyiyumptewa, Stewart [21] see Leap, Lisa

Koyiyumptewa, Stewart (Hopi Cultural Preservation Office)**[254] *Exploring the Hopi Youth Component of the Navajo-Gallup Water Supply Project***

Since 1989, the Hopi Cultural Preservation Office (HCPO) has conducted numerous archaeological and ethnographic studies. All of the past projects involved the input of the Hopi Cultural Resource Advisor Task Team, representing twelve villages, clan groups and religious societies for which proposed projects may have impacts. In September 2017, the Bureau of Reclamation awarded the Hopi Tribe a FAA to conduct a TCP study. In the award, HCPO successfully incorporated a youth component to the NGWSP, which would allow the youth interns to work side by side with HCPO staff, Cultural Advisers, Archaeologists, Anthropologists and other professionals relevant to the NGWSP. This paper will describe the Hopi Cultural Preservation Office's experience working with youth for the first time on a TCP study.

[93] *Discussant*

Kracinski, Andrew [207] see Carlson, Kristen

Králik, Vlastimil [386] see Koterová, Anežka

Krall, Angie (Rio Grande National Forest)**[62] *Discussant*****Kranda, Forrest****[241] *Cleaning up History: Historic preservation at Formally Used Defense Sites***

The U.S. Army Corps of Engineers (USACE), Alaska District's Formally Used Defense Site (FUDS) program conducts environmental remediation of abandoned World War II and Cold War era military facilities owned by federal, state, and local parties. These FUDS properties, which are often in remote locations, are associated with the release of hazardous materials like petroleum and lead. This paper presents on the Alaska District's efforts to identify and evaluate historic military sites in the Far North and minimize or mitigate any adverse effects to significant cultural resources, while addressing the need for a clean environment. Sites that have been the subject of FUDS remediation include NHLs at the Dutch Harbor Naval Operating Base, Adak Army Base and Naval Operating Base, Fort Glenn, Japanese's Occupation Site, Kiska, and the Attu Battlefield, and NRHP-eligible properties at Chernofski

Harbor and Cape Prominence and many other islands throughout the Aleutians and Alaska.

Kranda, Forrest [241] see Sparaga, Joseph

Krasinski, Kathryn [10] see Wygal, Brian

Krasinski, Kathryn (Adelphi University), Laura Rojas (Adelphi University), Alexander Bautista (Adelphi University), Charles Holmes (University of Alaska Fairbanks) and Barbara Crass (University of Alaska Fairbanks)

[57] *Diachronic Patterns in Subsistence at Swan Point, Tanana Valley, Alaska*

Approximately 1000 years ago, the archaeological record of Southcentral and interior Alaska shows a shift toward the increased use of fish caches, semi-subterranean houses, permanent year-round villages, and the appearance of ranked societies. Ultimately, the highly mobile big game hunter-gatherer way of life was supplanted by more intensive resource procurement such as salmon processing. These innovations have caused many researchers to hypothesize a migration of Athabascan-speakers into Alaska, in part because this is when modern Athabascan cultures become archaeologically visible. Since traditional foodways tend to be conservative in cultures, material remains of past meals offer culturally specific information for identifying cultural identities in the archaeological record. A zooarchaeological analysis focused on reconstructing subsistence patterns was undertaken at the Swan Point site in the Shaw Creek Flats, Tanana Valley, to assess whether there were corresponding changes in food preparation which can be used to test whether cultural continuity is reflected in food preparation compared to a migration of new people to interior Alaska.

[57] *Chair*

Krause, Johannes

[253] *Ancient Pathogen Genomes from Pre- and Early Colonial Epidemics in Mesoamerica and the Evolution of Paratyphi C*

Genome wide data from ancient microbes may help to understand mechanisms of pathogen evolution and adaptation for emerging and re-emerging infectious disease. Ancient pathogen genomes provide furthermore the possibility to identify causative agents of past pandemics and therefore elucidate mortality crisis such as the early contact period in the New World. In order to identify the presence of pathogens in past populations we used a novel high-throughput DNA sequence alignment and taxonomic assignment tool MALT (MEGAN Alignment Tool) and were able to identify traces of *Salmonella enterica* DNA in individuals buried in an early contact era epidemic cemetery at Teposcolula-Yucundaa, Oaxaca in Southern Mexico. This cemetery is linked to the 1545–1550 CE epidemic that affected large parts of Mexico, the pathogenic cause of which has been debated for more than a century. We generated genome-wide data from ten individuals for *Salmonella enterica* subsp. *enterica* serovar Paratyphi C, a bacterial cause of enteric fever. We propose *S. Paratyphi C* as a strong candidate for the epidemic population decline during the 1545 outbreak. We furthermore show that the Paratyphi C lineage has been common in the human population for thousands of years and shows strong signs of human adaptation through time.

Krause, Maya B. (Vanderbilt University), Tiffiny A. Tung (Vanderbilt University) and Steve Kosiba (University of Minnesota)

[183] *Dimensions of Health in the Andes: A Bioarchaeological Investigation of Morbidity Patterns in Mountain Landscapes*

This paper uses a bioarchaeological approach to examine the morbidity profiles of highland communities in the Cusco region of Peru during the centuries that witnessed the rise, fluorescence, and demise of the Inka Empire (ca. 1300-1550 CE). Through original analysis of human skeletons from the sites of Huanacauri and Matagua and a meta-analysis of skeletal data from other sites in the region, this study seeks to build a preliminary understanding of social and ecological distinctions in this mountain landscape, and how these distinctions engendered or coincided with discernible differences in disease, developmental health, and trauma. Bioarchaeological data are used to examine whether people living in different areas of Cusco experienced the formation and dissolution of the Inka polity in similar ways, or whether there is variation in skeletal markers of health according to ecological setting,

cultural background, social position, or gender. The contextualized bioarchaeological data are used to interrogate many current models of mountain landscapes, which too often generalize human populations by treating them as variables dependent on regional environmental or adaptive economic frameworks, rather than investigating the intertwined local social differences, ecological distinctions, and biocultural attributes that constitute such mountain landscapes and frameworks.

Krause, Samantha (University of Texas at Austin)**[63] Reconstructing a Maya Agricultural Wetland on the Rio Bravo Floodplain, Northwestern Belize**

The Birds of Paradise wetlands have been a subject of recent intensive study within Northwestern Belize. We now recognize this fluviokarst wetland has undergone extensive modification of field building and channelization during the Maya Classic (1650-1050 BP) with use possibly extending into the early Maya Postclassic (1050-700 BP). Through many field seasons of study, we have begun to develop a chronosequence for soils and management within this wetland environment as well as an understanding of the form and function of agricultural features in the wetland, including ditched and raised fields, reservoirs, and sacbeob. Geoarchaeological efforts on a sacbe/berm feature along the east side of the wetland suggest that human modification within the system began at least to some extent sometime in the early Classic time period. The eastern margins of the BOP wetland are slightly lower in elevation than the area in the system that has been channelized, and it is possible this berm either acts as feature that serves as a boundary, eastern edge of a catchment, or elevated causeway. This study helps us to refine our understanding of how Maya agriculture and resource extraction within wetland environments either persisted or changed through drought cycles and cultural transitions.

[234] Discussant**[63] Chair**

Krause, Maya B. [286] see Whittemore, Anna

Kray, Christine (Rochester Institute of Technology), Minette Church (University of Colorado-Colorado Springs) and Jason Yaeger (University of Texas-San Antonio)**[198] Crosses, Burned Churches, and Kidnapped Priests: Ambivalent Maya Catholics in 19th-Century British Honduras**

Spanish colonization of New Spain rested upon a pragmatic, yet conflicted, alliance between Cross and Crown. Following independence, many republican and neocolonial governments also relied on the soft power of the Church. In the 19th century, Yucatec Maya religious sentiments appear to have been indelibly shaped by prevailing relations of power. The syncretic religion of the Talking Cross that developed among Santa Cruz Maya rebels during the Caste War of Yucatán (1847-1901) is well known for its militaristic character, and heavy religious fees contributed to the war's outbreak. This presentation considers the less well-known religious practices of other Maya rebel groups of southern Yucatán and British Honduras, who did not revere the Talking Cross. In the 1850s-60s, both the British Honduran and Yucatecan governments used priests as emissaries to encourage political submission by rebels. In British Honduras, priests expressed personal regard, sympathy, and even affection in a way that other representatives of colonial power typically did not. The Janus face of the Catholic church generated extraordinary feelings of ambivalence among the Yucatec Maya, as can be seen in the archaeological and archival materials from San Pedro, wherein examples of devotional crosses contrast with accounts of anti-clerical violence.

Kreindler, Kate**[149] Having It All in the Field: Families, Inclusivity, Career Development, and Archaeological Fieldwork**

Participation in archaeological fieldwork poses numerous practical challenges. This paper will address some difficulties that arise from the decision to start a family. The choice to have children frequently affects archaeologists working to establish their careers, namely (female) graduate students, junior faculty, and field technicians. Young archaeologists may have small children who are not yet old enough to be separated from a parent or may not have the financial resources to pay for childcare while in the field. Furthermore, many projects do not have, or earmark, funding for childcare, nor do they have the facilities to accommodate participants' families. As a result, many

archaeologists, especially women, who are trying to establish their careers are forced to choose: fieldwork or family. Those who opt to start families may be at a professional disadvantage when they return to the field, due to missed excavation and publication opportunities. This paper will examine how one field project, the Poggio Civitate Archaeological Project, has created an affiliated not-for-profit entity, in part to raise funds that offset the costs of childcare. As a result, the project supports young archaeologists with families, as part of a larger effort to promote inclusivity and early career development in archaeology.

Kretzler, Ian (University of Washington)

- [19] *"I Can Tell It Always": Confronting Colonialist Presumptions and Disciplinary Blind Spots through Community-Based Research*

The nineteenth and early twentieth century history of western Oregon is rife with Euro-American presumptions about the trajectory, pace, and nature of Native cultural change. Federal architects of the state's reservation system and, later, reservation agents wrote extensively about Native peoples' ability to throw off traditional lifeways in favor of "civilized" behaviors. Since 2014, two community-based research projects conducted alongside the Confederated Tribes of Grand Ronde Historic Preservation Office have exposed these observations as fragmentary and culturally and politically situated. Analysis of historic maps and recovery of household belongings have revealed the strategies employed by Native families to balance participation in Euro-American economies and continuation of pre-preservation practices and relationships. Furthermore, these projects have highlighted the inadequacy of conventional classification schemes predicated on cultural and temporal homogeneity. The complexity of the reservation material record challenges archaeologists to develop interpretive approaches grounded in Native knowledge systems and community experiences. This paper discusses the issues inherent to recognizing Native presence—in the colonial archive and in the field—and the value of community-based research in crafting nuanced accounts of Native history.

Kreuzwieser, Clare (College of Wooster) and Paul Nick Kardulias (College of Wooster)

- [118] *The Elephanta Caves: Avenues for Their Future Preservation in Digital Preservation and Public Outreach*

In this study, I examine how the Elephanta Caves (500 C.E. - 900 C.E.), off the coast of Mumbai, in the Indian state of Maharashtra, can best be preserved in the future. These man-made caves were a place of Shiva and goddess-worship for local Hindus, up until Portuguese contact and occupation in AD 1534-35. Interest in this topic stems from the caves' exposure to destructive forces in the past and present, which are directly and indirectly man-made. Some of these include its location along a fault, pollution from the Mumbai metropolis, tourist traffic, as well as past damage from colonial occupation. I focus specifically on how digital forms of preservation can aid in preserving the integrity of the cave's structure and relief carvings, as well as how tapping into public interest as a resource can help to grow public knowledge as well as garner more extensive protection for this UNESCO World Heritage site. Furthermore the research is a demonstration of the potential of reconstructive drawings in preserving a site as well as helping to create a visualization to place the viewer more perfectly within the time and place the caves occupied in history.

Krigbaum, John [111] see Kate, Emily

Kristan-Graham, Cynthia

- [304] *An Animal Kingdom at Chichen Itza, Yucatan, Mexico*

At the Postclassic Maya city of Chichen Itza, buildings, planned spaces, and imagery blend with the landscape to form meta-narratives. One instance is the Sacred Cenote, a limestone sinkhole that was a major focus of rituals. The cenote rim features frogs/toads carved from the living rock, and at one time sculptures of jaguars and snakes were also there. These animals allude to fertility, rulership, and the night. Ceramics in the nearby temple and fauna that inhabit cenotes echo these concerns and also are associated with watery worlds and death.

- [28] *Discussant*

- [28] *Chair*

Kroonen, Guus (Leiden University) and Rune Iversen

[196] *The Linguistic Legacy of the Pitted Ware Culture*

The Scandinavian hunter-, fisher- and gatherer-based Pitted Ware culture is chronologically situated in the Neolithic. However, it challenges our traditional view on cultural and social evolution by representing a return to an otherwise abandoned hunter-gatherer lifestyle. In general, the Pitted Ware culture must be seen as an offshoot of the "Sub-Neolithic" societies inhabiting wide parts of northern and northeastern Europe in the fourth and third millennium B.C.E.

Isotopic and aDNA studies have shown that people of the east Swedish Pitted Ware culture, both dietarily and genetically were distinct from the early farmers in this region, the Funnel Beaker culture. Isotopic data shows a marked predominance of seal in the diet, which has given the Pitted Ware people the nickname "Inuit of the Baltic".

As regards language, it is to be expected that people practicing a Pitted Ware lifestyle spoke a non-Indo-European language. In fact, there is some linguistic evidence that can support this claim. It is conceivable that both the Germanic and Finnish word for "seal" were ultimately borrowed from a language spoken in a Pitted Ware context. Once more, the linguistic evidence turns out to offer important information complementary to that of archaeology and archaeo-genetics.

Krotscheck, Ulrike [107] see Sonenshine, Krista

Krug, Andrew (University of Oklahoma)

[296] *Reconstructing Shell Trade Corridors in Northwest Mexico*

Questions over the nature of long-distance exchange are central to competing models of socio-political evolution in Northwest Mexico. At Paquimé, the preeminent site in northern Chihuahua, Mexico, from 1250 to 1450 AD, excavations recovered abundant non-local goods, including macaws, copper bells, and nearly four million marine shells. To evaluate the numerous hypotheses of procurement and trade, archaeologists need to understand the possible routes for the purveyors of shell and the eventual distribution of marine shell consumption throughout Northwest Mexico. By mapping the distribution of shell consumption and reconstructing trade corridors archaeologists can better contextualize the social relationships and motives that led to Paquimeños acquiring millions of shells from the Gulf of California. In this study, I perform a least-cost pathway analysis to evaluate possible trade corridors from various locations along the Sonoran coastline. Hot spot analyses are used to demonstrate the distribution of *Olivella*, *Glycymeris*, and *Nassarius* shell artifacts at archaeological sites in Northwest Mexico. Each of these analyses—least-cost and hot spot—are crucial for understanding the distribution and concentration of shell artifacts and defining possible trade corridors that delivered millions of marine shells into the North American Southwest.

Krug, Ronald [21] see Neff, Linda

Krupa, Krystiana [382] see Thomas, Jayne-Leigh

Krus, Anthony (University of South Dakota), Edward Herrmann (Indiana University Bloomington), Matthew Pike (Purdue University), William Monaghan (Indiana University–Purdue University Indianapolis) and Jeremy Wilson (Indiana University–Purdue University Indianapolis)

[205] *Chronology of a Fortified Mississippian Village in the Central Illinois River Valley*

Geophysical survey and excavations from 2010–2016 at Lawrenz Gun Club (11CS4), a late pre-Columbian village located in the central Illinois River valley in Illinois, identified 10 mounds, a central plaza, and dozens of structures enclosed within a stout 10 hectare bastioned palisade. Nineteen radiocarbon measurements were taken from single entities of wood charcoal, short-lived plants, and animal bones. A site chronology has been constructed using a Bayesian approach that considers the stratigraphic contexts and feature formation processes. The village was host to hundreds of years of continuous human activity during the Mississippi Period. Mississippian activity at the site is estimated to have begun in cal AD 1005–1160 (95% probability), ended in cal AD 1300–1405 (95% probability), and lasted 150–400 yr (95% probability) in the primary Bayesian model with similar results obtained in two alternative models. The palisade is estimated to have been constructed in cal AD 1150–1225 (95% probability) and was continuously repaired and rebuilt for 15–115 yr (95% probability), probably for 40–85 yr (68% probability). Comparison to other studies demonstrates that the bastioned palisade at Lawrenz was one of the earliest constructed in the midcontinental U.S.

Kruse, Andrea (University of Nebraska- Lincoln)**[147] A Great Plains Early Archaic Site Understanding from Lithic Debitage Analysis**

Early Archaic sites on the Great Plains are few in number and often little studied and poorly reported, as they are almost always found in salvage or recover archaeology. Of those early Archaic sites that have been studied rarely has debitage been analysed in detail or fully evaluated for usewear. This presentation describes the lithic assemblage from the Spring Creek (25FT31) site located in southwestern Nebraska. As one of two important early sites in the state, detailed lithic analysis will complement the thorough analysis of faunal remains conducted in the 2000s. This presentation will present the methods used to complete debitage and tool analysis along with low power use-wear technique to better understand the artifacts. GIS-ArcMap was used to better visualise patterns between the lithics and faunal. By using many different methods of analysis along with new digital techniques one can gain better perception of the relationship of the resources procured across the Plains landscape and the Early Archaic hunter-gatherers.

[147] Chair**Kryder-Reid, Elizabeth****[283] Moderator****[283] Discussant****Kuglitsch, Linnea (University of Manchester)****[69] "Flowers [and] Open-Air Exercises": An Archaeology of Patient, Cure, and the Natural World at the American Lunatic Asylum**

As the nineteenth century dawned in the United States of America, a new approach to the treatment and care of the mentally ill took hold. This movement, known as moral management, championed the delivery of kind treatment to patients within the orderly environment of the asylum, and structured regime designed to draw the insane from unhealthy habits and reinvigorate their self-regulative abilities. This paper examines how patients at two nineteenth- and early-twentieth lunatic asylums—the Western Washington Hospital for the insane in Steilacoom, Washington, and at the Eastern Lunatic Asylum in Williamsburg, Virginia—engaged with elements of the natural world, drawing out a multitude of meanings converged over and diverged around these items. While items derived from the natural world could serve the curative goals and rules of the institution, this class of material culture also offers a key to identifying patients' action and reinforcing the patients voice.

Kuhn, Steven (University of Arizona)**[365] Thinking about Spatial Scale and Diversity in Archaeology**

Diversity is fundamentally a scalar phenomenon. Archaeologists have been very attentive to the relationship between sample size and various diversity measures. They have not paid as much attention to the spatial scale of diversity. Ecologists frequently consider diversity at three spatial scales. Alpha diversity refers to richness within patches or sample units. Gamma diversity refers to overall richness within an entire ecosystem or habitat. Beta diversity is a function of the differences among patches. Diversity at different spatial scales is influenced by different ranges of factors. Most of what has been said about diversity in archaeology refers effectively to alpha (within assemblage) diversity. Concepts analogous to beta and gamma diversity could be effectively applied in archaeology. To illustrate the relevance of thinking about diversity at different spatial scales, this paper considers some of the factors affecting alphas, beta, and gamma diversity in material culture, especially stone tools.

Kuijt, Ian [8] see Bursali, Ayse

Kuijt, Ian (University of Notre Dame)**[366] Stop the Press!!!: Settlement Hierarchies in the Early Pre-Pottery Neolithic? Not...**

Archaeologists, as with historians, search for patterning, commonalities and order as we seek to explain past human settlement systems. As landscape archaeologists our attempt to reconstruct settlement systems involves connecting the

remains of human behavior, consider regional patterns, and then interpreting these remains on the basis of ethnographically derived models. With varied preservation differences within and between settlements, and poor understanding of the linkages between past human action and the resulting contemporary material footprint, as researchers we are challenged in our attempts to understand the broader picture, and run the risk of imposing, rather than revealing, patterning of the past. In this presentation I return to early arguments (Kuijt 1994) for the existence of socio-political developments and differences in Levant Pre-Pottery Neolithic A period (PPNA) period. There is no doubt that the hamlets of the Southern Levant Pre-Pottery Neolithic A period (PPNA) period serve as an evolutionary transitional moment between small forager camps of the Epipaleolithic and large villages of the later stages of the Pre-Pottery Neolithic. What is now clear is that variation in PPNA settlements, counter to Kuijt (1994), was not linked to socio-political developments and manifest within a regional settlement system.

[239] *Discussant*

Kulcsár, Gabriella [126] see Giblin, Julia

Kulick, Rachel (University of Toronto)

[338] *Crisis in Geoarchaeological Context: Reassessing Bronze Age 'Collapse' at Palaikastro, Crete, Greece*

Research on social change and 'crisis' demonstrates that both phenomena require analyses of longer-term processes and discrete local processes that need to be evaluated on site-by-site bases (Vigh, 2008; Visacovsky, 2017). The multi-scalar attention required to study crisis and change at individual Bronze Age settlement sites on Crete, Greece, has been recognized in studies of local and regional factors in collapse scenarios for the end of the Neopalatial period (end of LM IB, ca. 1470/1460 BC) (Driessen, 2018). Nevertheless, various narratives of collapse and crisis situations remain debated for Late Bronze Age Minoan, and broader Mediterranean, societies. This paper presents new geoarchaeological evidence from the archaeological settlement of Palaikastro, Crete, and reassesses the tsunami hypothesis proposed in relation to collapse at Palaikastro (cf. Bruins et al., 2008). Combined with evidence from recent tsunami and storm surge research and considerations of broader crisis situations, the results demonstrate the capability of a geoarchaeological approach to understanding the nuanced nature and chronology of change in this complex coastal environment.

[338] *Chair*

Kulisheck, Jeremy [25] see Benedict, Cynthia

Kulisheck, Jeremy (Cibola National Forest and Grasslands)

[257] *Prosaic Biases: Independent Factors Contributing to the Definition of the Classic and Colonial Archaeological Record of New Mexico, USA*

Archaeological records are knowledge palimpsests of the research agendas responsible for identifying and defining these records. When evaluating the representativeness of these records, biases inherent to the research agendas themselves, ranging from methodological approaches to political considerations, are typically implicated. However, factors independent from research agendas can exert strong forces on the composition of a record. In New Mexico, land ownership, land use, and access for researchers significantly has affected the composition of the record considered for the ancestral and early modern Pueblo Classic and Colonial periods (A.D. 1325-1825). This relatively prosaic source of bias may exert a stronger influence on the how this period is known than research biases, despite being largely unrecognized.

[257] *Chair*

Kurin, Danielle [185] see Lozada, Maria

Kurin, Danielle (University of California Santa Barbara)

[185] *Discussant*

Kurin, Danielle [286] see Roberts, Alicia

Kurnick, Sarah (University of Colorado Boulder)

[401] Community Archaeology and the Production of Space at Punta Laguna, Yucatan, Mexico

Archaeologists have considered the relationships between the production of space and the production of social inequality in past societies. Those practicing community and other forms of engaged archaeology have also examined the relationships between the production of space and inequality in the present, including at archaeological sites developed for tourism. As others have noted, the creation of such attractions, and particularly eco-archaeological parks, often involves the processes of spatial colonization and spatial commodification, which justify and exacerbate inequality. This presentation suggests and presents a case study – the Punta Laguna archaeological site in the Otoch Ma'ax Yetel Kooh reserve in Yucatan, Mexico – in which the production of an eco-archaeological tourist attraction has empowered an indigenous group and helped ameliorate inequality. Specifically, this presentation argues that those seeking to decolonize archaeological practice can facilitate the indigenous production of archaeological tourist spaces in three ways. Through academic research, archaeologists can expose faulty narratives of spatial colonization and defy erroneous attempts at spatial commodification. Through collaborative, community-based field research, archaeologists can help local groups disseminate their own history and identity to others. And, through public outreach, archaeologists can generate awareness and encourage tourists to patronize spaces owned and operated by local groups.

Kurota, Alexander [413] see Rogers, Thatcher

Kurota, Alexander (Office of Contract Archeology, UNM)

[413] Recent Research at El Paso Phase Jornada Mogollon Pueblos in Southern Tularosa Basin, New Mexico

During the past four years, the Office of Contract Archeology, University of New Mexico conducted a series of archaeological test evaluations on White Sands Missile Range that uncovered evidence related to new trends in El Paso phase Jornada Mogollon residential patterns. The results of our fieldwork indicate the existence of large melted adobe room block complexes all clustering around playa basins that would have collected seasonal water supplies. The observed surface manifestations indicate some room block complexes were very large with some consisting possibly of several hundred rooms. Analysis of surface ceramics, turquoise, malachite and shell artifacts from the melted adobe room block areas revealed new information about the trading patterns between Casas Grandes, Salado, Rio Grande and the Northern Jornada groups. Recent testing of one of the rooms has revealed evidence for ritual termination of the structure and new information about Jornada Mogollon ceremonialism and interactions with their neighbors.

[413] Chair

Kurozumi, Taiji [33] see Takamiya, Hiroto

Kuruçayırılı, Emre [321] see Martin, Samuel

Kuwanwisiwma, Leigh [122] see Ermigotti, Paul

Kuzminsky, Susan (University of Idaho, Department of Sociology & Anthropology)

[326] Investigating the Population History of Western North America: Implications for the Peopling of the New World

Western North America has emerged as a key region of focus in studies addressing the migration routes and demographic processes involved in the peopling of the Americas. Archaeological investigations in this region have resulted in the discovery of several of the earliest human skeletons and archaeological sites on the North American continent. Given that this region is critical to understanding early population dynamics, this study investigates 10,000 years of prehistory in western North America where genomic and skeletal research of human remains have been underutilized or attempts to extract ancient DNA were unsuccessful. Using 3D geometric morphometric analyses of ancient human crania from Alaska, British Columbia, California, Nevada and Washington, results demonstrate biological affinities among several ancient populations of western North America. These data support recent genomic research addressing ancient population history

in the region, placing it within the broader context of research focused on prehistoric population dynamics in the Americas.

Kvamme, Kenneth (University of Arkansas)**[128] Isolating the Principal Dimensions of Settlement**

In regional investigations of settlement location the analyst typically assumes that appropriate variables have been identified—important variables have not been omitted and irrelevant ones have not been included—an assumption not always justified. The identification of a “minimum set” of location requirements is more appropriate for understanding or modeling settlement placements. This can be accomplished through a principal components analysis of a wide collection of variables measured at settlements, but with a twist. By selecting the lowest stable components principal dimensions relevant to settlement may be defined that point to constant relationships in their distributions, maintain consistent values where settlements occur, and which minimize variance by indicating where settlements vary the least in terms of location. High loadings on these components permit their interpretation and define the principal dimensions of settlement. Their mapping, via GIS, offers much insight. These components may also be used as inputs to archaeological location models. An example is offered from historic Northwest Arkansas based on hundreds of farmsteads and historic maps where landform, soils, the hydrologic network, and the cultural landscape define four principal dimensions of settlement.

Kvetina, Petr (Institute of Archaeology Prague, Czech Republic) and Vaclav Hrncir (Faculty of Arts at Charles University, Czech Republic)**[65] Identification of Post-marital Residence Patterns in Prehistory: A Case from the European Neolithic**

The aim of this contribution is to test hypotheses about the correlation of post-marital residence with several material patterns observed in the archaeological record, namely household floor area, the spatial arrangements of households and type of subsistence. These associations, which were previously revealed in the anthropological literature, are surprisingly strong and have already been used for interpretation of archaeological data, for example, for the pre-Hispanic Maya or the prehistoric Hohokam. The dataset used for our case study dates back to the Neolithic period (5500 – 4900 BC) in the European Temperate Zone (LBK). The method will be based on cross-cultural analysis, controlled for phylogenetic non-independence, that arises through patterns of shared common ancestry. The results will be then confronted with outcomes of other methods, such as genetic, linguistic and strontium isotope analyses.

Kwak, Seungki (Korea National University of Cultural Heritage)**[156] Subsistence Strategy, Pottery Use, and the Role of Animal Hunting on the Neolithic Korean Peninsula**

One of the main topics of Korean archaeology is understanding of prehistoric subsistence throughout the Neolithic. However, due to the high acidity of sediments that do not favor long-term preservation of organic remains, we still lack critical information related to the subsistence of the prehistoric population of the peninsula. Cooking pots contain well-preserved organic compounds originated from culinary practices. Reconstructing food processing episodes through CSIA (Compound-specific Stable Isotope Analysis) of fatty acid extracted from pottery/sediment matrix can contribute to understand the true nature of the subsistence of prehistoric Korean peninsula.

Kwoka, Joshua [30] see Guderjan, Thomas

Kwoka, Joshua (University at Buffalo)**[255] Late Classic Lithics Caches in Northwestern Belize: Technology and Symbolism**

During the Late Classic, lithic artifacts, including eccentrics, served as the primary elements of many Lowland Maya caches. Despite this general pattern, technological and iconographic analyses illuminate the distinct character of individual caches, particularly in relation to artifact production, acquisition, and cache symbolism. This paper presents comparative data from two Late Classic caches recovered in northwestern Belize: one from an elite residential group at Blue Creek and, the other from a termination deposit located within the E-group at the site of Tz'unun. In terms of technology, the caches exhibit significant differences in raw material preferences, degree of artifact standardization, and artisan skill. Eccentric symbolism also varies, with references to celestial phenomena, deities, acts, and social roles.

Kwoka, Joshua [30] see Baaske, Benjamin

Kyaw, Pyet Phy [300] see Iannone, Gyles

La Roche, Christopher (University of Arizona) and Jeffery Clark (Archaeology Southwest)

[263] Coalescence within the Gila River Farm Site and other Salado Settlements of the Upper Gila

Archaeology Southwest and the University of Arizona's Upper Gila Preservation Archaeology Field School (UGPA) have conducted excavations for three field seasons (2016-2018) at the Gila River Farm Site. This poster evaluates the extent of coalescence between Kayenta immigrant and local Mogollon inhabitants within the two main room blocks of this Cliff Phase (A.D. 1300 - 1450) Salado settlement using distributions of ceramics, ground stone tool attributes, and domestic installations. Despite the high frequency of Salado polychromes in both room blocks, results indicate that coalescence was incomplete by the time of depopulation. Coalescence at the Gila River Farm Site is compared to that of three other Cliff Phase Salado settlements in the Upper Gila watershed to gain a regional perspective on this process.

LaBelle, Jason [89] see Pedersen-Guzman, Jeannine

LaBelle, Jason (Colorado State University)

[147] Of Hearth and Home: Investigating Site Structure at the Fossil Creek Site, an Early Ceramic Camp in Larimer County, Colorado

Fossil Creek (5LR13041) is a significant Early Ceramic (Plains Woodland) campsite in northern Colorado. Since 2010, archaeologists from Colorado State University and the University of Northern Colorado periodically conducted controlled surface collection, shovel testing, ground-based remote sensing, and block excavation (70 m²) of this large site. Artifacts recovered span the Late Pleistocene to Late Holocene in age, but are dominated by Early Ceramic era (CE 150-1150) artifacts, including abundant corner-notched arrow points, cord-marked pottery, ground stone, faunal remains, and thermal features. The features consist of heavily oxidized basins and pits filled with ash/charcoal, and on occasion, large quantities of fire altered rock. Radiocarbon dating of macrobotanical remains recovered from feature fill suggests contemporaneity between the features. This presentation focuses on site structure through examination of the spatial distribution of thermal features, ground stone, fire altered rock, and animal remains. Analysis suggests the Fossil Creek site represents a locale of decreased residential mobility linked to intensified food production, perhaps during a period of food stress during the Early Ceramic era.

LaBerge, Michelle (University of Wisconsin-Milwaukee)

[95] The Heart of the Madder: New Research on an Important Prehistoric Dye Plant

In recent years, an interest in natural botanical dye sources has prompted new research into the cultivation and processing of prehistoric dye plants in Europe and the Near East. Advances in chemical analyses of ancient European textiles have provided more detailed information about dye plants, which were important sources of color in early textile production. Evidence of dye from domesticated madder root (*Rubia tinctorum*) has been reported in the archaeological record of the European Bronze and Iron Ages in textiles preserved in salt mines, bog sites and elite European burials but the picture of madder usage from the Late Bronze Age into the medieval era is still unclear. The use of other indigenous plants related to madder also complicates this picture. A critical review of the history of research on madder and the evidence for its use in archaeological contexts in Europe, along with an experimental component of the thesis involved growing madder and using madder root as a dye has suggested new paths of research, and "ground-truthed" older data. The preliminary results may shed some light on the distribution of madder through the Iron Age, and may speak to the significance of the color red in European prehistory.

Labrada, Marcos [350] see Jijon, Juan

Lacan, Melanie (University at Buffalo)**[301] Maritime Mobility during the Western Mediterranean Iron Age**

Research on the topic of seafaring in the western Mediterranean during the Iron Age has often focused on Greek, Etruscan, Roman, and Phoenician activity. By contrast, the maritime endeavors of other coastal populations have largely been ignored. Yet, historical accounts and archaeological evidence indicate that groups living along the French and Iberian coasts may have been more active on the Mediterranean Sea than has previously been reported in the archaeological literature. By exploring the participation of French and Iberian indigenous populations in trade, fishing, and piracy activities thanks to evidence found at coastal sites, this paper aims at rectifying a gap in the literature that has led us to depict these Iron Age communities as passive players within an otherwise dynamic network of social, economic and political exchanges.

Lack, Andrew (EcoPlan Associates, Inc.) and Mary Ownby (Desert Archaeology, Inc., University of Arizona)**[298] Memes of Hohokam Pottery: The Spread of Ceramic Traditions from the Middle Gila River, Arizona**

The idea of memes, as coined by Dawkins, originally referred to an element of a culture or behavior that is passed from one individual to another by nongenetic means. It was used to examine how cultural phenomenon replicate, mutate, survive, or become extinct. This has clear applications to ceramic traditions where the cultural behavior is passed from one generation to the next with some changes but also the preservation of specific traits. Using this theoretical framework, without the biological aspects, research analyzes the conditions that allowed particular memes to continue, change, or be rejected.

To illustrate how the concept may be utilized, in combination with ceramic petrography, Hohokam pottery from the greater Phoenix area of Arizona is examined. From earliest times, ceramics made in the middle Gila River valley used readily available micaceous rock temper. Recent examination of pottery from several outlying sites to this core area, indicates a continuing preference for micaceous material over easily accessible volcanic sands for temper. Such a trend indicates, the meme of pottery making with micaceous raw materials continued long-term in the middle Gila area and was spread to other adjacent pottery making groups with ties to the Phoenix area Hohokam.

Lacombe, Laura (Harvard University), Amy Thompson (University of New Mexico), William Fash (Harvard University) and Loa Traxler (University of New Mexico)**[105] Digital Methods for Conservation in Underground Archaeological Contexts: A Case Study from the Copan Acropolis**

As site documentation methods become more high-tech and data-heavy, it raises issues of repeatability, access, and expense. In the case of the 3 kilometers of circuitous archaeological tunnels at the Classic Maya site of Copan, Honduras, it was imperative to document them in a manner that would be accurate, efficient, and accessible not only to scholars with expensive resources, but also to technicians and engineers within Honduras. This multidisciplinary team developed a method of three dimensional documentation using a total station that was easily teachable and replicable, allowing for continuity between mapping teams, as this tunnel system was too massive for any one group to complete. The resulting models are less expensive and data-heavy than 3D scans or point clouds, and were adapted specifically for tunnel environments with the overarching goal of informing the creation of a conservation plan for the Copan tunnel network. The color-coding of various kinds of archaeological features visible in the maps, and different kinds of interventions effected on them, enables their utility for conservation to be enhanced. New data can be continuously added to enable conservators as well as site managers an easier means of ascertaining risk and stability in the tunnel system.

Lacombe, Sébastien [186] see Sterling, Kathleen

Lacy, Kyle**[272] An Analysis of No Agua Obsidian**

The No Agua Peaks are a relative understudied obsidian source. An easily accessed and relatively large deposit area, one would expect No Agua obsidian to be frequently used and widely distributed. However, because of the source's high silica content, desirability for and practicality of use of this material is questionable. Using data from a recent survey surrounding portions of the No Agua Peaks and neighboring Cerro del Aire, a comparison of the use of various lithic materials for chipped stone tool production was conducted. Despite its ready availability, even at sites in and around the No Agua Peaks the obsidian appears to have been used only for expedient tools. Formal chipped stone tools were made instead from local dacite, imported Jemez and Los Rechuelos obsidians, and imported cherts regardless of a site's temporal affiliation or

proximity to the Peaks.

Ladefoged, Thegn [316] see McCoy, Mark

Ladefoged, Thegn (University of Auckland)

[354] *Discussant*

Ladegaard-Pedersen, Pernille [386] see Walsh, Matthew

Laffey, Ann (University of Florida)

[250] *The Role of the Toad in the Middle Horizon Andes: A Chemical and Iconographic Analysis*

Here we present preliminary findings of chemical analyses performed on a Middle Horizon pottery sherd (c. 600-1100 AD). The sherd originates from the capital region of the Wari and has the striking iconographic representation of either a frog or a toad with visual indications of preserved residues. Compound groups will be isolated via esterification and gas chromatography mass spectrometry will identify lipid compounds such as cholesterol, FA16:0, and FA18:0. These compounds can indicate either plant and/or animal products. We will also be using metabolomic techniques to isolate alkaloid and biomarker compounds specific to bufotoxins. We intend to juxtapose the identification of the chemical remains with that of the exterior decoration of the vessel by contextualizing the toad within the corpus of Southern Andean Iconographic Series (SAIS) and Wari sensibility. If bufotoxins are discovered in the clay, it could witness a ritual practice that was integrated into Wari culture much like the iconographic representations of the SAIS. By tracing the two variables in tandem, the chemistry and the iconography, it is hoped that we can shed further light on the cultural processes that fostered one of the first expansive empires in the Andes.

Lafrenz Samuels, Kathryn (University of Maryland, College Park)

[283] *Moderator*

[283] *Discussant*

Lail, Warren [44] see Montoya, Joaquin

LaJeunesse, Roger [210] see Dodd, Walter

Lalueza-Fox, Carles [253] see Lipson, Mark

Laluk, Nicholas (White Mountain Apache Tribe-Brown University)

[96] *We Know Who We Are and What Is Needed: Achieving Healing, Harmony and Balance in Ndee Institutions*

Ndee perceptions of the past bear directly on the present. Our institutions—lifeways, worldviews and overall continued well-being—are contingent upon our relationship to the land in the form of access, prayer, offerings, power acquisition and overall reciprocity. Intergenerational, ecological and environmental commitment are essential components to maintain and ensure such relationships. In reference to how archaeology and the ethnohistorical narrative can inform the topic of ancient medicine and healing, our paper will explore the intricate braiding of intergenerational knowledge informing contemporary medicinal and healing practices in Ndee contexts. Such institutional practices are inseparable from management and preservation of Ndee cultural heritage resources. Although archaeological and ethnohistorical evidence can provide useful glimpses into the ancient medicinal and healing practices we feel that such longstanding knowledge systems and practices are innately and intricately engrained within Ndee communities. Although such knowledge is not always called upon, various forms are continually used to heal and provide balance and harmony.

[60] *Discussant*

[294] *Chair*

Lam, Wengcheong [300] see Allard, Francis

Lamb, Céline (University of Kentucky) and Joana Cetina Batún (Universidad Autónoma de Yucatán, México)

[146] *Morir para renacer: Funerary Rituals of Pregnant Women in Chunhuayum, Yucatan*

The lives of women have been a focus of recent research in Maya Archaeology, finding that they fulfilled important roles as mothers, wives, priestesses, members of the elite and even as rulers. Within each social stratum, women lived diverse identities, however they shared similar biological processes, such as pregnancy, which was ruled by diverse beliefs and natal care practices. This was especially true because of the Mesoamerican belief that the duality of life and death governed women during pregnancy, because at the moment of birth their status was equivalent to that of a warrior. In 2016 as part of the excavations of the Ucí Regional Integration Project (UCRIP) at the Chunhuayum site, we found three female funerary contexts deposited in cists built continuously in an apparently domestic structure. Two of the females contained the remains of an unborn child in the pelvis and all the contexts were revisited with evident manipulation of the left extremities and bony segments near the pelvis. Our presentation will interpret the symbolism expressed in the funerary ritual, investigating the status of women as possible dead warriors in childbirth as well as discussing the ritual nature of the domestic unit in which they were buried.

Lambert, Patricia (Utah State University)

[44] *Reinterpreting the Evidence for Violence in Cave 7, Grand Gulch, Utah*

Wetherill's Cave 7 in Grand Gulch, Utah, has long been considered a massacre site, notable in particular for the large number of individuals in the assemblage (~90) and for its temporal placement in the Basketmaker II period. Recent debate concerning these remains has centered around the chronology of burials in the cave, as establishing contemporaneity of the remains is recognized as crucial for interpreting the social context—and specific events—surrounding the formation of the assemblage. In this paper new osteological evidence pertaining to this debate is presented, based on a reexamination of the remains of 74 individuals from Cave 7. These data support the interpretation of high levels of violence at this time and place, but not of a single massacre event involving all or even most of the burial population. That said, 45% of these individuals (59% of men, 36% of women) have some evidence for violent injury, including 24% with perimortem cranial trauma, scalping cut marks, and/or projectile injuries. These data suggest that the Cave 7 population was heavily embattled, and raise important questions about the history of the Cave 7 population and of the social dynamics in the region some 2000 years ago.

Lambert, Spencer (Southern Methodist University)

[57] *Examining Large Game Animal Trade at Two Fremont Sites in Utah*

Strontrium isotope analysis has been used by archaeologists to track prehistoric human and animal migrations. Strontium isotope analysis can suggest which large game individuals were obtained locally by prehistoric hunters and which were brought to habitation sites through long-distance hunting or trade. This study explores the potential of using strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) analysis to determine whether the Fremont obtained some non-local large game at habitation sites. The transport of large game by Fremont hunters is examined at two sites: Five Finger Ridge in central Utah and Wolf Village in northern Utah. The results suggest that Fremont hunters obtained at least some large game individuals from areas away from their habitations, potentially through trade.

Lambrecht, Glenn (Archaeological Micromorphology and Biomarkers Lab, ULL, Tenerife, Spain), Inocencio Rafael Martín Benenzuela (Departamento de Física y IMN, ULL, Tenerife, Spain), Caterina R. de Vera (Archaeological Micromorphology and Biomarkers Lab) and Carolina Mallol (Archaeological Micromorphology and Biomarkers Lab)

[417] Epifluorescence Microscopy of Experimentally Heated Animal Bones: Applications to Archaeological Micromorphology

Burned bones are an important constituent of the archaeological sedimentary record. Their presence is usually indicative of human activity and may provide information about past human behavior.

In micromorphological thin sections, charred bone fragments may appear as opaque and amorphous, and extremely difficult to distinguish from other organics related to fire activities.

As bones emit a green fluorescence upon irradiation with UV-blue light, epifluorescence microscopy can provide a solution to this problem. To our knowledge, no rigorous studies have ever been performed on fluorescence properties of heat-altered bones in thin sections.

We have experimentally heated animal bones in a muffle furnace under oxidizing conditions at different temperatures between 100 and 700 °C; and subsequently prepared sets of polished samples. We investigated their fluorescence properties with a customized epifluorescence microscope: by attaching a spectrometer to one of the oculars, we could record emission spectra for specific regions in the microscope's field of view, hence objectively describing color.

Our preliminary results show that at each temperature, bone is characterized by a unique emission spectrum, indicative of the heat-induced chemical and structural changes within the bone. Understanding these changes may allow us to interpret archaeological bones in thin sections in new ways.

Lamoureux St-Hilaire, Maxime (Boundary End Center)

[165] Moderator

[165] Discussant

Lan, Wanli [416] see Li, Weiya

Lancaster, Don [346] see Neely, James

Landau, Kristin (Alma College), Christopher Hernandez (NSF Postdoctoral Fellow/University of Illinois Chi) and Nancy Gonlin (Bellevue College)

[24] Lunar Power in Ancient Maya Cities

As the sun set on the horizon, ancient city dwellers would have felt the cooler air, heard cicadas' songs, and perhaps tasted a late-night snack. Their vision, however, would have suffered the most as dusk turned to night and some form of illumination was necessary to see others, carry on activities, or get to bed. Once the sun fully set, nature provided another source of light: the moon. Although today most people barely check whether the moon's still up there, ancient Maya closely counted its days, phases, and form. In this paper, we briefly review Maya conceptions of the moon as understood through Classic inscriptions, Postclassic codices, ethnohistoric documents, and ethnographic accounts. Specifically we find that rulers ascended to the throne and dedicated monuments under a growing gibbous moon. We argue that moonlight was linked to authority for Classic Maya kings, both for its illuminating quality and symbolic power. In an urban setting, important rituals would have been conducted during auspicious lunar moments, transforming large open plazas into special ceremonial spaces and fortifying the power of kings.

[234] Discussant

Landers, Jane (Vanderbilt University)

[162] The Material Culture of Maroon Communities in the Early Circum-Caribbean

This paper examines early maroon settlements of the Circum-Caribbean and is based upon original research in a wide assortment of Spanish archives, as well as archaeological investigations of African sites in the Americas. As in Gracia Real

de Santa Teresa de Mose, in Spanish Florida, I find Africans readily adapted certain elements of European and indigenous cultures in their re-created communities, but they also retained at least some from their African homelands, despite the incalculable damage wrought by the slave trade. One maroon community in Colombia created a Christian church served by its own clergy who shared religious authority with an African religious specialist. Others had executioners and exorcised "witches." Some were led by Kings and Queens, others by war captains, and some featured family dynasties.

Spanish priests recorded their visits to maroon communities and at least some basic demographic information on their inhabitants Spanish maps and military accounts also document some of their building and fortification patterns, while surface collections and excavations yield metal objects such as bracelets, arrow tips, and lance points, as well as slag deposits from their manufacture.

Landry-Montes, Khristin (InHerit Affiliated Researcher) and Daniela Angélica Garrido Durán (Secundaria Humberto Cantón Moller and Secundaria I)

[244] Youthful Visions of Time and Place: Photovoice Methodology in Three Maya Communities

Archaeology, and to greater extent academe in the Western world, is evolving from a past couched in the comfort of objective truths and universal knowledge focused on static places and societies. However, now more than ever, there has been a push towards understanding the dynamism that is, and has always been, part of the greater human experience. In seeking new directions of collaboration with Native American groups throughout the Americas, academics are finding new ways of knowing and interpreting the pluralistic realities of lived time and place. Inspired by Sonya Atalya's concept "Braiding Knowledge", we as university researchers and grade-school educators of InHerit and the Cultural Heritage, Ecology, and Conservation of Yucatec Cenotes project present "photovoice"— a community-based photographic research initiative. We suggest that this methodological practice is an ideal way to interpret and articulate subjective and therefore truthful understandings of time and place. In this talk, we present those realities in relationship to the cultural patrimony of cenotes (underground water sources) as interpreted through the visions of middle school students from the Yucatec Maya communities of Yalcobá, Cuncunul, and Kaua.

Landt, Matthew [207] see Williams, Justin

Langan, John [357] see Lundin, Deil

Lange, Christine (Desert Archaeology, Inc.)

[259] The Use of Shell Ornaments at Early Agricultural Period Sites in the Tucson Basin

Recent excavations of Early Agricultural Period (circa 1200BC-AD 50) sites in the Tucson Basin of southern Arizona have produced a number of ornaments of personal adornment manufactured from marine shells that are found in either the Gulf of California or the Pacific coastal region of southern California. Thriving shell ornament manufacturing industries in both California and northern Mexico at La Playa were the likely contributors for the finished items of jewelry that have been recovered. It has been suggested that the origin of some of these ornament forms may be found in the exchange of shell artifacts between the populations from the California coast and the Great Basin region. This suggests that the local inhabitants were active participants in one or more exchange networks, and were intent on maintaining these networks. The ornaments may represent symbols of a connection to a faraway place and people, knowledge and experience as a result of their journey to the Tucson Basin.

Lange, Frederick (Smithsonian Institution Department of Anthropology)

[191] Discussant

Lange, Hans [251] see Darwent, Christyann

Lange, Richard**[191] Born to Go Far: Tracing the Footsteps of Frederick W. Lange**

Born in the midst of WWII (December 1944), Frederick William Lange emerged into this world in Madison WI. Soon thereafter, he was in New Mexico, then Texas, then Southern Illinois. His travels would take him to Germany and Russia. Summers he worked in the Southwest, at Nauvoo IL, and in the Michigan Upper Peninsula. College took him back to Wisconsin for undergraduate and graduate work, then to Central America, back to the Midwest (Beloit and ISU), back to Central America, then to CU (Boulder), then to Phoenix and then California...all the while bouncing back and forth to Central America—Costa Rica, Panama, Nicaragua, and El Salvador. In between all of this there were adventures in Canada and in the Caribbean as well. If travel broadens one's horizons, it would be difficult to get much broader than what Fred has achieved. It wasn't just travel, however—he was professionally involved in most all of these venues, learning from them, and creating and contributing to the vast bank of knowledge about the peoples and histories of each of these regions.

Langis-Barsetti, Dominique [321] see Martin, Samuel

Langlie, BrieAnna (Binghamton University)**[287] Mapping Terraces, Mapping Agricultural Practice in the Lake Titicaca Basin, Peru**

In the Lake Titicaca basin of southern Peru, agronomic systems were finely tuned over millennia to the high-altitude environment, an ever-oscillating climate, and dynamic cultural regimes. To succeed in these conditions, prehistoric farmers transformed steep hillsides into viable agricultural land by modifying them into massive agricultural terrace complexes. The crops grown, and llamas grazed on these landscapes provided food security for ancient cities just as they continue to provide security for populations living in the region today. However, very little is known about the development of these agricultural terraces. The Altiplano Agriculture and Communities Project (AACP) conducted pedestrian survey during June and July of 2018 to begin to elucidate patterns throughout the region. A drone was used to make three-dimensional models of the terraces to better understand their dimensions and hydrology. Mapping styles of masonry on terrace walls shed light on regional and chronological variation in terraces. We also identified architecture that marked ownership of terrace plots and walls used to manage the vertical movement of livestock. The preliminary results of AACP's 2018 survey provide evidence of the varied labor regimes that built and farmed terraces in the south-central Andes.

Langston, Jada [58] see Dorr, Lana

Lanoë, François [8] see Soza, Danielle

Lanoë, François (University of Arizona) and Joshua Reuther (University of Alaska Museum of the North)**[10] Environmental Change and Human Ecology in Central Alaska during the Early Holocene: Hollembaek's Hill**

Dramatic environmental changes occurred in central Alaska during the Early Holocene as mixed woodlands and grasslands transitioned to boreal forest ecosystems. Despite 80 years of research in this region, we are just beginning to understand how interior Alaskan populations coped with the extinction of the large grazers (bison and elk) that constituted their favored resources, and how caribou became the preferred large mammal resource in the Northern Archaic. Hollembaek's Hill site contains an archaeological occupation dated to 8,000 cal B.P. that provides rare insights into this period of central Alaska's history. The occupation contains numerous faunal remains dominated by elk, which are likely associated with microblades as part of a late Denali component. A large pit was excavated by the site's occupants and may have functioned as a storage pit before being re-used for trash management. This evidence for investment in modification of domestic space suggests the adoption of novel forms of mobility that may have been designed to cope with changes in resource availability, and provides information on economic choices and how they influenced the evolution of material culture.

Lanza, Mariangela (University of Western Australia)

- [305] *Roots and Routes of Rock Art: A Kernel Density Analysis of Newly Recorded Rock Art Sites to Understand Human Mobility in the North East Kimberley, Australia*

A large corpus of 1034 rock art sites in Australia's NE Kimberley has recently been recorded within the Kimberley Visions Australian Research Council Linkage Project. Rock art analysis in the Kimberley has often focused on distinctive iconographic signatures to structure images in rigid sequences. This approach is inadequate for the understanding of the complex dynamics behind the diachronic development of different stylistic phases. This presentation follows a different approach by showing the results of a two-step geospatial analysis focused on mobility behaviour with topographic, archaeological and rock art data stored and manipulated as a GIS dataset (ArcMAP 10.5). The first step is identifying the density and directional distribution patterns of motifs. Second is modelling possible travel routes for the spread of figurative rock art conventions. Kernel Density (Spatial Analyst Toolbox) is used to quantify and display clustering/dispersal patterns in the distribution of motifs and figurative conventions, highlight spatial relationships between topographical features and rock art sites, and help re-assess the extent of rock art styles' boundaries. The outcome can provide new insights into human mobility as one of the factors that contributed to the formation of distinctive rock art provinces in a constantly changing natural and cultural landscape.

Lapham, Heather [197] see Faulseit, Ronald

Lapp, Jennifer E.

- [167] *Moderator*

Larios, Jennifer (University of Michigan), Jacob Bongers (UCLA Cotsen Institute of Archaeology), Jordan Dalton (University of Michigan), Jo Osborn (University of Michigan) and Camille Weinberg (University of Texas at Austin)

- [182] *Chincha Mercantilism: A Preliminary Investigation into Chincha Valley Economic Organization during the Late Intermediate Period and Late Horizon*

The Chincha Kingdom is widely recognized as one of the few cases in which 10,000 merchants are said to have existed in the Late Horizon non-market Inca economy. This paper seeks to investigate Chincha economic organization by analyzing the distribution of pottery from various sites in the valley attributed to the Late Intermediate Period and Late Horizon. With our findings, we aim to compare Chincha distributional patterns with those of known market and non-market economies to attain a better understanding of mercantilism in the absence of a market economy.

Larkin, Karin (University of Colorado at Colorado Springs)

- [184] *Surveying the Utility of Field Schools in Preparing Students for Compliance Work*

Cultural Resource Management (CRM) professionals lament that they felt unprepared upon graduation for entering the field of compliance archaeology and recent graduates often complain that they are not qualified for CRM jobs as posted. This anecdotal information raises the question of whether field schools and undergraduate programs adequately prepare students for the field of CRM or other compliance archaeology. While there is research that details the benefits of experiential learning in field school pedagogically, few studies are available that examine the utility of field schools for preparing students for compliance work. Here, we present our results from a recent survey that examined student preparation for CRM or compliance work. This survey queried both compliance professionals and academics about field schools and student preparation. Using our results, we also offer some possible suggestions for addressing observed gaps and other possibilities for curriculum reform.

- [139] *Moderator*

Larmon, Jean (University of Illinois at Urbana-Champaign), Vilma Fialko (Department of Conservation and Rescue of Prehispanic) and Lisa Lucero (University of Illinois at Urbana-Champaign)

[199] Erasing Borders: Integrating the Settlement Hierarchies of Central Belize and the Petén, Guatemala

Over the last 18 years, the Department of Conservation and Rescue of Prehispanic Archaeological Sites (DECORSIAP) in Guatemala has carried out extensive systematic surveys of the northeast region of Petén, Guatemala in order to better understand the internal and external political dynamics of Naranjo Sa'aal and its hinterland. Transects between Naranjo, Tikal, Yaxhá, and Nakum have helped to elucidate settlement hierarchies of northeastern Petén, though Naranjo's political influence likely extended much further. The northern Guatemalan/Belizean border is host to a swath of unexplored ancient Maya centers that likely fit into this political sphere. In 2005 and 2018, the Valley of Peace Archaeology project visited two large centers near the border that are tentatively classified as intermediate centers, each with ball courts and large temples around the acropolis. This paper integrates these recently identified centers in the social dynamics of the Rio Homul and Mopan Basin using the settlement hierarchies outlined in studies of Tikal, Naranjo, and Yaxhá. We will apply the same survey and mapping strategies already employed by DECORSIAP in order to produce a comprehensive, integrated hierarchy of these river basins that can be applied in future studies.

Larralde, Signa, Sarah Schlanger (Bureau of Land Management New Mexico State Office) and Martin Stein (Bureau of Land Management Carlsbad Field Office)

[75] Exporting Oil and Gas Landscape-Level Mitigation Programs

In the ten years since the Bureau of Land Management (BLM) launched its Permian Basin mitigation program in New Mexico, the agency has funded research initiatives worth upwards of \$4.5 million and streamlined its approach to developing oil and gas production in the busiest "oilpatch" in the nation. Why haven't we seen more programs like this one in other places across the country? In this paper, we seek to unpack the "well, but that wouldn't work here" response the Permian Basin program has generated elsewhere in the BLM and among land-managing federal agencies in general. We explore the difficulties of exporting and adapting mitigation programs across agency and jurisdictional lines, we spend a modest amount of time identifying some common impediments to creativity in federal agencies, and we suggest some locations and circumstances where aligning creative mitigation and process simplification might yield some new approaches to cultural resource management.

Larreina-Garcia, David (UPV-EHU: University of the Basque Country) and Juan Antonio Quirós-Castillo (UPV-EHU: University of the Basque Country)

[363] The Medieval Basque Iron Industry, Cultural Traits in Technological Traditions

The Basquesmith project investigates ironworking production during Early Medieval times –mostly utilitarian iron implements such as ladles or keys– excavated in rural settlements in the Basque Country (northern Spain), focusing on the characterisation of the manufacture used, the quality of the utensils produced, and the debris generated. The material characterisation and reverse engineering of the technical materials is starting to reveal a complex network between smelters, smiths, consumers and agencies of a lively market in force at least during the 7th-12th centuries AD. While the metallographic study on ~100 items detects a technological tradition in the manufacture of iron implements inherited from the Roman times, the smelting technique seems to be well developed in the area before the arrival of the Roman people and apparently both technological procedures coexisted in time. The reconstruction of the various processes in a relatively small region illustrates a technological adaptation to natural resources and socio-technological contexts, seemingly permeable to external influence but also retaining its own traditions in technical activities.

Lerrick, Dakota [322] see Bement, Leland

Larson, Bruce J. [168] see Bassett, Hayden

Larson, Bruce J. [391] see Bassett, Madeleine

[401] Native American Indian Women Working in California Archaeology

Women archaeologists approach their work from the influences of their gender and life experiences, using their skills and knowledge in archaeology. In 2018 seven women archaeologists were interviewed by the author and were asked five questions about the role of gender in their work. Only one of them was Native American Indian, and she discussed obstacles and barriers specific to Native women. The author (Navajo) will interview at least seven Native American Indian women archaeologists working in California archaeology, in both academia and the private sector. These women will be asked the same questions as their non-Native counterparts, as well as questions that focus on their Native backgrounds, to explore how their cultural background affects their work in archaeology. Information from these interviews will be summarized and compiled for this presentation.

Larson, Greger [20] see Ameen, Carly

Larson, Greger (University of Oxford), Julia Best (Bournemouth), Alison Foster (Leicester), Ophelie Lebrasseur (Oxford) and Naomi Sykes (Exeter)

[20] *The Human-Chicken-Environment Nexus*

The chicken is a relatively recent addition to global cuisine. Unlike cattle, sheep and pigs, which were domesticated 10,000-12,000 years ago, convincing evidence for the domestication of Red Junglefowl, native to Southeast Asia, does not emerge until at 5,000 years ago, at the earliest. Furthermore, multiple strands of evidence suggest that chickens were not domesticated primarily as a source of food but rather for sport and divination. So how did a bird with a restricted native range come to dominate food cultures worldwide, and with what consequences for human-chicken-environmental health?

Against a backdrop of archaeological data, this paper will consider the sustainability of modern day chicken production, providing examples generated through two AHRC-funded projects 'Cultural and Scientific Perceptions of Human-Chicken Interactions' and 'Going Places: Empowering women, enhancing heritage and increasing chicken production in Ethiopia'.

[352] *Chair*

Larson, Griffin (Western State Colorado University), Zachary Stanyard (The University of Texas at Austin), David M. Hyde (Western State Colorado University) and Michael Stowe (Department of Defense)

[371] *Excavations at Group I: A Small Residential Household in the Medicinal Trail Hinterlands Community, Northwest Belize*

Group I of the Medicinal Trail Community is a small residential household in the Rio Bravo Conservation and Management Area of northwestern Belize and consists of an eastern shrine and two house mounds on the south and west sides of the courtyard, all situated on an artificial plaza platform. This group is located directly east of the larger and more formally constructed Group B, and is bounded by a steep escarpment to the east and north. Excavations during the 2014-2017 field seasons reveal an at times complicated construction and occupation sequence. Our investigations at the group explored all three structures, the courtyard, and an anomalous feature just below the surface of the courtyard directly in front of the eastern shrine. This poster will summarize and synthesize all of these data to provide an understanding of Group I's function internally and how it articulates with the larger Medicinal Trail Community.

Larson, Mary Lou (University of Wyoming)

[329] *Folsom and Goshen Technological Organization at Locality I of the Hell Gap Site*

Chipped stone tools and debitage from the Hell Gap site offer evidence of a wide range of activities such as procurement, manufacture, and use of stone tools. Several features with multiple pieces of chipped stone (piles) excavated from the earliest Paleoindian components at Locality I appear to show different production trajectories, suggesting that a wide range of production stages were carried on. Analysis of the assemblages from these features provide insight into the nature of technological organization of the earliest peoples of North America. One feature, although not containing dense and concentrated debitage, includes eight Folsom channel flakes and two broken preforms, representing a fluting location. Additionally the presence of carnivore bone (a wolf vertebrae), turtle carapace, and ochre suggests ritual associated with Folsom fluting. The 1960s Hell Gap investigations delineated a number of stone tool production features (flake piles), but individual specimens could not be assigned to a specific feature for assemblage analysis. The advantage of our excavation protocols is that they allow for the selection of specimens contained in piles. In this presentation I compare several production events from early Paleoindian components.

[329] *Chair*

Larson, Kara [387] see Paige, Julianne

Larson, Mary Lou [329] see Kornfeld, Marcel

Larter, Fergus [32] see Mercader, Julio

Larter, Steve [278] see Inwood, Jamie

LaRue, Chuck [76] see Gearty, Erin

Lash, Samantha

[278] *From Soil to Society: Local Variability in Inferred Climatic and Environmental Change and Landuse in the Valencian Community, Spain*

Climatic and environmental factors are 'creeping' phenomena with rapid thresholds, and there is a disjuncture between product and best-practice in terms of landuse. The ways in which people engage with their environment are necessarily influenced by the nature of the given region, but the form of that engagement is contingent on cultural and historical specificities. This paper targets these negotiations between small-scale land use practices, increasingly "state"-driven macro-economic systems, and changing environmental conditions within the wider historical narratives of colonial expansion in the ancient western Mediterranean (1st millennium BCE). I use novel environmental data and inferred climatic change to contextualize these "glocal" tensions. In short, this research includes the application of a proxy based on a certain class of lipid biomarkers (GDGTS) for relative changes in temperature and pH from excavated material (here faunal remains); thus providing comparable environmental and climatic datasets from sites themselves, avoiding the ambiguity of using indirect geological archives as indicators). The broader Valencian region boasts a relatively large body of work on Holocene climate as well as long-term archaeological research focused on the development of agriculture and diversified regional economies in South Eastern Spain, and thus serves as the primary case study.

Lassen, Robert (Gault Project at Texas State University) and Sergio Ayala (Gault Project at Texas State University)

[322] *Is Fluting Exclusive to Paleoindians? A Comparison of Paleoindian and Archaic End-Thinning Techniques*

The idea that fluting is a uniquely Paleoindian technological marker for projectile points in the Americas has been considered a given ever since the original Folsom discovery in 1927. While it is true that fluted lanceolate points are reliably diagnostic artifacts of the Paleoindian period, stemmed points from the Archaic period also occasionally exhibit end thinning flake scars that are reminiscent of flakes. In Central Texas, Middle Archaic point types such as Andice/Bell, Bulverde, and Pedernales regularly possess end thinning flake scars that facilitate hafting. This study compares the basal end thinning of Paleoindian points such as Clovis, Folsom, and South American Fluted Fishtail to that of the aforementioned Archaic points. The comparison involves a morphological study utilizing metric variables, as well as a technological study involving replicative flintknapping and an analysis of reduction sequences for the various point types. The results will determine the validity of fluting as a uniquely Paleoindian strategy.

Latorre, Claudio (IEB & Departamento de Ecología, Pontificia Universidad Católica de Chile), Calogero Santoro (Instituto de Alta Investigacion, Universidad de Ta), Ricardo De Pol-Holz (GAIA-Antartica, Universidad de Magallanes, Punta A), Eugenia Gayó (Center for Climate Change and Resilience Research) and Mariana Yilales (IEB & Departamento de Ecología, Pontificia Univers)

[248] *PEOPLE3k: Demographic Boom and Bust Cycles of Coastal Hunter-gatherers Cycles Track Shifting Upwelling Conditions in Northern Chile*

Extensive archaeological shell middens can be found throughout coastal northern Chile, where they span more than 9,000 years. They contain abundant terrestrial plants and shellfish remains and can often accumulate very quickly and/or episodically. We use multiple radiocarbon dates to measure local radiocarbon deviations (R) between marine and

atmospheric ages along a given stratigraphic horizon. Such estimates are then used to calculate regional marine reservoir departures from the global marine ^{14}C calibration curve (ΔR). Previous research has shown that ΔR estimates can be used to reconstruct local upwelling conditions. A steady increase in upwelling and colder coastal waters drove increased marine productivity along with an almost constant increase in coastal hunter-gatherer populations from 9,300 to 5,500 cal yr BP. Major shifts in upwelling associated with unstable coastal ecosystems drove demographic collapse of coastal hunter-gatherers from 5,500 to 4,700 years ago- with populations declining until c. 2,500 cal yr BP. Our upwelling records shed new light on how the coastal ecosystems of northern Chile have evolved and co-adapted with prehistoric human societies, and show how these changes relate to global climate change, such as the onset and intensification of ENSO over the last 9,000 years.

Lattanzi, Gregory [70] see Sanger, Matthew

Lattanzi, Gregory (New Jersey State Museum)

- [133] *Look What Just Washed Up on the Jersey Shore: Climate Change and Its Impacts on Submerged Sites in New Jersey*

Beginning in 2013, the office of the New Jersey State Archaeologist began receiving requests to identify artifacts found along the Atlantic shoreline and the Delaware Bay. While finding artifacts along beaches is not new, the substantial increase both in number and locations of finds can only be attributed to the results of climate change. The frequency and intensity in which these storms occur has contributed to the disturbance and destruction of submerged archaeological sites along the continental shelf. Although without context, these finds provide significant data on potential site locations, site chronology, and potential site preservation. This presentation will document the locations of these finds, identify their chronology, and examine areas of archaeological concern regarding continued climate change and its impact on archaeological sites.

Lau, George (Sainsbury Research Unit, UNIV OF EAST ANGLIA)

- [161] *Making Kin out of Stone: Production of Landscape and Collectivity in Ancient Peru*

This presentation details different strands of evidence we have on the organisation and kin-based significances of carved stone monoliths during the late prehispanic period of ancient northern Peru (ca. AD 500-1532). Ethnohistorical documents suggest that it was close kin who carved and erected stone images of esteemed forebears; the images themselves, meanwhile, were referred to as 'brothers' of the prototype. Stony things—craggs, boulders, mountains—were also described as tangible remnants of where past kin 'lithified'. Archaeology, meanwhile, shows the close associations between the carved monoliths and funerary cult; they were images of the deceased generally adorning mausolea and necropoli. They are consistent with the idea that production of stone images were the purview of family/lineage groups and centred on important instantiations of esteemed forebears in the landscape. It is argued that late prehispanic groups of Peru's north highlands sought to consolidate collectivity and multiply ancestral presences through their stonework, both within the village setting and through the visible landscape. Engagements with stone during this time of great social and demographic upheaval, was intimately related to the process of 'make kin'.

Laudeman, Bobby [119] see Renteria, Bernardo

Laugier, Elise Jakoby [120] see Hill, Austin

Laumbach, Karl (Human Systems Research, Inc.)

- [413] *Discussant*

Lau-Ozawa, Koji

- [83] *Materializing the Incarceration of Japanese Americans during WWII*

The mass removal and imprisonment of over 110,000 people of Japanese descent during WWII relied upon an interconnected infrastructure of materials and technologies. These camps were not spontaneous creations, but the result of

numerous strategies of immigration control and confinement with their own histories of use within the United States. The deployment of these technologies was often governed by economic and political logics, not accounting for the experiential qualities of such decisions. Here I will discuss the various material qualities of the WWII Japanese American incarceration and the subsequent ways in which they were experienced. While archaeological studies have highlighted the physical manifestations of the Japanese American incarceration camps, they often focus on the strategies employed by incarcerated to build new environments and alleviate the traumas of incarceration. Here instead I will step back to examine some of the seemingly benign qualities of these camps which inflicted trauma in the first place. With a focus on these materials, archaeology can help to illuminate the deep and often unnoticed consequences of such decisions and their impacts on those subject to them. This topic is of growing concern as the technologies of removal, mass resettlement, and confinement become increasingly common.

Lauria, Kathryn**[273] Neanderthal Communities of Care: How & Why Did Non-modern Hominins Care for Victims of Interpersonal Violence?**

Within the constantly evolving field of human origins, researchers are looking for new methods and theories to infer behavior from the paleoanthropological record. Here, Shanidar 3, a Neanderthal specimen with evidence of partially healed sharp force trauma, is examined using the Bioarchaeology of Care approach. Based on a comparison with paleopathological and forensic literature, Shanidar 3's injuries are consistent with sharp force trauma caused by a penetrating object. The severity of Shanidar 3's injuries suggest that healthcare provisioning was required for immediate survival. Furthermore, the relatively high number of extreme injuries which demonstrate healing in the Neanderthal record, referred to as the "rodeo traumatic lesion pattern" due to the high incidence of head and neck trauma, indicates a system of care that was in place for injured members of the species. This paper explores how bioarchaeological theories can be applied to non-modern hominins, such as Shanidar 3, to infer not only violent behaviors among individuals, but the systems of care that were enacted to assist such individuals and ensure their immediate survival.

Laurich, Megan (Northern Arizona University), Wyatt Benson (Northern Arizona University), Natalie Patton (Northern Arizona University) and Chrissina Burke (Northern Arizona University)**[117] Are You a Tool? A Zooarchaeological Analysis of Worked Bone from Wupatki National Monument**

Zooarchaeological analysis provides details on the processes used to create and modify bone artifacts and the potential use of these materials by past peoples. This poster provides the results of faunal analysis, usewear analysis, scanning electron microscopy, and experimental archaeology to examine bone artifacts from Wupatki National Monument. The data collected includes skeletal elements from a range of taxa, assessment of bone working stages, and evidence for bone modification in the form of bone tools, ornaments, and instruments. We elucidate human behaviors tied to these implements to provide a better understanding of bone processing, manufacturing, use, and activities associated therein at Wupatki. This research further contributes to the conversation of bone working for the zooarchaeological community at large in the American Southwest and worldwide.

Laurila, Erick (Logan Simpson), Jewel Touchin (Logan Simpson), Saul Hedquist (Logan Simpson), Shawn Kelley (Parametrix) and Shere Churchill (Parametrix)**[254] Navajo-Gallup Water Supply Project: Best Management Practices Manual**

The Navajo-Gallup Water Supply Project (NGWSP) is a Bureau of Reclamation (Reclamation) sponsored project in northwest New Mexico that will convey water from the San Juan River to Navajo and Jicarilla Apache communities, as well as to the City of Gallup. Reclamation developed a Programmatic Agreement (PA) that prescribes how cultural resources, including numerous archaeological sites, will be considered during project construction. The PA stipulates that a lessons-learned case study or best management practices manual (manual) shall be produced following the completion of construction. Logan Simpson and Parametrix archaeologists and anthropologists have been working with Reclamation and the NGWSP PA consulting parties to develop the first draft of the manual. One of the themes of the manual is to provide guidance on how to meaningfully engage in consultation with Native American tribes so that the perspectives and knowledge of descendant communities are given equal footing to understanding and managing the archaeological resources, traditional cultural properties, and the cultural landscapes being investigated as part of the NGWSP. This paper presents both case studies and recommendations on how tribal participation is critical to archaeological work completed within a National Historic Preservation Act Section 106 context.

LaValley, S. Joey [189] see Haines, Jeremy

LaValley, S. Joey (Logan Simpson Design, Inc.)

[381] *Movin' on Up: Insights into Habitations on the Slopes of Cañon de San Diego, New Mexico*

Archaeology in the Jemez Province of New Mexico has been explored and studied since the late 19th century. High site densities and pueblo complexes are common, but most of the areas suspected to contain pueblo settlements have been thoroughly reconnoitered. These resources are primarily identified within drainage bottoms and atop the numerous mesas between canyons. In 2017, Logan Simpson surveyed 662 acres of steep, heavily incised, and extremely rugged Santa Fe National Forest land on the western slopes of the Cañon de San Diego immediately north of Jemez Springs. The parcels, sandwiched between the Jemez River and the edge of Virgin Mesa, were anticipated by all involved to contain relatively few cultural resources. Instead, 48 new sites were identified, most of which contain standing architecture with intact mortar, including several on slopes greater than 30 percent. Diagnostic artifacts indicate that most sites date from the late Coalition and Classic periods (A.D. 1250–1650), a time that saw rapid population increase in the area and an intensification of villages on mesa tops. This paper discusses results of survey, assesses the spatial and temporal distribution of sites, and provides new insights into the habitation of "less-than-ideal" landforms.

[189] *Chair*

Law Pezzarossi, Heather (Syracuse University)

[19] *Belonging, Not Belongings: Thinking beyond the "White Possessive" in the Identification of 19th Century Indigenous Landscapes in New England*

In her recent book, "The White Possessive," Aileen Moreton-Robinson details the way in which Western Nationhood hinges upon the possession of property. Consequently, the mechanisms by which Indigenous people become "propertyless," are crucial for the state's denial of Indigenous sovereignty. For example, in 18th century Massachusetts, the Nipmuc people were identified, traced, archived and legitimized by their ownership of land. Colonial records plot Nipmuc land holdings with care, measuring and quantifying state approved land "grants," reservations, and holdings in severalty. Nipmuc land sale transactions were highly monitored and subject to state approval. As Nipmuc land holdings dwindle in the late 18th and 19th centuries, so do archival records of Nipmuc presence on the landscape, creating a lasting historical erasure and a discourse of Native "disappearance" despite the continued presence of Nipmuc people in New England. In this paper, I will share some methods I've adapted for tracing Nipmuc residence without the assumption of ownership and immediate proximity, revealing tangible locations and traceable routes of dynamic Indigenous communities that existed within, amongst, and in-spite-of Western landscapes of private property in 19th century New England.

Lawler, Andrew

[132] *Discussant*

Lawrence, John, Scott Fitzpatrick (University of Oregon) and Christina Giovas (Simon Fraser University)

[298] *Petrographic Analysis of Pre-Columbian Pottery From Nevis, Eastern Caribbean*

Prehistoric Amerindians in the Eastern Caribbean often used local materials in the manufacturing of ceramics, and in some cases, transported these as they migrated. Given the ubiquity of ceramics in the Caribbean, they are useful in discerning past movements, and spheres of interaction. However, studies of this nature are scarce in the region. In this paper, we have conducted an exploratory study of pottery from the island of Nevis (northern Lesser Antilles), in a continuation of efforts to understand and define ceramic production, distribution, and use. The Dickenson method of petrography, initially used in Oceania, was implemented on 20 non-diagnostic Late Ceramic Age potsherds from the site of Coconut Walk. These, along with 11 modern sands, were collected and petrographically described. Descriptions focused on sand and matrix characteristics such as composition, size, sorting, and angularity. From descriptions, sherds were categorized into compositional temper groups: group 1(Felsitic) and group 2(Volcanic). Sands were also described and organized into temper groups. Representatives of each temper group, both sherds and sands, were then selected for point-count analysis using the Gazzi-Dickinson method. Results indicate that temper groups match both local geologic description and local modern sands, suggesting a local provenience for pottery production.

Lawrence, Ken (SWCA-Texas State University), Charles Frederick (Consulting Geoarchaeologist-Geologist), Charles Koenig (Texas State University), Arlo McKee (Texas Historical Commission) and Jacob I. Sullivan (Pape-Dawson Engineers)

[36] Looking under the Rocks: Geoarchaeological Investigations of Earth Oven Facilities in Various Settings of the Lower Pecos, Texas

The multi-year Ancient Southwest Texas (ASWT) Project at Texas State University has investigated numerous earth oven facilities (more commonly known as burned rock middens or BRMs) in the Lower Pecos of southwest Texas. The investigated prehistoric sites ranged from large, cavernous rock shelters to subtle overhangs and open-air campsites. Among the many observations made during the excavations was the differing preservation and composition of the BRMs in each of these settings. This presentation discusses these features and summarizes the preliminary geoarchaeological investigations of the BRMs at Skiles Shelter (41VV165), Eagle Cave (41VV167), Horse Trail Shelter (41VV166), and Tractor Terrace (41VV2055).

Lawres, Nathan (University of Florida - Department of Anthropology)

[362] Relatedness, Circularity, and Place-Centeredness in Belle Glade Artifacts: Reevaluating South Florida Collections from an Ontological Framework

Museum collections provide a quintessential database for archaeological studies, yet they are often overlooked in favor of new excavations that eventually add to museum collections. While new excavations provide us valuable insight into the communities of the past, reevaluating existing collections can provide us with entirely new interpretations of the past, especially in light of new methodological technologies and new theoretical frameworks. In this paper, I provide a case study on how reevaluating collections with new theories and methods can shed an entirely different light on the past. The Florida Museum of Natural History curates many collections associated with the Belle Glade culture of South Florida. Previous Belle Glade studies have been limited and focused primarily on economics and subsistence. Reevaluating these collections in terms of an ontological framework provides a whole new understanding of the peoples that once dwelled in the Kissimmee-Okeechobee-Everglades watershed.

Layco, Wendy (California State University Los Angeles)

[360] The Investigation of a Sascabera Near the Las Monjas Complex in Chichen Itza

Some 75 m southwest of the Las Monjas complex at Chichen Itza and just west of Sacbe No. 7, lie a series of eleven sascaberases that are shown schematically on the Carnegie map. While ceiling collapse has undoubtedly occurred in the millennium since their creation, some, such as Sascabera #2, have an extensive enclosed dark zone space. In Sascabera #2, this can be attributed in part to the leaving of pillars to support the ceiling. A survey of Sascabera #2 recovered a fair number of ceramic sherds indicating post mining activities carried out within the dark zone. The feature was also noteworthy in being the only sascabera where stalactites had formed on the ceiling. Evidence suggests that the Maya may have deliberately excavated sascaberases at the site to function as caves.

LaZar, Miranda (University of New Mexico), Jonathan Dombrosky (University of New Mexico), Emily Jones (University of New Mexico) and Seth Newsome (University of New Mexico)

[260] Tracking Individual Raptors in the Archaeological Record Using Stable Isotope Analysis: Some Implications for the Study of Ritual Economies in New Mexico

In this poster, we explore a cost-effective method for tracking artifacts made from individual raptors (or birds of prey) through the use of intra-skeletal variation in $\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^2\text{H}$ in modern samples of Turkey Vultures (*Cathartes aura*) and Golden Eagles (*Aquila chrysaetos*). Current methods of quantification in zooarchaeology, such as the minimum number of individuals (MNI), work to identify individual animals within a site. However, they cannot be applied to quantifying skeletal material from the same individual at different sites. Ancient DNA is one method that allows archaeologists to track individual fauna, but it is expensive. Do individual raptors exhibit distinct stable isotopic signatures because of little to no intra-skeletal variation in $\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^2\text{H}$? Identifying individual fauna in the archaeological record could aid in the reconstruction of regional trade networks and distinguishing potential distribution centers of flutes and whistles in prehispanic New Mexico. Flutes and whistles recovered from Ancestral Pueblo contexts were commonly manufactured from the bones of birds of prey. Tracking individual raptors can lead to better understanding the economic role that flutes and whistles had in the Ancestral Pueblo world.

Lazrus, Paula Kay (St. John's University)

[387] Managing Forests in the 19th and Early 20th Century Bovese

The town of Bova, located in the foothills of the Aspromonte in the province of Reggio Calabria, Italy, once dominated a region rich in forests and woods. Travelers from the 15th – 19th centuries commented upon the rich vegetation. Archival records ranging from tax declarations to legal disputes refer to the presence of trees and forests in locations around the town of Bova. Many of these areas are no longer forested. In this exploration of the tax data and legal disputes over the use of these resources, references to forested areas and to the tending of trees such as oaks and chestnuts are mapped in order to begin analyzing the possible ways in which citizens interacted with these resources. Forests were often used to demarcate limits of neighborhoods as well as for their intrinsic resources, and some were owned or managed by the church or the municipality. Here, an attempt is made to use spatial analysis to better understand these relationships within the Bovan economy of the 19th and early 20th centuries.

Le Goffic, Michel [403] see Naudinot, Nicolas

Le Moine, Jean-Baptiste [199] see Mongelluzzo, Ryan

Leach, Peter (University of Connecticut; Geophysical Survey Systems, Inc.), David Givens (Jamestown Rediscovery) and Richard Boisvert (NH State Conservation and Rescue Archaeology Program)

[72] The Current State and Future Possibilities of Ground-Penetrating Radar in Cultural Resource Management

Ground-penetrating radar (GPR) is an established prospection method in cultural resource management (CRM), yet despite its contributions its use is not universal. The goal of this presentation is to demonstrate the utility of GPR surveys before and during CRM excavations, and to underscore the need for maximizing the archaeological capabilities of GPR. This talk is organized into two parts. The first presents case studies of typical GPR surveys from CRM contexts, with the goal of exhibiting the various target types encountered with relatively low frequency (350-900MHz) antennas. A major part of this discussion will be the common pitfalls associated with different sites and types of data, and methods for overcoming these issues. Also discussed are best practices for GPR fieldwork and post-processing techniques for archaeological datasets. The latter half will highlight the authors' experimental GPR techniques that employ high-frequency (1600-2700MHz) antennas inside excavation units. Case studies from pre-contact sites in New England and investigation of a historical burial at the Jamestown Colony will reveal the archaeological importance of higher frequency antennas. These high-frequency data are forwarded as a means of 'digital bisection', whereby GPR surveys during excavation provide a new level of real-time mission planning for archaeological efforts.

Leader, George [131] see Dhody, Anna

Leader, George (University of Pennsylvania)

[131] Funerary Hardware in 18th and 19th Century Philadelphia: What Can Be Used as an Indication of Wealth from the Arch Street Site?

The cemetery of the First Baptist Church of Philadelphia (ca. 1702-1859) was excavated in 2017. Almost 500 remains and associated material culture highlight the lives of Philadelphia's early citizens during pre and post-colonial eras. Individual graves offer multiple lines of evidence from which to assign a wealth index within the sample. Variables used in the study include coffin hardware (furniture), lid plaques, lid tacks, escutcheons, and grave goods. The study created a rubric on which to grade each individual graves' wealth based on the presence or absence of such funerary goods. Historical records were then compared to the results to blindly test how the cemetery's sample may represent the congregations' population at the time. This paper presents the results of the analysis and highlights the importance of additional research on coffin hardware and grave goods.

[131] Discussant

[131] Chair

Leap, Lisa, Gwenn Gallenstein (National Park Service) and Stewart Koyiyumptewa (Hopi Tribe)

[21] *Please Put It Back: A Non-NAGPRA Case of Reburial*

Due to recent erosion from intensified downpours related to global warming, Wupatki National Monument archaeologists recovered artifacts from an exposed cyst that were about to fall into a newly formed wash. Working with traditionally associated tribes, the monument created an emergency excavation plan and a contingency for the reburial of cyst contents should human remains be encountered. When no human remains were found, the monument accessioned and catalogued the cyst contents, including seven intact pots. Because intact pottery is seldom found outside of a burial context, the monument and its Friend's Group sought to place the items on display. When monument personnel consulted with Hopi elders about the cyst and contents for the exhibit, however, they learned that what they thought was a "pot cache" was something else entirely. This paper discusses the events that led to the eventual reburial of the cyst contents and the resulting lessons learned.

Leavesley, Matthew [129] see Stephen, Jesse

Lebenzon, Roxanne (University of Connecticut), Elic Weitzel (University of Connecticut), Isaac A. Hart (University of Utah) and Brian Codding (University of Utah)

[47] *Climatic Controls on Prehistoric Utah Populations*

Recognizing how climate variability altered the landscape in regards to nutrient availability is a key aspect in reconstructing how prehistoric peoples were able to thrive. Further, understanding how past climate and environmental change affected organisms is important for predicting the role of imminent future climate change on populations today. Previous research found mammal populations during the Holocene fluctuated directly with climate variability in accordance with the availability of edible resources. This study provides a record of climatic controls, particularly precipitation, on past human populations in the Bonneville Basin. Utilizing pollen data from Utah's Blue Lake as a proxy of environment in the Bonneville Basin, and the "dates as data" approach to account for human population, we are able to explore the interplay between climate and human population growth for the past 12000 years. We predict during the Holocene, periods of increased moisture were more conducive to consistent sustainable food sources, and thus human populations would have been able to expand. As predicted, our results indicate a significant correlation between precipitation and population density: when more arid-adapted taxa dominate the pollen record, human population densities are low, and vice versa.

Lebrasseur, Ophelie [20] see Larson, Greger

LeBrell, Emilie (University of Calgary), Geoffrey McCafferty (University of Calgary) and Sharisse McCafferty (University of Calgary)

[349] *Female Figurines of the Greater Nicoya Region 500 BCE – 1250 CE*

Female figurines of the Greater Nicoya region feature a 2000-year history of thematic continuity. During the Formative and Classic periods (locally Tempisque and Bagaces periods), figurines were often red-slipped, nude females in a seated, kneeling or standing position with hands on hips; these were occasionally elaborated with black pigment depicting body paint or tattoos. About 800 CE, however, figurines became decorated with polychrome paint consistent with the ceramic tradition of the Postclassic. These polychrome designs often included textiles, which have traditionally been associated with female identity. Despite notable decorative changes, the postures of female figurines continued with only minor changes, suggesting that their primary meaning remained the same diachronically. This paper will discuss the implications of continuity in figurine form and will also explore functional and symbolic significance. Further, we will consider the popular hypothesis that figurines were used in shamanistic practice, and examine a larger implication concerning the prominence of women in indigenous homes and politico-religious roles.

Lebreton, Loic [415] see Morin, Eugene

Leckman, Phillip [84] see Lycett, Mark

Leckman, Phillip (Statistical Research, Inc.) and Karen Schollmeyer (Archaeology Southwest)

[315] *From the Andes to the Gila: Space, Society and Zooarchaeology in the US Southwest*

This paper is a story in two halves, each inspired by John and his academic legacy. Home to some of the earliest and most impressive ritual architecture in the hemisphere, the Andes has long fostered research into the interchange between social organization and the built environment. The first half of this paper demonstrates the long reach of this research, connecting threads between Andean architectural analyses and the built environment in the American Southwest at a variety of spatial scales. The second half of this paper focuses on the Mimbres-Mogollon region of the Southwestern uplands. A combination of legacy datasets and recently analyzed museum collections provides new insights into the long-term record of human-environment interactions in this region, including the resilience of different animal taxa to human hunting and anthropogenic landscape change at different spatial and temporal scales. Implications for understanding the recursive effects of hunting are linked to John Rick's research on vicuña harvesting in the Andes.

LeCompte, Elise

[362] *The Paper Chase: Legacy Collections' Records*

The analysis of legacy collections is often hampered by documentation that is fragmentary, preserved on obsolete media, or entirely absent. Like the physical material that makes up a legacy collection, the associated documents may be spread across institutions. This may include other museums, educational facilities, government agencies, and private firms. Some of these institutions may include those that do not actually curate the physical objects and specimens, like libraries. This presentation describes the processes used to locate legacy collections documents, as well as the legal and ethical issues related to collections and documents that are shared across institutions. Data management plans are now standard parts of research projects. Though just as necessary, codified plans for the long-term curation of associated documents are far less common. By focusing on the stability and tracking of these crucial collections components, institutions can facilitate better collaboration and research.

Ledogar, Sarah [47] see Henry, Lauren

Ledogar, Sarah [352] see Fillios, Melanie

Lee, Chengyi [389] see Lin, Kuei-chen

Lee, Christine (California State University, Los Angeles)

[353] *Nomadic Identity: The Origins of a Multiethnic Empire in Mongolia.*

Little is known about the ethnic composition of early nomadic populations in Mongolia. Archaeological and historical research have concentrated on the Xiongnu (209 BC-93 AD) and Mongol (1206-1368) time periods. The period in between is known as the period of disunion, characterized by fragmented states and foreign dynasties. This is a period of political unrest, but there is evidence that many different ethnicities were accepted and incorporated into these states. Five cemeteries from Bulgan, Arkhangai, and Orkhon Aimags were analyzed to determine how many different ethnicities were present. Twelve burials were recorded from the Xianbei (147-234), 15 from the Rouran (330-555), and 15 from the Turkic (555-840) periods. Based on grave architecture, burials artifacts, metric traits, nonmetric traits, developmental defects, and musculoskeletal markers, various ethnicities were assigned to the burials. During the Xianbei period, Xianbei, Ordos, Qidan, and Turkic individuals were identified. At the Rouran cemeteries, Xianbei, Ordos, Qidan, Turkic, Mongol, and Xiongnu individuals were present. The Turkic period cemetery had only Turkic burials. The variability in ethnicities is probably related to differences in political control and national identity. Further analyses incorporating the Xiongnu and Mongol periods may clarify the unusual level of inclusiveness which characterized the resulting Mongol Empire.

Lee, Craig (Metcalf Archaeological Consultants & INSTAAR)

[292] *Discussant*

Lee, Galen [8] see Pryor, John

Lee, Gaylen D. [400] see Gaskell, Sandra

Lee, Gyoung-Ah (University of Oregon)

[156] *Sustained Farming in the Nam River Valley, South-central Korea, through the Mumun/Bronze to Early Historical Periods*

This research examines agricultural management, particularly raised field farming from the Mumun/Bronze to early historical periods (3400–1600 cal. BP) along the Nam River in south-central Korea. The study of settlements on alluvial flatlands provides crucial information on early agricultural developments around the world. The Nam River basin is an exemplary case, revealing over 1600 features of dwelling structures, burials, altars, and sequences of agricultural fields across the area of 47 hectares. Research questions include how inhabitants constructed the farming fields and manipulated crops, and ways that this affected both environmental and cultural niches. Multiple lines of evidence for the transition to farming include macro- and micro-plant remains and settlement patterns, as well as a close examination of radiocarbon dates. The research evaluates the Neolithic management of economic plants and the transition to a more closely managed construction of farming landscape in a broad East Asian context.

Lee, Hyunsoo (University of Oregon)

[156] *Early-Middle Holocene Resource Use and Niche Construction in Jeju Island, Korea*

Study of various human adaptations and human-environmental dynamics amid Early-Middle Holocene (ca. 11,500-5,000 BP) climate changes has been a noteworthy theme in archaeological research. One of the main questions in this discourse is how occupants in various environments and landscapes have gone through diverse utilizations and interactions with the surrounding resources. Early-Middle Holocene societies in Korea have been often simply defined as hunter-gatherer economies with no existence of plant management, due to dichotomous views between plant gathering and cultivation/agriculture, and between wild versus domesticated plants. The main objective of this research is to develop a niche construction model in Early-Middle Holocene societies based on the case studies of Early-Middle Holocene sites in Jeju, including the Gosanri. Through mainly microbotanical evidence, this study identifies plant species utilized through time and characterizes an early management of anthropogenic species prior to or along with systemic agricultural practice. The study aims to contribute to mapping diverse economic niche constructions, human-environmental dynamics, and sociocultural transitions amid climate changes of the Early-Middle Holocene worldwide.

Lee, Lori (Flagler College)

[83] *The Materiality of Migration*

This paper considers what archaeologists can contribute to contemporary issues through doing what we do best—analyzing material culture to create narratives. I use this approach to personify a particular group of liminal, stereotyped people whose anonymity is critical for their survival—undocumented migrants. This paper is part of a broader collaborative project between me and Edgar Endress. The goal of the project was to produce a multilayered vision of Haitian migration and identity transformation to provoke critical thinking about Haitian migrants in the hope of promoting social change in terms of awareness and advocacy for changes in migration policies.

Lee, Patrick (University of Toronto), Jamie Inwood (University of Calgary), Samson Koromo (United Republic of Tanzania), Lucas Olesilau (United Republic of Tanzania) and Julio Mercader (University of Calgary)

[2] *Quantitatively and Qualitatively Evaluating the Impact That Palaeoanthropology Makes on the Lives of the Maasai People of Olduvai Gorge, Tanzania*

Tanzania's Olduvai Gorge is a flagship human origins research site, yet less recognised is that the lands surrounding Olduvai are home to the pastoralist Maasai society. Even though scientists have, for over a century, sought to illuminate the shared past of our species in what many regard to be a cradle of humankind, there has seldom been meaningful and lasting collaboration between palaeoanthropologists and the Maasai. We conducted three seasons of ethnographic research within Maasai and palaeoanthropological communities to gain a thorough understanding of the social dynamics of the Olduvai

area and thereafter develop a standardised survey that could substantially capture the experiences of all Maasai who sought to share their thoughts. Our results, which qualitatively and quantitatively delineate daily life within a renowned research site before and after the formation of the Stone Tools, Diet, and Sociality partnership, foreground the impacts that scientific projects have made – and can make – on Maasai communities. This paper emphasises that instead of lending strength to the myth that scientific work is absolutely disengaged from societal matters, palaeoanthropologists can explore the contexts surrounding their field projects to create new policies and practices that cultivate the myriad benefits of engaged archaeological fieldwork.

Lee, Rachel (University of Washington), Martin Bale (Yeungnam University) and Jade D'Alpoim Guedes (University of California San Diego)

[156] Assessing Agricultural Strategies in Prehistoric Korea through Climate and Landscape Models

Relict fields and archaeobotanical remains from village sites in South Korea indicate intensive agriculture was practiced during the Mumun Period (ca. 1500-200 B.C.). In this paper, we discuss the effects of climate and landscape in the decision-making of Mumun farmers, particularly which crops to plant, at what times, and which locations. Our results are based on complementary models that consider temperature and soils across the Korean peninsula for multiple sites and multiple crops (i.e. millet, barley, rice). More than identifying the presence or absence of domesticates, we argue that our models help explain Mumun Period agricultural strategies such as diversification, specialization, and intensification.

Lee, Rechanda

[150] 'ASHŁÓ YÓHOOŁ'AAH (*Learning to Weave*): The Cultural Transmission of Technological Style in Navajo Textiles

Learning is a process that all individuals experience either consciously or unconsciously in a social environment. The process of learning is important to understand because learning develops knowledge and skills that are the foundation of an emerging culture. The significance of understanding how humans learn may guide our understanding in how the learning process affects the patterning of material culture. Archaeologists understand relatively little about the process of learning, how skills are acquired, and how some skills remain unchanged over time. By examining the transmission of traditional knowledge and skill from Master Weaver to apprentice we develop an understanding of the process of learning. The simplistic explanation of understanding how one learns a skill is described as learning by means of participation, observation, and imitation. This research investigates the role of a community of practice and its importance to the passage of learned technological styles as reflected in Navajo textiles. The results of this study provide some insight into the learning and social networks that preserve and keep traditions alive, especially, during times of a changing weaving tradition.

Lee, Sungjoo

[156] Technological Transmission between Different Levels of Specialization in Proto-historic NE Asia

The Proto-historic period (300 B.C. - A.D. 300) in Northeast Asia was a critical time when technological innovations and the fundamental changes of craft-specialization in the ceramic production occurred. From the early 3rd century B.C., ancient Chinese states of Yan, Qin, and Han expanded their influence over Manchuria and the northwestern part of the Korean Peninsula and established sporadic outposts into indigenous territory. The interaction spaces between the Chinese outposts and the surrounding indigenous communities were very important in explaining the transmissions and innovation of ceramic producing technology. This study explores cultural transmission of a bundle of complex technological behaviors from pottery craftspeople who had embodied skills for forming techniques of various standardized ceramic vessels to native practitioners working within a less-specialized context.

Lees, William (University of West Florida), Tom Dawson (University of St. Andrews), Sally Foster (University of Stirling), Joanna Hamby (University of St. Andrews) and Marcy Rockman (US National Park Service)

[251] Learning from Loss 2018: Considering Responses to Accelerated Climate Change in Scotland

In June 2018 interdisciplinary scholars from Scotland and the US convened in Edinburgh to consider action in the face of inevitable loss of coastal and carved stone heritage from accelerated processes related to climate change. The project, "Learning from Loss," was funded by the Scottish Universities Insight Institute with lead partners University of St. Andrews and University of Stirling. The project team included archaeologists, cultural anthropologists, geomorphologists, conservators, and climate scientists from Scotland and the United States. Over 13 days, the project team held pre- and post-visit meetings in Edinburgh and travelled north to 28 select carved stone and coastal sites to consider the question:

"How will Scotland respond to transformation in the historic environment in the face of accelerating impacts of climate change by 2030?" The team considered social and community values, prioritization (how to), responsibilities (decision makers and stakeholders), and actions. Key insights and recommendations are reviewed.

[251] *Discussant*

Lee-Thorp, Julia [102] see Santana Sagredo, Francisca

LeFebvre, Michelle (Florida Museum of Natural History), Lee Newsom (Flagler College), Rachel Woodcock (University of Florida), Andy Ciofalo (Leiden University) and Michael Pateman (Turks & Caicos National Museum Foundation)

[37] "Site" (LN-101), *Long Island, Bahamas: Beads, Baking, and Burials, but Brief Occupations?*

LN-101 is a multi-component Lucayan site located on the windward coast of Long Island in The Bahamas. The site is situated along sand dunes directly on the beach and is characterized by the presence of earth ovens, evidence of bead manufacture, and associated human burials, with a notable absence of dense midden deposits or features indicative of past structures. In comparison to some Lucayan villages or midden sites, which contain abundant clay artifacts and fauna-rich deposits associated with long-term or persistent site occupations elsewhere within the Bahama Archipelago, Rolling Heads presents a different combination, or "site", of archaeological finds suggestive of possibly short-term or task-specific occupations focused on the exploitation and use of animal and plant resources. Here we present a synthesis of our ongoing archaeological research, detailing the presence of earth ovens and highlighting recent zooarchaeological, starch, macrobotanical, and seasonality studies. Taken together, our analyses provide perspectives on the Lucayan-environment interactions underlying subsistence practices and landscape use at the site and challenge us to more thoroughly consider the significance of short-term or ephemeral site occupations within greater Lucayan settlement patterns.

LeFebvre, Michelle [159] see Mistretta, Brittany

Legere, Jacob [46] see Kellett, Lucas

Lehman, Calvin [94] see Sisneros, Brianne

Lehner, Joseph [321] see Martin, Samuel

Lei, Xingshan [299] see Chastain, Matthew

Leierer, Lucia [417] see Jambrina-Enríquez, Margarita

Leierer, Lucia (Universidad de La Laguna), Antonio V. Herrera-Herrera (Archaeological Micromorphology and Biomarker Lab), Margarita Jambrina-Enríquez (Archaeological Micromorphology and Biomarker Lab), Tammy Buonasera (Department of Anthropology, University of California) and Carolina Mallol (Archaeological Micromorphology and Biomarker Lab)

[417] *Searching for Clues of Neanderthal Occupation and Mobility in Combustion Structure Residues: A Micromorphological and Biomarker Study of El Salt Unit Xb, Alcoy, Spain*

The Neanderthal lithic and faunal record shows a short-term occupation, high mobility trend throughout Eurasia. Although combustion structures, which are numerous and well preserved in most Middle Paleolithic sites, play a central role in short-term occupations, they have not been sufficiently investigated from a geoarchaeological perspective to explore settlement patterns. This paper examines eleven combustion structures of the Middle Paleolithic site of El Salt (Spain), Unit Xb, with a focus on Neanderthal settlement patterns. The study is conducted using micromorphology, lipid biomarker analysis and compound specific isotope analysis. Results show in situ hearths build on a vegetational surface previously occupied by herbivores, preserved as black layers. Likewise, the results indicate a presence of angiosperms surrounding the occupation

site. Regardless of a high density of overlapping combustion structures, each hearth was built on a surface previously uninhabited by humans, pointing to short stays and therefore a high mobility. Mobility was additionally noted for fuel acquisition through an absence of conifer biomarkers in the fires, despite conifers being identified as a major source of fuel. A microscopic and molecular approach in the study of combustion structures provides insight for our understanding of Neanderthal settlement patterns.

Leigh, David S. [274] see Purdy, Barbara

Leight, Megan (CUNY Graduate Center)

- [339] *Maya kosmopolitēs (Citizens of the World): Using a Cosmopolitan Approach to Study Trade, Identity and Belonging at Salinas de los Nueve Cerros*

The use of cosmopolitanism as a theoretical framework for conceptualizing belonging in archaeology is derived from the ancient Greek concept *kosmopolitēs* – humans are citizens of the world. Inspired by Halperin, this paper takes up her challenge to consider how “worldly dispositions, values, and identities are held in tension with local and more personalized practices and experiences (2017:351).” Using the theoretical approach of rooted cosmopolitanism, whereby individuals can be situated in both local and worldly identities, this paper explores how aspects of trade interaction influence identity at the site of Salinas de los Nueve Cerros. As a locus for both highland and lowland Maya good transfers, the site is an important node for long-distance good procurement and direct and indirect spheres of influence at the local and interregional levels, which influences its citizens’ external connections, internal organization, and individual senses of belonging at the site.

[234] *Moderator*

[234] *Discussant*

Leister, Matthew [357] see Wells, Rebecca

Leitao De Almeida, Marcos (Northwestern University)

- [347] *Becoming Villagers, Becoming Enslavers: Social Change in Bantu-Speaking Early Villages during the Late Holocene Arid Phase (ca. 1200 BCE. – ca. 100 BCE)*

Recent syntheses incorporating linguistic, archaeological, and paleoclimatic evidence have argued that villages inhabited by Bantu-speaking communities spread from Cameroon to the Lower Congo from about 1200 BCE to 100 BCE. This southward migration was facilitated by an abrupt climatic warming event that expanded savanna-like environments and destructed portions of the Central African rainforest. Particularly between 650 BCE and 70 BCE, these new environmental conditions offered new opportunities and challenges to the newly arrived Bantu-speaking inhabitants, such as the adoption of pearl millet agriculture, the rapid circulation of iron technology, and the growth of population. This presentation discusses how village leaders resorted to slaving and captive-taking strategies to expand their communities in this period of unsettling changes. Based on comparative ethnography and historical linguistics, a re-analysis of four previously proposed lexical reconstructions reveals emerging ideas around alienation, honor, social status, and inter-village conflicts that provide important insights into the ways in which early Bantu speakers created a new logic of dispensability and incorporation in their communities. Lastly, this presentation discusses the implication of this discovery vis-à-vis other streams of evidence and ends by showing how the concepts of slavery created in this period became a lasting tradition in Equatorial Africa.

LeJeune, Colin (University of Illinois at Chicago)

- [300] *Interaction, Change, and Ceramic Variation along Coastal Nakhon Si Thammarat, Thailand, AD 100-1500*

Coastal Nakhon Si Thammarat Province, Thailand, situated along Peninsular Thailand's eastern facing South China Sea shore, was one of the many vibrant zones of interregional exchange and complexity growth in premodern maritime Southeast Asia. The region's culture-history, settlement pattern, material culture, and international connections between AD 100 and 1500 have become points of archaeological interest in recent years. Research on its Hindu and Buddhist shrines has identified four distinct periods of local development, and the presence of northern and southern site clusters possibly displaying some political or cultural differentiation between the 5th and 11th centuries and heavier southern occupation after AD 1100. This paper discusses the results of a program of survey and excavation conducted in 2017 at three northern cluster and three southern cluster sites to help advance understanding of premodern coastal Nakhon Si Thammarat's

organizational development and external engagements. Specifically, it details efforts made to locate, collect, and define variation exhibited within the region's local earthenware assemblages over time. This paper also attempts to interrogate what identified local ceramic patterns suggest about the organization and relations of daily life in premodern coastal Nakhon Si Thammarat and its place in local mobilization of external connection toward local development.

Lekson, Stephen (University of Colorado)**[88] Archaeological Curation: Challenges and Opportunities**

After almost three decades in museums and allied institutions, I have some ideas about the challenges and opportunities facing archaeological curation, especially in the western United States. This poster presents several of these themes – the permanent curation crisis, UFOs and CUIs, legacy collections, changing audiences, and of course Tribal collaborations – with ideas about how they might (or might not) be resolved. The poster format invites comment and conversation with other curators, historic preservation professionals, and any archaeologists concerned with collections and public interpretation – hopefully refining these ideas for an article or online content.

Lemminger, Jennifer (Department of Anthropology, University of Wyoming)**[89] Identification of Wood Used at Daugherty Cave, WY**

From 1954 to 1957 Dr. Frison excavated Daugherty Cave (48-WA-302). Various perishable artifacts were recovered from the site including moccasins, basketry, cordage, wood, hide and sinew. It is a Late Archaic to Late Prehistoric site on the west side of the Bighorn Mountains in the Northwest Plains. Dr. Frison published on the site in 1968 detailing the artifacts found. Minimal work has been done with the artifacts since housed at the University of Wyoming Archaeological Repository. For this project, I used microscopic wood identification to answer: what types of wood were being used; were materials local or non-local; how this compares to other rock shelters and caves analyzed on the Northwest Plains; were different woodworking techniques used for different wood types; and were different techniques used for different artifacts? Additional information about the site, plants and plant use was obtained from the Rocky Mountain Herbarium Database (RMHS), the Native American Ethnobotany Database and discussions with Dr. George Frison. I was able to create comparisons with analyzed sites in Wyoming and the surrounding area, establish wood resource exploitation, local and/or non-local exploitation and what kind of woodworking techniques were being used at the site and on what object type.

LeMoine, Genevieve [10] see Ebel, Erika

LeMoine, Jean Baptiste [199] see Halperin, Christina

Lemoine, Ximena (Washington University in St. Louis)**[78] Pig Management in Neolithic North China: Foddering and Social Change in the Western Liao River Valley**

Recent models for pig domestication in China have suggested that initial domestication was contingent upon millet cultivation, which allowed for foddering through agricultural surplus. For this study, a combination of bulk collagen carbon and nitrogen isotopic analysis and compound specific carbon isotopic analysis are used to infer the extent to which pigs consumed domestic food products in the form of millet and/or household refuse at two key Neolithic sites in Northern China: Xinglonggou and Xinglongwa. Additionally, by sampling pig remains based on both age and sex, food provisioning directed at certain cohorts within the herd can be identified and associated with ethnographically described management strategies. Ethnographic work on pig management--notably from New Guinea--has illustrated that identifying feeding regimes can be useful to distinguishing between intensive and extensive management strategies as well as community involvement in larger social networks and institutions at a regional level. In the context of the origins of agriculture in the Chinese Neolithic, this paper addresses two major lines of research: (1) when and in what context did foddering emerge; and (2) how changes in pig management practices reflect changes in social and economic organization seen during the transition to the Bronze Age.

Lennon, Mary [128] see Harris, Matthew

Lennox, Sandra [110] see Matias, Roxane

Lensink, Stephen [89] see Doershuk, John

Leonard, Jessica (Brandeis University), Hannah Plumer-Moodie (University of Sheffield), Thomas Guderjan (University of Texas at Tyler) and Colleen Hanratty (University of Texas at Tyler)

[398] *Dental Pathology and Paleodiet: Exploring Spatial and Temporal Variability of Ancient Maya Subsistence Practices in Northwestern Belize*

The osteological analysis of skeletal remains provides a unique lens for viewing social behaviors within ancient complex societies at the level of the individual as well as the population. The dentition from skeletal remains can be especially useful for answering questions regarding dietary practices as the consumption of specific foods leave identifiable macroscopic markings on teeth, which preserve well in archaeological contexts. Presented in this paper are the results of an analysis of the observable macroscopic indicators of dental pathology from ancient Maya populations located at three sites in northwestern Belize. Given its prolonged occupation (AD 250 to 1000), this region is ideal for investigating evidence of changes and/or variations within Maya society over time and space. Thus, this research explores the consistencies and variations of food distributions and other patterns of dietary practices across different Maya social groups over a span of 700+ years. The results of this investigation reveal spatial and temporal stability in dental health and thereby diet throughout these ancient Maya populations, concurring with the archaeological and geoarchaeological evidence of dynamic and sustainable agricultural practices in this region.

Leonard, William [400] see Gaskell, Sandra

Leonardt, Sabrina [364] see Scheinsohn, Vivian

Lepofsky, Dana [70] see Springer, Chris

Lercari, Nicola (University of California Merced)

[177] *Discussant*

Lercari, Nicola [221] see Duenas-Garcia, Manuel

Lerner, Shereen (Mesa College)

[229] *Discussant*

Lertcharnrit, Thanik [317] see Halcrow, Sian

Lesage, Louis [308] see Micon, Jonathan

Lesh, Andrew (Stanford University)

[64] *New Methods for Duct Exploration and Gallery Discovery at Chavín de Huántar*

Originally the only known underground gallery between Building A and the Circular Plaza of Chavín de Huántar, the Caracoles gallery was long thought by Professor John Rick of Stanford University to be one of multiple chambers due to its three wall ducts, each exiting at an unknown location. This paper illustrates the methods developed for exploring these and

other such ducts, namely the usage of cameras, light arrays, and laser rangefinding equipment with modular poles. During the 2017 field excavation season led by Professor Rick, these techniques resulted in the discovery of a gallery thought sealed since Chavín times, temporarily designated as 'Gallery X.' Using images obtained in this manner, Gallery X was confirmed via comparative photography to be a chamber mirroring the architecture of Caracoles, with Building A's north entrance serving as an axis of symmetry. Two galleries were subsequently discovered in line with this pair (galleries 'three' and 'four'), and during the 2018 season, these techniques were used to gather evidence for the presence of an additional row of four galleries 3.2 meters to the north.

[64] *Chair*

Leslie, David (University of Connecticut)

[72] *Discussant*

[72] *Chair*

Leslie, David [72] see Ranslow, Mandy

Leslie, Zubierta [369] see Diaz-Andreu, Margarita

Lesnik, Julie [397] see Beasley, Melanie

Levi, Laura (The University of Texas at San Antonio)

[30] *Making Place: A View from Northwestern Belize*

Ancient Maya places were dynamic assemblages of people, the things that they made and used, and myriad material and immaterial affordances. Unfortunately, a simple enumeration of their components cannot account for the historical valence carried by places. In northwestern Belize, the multi-scalar operation of ritual may help clarify the processes involved. Using the site of Wari Camp as a springboard for discussion, this paper will focus on ritual as "skilled practice" – technology enacted by ruler and ruled to continuously make and remake community and region.

[345] *Discussant*

Levin, Anais [280] see Qiu, Yijia

Levin, Anais (Grinnell College), John Walden (University of Pittsburgh), Lauren Garcia (University of California, Berkeley), Julie Hoggarth (Baylor University) and Jaime Awe (Northern Arizona University)

[372] *The Impact of an Emergent Maya Polity on the Domestic Lithic Economy: A Perspective from the Hinterlands of Lower Dover, Belize*

Lithic tool production and use offers a way to understand domestic activities and how they developed in relation to broader socio-political changes. The Late Classic (AD 600-900) Maya polity of Lower Dover, Belize emerged in the midst of a densely occupied landscape, and this transition saw the incorporation of three autonomous communities – Tutu Uitz Na, Floral Park and Barton Ramie – into the polity as urban neighborhoods. The appearance of Lower Dover on the political landscape impacted lithic tool production and exchange at the household and neighborhood levels. By comparing the patterns of tool production and use in these three communities as they transitioned into Late Classic neighborhoods, we examine the ways commoner activities changed at the household and neighborhood level following the emergence of the Lower Dover polity. Preliminary research at the Tutu Uitz Na neighborhood indicates the establishment of a specialized chert workshop following the rise of Lower Dover. This poster builds on this research by comparing established patterns of lithic production and consumption at Tutu Uitz Na with data from the Barton Ramie and Floral Park neighborhoods.

Levin, Martin [396] see Gonzalez, Kerry

Levin, Maureece (Stanford University), Katherine Seikel (The Australian National University) and Aimee Miles (Uppsala University)

[212] A Multi-proxy Investigation of Settlement on Pingelap Atoll, Pohnpei State, Federated States of Micronesia

Pacific atolls are generally regarded as challenging places to live. In addition to being far from other land masses, most have low biodiversity, limited access to freshwater, and are susceptible to extreme weather. However, settlers established residence on atolls in the Micronesian region as early as 2,000 years ago. This paper presents the first major archaeological investigation focused on the atoll of Pingelap and addresses the timing of settlement as well as the ways that people have subsisted over long periods of time in this atoll environment. Located about halfway between the high islands of Pohnpei and Kosrae, Pingelap consists of 1.8 km² of land spread across three islets, with only the largest island, Kahlap, being continually inhabited. Our results indicate that Pingelap has been settled since at least 1550-1700 cal BP, and has likely been continuously inhabited by humans until the present. Zooarchaeological and archaeobotanical work suggest a diet from early habitation heavily reliant on reef fish and shellfish, with plants such as coconut and pandanus also playing a key role. In ethnoarchaeological investigation, local consultants describe farming practices that complement our archaeological understanding on the persistence of atoll settlement.

Levin, Naomi [32] see Rogers, Michael

Levin, Samuel (The University of Texas at Dallas), May Yuan (The University of Texas at Dallas) and Michael Adler (Southern Methodist University)

[409] Archaeological Prospection Using Aerial Thermography and Quantitative Image Processing Methods

This paper explores new methods and developments in thermal remote sensing, aerial thermography, for archaeological research. These methods are applied in a pilot study at Picuris Pueblo, NM. Principles of thermal remote sensing that enable subsurface prospection are considered, along with previous investigations in this arena. Expanding upon existing approaches, new quantitative image processing methods for subsurface feature identification are proposed. These methods exploit the enhanced data potential of radiometric thermal data with multitemporal resolution, acquired from a sUAS platform. Using a novel image differencing algorithm, the ephemeral thermal signature of subsurface features is enhanced. Modern machine learning models are applied to the processed thermal imagery to extract the locations of probable subsurface features. Subsurface adobe structures documented during previous investigations are relocated, demonstrating the capability of the proposed methods. Moreover, known features are used as training data for classification of uninvestigated areas of the site, revealing multiple thermal anomalies that may be indicative of additional subsurface architectural features. The image processing methods presented in this study demonstrate the immense potential of thermal remote sensing in archaeology, providing non-destructive approaches for investigating archaeological landscapes.

Levine, Evan [35] see Plekhov, Daniel

Levine, Marc [155] see Hammerstedt, Scott

Levine, Marc (University of Oklahoma) and Kathryn Puseman (Paleoscapes Archaeobotanical Services Team)

[197] Foregrounding Food: Mixtec Cuisine, Identity, and Household Ritual at Late Postclassic Tututepec, Oaxaca

This paper highlights the results of a recent analysis of macrobotanical remains from commoner households at the Late Postclassic (AD 1100-1522) Mixtec capital of Tututepec. The paleoethnobotanical data is considered in light of archaeological evidence, as well as ethnographic and ethnohistoric data, to investigate the nature of household food production, consumption, and exchange. In addition to reconstructing the local cuisine, we consider the role of foods and plants in household ritual and healing. Furthermore, we examine how food preferences may have figured in the expression of Mixtec identity, and how these preferences impacted decisions concerning how to organize food production and exchange.

Levy, Janet (UNC Charlotte) and Patty Jo Watson (Washington University-St. Louis)**[312] Archaeology in the Big Bend of the Green River, KY**

Julie Stein joined the Shell Mound Archaeological Project (SMAP) in western Kentucky in 1977 when Patty Jo Watson and William Marquardt, leaders of the project initiated in 1971, recognized the need to add geoarchaeology to the already interdisciplinary project. I started as a graduate student at Washington University—St. Louis in Fall 1971; and, while not a core member of the research team, I was there, on the ground and in the dirt, from the beginning. Julie and I both took full-time jobs in 1980, in Washington state and North Carolina respectively, and stayed put for the rest of our careers. We each experienced archaeology both in an academic department and in museums, although I was a graduate student working at the National Museum in Copenhagen, while Julie has directed the Burke Museum of Natural History and Culture with great success since 2005. SMAP was the place we became friends, colleagues, and, I think it is fair to say, professionals, mentored especially by Pat Watson. In this presentation, Pat and I would like to share some of the experiences from that project and what was learned from working with Julie.

Levy, Thomas E. [134] see Howland, Matthew

Levy, Thomas E. (University of California, San Diego)**[278] Pastoral Societies, Holocene Climate and Technology: Perspectives from Iron Age Southern Jordan (Session 4400)**

How did pastoral societies evolve into more complex social organizations in what is today a hyper-arid desert zone? This paper examines the Iron Age (ca 1200 - 500 BC) data from southern Jordan that indicates relatively little climate change from today, yet the rise of complex pastoral nomadic societies.

[177] Moderator**[148] Discussant**

Lewandowska, Magdalena [190] see Palonka, Radoslaw

Lewandowski, David (Logan Simpson)**[346] Persistent Places and Settlement Patterns in the Mogollon Highlands: A Case Study along Eagle Creek, Eastern Arizona**

This paper examines settlement patterns and the concept of persistent places and its implications regarding population circulation, community, and identity during the Pithouse and Pueblo period occupations (A.D. 700–1450) within the Eagle Creek area of the Apache-Sitgreaves National Forests (ASNF) in eastern Arizona. Eagle Creek is a perennial stream which flows south from the Mogollon Rim to the Gila River along the border of the ASNF and San Carlos Reservation, immediately east of the Point of Pines cultural region. In this study I focus on survey data to examine site occupation spans and site function to reconstruct persistence, the reuse of sites, population movements, and changes in community location and structure in the Eagle Creek area over time. Changes in the presence and proportions of sourced obsidian and non-local decorated ceramics are also used to discuss the changing external relationships of the prehistoric Eagle Creek residents, which may tell us about changes in shifting identity formation within the area over time, with implications for the adjacent Point of Pines area and greater Mogollon Highlands region.

[346] Chair**Lewarch, Dennis (Suquamish Tribe)****[22] Using Archaeological Training to Help Tribal Communities**

Indigenous communities often lack financial resources, technical skill sets, and expertise in regulatory processes to identify, document, protect, and enhance their cultural patrimony. Well-trained archaeologists are competent in a wide range of skills needed to collaborate and work with indigenous people, thereby allowing indigenous communities to express their own voices regarding their heritage. Archaeological training in areas such as critical thinking, historic research techniques, grant

writing, field procedures, laboratory analysis techniques, data analysis, statistics, GIS, and technical writing is in demand in many tribal communities. Archaeologists can make important contributions to tribal culture, have rewarding careers, and give back tangible benefits to indigenous communities whose heritage has been exploited for decades by anthropologists and archaeologists.

Lewis, Barnaby [246] see Morgan, Linda

Lewis, Devlin and Leslie Aragon (Archaeology Southwest)

[263] Ongoing Investigations at the Gila River Farm Site

The manifestation of the Salado Phenomenon in the Upper Gila is expressed as a combination of local Mogollon traits and traits associated with immigrants from northeastern Arizona. New communities that were formed in the generations after initial migration incorporated ceramic styles, architecture, and other attributes of both the local population and Kayenta descendants. Recent excavations at the Gila River Farm site (LA 39315), a Cliff phase Salado site near Cliff, New Mexico, suggest that the 14th- and 15th-century inhabitants may have had diverse backgrounds, but also maintained a broader identity that is recognized across the southern Southwest as Salado. This poster presents the results from Archaeology Southwest and the University of Arizona's Upper Gila Preservation Archaeology field school 2016–2018 excavations and places the Gila River Farm site in the broader context of Salado sites in the Upper Gila.

Lewis, Jamie (Field Museum)

[293] Discussant

Lewis, Jason [47] see Quirin, Carley

Lewis, Jenifer and David Witt

[136] Arthur C. Parker: Legacies of a Seneca Archaeologist

Arthur Caswell Parker was one of the first of his kind as an indigenous archaeologist. As a Seneca scientist with roots on the Cattaraugus territory where his grandparents lived, he had a foot in two worlds that may have aided with collaboration and research. However, his career started at a time when the archaeological field was still in its infancy, and many Native American tribes considered archaeological research and collecting practices to be unethical. Although the installation of the NAGPRA legislation moves to improve the discourse between tribes and archaeologists, a strong dichotomy in the rhetoric concerning archaeology in Native American communities remains. Different people will have opposing views on archaeology and Parker himself. In this paper, we aim to bring to light the differing views held by individuals within the Seneca Nation by exploring traditional and modern beliefs. This study delves into contrasting perspectives in regards to Arthur C. Parker and archaeology within the Seneca Nation of Indians.

Lewis, Michael [313] see Burrillo, R. E.

Lewis, Michael D. (University of Utah) and Joan Coltrain (University of Utah)

[381] Refining Stable-Isotope Diet Models at Cedar Mesa, Utah: A Graphical Approach to Handling Too Many Sources

Our recent study of wild and cultivated food sources from Cedar Mesa in Bears Ear's National Monument has provided a locally grounded isotope-ecology baseline for modeling human diet. However, initial unconstrained mixing models yielded non-informative results. This paper presents a graphical method for integrating isotope mixing modeling and hypotheses derived from other archaeological data sets. By examining correlations in model outputs across multiple dimensions, extrinsic constraints on one dietary element can be shown to limit other elements narrowing the range of possible diets and

revealing sex- and temporally-based dietary patterning.

Lewis-Sing, Emma (Memorial University of Newfoundland), Oscar Moro Abadia (Memorial University of Newfoundland) and Julia Brenan (Memorial University of Newfoundland)

[271] *Single-Use Heritage: An Archaeological Approach to Plastic Wastescapes as Places of (Ecological) Shame*

In recent years, archaeologists have been increasingly interested in 'places of shame', i.e. places related to past traumatic, painful, or regrettable human actions. In this paper we argue this concept can be expanded to incorporate sites with negative ecological impact. In particular, the interpretation of places of single-use plastic waste accumulation as contemporary heritage landscapes, or 'wastescapes,' of shame can import an ethical load and a responsibility to reflect on behavioural pasts, presents and futures. We suggest that the archaeological treatment and 'heritagisation' of such places has the potential to incite critical self-reflection on plastic consumption and hopefully encourage change in these behaviours. We examine the case of the Sugarloaf Path in Newfoundland (Canada), a hiking trail renowned for its breathtaking views of the North Atlantic coastal landscape. A portion of this path circumvents the landfill that serves the City of St. John's. Windblown plastic waste from the landfill litters the path and surrounding area. This paper presents the preliminary digital mapping of this wastescape – a first step in making a heritage record of this contemporary archaeological place of ecological shame.

Li, Dongdong (Minzu University of China) and Camilla Sturm (New York University)

[361] *Settlement Patterns in the Taojiahu-Xiaocheng Region of Jianghan Plain China*

The especially early emergence of Neolithic walled towns in the Jianghan Plain is widely used as an indicator of social complexity. Several models have been suggested to explain the emergence of walled towns: inter-regional conflicts between the Central Plain and the Jianghan Plain, intra-regional conflicts among walled towns in the Jianghan Plain, and control of flooding in the Neolithic period. The trajectories of developing social complexity of these earliest walled towns and the relationships that existed among them have not previously been systematically investigated from the perspective of demographic distributions. The full-coverage systematic regional survey presented here included two of the earliest walled towns in the Jianghan Plain: Taojiahu and Xiaocheng. It was designed to illuminate their social trajectories and by extension those of their counterparts elsewhere in the Jianghan Plain and areas adjacent to it. The regional survey revealed spatial and temporal variations in the survey area from 3900 BCE to 600 CE. Population distribution patterns were documented for each period in this time span to investigate the dynamic forces behind social and settlement changes.

Li, Jiaxin [389] see Yang, Shiyu

Li, Weiya (Leiden University), Wanli Lan (Henan Provincial Institute of Cultural Heritage), Yuzhang Yang (Department for the History of Science), Christina Tsoraki (McDonald Institute for Archaeological Research) and Annelou Van Gijn (Material Culture Studies, Faculty of Archaeology)

[416] *Dry-Grinding or Wet-Grinding? Use-Wear Reveals the Grinding Technique Used for Cereal Processing in Early Neolithic Central China*

Different food processing techniques often shed light on the dietary habits and subsistence strategies adopted by prehistoric populations. Studies have shown that grinding cereals into flour took place since the Paleolithic age. Nevertheless, the grinding method employed in the prehistoric periods was often not investigated. This study discovered the different features of use-wear traces associated with dry-grinding and wet-grinding of cereals, which can be used to infer the ancient grinding techniques. By applying this reference baseline to Jiahu, an early Neolithic site which is known for the earliest finding of domesticated rice in the central plain of China, it reveals that dry-grinding rather than wet-grinding was adopted for cereal (including rice) processing 9000 years ago. This kind of grinding technique could have been inherited from the earlier hunter-gatherers, but also could be related to broad-spectrum subsistence strategy adopted at Jiahu. By comparing the properties and ethnographic uses of different plant species, it is also suggested that cereals such as rice was a more sensible choice for dry-grinding process.

Li, Xinwei [255] see Ramos, Jorge

Li, Xiuzhen (Emperor Qin Shihuang's Mausoleum Site Museum), Andrew Bevan (UCL Institute of Archaeology), Marcos Martinón-Torres (McDonald Institute for Archaeological Research, CB), Yin Xia (Emperor Qin Shihuang's Mausoleum Site Museum) and Kun Zhao (Emperor Qin Shihuang's Mausoleum Site Museum)

[299] *Inscriptions and Technology: Knowledge of the Artisans Who Created China's Terracotta Army*

This study offers a new perspective and combines multidisciplinary methods, with the aim of revealing knowledge and behaviour of the artisans in ancient China. It considers the inscriptions incised, painted, or stamped on the terracotta warriors and their accompanying weapons, and interprets the information they reveal about the artisans and artists who worked for the Qin Empire. In addition, the study investigates technological features associated with the production of both the terracotta warriors and the bronze weapons by comparing and contrasting these two very different kinds of artefacts. Close attention is given to implications about knowledge and behaviour of the artisans and artists who created such a magnificent Terracotta Army for China's First Emperor. The study also plots wider spatial distribution of items across the pit as a whole, in order to understand the operational sequences and workshop organisation required to make the Terracotta Army. The project's logistics during this crucial early phase of empire-building in China are also discussed.

Li, Yinghua (Harvard-Yenching Institute; School of History, Wuhan University), Yuduan Zhou (National Museum of Natural History, France), Side Hao (Museum of Hainan Province, China), Wanbo Huang (Institute of Vertebrate Paleontology and Paleoanth) and Hubert Forestier (National Museum of Natural History, France)

[361] *Rethinking the Variability of Cobble-Tool Industry in South China and Southeast Asia during Late Pleistocene-Holocene Transition*

The lithic industry of South China has been characterized as simple "cobble-tool" industry persisting from early Pleistocene to Holocene and the most representative industry of Southeast Asia was also marked by pebble-tool techno-complex termed Hoabinhian during late Pleistocene-early Holocene. The possible cultural link of the two regions was proposed by some scholars but the technological characteristics and variability within the two industries was elusive. In this paper we conducted technological analysis on a "cobble-tool" industry associated with a bone tool technology from the Luobi Cave, Hainan Island, dated to ca. 11-10 ka and compared it with a well-studied typical Hoabinhian site of Laang Spean in Cambodia. Except a minimum similarity in operational sequence (*chaîne opératoire*) the major difference has rejected the Luobi Cave as a potential Hoabinhian site, indicating a high originality and a new variability in the tool-kit of modern human groups during late Pleistocene-early Holocene transition in South China and Southeast Asia.

Li, Yue (School of Cultural Heritage, Northwest University), Yaopeng Qian (School of Cultural Heritage, Northwest University), Honghai Chen (School of Cultural Heritage, Northwest University), Zhen Wang (School of Cultural Heritage, Northwest University) and Haifeng Dou (School of Cultural Heritage, Northwest University)

[361] *The Zooarchaeological Analysis of Pre-Zhou Animal Remains from the Zaoshugouao Site and the Zaolinhetan Site in Central Shaanxi, China*

This research analyzed animal remains of the late Pre-Zhou culture from two sites of Zaoshugouao and Zaolinhetan in present-day central Shaanxi Province in China. The comparison of wild and domestic animal taxa, age profiles for main domestic animals, and sources and types of bone artifacts suggest distinct patterns of animal resource exploitation at the sites, showing different levels of complexity at Zaoshugouao and Zaolinhetan. This comparative zooarchaeological research provides new insights into the social and economic development in the historical 'Bin' area on the eve of the collapse of the Shang Dynasty.

Liao, Xuezhu [389] see Yang, Shiyu

Licheli, Vakhtang (Prof. of the Institute of Archaeology. Director)

[359] *10th Century BC Novelties in the Central Part of Southern Caucasus*

The materials discovered at the Grakiani settlement and necropolis (Eastern Georgia) date from different periods and cover the stratigraphy presented below: 1. The Paleolithic Age with an upper Pleistocene paleontological site; 2. Neolithic; 3. Chalcolithic; 4. Early Bronze Age; 5. Late Bronze/ Early Iron Age; 6. The developed Iron Age (the 8th-6th centuries BC); 7. The 5th-4th centuries BC; 8. The 4th-3rd centuries BC; 9. The 3rd-2nd centuries BC; 10. The 2nd-1st centuries; 11. 3rd-4th centuries AD.

The most important items have been discovered in the layers and buildings of the 11th - 10th centuries BC (loom weights, weights). In the small sanctuary located on the 3rd terrace, two inscriptions from the 10th century BC have been unearthed [“A” -North - Western Semitic(?) and “B”- probably - Aramaic]. “B” inscription is the earliest inscription on the territory of Caucasus and is one of the earliest Aramaic inscriptions in the Near Eastern area, showing very intensive interrelations between Central Caucasus and Near Eastern area.

Lieb, Brad (Chickasaw Nation) and Adam Moody

[9] Chickasaw Pottery Vessel Form and Function in the Early Historic Period

This study of Chickasaw pottery vessel forms dating to ca.1700 C.E. explores 268 reconstructed analytical vessels from six okaakinafa' midden pits across two sites (22Le907 and 22Po755) located in and around Tupelo in Lee and Pontotoc counties, Mississippi. Ethnohistorical information, prior research, and oral traditions are gleaned for interpretive information on Chickasaw cuisine and domestic organization. This account of vessel form and function is compared with published studies on other groups and aids interpretation of innovations and traditions in Chickasaw domestic life and adaptation to a rapidly transforming colonial economy.

Lieb, Brad [414] see Boudreux, Edmond

Liebmann, Matt (Harvard University)

[367] A Slow Burning Fuse: Spanish Colonialism, Franciscan Missions, and Pueblo Population Changes in Northern New Mexico

For nearly half a century, prevailing models of post-Contact Native American demography have held that the appearance of Europeans and Africans in the New World sparked a rapid and catastrophic population decline across North America in the sixteenth century. Recent archaeological investigations in the Pueblo Southwest and elsewhere have questioned this model, suggesting instead that Native American population decline followed a very different trajectory than previous models have suggested. This paper presents archaeological data from ancestral Jemez Pueblo villages and Franciscan mission sites in the Jemez Valley of Northern New Mexico in support of a new model of post-Contact Pueblo population, which raises an entirely new set of questions revolving around contact, colonialism, and indigenous resilience.

Liendo, Rodrigo

[309] Discussant

Liendo, Rodrigo [410] see Campiani, Arianna

Lightfoot, Kent (University of California, Berkeley), Valentin Lopez (Amah Mutsun Tribal Band), Mark Hylkema (California State Parks), Roberta Jewett (University of California, Berkeley) and Peter Nelson (San Diego State University)

[231] The Study of Indigenous Landscape and Seascape Management Practices in Central California: A Synthesis of Recent Findings

This paper synthesizes the results of our recent investigation of indigenous landscape and seascape management practices in Central California in ancient and historical times. The project involves a collaborative team of scholars from the Amah Mutsun Tribal Band, Amah Mutsun Land Trust, California State Parks, and the University of California campuses at Berkeley and Santa Cruz who are implementing an inter-disciplinary approach to the study of terrestrial (anthropogenic burning) and coastal management practices using multiple data sets drawn from tribal histories, archaeological and aDNA research, ecological studies, and ethnohistorical sources. The specific goals of the second phase of this project are to provide a better understanding of when people initiated sustained anthropogenic burning and seascape management practices, how they may have modified and developed these practices over time, and to address the scale at which people implemented these practices. These goals are being addressed through the investigation of sites in several study areas along the Santa Cruz Coast that date to Middle Holocene (7000-3000 BP), Late Holocene (3000-500 BP), and Historical times (500-200 BP).

Lightfoot, Kent [231] see Fine, Paul

Ligouis, Bertrand [417] see Mentzer, Susan

Limberg, Caitlin (Archaeological and Historical Services) and Christopher Noll (Archaeological and Historical Services)

[328] *Lithic Technological Organization at Three Olcott Sites along the Elwha River, Clallam County, Washington*

In western Washington, Olcott sites are generally understood to represent a period of cultural and technological stability that extended through the early Holocene into the middle Holocene. While some researchers have suggested subtle technological evolutionary developments occurred over time, Olcott sites have often been characterized as a consistent or uniform technological pattern. Recent archaeological investigations at three Olcott sites located along the Elwha River (sites 45CA727, 45CA774, and 45CA775) recovered a diverse assemblage of chipped stone tools and debitage that indicate Olcott technological organization was not homogenous between sites. The tool production strategies evidenced by the discarded tools and debitage suggest that individual sites were dominated by varying degrees of biface production and informal core/flake tool production. The implications of the Elwha lithic pattern for regional Olcott land-use are explored.

Lin, Kuei-chen (Institute of History and Philology, Academia Sinica) and Chengyi Lee (Institute of History and Philology, Academia Sinica)

[389] *The External Connections of the Yingpanshan Site Cluster in Western Sichuan, China*

Previous studies suggest that both painted pottery vessels and certain kinds of cereals, such as millets, were introduced to the Upper Min River from the north due to the expansion of the Neolithic cultures in the upper reaches of the Yellow River, during the fourth millennium BC. By investigating related ceramic samples and human and animal teeth and bones from the Yingpanshan site cluster in the drainage of the Upper Min River, near the border of Sichuan, Gansu, and Qinghai, we further discover that the direction and intensity of influences had changed through time and varied by river valleys. Interactions between the Upper Min River and the Chengdu Plain to the southeast also existed and later, the core-periphery relationship seemingly overturned.

Lin, Sam [247] see Iovita, Radu

Lin, Yi-Ling (Department of Anthropology, Washington University in St. Louis) and Yuling He (Institute of Archaeology, Chinese Academy)

[49] *Paleopollution and Environmental Consequences of Bronze Craft Production during the Shang Periods in Anyang, China*

The aim of this study is to understand the relationship between bronze production and paleopollution during the middle and late Shang periods (1450-1045 BCE) in Anyang. Archaeologists have discovered several bronze workshops operating during these periods. These workshops were located among residential areas, and the long-term bronze production activity at Anyang could have generated hazardous elements that polluted the environment. Since 2016, paleosols have been collected from a wide variety of archaeological contexts and time periods during excavations in Anyang. We apply trace metal analysis and particle size analysis to study the chemical composition and structure of these paleosols. The information recorded in paleosols indicates paleopollution related to bronze production and other human activities.

Lincoln, Hollie [30] see Hanratty, Colleen

Lincoln, Thomas**[246] *The Central Arizona Project and Platform Mounds in Arizona***

This paper will chronicle some of the history of the Federal investment in Big Archaeology for the Central Arizona Project. Specifically, the decisions to support a philosophy of Cultural Research Management, which facilitated a huge contribution to the archaeology of Arizona, and more broadly to the Southwest United States. The CAP construction project snaked its way through homeland territory of the prehistoric Hohokam and Salado affecting many platform mound-centered communities in the Phoenix Basin, Gila Basin, Tucson Basin, and in the Tonto Basin and it is these sites and communities that provided the fruit for informed archaeological research and a significant intellectual contribution to American Archaeology in the late Twentieth Century. The massive CAP archaeological program, from the late 1960s to the 21st Century (50 years and counting), had its own historical roots and I will discuss the relevance of the Bureau of American Ethnology as the intellectual spark for Big Archaeological thinking at the Federal Level, notably late Twentieth Century mitigative archaeology, and the why the furtherance of Big Federally-sponsored Archaeology programs is a logical, necessary, and appropriate model.

Lindauer, Owen and Arley Simon (Arizona State University)**[194] *White, Red, and Plain Wares in the Tonto Basin: Precursor Correlate of Culture Change***

We present a consideration of Roosevelt Black-on-white, recovered from archaeological sites in Arizona's Tonto Basin, as a correlate for Tonto Basin populations' changing exchange relations as well as emulation through production of locally-produced copies of non-local wares. Implications of broad-scale ceramic exchange, population migration, and emulation are considered for the period A.D. 1250 to 1350+ through Tonto Basin white ware, red ware, and plain ware ceramic analysis. We view a marked diversity in white ware technology while maintaining a desired design style as presaging similar trends in other red and plain Tonto Basin wares throughout the Salado temporal sequence. These trends provide evidence of the amalgamation and integration of traditions indigenous to the Tonto Basin, with population in-migration from surrounding areas, as well as influences from regional trade. The ceramic assemblages provide correlates of dynamic changes that led to the intermingling and integration of cultural influences during the development and fluorescence of the Salado Platform Mound communities.

[357] *Discussant***Linderholm, Anna (The BiG lab, Texas A&M)****[281] *Discussant*****Lindo, John, Randall Hass (UC Davis), Christina Warinner (Max Planck Institute for the Science of Human Hist), Mark Aldenderfer (UC Merced) and Anna Di Rienzo (University of Chicago)****[253] *The Genetic Prehistory of the Andean Highlands 7,000 Years BP though European Contact***

The peopling of the Andean highlands above 2500m in elevation was a complex process that included cultural, biological and genetic adaptations. Here we present a time series of ancient whole genomes from the Andes of Peru, dating back to 7,000 calendar years before present (BP), and compare them to 64 new genome-wide genetic variation datasets from both high and lowland populations. We infer three significant features: a split between low and high elevation populations 30 that occurred between 9200-8200 BP; a population collapse after European contact that is significantly more severe in South American lowlanders than in highland populations; and evidence for positive selection at genetic loci related to starch digestion and plausibly pathogen resistance after European contact. Importantly, we do not find selective sweep signals related to known components of the human hypoxia response, which may suggest more complex modes of 35 genetic adaptation to high altitude.

Lindquist, Shayna (University of Kentucky)**[158] *Obsidian Production and Consumption Practices at Matacanela***

Matacanela's chipped stone assemblage overwhelmingly is dominated by nonlocal obsidian, including both products and by-products of multiple reductive technologies. Overarching temporal trends and classification of Matacanela's obsidian

assemblage have previously been discussed within the context of the site's general settlement; however, this data has yet to be thoroughly recontextualized within the socio-economic milieu of the site. This paper focuses particularly on the dawn of the Late Classic period at Matacanela. The obsidian data from this period suggests that the people of Matacanela became more engaged in prismatic blade production, though to varying degrees across the site. I make the argument for localized obsidian craft specialization during the Late Classic period and situate this data within concurrent shifts in subsistence strategies and political alignment.

Lindsay, Audrey (Center for Environmental Management of Military Lands [CEMML])

[122] Fire Effects at the Honda Ridge Rock Art Site, Vandenberg Air Force Base, California

As California wildfires increase in intensity and frequency across the state, archaeologists and land managers work to update fire management strategies and reassess fire risks to sensitive cultural resources. Existing literature indicates that while some buried archaeological resources are fairly protected, rock art sites are particularly susceptible to wildfire effects. Vandenberg AFB has collaborative pre- and post-fire management plans specific to each rock art site. In September 2016, the Canyon Fire burned approximately 12,742 acres within Vandenberg AFB. High winds and dry conditions swept the fire over the Honda Ridge rock art site, burning the interpretive infrastructure and visibly impacting the northeastern pictograph panel. This poster presents the collaborative observations of fire impacts to the rock art, shares the refined pre- and post-fire management strategies, and demonstrates the resilience of the pictographs and overall rock art site.

Lindsay, David (Society for American Archaeology)

[4] Discussant

Lindsay, Ian (Purdue University) and Alan F. Greene (NYU/Institute for the Study of the Ancient World)

[359] New Solutions to Old Challenges: Methods and Results from Project ArAGATS' Kasakh Valley Archaeological Survey (KVAS) Project, Northwestern Armenia (2015-17)

The South Caucasus witnessed multiple long-term shifts in settlement systems, social organization, and sociopolitics from the Paleolithic and the close of the Bronze Age. Throughout this long history, local environments and human landscapes served as important material and social contexts through which processes of community (re)production unfolded. However local topographies and historic modifications to the landscape present unique challenges to systematic settlement survey in the South Caucasus. In this paper, we discuss results of the last three seasons of pedestrian survey and test excavations in the upper Kasakh River Valley in northwestern Armenia, which have broadened our understanding of changing land-use and settlement patterns. We also highlight some of our methodological approaches to site documentation such as a mobile GIS system and airborne photogrammetric mapping workflows that were developed to help mitigate survey challenges in the region's heterogeneous landscapes.

Linduff, Katheryn (University of Pittsburgh) and Karen Rubinson

[196] Horses in Iron Age Steppe Burials: Their Enduring Socio-political Role

Horses have been a large part of the David Anthony's research interests. Horses also played a significant role in the Pazyryk Culture (4th-3rd centuries BCE), a group of peoples buried in the Altai Mountains, in the region where modern Russia, Mongolia, China and Kazakhstan meet. Horses are regularly deposited in burials associated with the Pazyryk Culture; this practice and its socio-political function is the topic of this paper. Not only are horses the backbone of the mobile and military functioning of these communities, they probably also played a central role in displaying the centralizing power and authority of trade and emerging societal complexity across a vast area in Eastern Eurasia.

Ling, Xue, Zhouyong Sun and Liang Chen

[78] Strontium Isotopes in Human Teeth as Indicators of Migration in the Warring States Period Sites of Zhaiteouhe and Shijiahe

The sites of ZhaiTouHe and ShiJiaHe are two neatly arranged cemeteries with complicated features. The cemeteries were both discovered in Huangling county, Shaanxi Province, are the first complete Rong people's tombs found in northern Shaanxi, and are closely related to the Wei's culture. In order to reveal migration patterns, strontium isotope analysis was

conducted on human teeth. With the help of some archaeological data and historical literature, the Rong's way of life and the changes in the immigration policy of Qin are also studied, with focus on the process of national fusion during the Warring States Period in northern Shaanxi. The results of the study indicate that both graveyards have some migrants, and the mobility of the population was high. The Rong people's way of living changed after arrival in the Huangling area. At the same time, one sample also indicates how immigration policies changed in the subsequent Qin Dynasty.

Lipe, William [313] see Matson, R.G.

Lipe, William (Washington State University), Shannon Tushingham (Washington State University), Eric Blinman (Office of Archaeological Studies, Museum of New Me), Chuck LaRue (Independent) and Laurie Webster (University of Arizona)

[419] How Many Turkeys Did It Take to Make a Blanket?

For a thousand years, turkey feather blankets were a standard part of Ancestral Pueblo material culture in the Central Mesa Verde (CMV) area. Investigating the "supply side" of blanket-making includes comparing the number of feathers needed for a blanket with the number of suitable feathers obtainable from an adult turkey. We estimate a one meter square blanket curated at the Edge of the Cedars Museum in Blanding required 12,000 to 14,000 body feathers measuring 5 to 17 cm long. Examination of several wild turkey pelts indicates an adult male has up to 2000 such feathers. If each household made only one new blanket annually, feathers from six or seven turkeys would be required each time. However, the archaeofaunal record doesn't reflect this level of harvesting live birds. We discuss use-lives of the blankets; whether turkeys' regular molts could have been a practical feather source; and if mature feathers could have been selectively picked from live birds. Also discussed are supply side effects when turkeys became a major meat source in the CMV after about CE 1150.

Lipo, Carl [325] see Davis, Dylan

Lipo, Carl [325] see Raymond, Tiffany

Lipo, Carl (Binghamton University), Mark Madsen (University of Washington), Robert J. DiNapoli (University of Oregon) and Terry Hunt (University of Arizona)

[365] Solutions to Drift on Small and Isolated Populations

Due to the effects of drift on small and isolated populations, island environments pose particular evolutionary challenges in the retention of richness and diversity of cultural information. Such variation, however, can have significant fitness consequences particularly when environmental conditions change in an unpredictable fashion: knowledge about past environments may be the key to long-term persistence. Evolutionarily, one would expect successful adaptations to include social mechanisms for maintaining diversity and richness within interacting populations. Factors that can shape the rate of drift across a population include the semantics of the traits as well as spatially structured social networks. Here, we explore how community patterning and interaction impacts the rate of trait retention and extinction. We use our findings to explore how this process might explain aspects of the archaeological record for the prehistoric populations of Rapa Nui (Easter Island, Chile).

Lippert, Dorothy (National Museum of Natural History)

[317] The Articulation of the Dead: Understanding Expatriation, Materiality and Voice in the Process of Repatriation

Bioarchaeologists assert the responsibility to give voice to the dead, but the dead exist in many different definitions. As ancestors, they are part of an existing human community, as objects, they are part of a created community of collections. They can also be sources of data for researchers seeking to expand knowledge about human existence. Far from being inert and silent, their nature both constructs and is informed by the emotional landscape of repatriation work. This presentation will consider the materiality of the individuals who are the focus of repatriation and the role of emotion in constructing their identity.

[177] Discussant

Lippi, Ronald (University of Wisconsin)**[2] A History of the Yumbos, Barbacoan Peoples of Northwestern Ecuador**

Many years of archaeological research under my direction coupled with ethnohistoric, linguistic and genetic studies by other scholars have allowed for the compilation of a fairly detailed history of the Yumbos, a cloud forest people of the western flank of the Andes in Pichincha province, Ecuador and members of the Barbacoan language family. I will review various hypotheses regarding their origin, highlight the most likely one, and then present a model of Barbacoan migrations over recent millennia. Then I will discuss what happened to the Yumbos following the Spanish conquest and to what extent they have survived into modern times.

Lippi, Ronald [350] see Gudino, Alejandra

Lipson, Mark (Harvard Medical School), Mary Prendergast (Harvard University), Isabelle Ribot (Université de Montréal), Carles Lalueza-Fox (Institute of Evolutionary Biology CSIC-UPF) and David Reich (Harvard Medical School)**[253] Ancient Human DNA from Shum Laka (Cameroon) in the Context of African Population History**

We generated genome-wide DNA data from four people buried at the site of Shum Laka in Cameroon between 8000–3000 years ago. One individual carried the deeply divergent Y chromosome haplogroup A00 found at low frequencies among some present-day Niger-Congo speakers, but the genome-wide ancestry profiles for all four individuals are very different from the majority of West Africans today and instead are more similar to West-Central African hunter-gatherers. Thus, despite the geographic proximity of Shum Laka to the hypothesized birthplace of Bantu languages and the temporal range of our samples bookending the initial Bantu expansion, these individuals are not representative of a Bantu source population. We present a phylogenetic model including Shum Laka that features three major radiations within Africa: one phase early in the history of modern humans, one close to the time of the migration giving rise to non-Africans, and one in the past several thousand years. Present-day West Africans and some East Africans, in addition to Central and Southern African hunter-gatherers, retain ancestry from the first phase, which is therefore still represented throughout the majority of human diversity in Africa today.

Lis, Bartłomiej (British School at Athens), Evangelia Kiriatzi (British School at Athens) and Noémi Müller (British School at Athens)**[363] From Local to Regional Technological Landscapes – The Mobility of Aeginetan Potters**

This paper stems from a project entitled TRACT (TRAveling Ceramic Technologies as markers of human mobility in the Aegean), funded through Marie Skłodowska-Curie Actions, which aims to demonstrate that the informed and interdisciplinary study of ancient pottery can shed new light on past human mobility. Our focus is on potters from the island of Aegina, located close to Athens, in the Saronic Gulf, and their mobility along the Euboean Gulf, a convenient water passage to the north, at the end of the Late Bronze Age (ca. 1200 BC).

The macroscopic examination of pottery, focusing on morphological/stylistic and technological features, has been the starting point of our study and the basis for the identification of craftspeople mobility. The subsequent incorporation of ceramic petrology and elemental analysis of a selection of ancient pottery samples, in combination with geological prospection in the studied landscapes and replication experiments, and ethnographic work on modern potters' mobility has contributed to the understanding of the entire technological phenomenon at various spatial scales and with a time perspective. In particular, in this paper we will explore the issue of adaptation of Aeginetan potting tradition to several 'new' landscapes along the coast of the Euboean Gulf.

Liss, Brady (University of California, San Diego), Thomas E. Levy (University of California, San Diego) and James Day (University of California, San Diego)**[363] Accidental Innovation? Using Isotopic Analysis to Test Possible Iron Production as a By-Product of Advanced Copper Smelting**

The Faynan region of Southern Jordan is one of the largest copper ore deposits in the Levant. These ores were exploited throughout history, and during the Iron Age (ca. 1200-800 BCE), copper production in Faynan reached an industrial scale. However, excavations at Khirbat en-Nahas (an Iron Age smelting center in the region) also discovered iron metal dating to

the 10th-9th centuries BCE in the form of mixed copper-iron chunks and a few iron objects. These iron artifacts were initially interpreted in two ways: 1) as possible evidence for innovative iron production stemming from advanced copper smelting technologies or 2) as waste materials from failed smelts resulting in unworkable copper (and the iron objects as imported). If correct, the former interpretation would have significant implications for understanding the currently enigmatic origins of iron production in the Levant. To address this dichotomy, these iron materials were recently analyzed with mass spectrometry to look for isotopic connections between the raw metal and select artifacts (to determine if the iron objects were produced from the copper-iron chunks). This paper will present preliminary results/interpretations from this analysis and their contributions to understanding the iron in Faynan and iron production in the Levant more generally.

Litschi, Melissa (Southern Illinois University, Carbondale)

[285] Applicability of Maxent Predictive Modeling in Locating Pre-Hispanic Quarries in the Callejón de Huaylas, Peru

Stone in the Andes is an integral component of both the natural landscape and of the material expressions of cultural beliefs and practices. Growing evidence from multiple cultures indicates preferences for stone materials from certain sources, which held political, symbolic, and ideological importance. Determining quarry locations is a vital step in analyses of the socio-political implications of material choice and relationships between people and landscape. However, in pre-Inka periods, locating material sources has often relied on pedestrian surveys and interviews with local inhabitants. Using the Recuay as a case study, this project tests the efficacy of Maximum Entropy (Maxent) predictive modeling methods to improve our ability to locate probable source locations prior to in-field surveys. Maxent modeling, commonly applied in ecological models, uses input constraints to identify the distribution of a selected feature with the maximum uncertainty (least amount of bias). Regional geologic, hydraulic, topographic, archaeological, and ethnographic data constrain the model identifying potential sources of analyzed Recuay stone sculptures. This approach will be field-tested in my upcoming dissertation research. This project contributes to the understanding of regional stone sourcing practices and its ties to socio-political negotiations between Recuay communities and to improving methodologies for archaeological survey and sourcing studies.

Littell, Jeremy [12] see Clark, Jorie

Litwinionek, Luc, Stance Hurst (Museum of Texas Tech University) and Eileen Johnson (Museum of Texas Tech University)

[147] Islands on the Plains Revisited: GIS-Based Predictive Models of Playa Use on the Southern High Plains

Landscape Archaeology is useful in providing a framework for understanding human movements across various environments. Such an approach relates landscapes as they evolved through time to settlement patterns of human groups occupying the area. Cultural behaviors can then be linked to physiographic and topographic features using such an approach. On the Southern High Plains of northwestern Texas and eastern New Mexico on an otherwise seamless terrain, playas are the dominant features on the landscape. These disparate islands were attractive to groups occupying the region as they provided seasonal water and a variety of resources. The relationship throughout the late Quaternary between hunter-gatherer mobility and these basins is explored through GIS predictive modeling. GIS-based data on such features provides a valuable tool to assist in the reconstruction of these landscapes not only spatially but within a temporal scale. More specifically, the goal is to understand the relationship between the development of playa basins and the movement of groups occupying the Southern High Plains during the late Quaternary, particularly during the late Pleistocene and the early Holocene.

Liu, Chin-hsin (California State University Northridge)

[27] A Bioarchaeological View on Long-Term Development in Prehistoric Central Thailand

Archaeologically, Metal Age sites in northeast and central Thailand exhibit different patterns in site formation, size, and mortuary practice. With geophysical characteristics of each region in mind, these differences have led to an on-going discussion on, for example, the origin of metallurgy and cultigens, and subsequently, their influence on population interaction and organization. The discussion centers primarily on the internal development vs. external transmission of technology and cultural practices. Over past decades, morphological and chemical analyses of human skeletal remains from prehistoric Thailand have provided significant insight into people's lifeways and by proxy, population histories, land-use variation, and sociocultural development in the region. This paper reviews the bioarchaeological evidence fundamental to the discussion. It utilizes data from a program of isotopic analyses of skeletal remains from multiple, small-scale sites in central Thailand, including a Thailand Archaeometallurgy Project (TAP) site, to evaluate the two perspectives and to provide

an outlook/perspective on pathways for future bioarchaeological research.

[27] *Chair*

Liu, Chun Fu [361] see Xie, Liye

Liu, Chung Yu (Department of Anthropology, National Taiwan University)

[333] *Settlement Configuration and Social Structural Change: An Example of Graphic-Based Spatial Analysis from Kucapungane of Southern Taiwan*

This presentation examines the social structure change revealed by the interpretations of the abandoned settlement layouts through graphic-based spatial analysis for Kucapungane area of southern Taiwan.

Kucapungane Rukai, an Austronesian indigenous tribe in Taiwan, has several abandoned settlements. The Kucapungane people lived in the Old-Kucapungane for the past 600-700 years. However, they were forced to move several places 50 years ago due to government policies and landslides triggered by typhoons. Previous studies of structural change of Kucapungane society was interpreted from ethnographic data majorly. The result of the changes in traditional lifestyle and culture value was forced by government's capitalistic policy. This interpretation becomes a normal perspective for the Kucapungane social structural change. However, applications of spatial technologies in archaeology began in the early 1980s. The graphic-based technologies brought about new research perspectives for social structural change. This study tries to use graphic-based spatial analysis to examine social structure at two Kucapungane settlement configurations (Old-Kucapungane and Tulalekelre), and reconstruct the social structural change process.

The results of this research not only highlight the different interpretations between archaeological and ethnographic data but also demonstrates the potential of comparing these interpretations to better understand social structural change variability of Kucapungane.

Liu, Li (Stanford University)

[78] *Discussant*

Liu, Siran (USTB)

[299] *Bronze Age Crucibles in China: A Unique Technological Tradition and Its Cultural Implications*

Most studies of early metallurgy in China have focused on style, manufacturing techniques and alloy compositions of bronze artefacts. In rare circumstances, other sections of the bronze production Chaîne opératoire such mining, smelting and metal processing are considered. This research concentrates on early bronze processing crucibles found in a number of Bronze Age workshops in China and showcases the great potential for studying production through these remains. In contrast to other parts of Eurasia, Chinese Bronze Age crucibles were multi-layered and do not show much vitrification on interior surfaces. A few well-preserved examples ones are much taller and bigger than West Asian and European counterparts. The microscopic analyses and experimental reconstruction reveal they were made with specialized silt-rich material. A comparative investigation of crucibles in China, Near East and Europe shed new light on the early spread and localization of metallurgical technology in Eurasia.

Liu, Xinyi [78] see Reid, Rachel

Liu, Xinyi (Department of Anthropology, Washington University in St. Louis)

[78] *From Tangible Things to Intangible Ideas: The Context of Trans-Regional Movements of Artifacts, Cereal Crops and Animals*

Scholarly interest has been growing in an episode of trans-Eurasian exchange of agricultural systems and tangible material goods in late prehistory. The trans-regional movement of a number of artifacts, cereal crops and animals occurred within a series of transformative process that brought together previously isolated communities across Eurasia, to constitute a new kind of network. This process was at its height during the second/first millennium BC. Much has been discussed relating to the timing and routes of those movements. In this presentation, we focus on the context. In particular, what were the

intangible ideas that might be associated with the movement of tangible things in archaeological evidence. Why was a certain type of technology or idea welcomed in one part of the world but rejected from another?

[78] Chair

Liu, Yan (School of History, Beijing Normal University) and Xingcan Chen (Institute of Archaeology, Chinese Academy of Social)

[416] *The Sense of Order: Contextual Analysis of the Habitus and Social Spaces in Baiyinchanghan Neolithic Site, Northeast China*

The Baiyinchanghan site is one of the most important sites of the Xinglongwa Culture (7,500-6,500 B.P.) in NE China. By employing Pierre Bourdieu's habitus theory, this research explores social relations and cultural ideas by studying occupants' habitus and social spaces. The habitus and social spaces in this site are demonstrated clearly through its well-organized houses, floors and artifacts with different functions placed at specific places. Contextually, habitus in this site forming in daily practice unconsciously is a kind of social norm, which could be called 'a sense of order', in a social context that people encountered with social risks during the hunt-gathering to agriculture transition. The sense of order was strengthened by the importance of digit "three", which was demonstrated by the tripartite classification of many cultural phenomena. The social spaces and habitus may also be related to gender-based labor division. In addition, the differences of social spaces and habitus between Zones A and B, not only could be resulted from distinct economic backgrounds, but also be divided to form two people groups. These differences could be interpreted as their strategy to strengthen the sense of identity in confronting with resource competition.

Liu, Yu

[299] Discussant

Livesay, Alison (Los Alamos National Laboratory)

[90] *No Photos Allowed: Photogrammetry at Los Alamos National Laboratory*

The Cultural Resources program at Los Alamos National Laboratory (LANL) manages nearly 2000 archaeological and historic properties, spanning thousands of years of human history. Due to its remoteness on the Pajarito Plateau, LANL boasts exceptional preservation of many sites. However, archaeologists must contend with an equally singular set of compliance-driven issues, such as back-logged legacy projects, difficulty in accessing sites on an operational national laboratory, and little time to conduct and disseminate research. As using photogrammetry programs to create 3D digital imaging has become an increasingly utilized tool in archaeology, I plan to ascertain if photogrammetry can be more widely used here at LANL to help mitigate some of the above circumstances. Can photogrammetry be implemented into routine site recording and updating in lieu of or to augment the complex sketch mapping process? Would employing photogrammetry techniques support current erosional and long-term monitoring of significant cultural properties? Would having 3D models assist in increasing access and experience of these unique ancestral and historic places for a wider public?

Livingood, Patrick (University of Oklahoma) and Christina Friberg (University of California, Santa Barbara)

[205] *Have Chert Will Travel: Anisotropic Transportation Cost Models of the Valuable Mill Creek Chert Hoe*

The Mill Creek hoe industry was integral to the political consolidation of Greater Cahokia. Manufactured at the chert quarries in southern Illinois and distributed throughout the Mississippi valley, previous research examined the relationship between Mill Creek hoe abundance and straight-line distance between source and site to produce characteristic fall-off curves. This paper reexamines these distribution patterns in terms of cost-distance, utilizing an anisotropic transportation model which permits both pedestrian and canoe travel and considers costs of moving heavy loads. This paper will expand on earlier work and also present efforts to make the code for this available to other researchers.

Liwoz, Chester (University of Barcelona)

- [43]** *Percussive Petroglyphs in the Digital Age: A Mojave Desert Case Study of Virtual Heritage Management for Rock Art Iconography and Phenomenology*

A recent study conducted at select petroglyph landscapes in the Mojave Desert integrated non-invasive multidisciplinary methods with advanced theories, and ethnographically informed understandings of the iconography and experiences of rock art locations. This approach sought to bridge scientific and indigenous ontologies through measuring phenomenological properties of rock art engagements. Research locations and actualistic experiments were documented for visual, spatial, and acoustic properties. Quantifiable data was contextualized in detailed virtual environments. These reconstructed environments aid the application of iconography and neuropsychology theory to inform understandings of oral traditions, in order to elucidate significant and novel new insights regarding Numic social structure, interaction, and religious cosmology. These findings' implications connect the vast Precontact Uto-Aztecán world, from California through Northern Mexico to Mesoamerica, emphasizing elements of religious experience, practice, and symbolism. Zero-impact methods designed to democratize archaeological practice through cost control nonetheless demonstrate the efficacy of digital approaches to heritage management. This paper utilizes aforementioned virtualized spaces to explore voices and songs that emerge from the attribution of other-than-human agency during production of, and subsequent engagement with, rock art contexts. Although oriented towards a humanistic, phenomenological understanding, quantitative measures of this study's approach operate as a framework for undertaking comparable scientific investigations elsewhere.

Lizama Aranda, Lilia [71] see Alvarez Estrada, José

Lizama Aranda, Lilia

- [71]** *El esfuerzo multidisciplinario de Arqueólogos Sin Fronteras del Mundo Maya Propuesta de un Plan para el Desarrollo de la Arqueología*

En esta presentación se plantean tres cosas: (1) las problemáticas que se relacionan con la disciplina arqueológica en la península de Yucatán; (2) los grupos y sectores que participan en la búsqueda de su solución; (3) las alternativas y soluciones así como el trabajo que en colaboración se viene coordinando. La propuesta es realizada por un grupo multidisciplinario y relacionado a la disciplina arqueológica denominado Arqueólogos Sin Fronteras del Mundo Maya. En el 2016, este grupo conformado por profesionales asociados a la disciplina, se reunieron por primera vez para evidenciar problemáticas que desde su percepción obstaculizaban la arqueología. En el 2017 se reunieron de nuevo en un taller por tres días, para discutir y buscar solución a las problemáticas que afectaban una región en específico en el Norte de Quintana Roo en el municipio del actual Puerto Morelos. Actualmente el grupo se está organizando para la realización de un siguiente taller conformado por sectores y actores relacionados, cuyo esfuerzo coordinado representa desde esta perspectiva la primera piedra que guiará al campo de la disciplina arqueológica, en el desarrollo para el bienestar a través de un plan nacional disciplinario y del mundo Maya.

- [71]** *Chair*

Lizarraga Rojas, Beatriz (Universidad de Granada España) and Danielle Kurin (University of California, Santa Barbara USA)

- [206]** *Salud y condiciones de vida de los pobladores prehispánicos de Sondor en los Andes sur centrales de Perú*

El trabajo de investigación tiene como objetivo el estado de salud y condiciones de vida de los habitantes de Sondor, durante el periodo de transición (Intermedio Tardío). El material de estudio procede de contextos funerarios hallados en los trabajos de excavación realizada el 2017, como parte del Proyecto de Investigación Arqueológica Sondor Pacucha, desarrollado en la provincia de Andahuaylas, departamento de Apurímac Perú. El estudio se centra a partir de dos unidades ubicadas en el sector de Muyu Muyu (área de enterramiento) y en el sector de Suyturumi (área doméstica), la unidad N° 02 contempla un espacio funerario que alberga un entierro múltiple, mientras que la unidad N° 05 registra un área de vivienda donde se han registrado cinco contextos funerarios que albergan individuos infantiles y adultos. El estudio bioarqueológico parte por determinar el sexo, edad aparente de muerte, estatura, indicadores paleo patológicos y entesopatías mediante el estudio de restos óseos, así mismo se ha registrado indicadores que han dejado huella en huesos y dientes, como lesiones traumáticas y enfermedades. Este conjunto de datos en relación a la edad de muerte y presencia de individuos infantiles nos permite indicar las condiciones precarias de salud de los habitantes de Sondor.

Lkhundev, Guunii [416] see Gillam, J. Christopher

Lloyd, Lara (Chandler-Gilbert Community College)

[119] *How Adequate Is the Etiquette? An Example from Mesa Verde National Park*

After the closure of Spruce Tree House at Mesa Verde National Park in 2015, instances of vandalism and similar problems increased. The correlation between observed site etiquette violations and the closure of the most-visited site cannot be ignored, and suggests the need for improved site etiquette education. Methods for mitigating damage to archaeological sites include an increase in archaeology education, more consistent rules for visiting sites across the U.S., and an increase in demonstrated site etiquette, much in the way that Spruce Tree House served prior to its closure.

[229] *Moderator*

Locker, Angelina [30] see Trein, Debora

Locker, Angelina (The University of Texas at Austin)

[63] *Papa Was a Rolling Stone: Migration Stories from the Three Rivers Region, NW Belize*

A robust body of literature on ancient Maya migration exists, showcasing their intrinsically mobile nature. Interestingly, while migration inquiries have been conducted in urban centers throughout the ancient Maya world, it is less well understood how people moved around more rural landscapes. For the ancient Maya inhabiting communities in the Three Rivers Region in northwest Belize, population ebbs and flows spanning the Late Preclassic (400 BCE – CE 250) to the Terminal Classic (CE 810 - 900) have been attributed to human migration. This research tests hypotheses related to regional population undulations; establishes a regional strontium isoscape based on local limestone bedrock, soils, and waters; presents data from strontium and oxygen isotopic analyses of human dental enamel from 49 individuals; and investigates migration across multi-scalar communities, highlighting the intersection of regional migration through time and the prevalence of rural migrations.

[63] *Chair*

Lockhart, Anna (Vassar College)

[112] *Comparability of Photogrammetry and Laser Scanners for Generating 3D Surfaces for Archaeological Questions*

Three-dimensional modeling has become an invaluable tool in many areas of archaeology, including bioarchaeological contexts. 3D modeling can increase the scope and scale of many research questions by, for example, allowing for the use of geometric morphometrics to provide high-resolution anatomical information. Unfortunately, rendering 3D surface data has traditionally required expensive equipment, limiting access to many researchers, especially students. Photogrammetry, which converts a series of 2D images into a 3D object, may provide a less expensive alternative for creating 3D models. This study compares the accuracy of 3D cranial models generated using photogrammetry to the physical crania and models derived from a laser scanner. Photogrammetry models were generated from photos taken with Canon Rebel T4i and Agisoft Photoscan software, while the laser scans were produced with NextEngine scanner. Results show high fidelity between the real crania and virtual models. Based on standard craniometric measurements, photogrammetry produced models of similar accuracy to that of the scanner and the crania, with the resulting models deviating < 5% from true cranial measurements. Therefore, in addition to reducing processing time, improving texture resolution, and being easier and less expensive to use, photogrammetry appears to be a reliable alternative for analyzing and disseminating archeological data.

Lockhart, Jami (Arkansas Archeological Survey) and Timothy Mulvihill (Arkansas Archeological Survey)

[367] *Crossing the Mississippi: A Landscape of First Encounters*

This research comprises a geospatial analysis of Late Mississippian/Protohistoric cultural landscapes in the Aquixo, Casqui, and Pacaha provinces of present-day Arkansas. A GIS-enabled methodology is used to examine the earliest documentary descriptions of the de Soto entrada via reconstructions and interpretations of contemporaneous physical geography, site distributions, and cultural areas informed by an integrated archeological database.

Lodge, Spencer (Desert National Wildlife Refuge)

[36] *Fire on the Mountain: The Use of Earth Ovens for Agave and Pinyon Processing in the Sheep Range, NV*

Hot-rock technology was an integral aspect of prehistoric life in modern day southern Nevada. The utility of earth oven use is exemplified in the Sheep Range, located 20 miles north of Las Vegas, where more than 200 earth oven facilities have been documented across six vegetative communities. A variety of plant foods were baked throughout the year across this significant landscape, such as agave in the winter-spring, as well as yuccas and green pinyon cones in the late summer to early fall. This paper presents ongoing research of roasting pits (earth ovens) within the Sheep Range, including measurement data indicating more frequent re-use of cooking sites at higher elevations, in addition to new survey data detailing the importance of hot-rock cooking for green-cone pinyon processing.

Loehman, Rachel (US Geological Survey)

[257] *Ecologies of Space and Time: The Shared History of Humans and Fire in the Jemez Mountains, NM*

In the southwestern US humans and ecosystems share a history of fire. An integrated archaeo-ecological framework offers an important interpretive lens for both archaeologists and ecologists. Contemporary ecological patterns and processes that are thought to be 'native' or 'natural' may in fact be highly influenced by past human land use legacies, and profound and persistent, human-driven landscape transformations may affect subsequent land use and settlement practices (i.e., the archaeological record of human-landscape interactions). The Jemez Mountains of central New Mexico provide a landscape laboratory rich in archaeological, ethnographic, and ecological data sets, within which to study the reciprocal, long-term interactions of humans and fire. Evidence from tree-rings, fire scars, and charcoal sediments suggests that prior to the 20th century, southwestern pine forests sustained frequent, low-severity surface fires. During a period of dense occupation in the 13th and 14th centuries, prehistoric land use may have significantly influenced forest structure, fuel properties, ignitions, and thus landscape fire dynamics. Coupled natural-human systems process modeling, used to simulate ecological responses to prehistoric land and resource use, highlights the complexity and extent of prehistoric landscape modifications, and the degree to which contemporary landscapes are shaped by legacies of the past.

Loendorf, Chris [194] see Medchill, Brian

Loendorf, Chris (Gila River Indian Community)

[369] *One Tough Act to Follow: A Retrospective of the Archaeological Career of Lawrence L. Loendorf*

This presentation summarizes the remarkable career of Lawrence L. Loendorf, who has conducted cutting edge archaeological research for nearly six decades. As his son, my life follows the arc of Larry's research as an archaeologist from when it formally began in early 1960s through today. Consequently, I am uniquely positioned to comment on his work, which is far too vast to fully encapsulate here, and instead I am only able to present a few highlights. Larry's passion for archaeology has inspired an entire generation of researchers, including myself. He is an award winning educator, and he has been a mentor to many aspiring archaeologists. He has personally helped many people develop successful careers of their own, including a number who were otherwise disadvantaged. His work has contributed greatly to our understanding of Northern Plains prehistory in particular, and to rock art research throughout North America in general. His incredible enthusiasm for understanding and preserving the past continues unabated to this day, and he remains highly engaged as a field and laboratory investigator with his on-going work at Sacred Sites Research, Inc., a non-profit corporation he established.

Loendorf, Lawrence (Retired Albuquerque NM)

[190] *Rock Art Sites in the Permian Basin, New Mexico*

Sacred Sites Research, Inc. and Versar Inc., working in cooperation with the Mescalero Apache Tribe and the Hopi Tribe, recorded and evaluated 17 rock art sites in New Mexico's Permian Basin, a project supported through the Bureau of Land Management programmatic agreement. Sixteen of the sites contain paintings, mostly in shades of red, but some with yellow, black and white figures. One petroglyph site is unusual because it is away from mountains on a flat surface where the figures face up toward the sky. The sites contain images that range from the Archaic through the Historic periods. An especially important site has 30 panels with a range of ages, including several horses and riders. One horse with a conquistador-like rider is accompanied by dogs attacking a pedestrian Indian camp. Overall the sites add considerably to

the knowledge about rock art in the Guadalupe Mountain-Permian Basin region.

[369] *Discussant*

Loendorf, Lawrence [369] see McClellan, Carolyn

Loewy, Staci L. [63] see Locker, Angelina

Lofaro, Ellen [362] see Van Voorhis, Laura

Lofaro, Ellen (University of Tennessee), Jorge Luis Soto Maguino (Dirección Desconcentrada de Cultura de Ayacucho), Jason Curtis (University of Florida) and John Krigbaum (University of Florida)

[398] *Diet, Identity and Status in Colonial Huamanga (Ayacucho), Peru*

This paper explores ideas of identity and status at the earliest Jesuit church in Ayacucho, Peru (ca. 1605-1767 CE), La Iglesia de la Compañía de Jesús de Huamanga (ICJH). Starting with an exploration of indigenous resistance to Spanish colonialism, this case study uses stable isotopes of carbon and nitrogen as proxies for diet and burial location as a proxy for potential status, to provide further analyses of the daily lives and deaths of the indigenous individuals buried underneath the church floors. Results are complicated. Isotopic values and burial position do not correlate as expected, suggesting that initial hypotheses may be too simple, and that broader discussions of diet and status within the urban context of 17th and 18th century Huamanga are needed to clarify ideas of identity within this community.

Logan, Amanda [110] see Harris, Samuel

Logan, Amanda (Northwestern University)

[347] *Assessing the Impacts of the Atlantic Slave Trade and American Crops on African Agriculture*

Although the Columbian Exchange had a significant impact on local agroecologies, we still know very little about the African side of the exchange. This is particularly complex knot to unravel given that the Atlantic slave trade peaked during those same centuries. Both processes were to have major impacts on human-environment relations and food security in the centuries to follow, though archaeological data on these processes is still extremely limited. In this paper, I consider the relationship between slavery and American crops using archaeological and archaeobotanical data from Banda, Ghana that spans the last six centuries. I evaluate a hypothesis that has been remains remarkably tenacious in the historical literature: that there was a tradeoff between the introduction of American crops and the siphoning off of human lives and labor from the continent. I argue that this hypothesis is wrong, by outlining the conditions under which maize was adopted and its relationship to food security. Areas depopulated by slave raiding did not turn to maize as a solution. Maize did increase in some areas along the coast, because it was ideally suited to feeding captives, who had little choice over what they ate.

[137] *Discussant*

Lohse, Jonathan [197] see Borejsza, Aleksander

Loiselle, Hope

[57] *Hunted or Scavenged?: Investigating Acquisition of Dolphins and Porpoises at the Par-Tee Site Using Zooarchaeology and Ancient DNA Identifications*

The large quantity of archaeological cetacean remains recovered from the Par-Tee site allows insight into the potential hunting of smaller cetaceans. Using the Smithsonian's Department of Vertebrate Zoology Marine Mammal Collection as a comparative, I identified four small cetacean species in the midden: harbor porpoise, Dall's porpoise, bottlenose dolphin, and Pacific white-sided dolphin. To determine whether these small cetaceans were from hunted or stranded individuals, I

compared the archaeological data to modern stranding data and was unable to reject stranding as a possibility for their occurrence in the midden. Analysis of the bones revealed no direct evidence of hunting or other modifications, even though ethnohistoric evidence suggests that hunting of small cetaceans is practiced globally, including on the Northwest Coast. Small cetaceans are oftentimes difficult to identify to species without a large, comprehensive comparative collection due to intraspecies variation and limited interspecies variation, so many zooarchaeological analyses lack a taxonomic identification beyond family. Due to different ecological roles and behaviors, species identification is important for understanding how humans may have potentially obtained this rich food and material resource. Toward this end, I confirm my species designations with ancient DNA and discuss the morphological characters which led to my initial identification.

Lomatewama, Ramson [44] see Natker, Leon

Long, Madison (East Carolina University) and Megan Perry (East Carolina University)

[9] *Bioarchaeological Analysis of a Historic North Carolina Family Cemetery*

The Gause Cemetery at Seaside, located in Sunset Beach, North Carolina, purportedly contains members of a wealthy and influential planter family, the Gause's, who died during the late 18th and early 19th centuries. In 2017, a Gause descendant requested excavation of the cemetery by East Carolina University as part of an extensive genealogical project that will culminate in restoration of the cemetery. During the first season of excavation, three adult individuals were recovered from the cemetery, and excavation in 2018 uncovered five additional graves containing seven individuals. Six out of the seven individuals recovered in 2018 are subadults, one 6-8 years of age, one 7-8 years of age, another 1.5 years old, and three term infants. All individuals at the site display skeletal evidence of childhood non-specific stress indicators, such as linear enamel hypoplasias in the adults and children, and/or periostitis or porotic hyperostosis in the children. This evidence, along with the simultaneous burial of two of the newborns and the 6-8 year old child in the same grave possibly due to a disease epidemic based on historical evidence, suggests that even "elite" 18th and 19th century landowning families experienced childhood frailty in North Carolina.

Longman, Darren (University of Texas at Austin) and John Pohl (UCLA)

[28] *Feathered Serpents of the Oaxacan Isthmus and Pacific Coast, Mexico: Hybridity, Ritualized Environments, and Territorial-Narratives*

Feathered Serpent iconography among Mixtec, Zapotec, Chontal, and Huave ethnic groups of Oaxaca, Mexico indicates that its sociopolitical and religious roles are concomitant with an investment in mythological landscapes and spiritually active ritual environments. Our approach to hybrid serpents draws from multifaceted investigations into images, textiles, manuscripts, rituals, and festivals to determine their impact on territorial-narratives and, more specifically, the social dynamics within and between these ecologically and culturally diverse regions. Further, this paper highlights the cultural variability of Oaxaca's Feathered Serpents both past and present to reshape our perception of composite creatures within terrestrial, celestial, and supernatural realms.

Loomis, Sarah (Harvard University)

[221] *Gendered Figurine Iconography at Los Guachimontines, Jalisco, Mexico*

Gender is one of the primary identity categories that provides structure to the social organization of societies. It sets expectations for the activities, status, presentation, and spatial organization of individuals within a community. This study aims to interrogate the social role of gender in the Teuchitlán tradition of Jalisco, Mexico, through a survey of figurines from the large ceremonial site of Los Guachimontones. For each figurine, the survey will identify material objects and adornments depicted or implied by the representation. These would include vessels, jewelry, clothing, tools, and weapons. After using primary and secondary sexual characteristics to assign a gender to each figure, a statistical analysis will correlate different types of items and activities with gender. This provides a starting point in understanding gender specificity for material objects in the Teuchitlán tradition, which could then be compared in a future study against the material record of a household area at Los Guachimontones. Within this study, the traits used consistently to signal figurine gender can be used to interpret conceptions of masculinity, femininity, and/or androgyny that were prevalent at Los Guachimontones.

Lopez, Escee (Department of Anthropology, California State University, Los Angeles), Jessica Morales (Department of Anthropology, California State University, Los Angeles) and Rene Vellanoweth (Department of Anthropology, California State University, Los Angeles)

[323] *Zooarchaeological Analysis of Fish Remains from the Thousand Spring Site (CA-SNI-11), San Nicolas Island, California*

Archaeological evidence from the California Channel Islands has provided insight on the important role fish played in daily human subsistence practices. San Nicolas Island is home to a rich and diverse marine environment containing the largest kelp forest along the Southern California Bight. This study focuses on fish data from a middle to late Holocene village site. The site is situated on the northwest coast of San Nicolas Island and contains a dense assemblage of ichthyofaunal remains. In this study, we present a fish dataset from the excavated units using standard archaeozoological methods to quantify NISP and MNI. A detailed examination of the ecology of fishes will allow for a comprehensive understanding of human harvesting at this site encompassing discussions of fishing technology and human procurement strategies. Through various statistical calculations, we compare and contrast our results in intra-local and extra-local context. We provide a baseline of human-fish relationships from archaeological data collected from San Nicolas Island and link this data to the functionality and advances in regional fishing technology. By understanding human-fish relationships in a spatial and chronological context, we may begin to explore large-scale patterns of fish harvesting practices along the Southern California Bight.

Lopez, Fermin (From Collaboration to Partnership in Pojoaque-Protecting Ancestral Places) and Bruce Bernstein (Tribal Historic Preservation Officer for Pueblo of)

[311] *Protecting Ancestral Pojoaque Places*

Protecting Pueblo of Pojoaque ancestral sites is a challenge. Inside our exterior boundaries are non-native encroachments. Cultural properties are often located within these checker board properties and more often than not have significant cultural meaning to the Pueblo's culture and history. Tangible and intangible cultural resources are everywhere on our lands and do not stop at today's boundaries. Retaining the history and protecting sites for which we have no access can negatively reflect on the Pueblo's culture and history and can be demeaning to relationships with our non-native neighbors. And sharing our land base with non-native neighbors is increasingly challenging-- Off road and recreational vehicles, horses, hikers, and domesticated grazing animals in the past and present have had significant negative impacts on cultural properties. How do we conserve and protect cultural properties within the exterior boundaries of the Pueblo of Pojoaque while maintaining a good neighbor policy?

Lopez, Julieta [406] see Murakami, Tatsuya

Lopez, Kirsten (Oregon State University)

[274] *Theoretical Reflections on Textiles and Environment in the Northern Great Basin*

Textiles are often given short shrift in archaeological research and reporting, due in large part to their rarity and thus limited depth of analysis. Recent studies have demonstrated a variety of new analytical techniques, revealing new potential in archaeological and anthropological textile studies. Unfortunately, over ten years into these developments, few studies have utilized these techniques. Considering theory frames research questions, a shortage of theory directly handling textile materials resource acquisition or manufacture affects the quality and quantity of research into this area. In a recent study using $^{87}\text{Sr}/^{86}\text{Sr}$ ratio sourcing techniques, various theoretical concepts around other types of resource acquisition, manufacture, learning and artifact life-history from the likes of Schiffer, Ingold, Hurcombe, and Jolie were used in developing research questions and trajectory. The purpose of this paper is to explore the implications of the study results through these theoretical lenses. The result is creating a middle-range theoretical platform for advanced textile study.

Lopez, Val (Amah Mustun Tribal Band)

[231] *The Importance of Restoring Indigenous Knowledge*

The Creation Story of the Amah Mutsun clearly delineates our traditional territory and asserts our responsibility to take care of Mother Earth and all living things. For thousands of years and many hundreds of generations the Amah Mutsun accumulated knowledge of how to ensure balance in their world. We recognize the importance of prayer and ceremony, that

all living things are our relatives, including the tangible and the intangible, that all plants have a responsibility to provide for a community, and that fire was both a gift and a tool given to us by Creator. Starting in the late 1700s the Amah Mutsun experienced three periods of brutal colonization. All three periods attempted to destroy traditional culture, spirituality, and environments. Today, the Amah Mutsun is working to restore the indigenous knowledge of our ancestors so we can fulfill our sacred obligation to Creator. At first, we resisted working with anthropologists, as we believed they would perpetuate a history of destruction and domination. After many conversations and careful steps forward, we recognize the value of archaeological research in restoring the knowledge of our ancestors. Trust and respect are at the center of our collaboration.

Lopez, Valentin [231] see Lightfoot, Kent

López, Alejandro

[193] *Strains of Different Cultures Embedded in the 400 Year Old Spanish Language of Northern New Mexico*

As the oldest center of Hispano/Mexicano culture in the United States, northern New Mexico offers a unique view into this culture's presence in what is now the continental United States. Due to the centuries-long isolation of the region and the relatively dense population of Spanish speakers, northern New Mexico's four hundred year-old Hispano/Mexicano culture continues to live and adapt to new conditions of life. It also maintains many of its core elements including a strong attachment to land, family, religion, music, traditional foods and language. An examination of some of the linguistic peculiarities of the Spanish spoken by this community will reveal its amalgamation of diverse cultural influences ranging from Nahuatl to English.

López, Eos (ENAH), Mauricio Obregón (Facultad de Ciencias Políticas y Sociales, UNAM), Flavio Silva (University of California, Berkeley) and Luis Barba (Instituto de Investigaciones Antropológicas, UNAM)

[407] *Residuos químicos en el patio de una unidad habitacional del Clásico Tardío en Chinikihá, Chiapas*

Las prácticas que tienen lugar en las unidades habitacionales se relacionan profundamente con procesos que ocurren a escala local y regional (Liendo et al., 2015: 12). El Proyecto Regional Palenque, incluyó el estudio de unidades habitacionales, tomando a los residuos químicos como estrategia para acercarse a las prácticas cotidianas que transforman los lugares donde se realizaron (Manzanilla y Barba 2003: 33). En 2013, se tomaron muestras de pisos de tierra en el patio de la Estructura G13 del Clásico Tardío en Chinikihá, Chiapas. En la ponencia se presentan los resultados, analizados en el Laboratorio de Prospección Arqueológica, IIA-UNAM, usando su metodología (Barba et al., 1991). La información obtenida a partir de spot test, permitieron elaborar mapas de distribución donde es posible identificar zonas de concentración y asociaciones con estructuras domésticas.

Lopez Aldave, Natali [286] see Wolin, Daniela

López Cabral, Rocío [393] see López Mazz, José

López Camacho, Javier [409] see Tsukamoto, Kenichiro

López Corral, Aurelio [68] see Costa, Angelica

López Corral, Aurelio [68] see Ibarra, Thania

López Corral, Aurelio [68] see Rodas, Diana

López Corral, Aurelio (Instituto Nacional de Antropología e Historia)

[238] *De Tepeticpac, a Tlaxcallan, a Tlaxcala: el forje del estado tlaxcalteca del Posclásico tardío (1250-1519 d.C.) a la Colonia temprana (1519-1600 d.C.)*

El contacto entre tlaxcaltecas y españoles en 1519 inicio un periodo de cambios fundamentales en las relaciones de poder entre los altepemeh del altiplano central mesoamericano. Para Tlaxcallan, la alianza representó una oportunidad para sortear los problemas políticos, bélicos y económicos en las cuales se encontraba inmersa la entidad estatal desde el siglo 15, hecho que a la poste les generó el mote de "traidores a la patria" entre los formadores de la nueva República Mexicana del siglo 19. Pero esta no fue la única ocasión que los tlaxcaltecas condujeron una alianza político-militar clave y reestructuraron su forma de gobierno. La historia revela episodios fluctuantes de coaliciones y conflictos entre Tlaxcallan y otras entidades estatales durante sus 250 años de existencia en el Posclásico tardío (1250-1519 d.C.). Este trabajo explora los cambios en las estructuras de poder tlaxcaltecas derivados de alianzas y antagonismos históricos, y sus implicaciones sociopolíticas y teóricas. Se analizan datos históricos y arqueológicos sobre la transición de un gobierno basado en un líder único, a un gobierno colectivo multiétnico formado por varios líderes con intereses contrastantes, hasta su transformación en un gobierno colectivo sincretizado con el sistema de dominio español en la colonia temprana (1519-1600 d.C.).

[238] *Chair*

López Luján, Leonardo (Museo del Templo Mayor, INAH), Alejandra Aguirre Molina (Proyecto Templo Mayor, INAH) and Israel Eizalde Mendez (Proyecto Templo Mayor, INAH)

[304] *Dressed to Kill: Richly Adorned Animals in the Offerings of the Great Temple of Tenochtitlan*

Over the course of four decades, the Templo Mayor Project (1978–2018) of Mexico's National Institute of Anthropology and History (INAH) has excavated more than two hundred offerings in the area corresponding to Tenochtitlan's sacred precinct. These rich Mexica deposits from the fourteenth, fifteenth, and sixteenth centuries contained an unusual diversity of mineral, floral, faunal, and human remains in addition to large quantities of cultural objects. Prominent among the offerings are the vestiges of tens of thousands of animals representing more than five hundred species, including a particularly interesting set of carnivorous mammals and birds of prey that were sacrificed in ritual ceremonies and buried inside temples and under plaza floors. The corpses of these animals were adorned with all sorts of insignia and ornaments (e.g., earpieces, nosepieces, necklaces, pectorals, anklets) made of gold, copper, wood, turquoise, greenstone, shell, and other precious materials. This presentation will analyze the archaeological contexts of such offerings and will study the symbolism of the animals in light of native pictography and sixteenth-century descriptions.

López Mazz, José (Universidad de la República, Uruguay) and Rocío López Cabral (Department of Anthropology, University of Florida)

[393] *The Presence of Groups of Amazonian Cultural Matrix in the La Plata River*

The Amazon has traditionally been seen as the scenery for different original human experiences. In recent years, research has allowed us to improve our knowledge of the territorial and cultural dynamics of Amazonian groups in South America. In this context, the spatial analysis of ceramic traditions allows us to know and recognize the dispersion of groups of Arawak and Guarani matrix towards places as distant as the La Plata river. These episodes of human migration seem to have begun about 2000 years ago BP, and they allow us to recognize precise cultural matrices, diverse archaeological contexts and reliable chronologies. This work presents information on the Guarani cultural tradition, based on the survey of presence of ceramic material attributed to this group. The diverse contexts in which this material has been recorded are analyzed, as well as the cultural dynamics in which it could be involved. The relevance that the La Plata river has within a wide sphere of cultural interaction that links the Southern Cone of South America with Amazonia is also discussed.

López Mestas Camberos, Martha Lorenza [173] see González López, Martha Cecilia

López Mestas Camberos, Martha Lorenza (Instituto Nacional de Antropología e Historia) and Marisol Montejano Esquivias (Instituto Nacional de Antropología e Historia)

[349] *Las Figurillas “Cerro de García”: Usos y Significación*

Las figurillas conocidas originalmente con el término genérico de “Cerro de García”, se ubican cronológicamente entre los años 600 a 900 d.C. y son consideradas como una evidencia de interacción intra e interregional por su amplia distribución en el Occidente de México. Sin embargo, a pesar de la importancia que se les ha otorgado, son pocas las excavaciones controladas que refieran su presencia y permitan realizar un análisis antropológico de las mismas, a partir de sus contextos de producción, distribución, uso y deposición, especialmente porque dichas figurillas se convirtieron en imágenes performativas que proyectaron los valores sociales y los sistemas simbólicos en la subjetividad de los individuos mediante los diferentes códigos que las conforman. El objetivo de esta ponencia no sólo se centrará en su producción y distribución, sino en la forma en que se usaron como parte de distintos procesos rituales que estructuraron a los sujetos sociales vía la internalización de esquemas y valores básicos, a partir de las excavaciones realizadas en el valle de Colima, el centro y los Altos de Jalisco.

Lopez Varela, Sandra (UNAM)

[105] *Alternative Mexico: A Mobile Application for the Preservation of Mexico's Heritage*

“México Alternativo” is a mobile application for iOS and Android platforms, drawing from the need to preserve and promote contemporary heritage resources that are of great value to Mexico’s citizens. Infrastructure building and promotion of urban lifeways to modernize and strengthen Mexico’s economy, has resulted in the appropriation by its citizens of modern spaces, with the inevitable creation of new heritage values. “México Alternativo” records people’s contemporary heritage values, hoping to play an important role in articulating the need for effective, sustainable and responsive preservation models contemplating all forms of heritage, creating a more agreeable partnership between Mexico’s citizens and institutions.

Lopinot, Neal [176] see Ray, Jack

Lord, Kathryn (The Broad Institute & UMass Medical School), Greger Larson (University of Oxford), Raymond Coppinger (Hampshire College) and Elinor Karlsson (The Broad Institute of MIT and Harvard)

[352] *The History of the Fox Farm Experiment and Its Ramifications for Understanding the Origins of Domesticated Animals*

Domestic and wild animals are distinguished primarily by behavioral changes difficult to discern in archaeological remains. Domestication syndrome describes the suite of behavioral and morphological changes proposed to consistently accompany domestication, including skeletal changes. It is largely based on an experiment in directed evolution in farmed foxes, which showed that selection for tameness resulted in other traits such as spotted coats, floppy ears, curly tails, loss of seasonality, and shorter muzzles. Here, we describe why the findings of the farm fox experiment are more complicated than widely assumed. While it achieved changes in fox behavior, these changes are not sufficient to clearly classify the foxes as domesticated. Furthermore, many of the traits classically cited as appearing in the foxes differ in significant ways from traits identified in domestic animals, while others appeared generations before the experiment began, when the foxes were bred for farming. The theory of a domestication syndrome in mammals is based primarily on dogs, with the fox-farm experiment providing crucial empirical evidence. With the fox data offering little support for the existence of such a syndrome, its use in archaeological studies should be re-examined.

Loren, Diana (Peabody Museum, Harvard University)

[15] *Body Histories, Historical Bodies: Adornment, Culture and Identity through Time*

The body is so many things simultaneously. It is an historical object, a site of experience and violence, a set of behaviors, and is both material and metaphysical. We cannot conceive of history without bodies. Bodily adornments add further nuances that are personal, symbolic, political, situational, and multifaceted; tied to taste, emulation, production, and consumption. Current research on bodies and their adornments draw out details of how sexuality, health, status, gender, desire, and identity were situated on and in the body, even in deep history. Recognizing that the body is constituted through history, in this paper I draw out broad themes of clothing, personal adornment, and embodiment over time, especially

regarding relationships among bodies, experiences, representation and history.

Lorenz, Carol (San Juan College) and David Preston (San Juan College)**[203] Anomalous Floor 2 Features in the Point Pueblo Great Kiva**

During the 2016 and 2018 seasons, excavators found more than 150 features in Floor 2 of the eastern half of the Great Kiva at Point Pueblo. Of these, 99 were east of the eastern vault complex. Features were lined with clay or adobe, demonstrated eight different shapes, and many contained artifacts. One large horseshoe-shaped (90+ cm) feature was due east; 20 features were connected to it directly or indirectly via 17 underground tunnels. This presentation provides a plan view of the eastern half of the Great Kiva with a detailed view of the horseshoe-shaped feature and its associated features, a basic analysis of artifact types found in the different feature shapes, and some possible explanations for this unusual find.

Lorenz, Samantha, Toni Gonzalez, Alanna Abel and Jessica Strayer**[383] Interpreting Identities: An Ahegemonic Archaeological Approach**

Mulch'en Witz (glossed 'Hill of Many Caves') is located in northwestern Belize within the periphery of the ancient Maya site of La Milpa. Preliminary investigations have recorded a high concentration of chultuns associated to architectural features and groups and, thus far, all cultural material dates to the Late Classic period (CE 600-800). Human skeletal material was encountered in Chultun 3, a small boot-shaped chultun located northwest of a Plaza Plan 2 group. An individual appears to have been placed on the stairs that lead into the main chamber, although s/he was later disturbed when the capstone was dislodged prior to excavation. The burial within a chultun along with the artifacts associated with this individual present challenges for conventional interpretation. This paper discusses how an ahegemonic archaeological approach might be useful to better contextualize the study and present a more accurate representation of this ancient Maya individual.

Lorenz, Wayne [337] see Trusler, Kate

Lorenzi, Varenka [348] see Schroeder, Sissel

Losey, Robert (University of Alberta)**[138] Discussant****Loubser, Johannes (Stratum Unlimited, LLC)****[252] High Elevation Petroglyphs along the South Carolina/North Carolina State Line**

Long Ridge Road is the most complicated of 20 high elevation sites with similar-looking circular and meandering petroglyphs along the South Carolina/North Carolina state line. With the aid of drone photography a minimum number of 1,043 petroglyph motifs were recorded. Based on motif style and stratigraphy the site most likely dates to the Middle to Late Woodland periods. Like other petroglyph sites in the region it is located beside an old trail that connects the valley bottoms with prominent mountain tops. Also, petroglyphs are concentrated on the steepest portion of the exposed bedrock pavement.

Loucks, Jordon (University at Albany)**[88] Archaeology and the Green Power Initiative: Reconciling Large Renewable Energy Development Projects and the Protection of Cultural Resources**

The development of utility scale renewable energy projects is a necessity to curtail our environmental footprint. The utilization of solar and wind power sources to provide stable, affordable, and ethically sound alternatives to the resource extraction-based energy production practices of yesterday is quickly sweeping the American landscape. However, with these developments, large undeveloped areas in rural settings are subject to substantial soil impacts, as well as viewshed impacts, and characteristic change of the landscape. The approach by many state historic preservation offices has been

similar in some respects, but not standardized to include an accepted set of best practices. To better evaluate cultural resources caught in the wake of energy development for each development type, the discussion of current approaches should be undertaken. This study evaluates direct and indirect impacts of both solar and wind facilities in mountainous terrain and explores a set of best practices to evaluate those impacts to provide developers with the best possible data to avoid impacts to cultural resources.

Lovata, Troy (University of New Mexico)**[193] Chicanx in the Wilderness: Tree Graffiti and Perceptions of People and Place**

This paper examines how historic and modern tree graffiti left by Chicanx and Latinx in Wyoming, Colorado, and New Mexico impact understanding both these peoples and the wild lands they inhabit/ed. Archaeologists have been at the forefront of countering ideas that graffiti is primarily a modern phenomenon of urban decay with studies that bring forth concepts of resistance and empowerment pushed back into prehistory and across wild places worldwide. Graffiti carved into trees by different modern and historic peoples is prevalent in North America. Graffiti on aspen trees is especially common in the Western United States and is often linked to Chicanx and Latinx sheepherders, laborers, and recreationalists. That such graffiti is often found in wild lands and legally defined wilderness areas has long put it under the purview of, and generated interest among, archaeologists. But the presence of Chicanx in these wild places also challenges long held assumptions about both what wilderness means and who Chicanx are. Artifacts of Chicanx in the wilderness both expand what it means to be Chicanx and problematize the idea that wilderness is, to quote the American Wilderness Act of 1964, "...where man himself is a visitor who does not remain."

Loven, Jeremy [254] see Yost, Scott

Loven, Jeremy (PaleoWest Archaeology), Kathryn Puseman (Paleoscapes Archaeobotanical Services Team, LLC), Kye Miller (PaleoWest Archaeology), Christy Briles (Paleoecology, Palynology, and Climate Change Labor) and John G. Jones (Archaeological Consulting Services, Ltd., Tempe)

[254] Middle Archaic Period Subsistence and Resource Use Practices in the Chuska Valley, New Mexico

The recent discovery and investigation of a Middle Archaic period campsite in the southern Chuska Valley has provided substantial insight into the relative importance of various plant and animal resources to the mobile inhabitants of the San Juan Basin region. Data generated from the analysis of macro- and micro-botanical remains recovered from structural and thermal features and ground stone surfaces suggests the site's inhabitants were processing a diverse assortment of local and non-local plants for consumption, while procuring numerous other species for use as structural posts or fuel sources. Pollen, phytolith, and macrofloral analyses all point to use of pine nuts, while macrofloral analysis lends insight into use of various other native plant resources. The faunal assemblage is dominated by small mammals, suggesting a focus on acquiring locally available animals for use as a protein source; however, at least a limited commitment to obtaining large mammals and possibly long-distance hunting is exhibited by the presence of medium-sized artiodactyl remains at the site. Results from botanical and faunal analyses, along with additional observations concerning lithic raw material procurement and tool-making strategies, architecture, and overall site formation processes, provide valuable information about a poorly understood time period in the San Juan Basin.

Low, Marika [277] see Watson, Sara

Lowe, Kelsey [170] see Kappers, Michiel

Lowe, Lynne (Centro de Estudios Mayas, UNAM)**[330] Hermann Berendt and Charles Rau: Notes on the Origin of Maya Archaeological Collections during the 19th Century**

The study of correspondence, field notes, catalogs and other archival documents has contributed important information to understand the history of some of the first Maya archaeological collections in the United States and Europe. The field and lab work developed by pioneering explorers and researchers, such as Hermann Berendt (1817-1878) and Charles Rau (1826-1887), among others, contributed to the establishment of the methodological foundations of the archaeological

discipline with the application of a systematic methodology of classification and study of diverse materials coming from the Maya region. The collaboration established with prominent local figures, such as the Yucatecan bishop Crescencio Carrillo y Ancona or the collector Florentino Jimeno, allowed them to be part of the circle of intellectuals who promoted the study of languages, antiquities and the formation of collections dedicated to archaeological research. This is the case of the first collections of Maya artifacts acquired by the Peabody Museum of Archaeology and Ethnology and the Smithsonian Institution of Washington, whose study will allow us to rescue unpublished information about the sites explored during the second half of the 19th century and their material legacy.

Lowry, Justin (SUNY Plattsburgh), Skelly Skolnick (SUNY Plattsburgh, Department of Anthropology) and Adam Benfer (University of Calgary)

[412] Mapping of Ancient Managua, Nicaragua using GIS

Settlement patterns within Central America can lead to a better understanding of the political and social complexity of the region. Although this method has been extensively used across archaeological regions, Nicaraguan archaeology can benefit from this settlement analysis because of the inclusion of a GIS-based systematic approach. This paper will outline some of the broader context of the Nicaraguan state of Managua surrounding the 5th century site of Chiquilistagua, and relies on an archaeological database of site locations compiled from public reports, publications, and surface surveys. By looking at the intra-regional dynamics of site location and political organization, we can make a first attempt at reconstructing of the political and social context of the region of Managua surrounding the site of Chiquilistagua.

Lozada, Maria (University of Chicago), Danielle Kurin and Emmanuel Gómez

[185] Andean Indigenous Bodies: Methodological Approaches to Past Perceptions of the Body

Any attempt to understand indigenous anatomy and perceptions of the body from an emic perspective in the Andes is a challenging endeavor, beginning with basic definitions that differ substantially from Western traditions. Furthermore, definitions changed across space and time throughout Andean prehistory, making it difficult to discuss the topic in a unified, monolithic manner. In the Andes, there are a variety of ontological data on this subject. These are based on ethnohistorical, linguistic, ethnographic, materiality and phenomenological studies that provide insights into an emic view of the Andean worldview, including perceptions of the body. In this paper, we present bioarchaeological case studies from different parts of the Andes as well as a study of Quechua terminology that illustrate the unique view and treatment of the "body" in this part of the world. In addition, we provide methodological recommendations in osteological research that need to be followed in an effort to provide a more nuanced interpretation of past worldviews anchored in the body.

[185] Chair

Lozada, Maria [286] see Cheever, Sylvia

Lozada Toledo, Josuhé [280] see Hernandez, Christopher

Lozano, Enadina [151] see Rankle, Chad

Lozano, Stephanie (University of California, Riverside)

[406] New Insights into Teotihuacan's Year Sign Headdress and Its Olmec Origins

This study will explore the origin and meaning of the Teotihuacan's year sign headdress and its connection to the Storm God (Tlaloc). Several scholars have noted the first appearance of the year sign worn by the Storm God starting from the Early Classic period at Teotihuacan. Evidence suggests a fair amount of interaction between Teotihuacan and other parts of Mesoamerica, which can be noted especially with the presence of the Teotihuacan year sign found at several different locations. The presence of the Teotihuacan year sign appears at several Maya sites, within the Mixtec region, and has also been noted in the Borgia codex. The year sign has its roots in Teotihuacan and is often worn as a headdress by Tlaloc which notes its agricultural significance with maize. I argue that the origin of the Teotihuacan year sign headdress can be traced back to the Olmec of the Formative Period. This is clearly seen through a study of the iconography of the Teotihuacan Storm God vessels from the Preclassic period found at Teotihuacan. I argue that the year sign headdress worn

by the Storm God is a Teotihuacan impersonation of the Olmec maize deity.

Lozny, Ludomir (Hunter College, CUNY)

[166] *Discussant*

Luan, Fengshi [361] see Wang, Yifan

Lubinski, Patrick (Central Washington University), Virginia L. Butler (Portland State University), Deanna Grimstead (Ohio State University), Dennis Jenkins (University of Oregon) and Dongya Yang (Simon Fraser University)

[47] *Using Fish Remains from Paisley Caves, Oregon to Explore Hunter-Gatherer Lifeways and Lake Level History in the Chewaucan Basin over the Past 14,000+ Calendar Years*

Paisley Caves holds some of the earliest evidence for human occupation in North America. The site's fish remains have received only limited attention before now. Our pilot study sought to assess the potential for using a sample of the fish remains to help reconstruct lake level history, better understand regional paleoenvironments, and gain insights on forager adaptations over the ~14,000 years of human occupation. Besides morphological analysis (and body size estimates), aDNA and C/O isotopes were studied. Recent reconstruction of Pleistocene lake history provided a framework for developing expectations of fish response. An age-depth model was created from 109 radiocarbon dates. A total of 3,342 fish remains from 6 test units were identified. Tui chub (*Siphateles bicolor*) dominates with small frequencies of rainbow/redband trout (*Oncorhynchus mykiss*) present. When grouped by climate interval, measures of overall fish abundance, salmonid abundance, and tui chub body size are largely consistent with expectations of lake levels for the Bølling/Allerød, Early, Mid, and Late Holocene, but not for the Younger Dryas. A sample of 32 tui chub bones revealed a similar correspondence for expected water conditions from $\delta^{13}\text{C}_{\text{PDB}}$ and $\delta^{18}\text{O}_{\text{PDB}}$ isotope values.

Lucas, Cristin [125] see Prasciunas, Mary

Lucas, Leilani [151] see Flynn, Alexandria

Lucas, Leilani (College of Southern Nevada)

[366] *Filling the Envelope: a History of Archaeobotanical Research in Cyprus*

Since the first experiments with the method of flotation in 1962, the sub-discipline of archaeobotany (paleoethnobotany) has developed and revolutionized our understanding of the origins and spread of agricultural systems worldwide. The history of modern archaeobotanical methods on the island of Cyprus has its roots in the 1970s with evidence from Neolithic Dhali-Agridhi, followed not long after by Khirokitia-Vounoi and Cape Andreas-Kastros. These early publications are testament to the role the island's archaeological community has played in the early development of the sub-discipline. The expanding dataset of Cypriot charred macro-botanical remains has not only transformed our understanding of the origins and spread of Near Eastern crop agriculture but has led to new research questions on early Cypriot subsistence strategies. Summarizing nearly 50 years of archaeobotany on the island highlights the key players and how they have questioned our understanding of the past, focusing on the key role the sub-discipline will have in Cypriot archaeological studies going forward.

Lucas, Virginia (University of Nevada, Las Vegas)

[168] *Faunal Exploitation Practices at Three Malabar Period Sites in the Fox Lake Sanctuary in Brevard County, Florida*

Three Malabar Period Sites, Hunter's Camp (8BR2508), Palm Hammock (8BR2509), and Xavier's Knoll (8BR2510), were excavated in the Fox Lake Sanctuary in Brevard County, Florida. Faunal assemblages recovered from general excavation units and features were examined to learn more about Malabar faunal exploitation strategies and subsistence patterns. Sampling methods utilized at the site allowed for a more complete perspective on subsistence strategies. The main objectives of this study were to determine the seasonality of the sites and to compare the subsistence strategies between the three sites by determining species diversity, and the relative abundance of marine vs. freshwater species and aquatic vs. terrestrial species. In addition, this poster aims to determine if these sites were habitation sites or satellite-processing

sites, and this is accomplished by comparing the faunal assemblages of these sites to contemporaneous sites located to the north and south. The data collected suggests that the people of these sites incorporated turtle and both marine and freshwater species of fish and shellfish, almost to the exclusion of all other species, into the subsistence economy.

Lucas, Virginia [260] see Benedict, Laura

Lucero, Lisa (University of Illinois at Urbana-Champaign)

[28] *Discussant*

Lucero, Lisa [199] see Larmon, Jean

Lucido, Jennifer and Scott Lydon (UC Los Angeles)

[193] *Where No Mestiza Has Gone Before: Brokering Colonialism, Ethnogenesis, and Gendered Landscapes in Alta California, 1775-1845*

The triple consciousness that is the Afro-Mestiza or Mestizo experience conjures nationalism, racialization, and ethnicity and thereby, the ongoing negotiation of identity on the Spanish and Mexican borderlands frontier. Where archaeology and historical studies are concerned, the effort to interrogate the lives of mestiza women within such contested landscapes is necessarily fraught. The entanglements of such liminal frontiers necessarily impact identity, material cultures, and their corollary forms of social expression. This paper therefore explores theoretical models of colonialism, historic and gendered landscapes, and processes of ethnogenesis and identity formations whose enduring character underpin the archaeology of Chicanismo in California and the West. We present a microscale genealogical analysis of successive generations of the Arballo lineage spanning 18th and 19th century Spanish and Mexican social formations and material cultures. The women under scrutiny constitute Alta California's earliest Spanish colonial families, including Feliciana Arballo, María Ignacia López, and sisters Josefa and Ramona Carrillo. In the final analysis, this paper explores the lives of mestiza women on the Spanish frontier, particularly insofar as how such women served as both domestic partners and colonial cultural agents in the negotiation of indigenous alliances.

Lucius, William [420] see Di Naso, Steven

Lueth, Friedrich

[155] *Changing the Picture – 1000 Hectare High Resolution Magnetometry on the Protected Zone of a World Heritage Site at Avebury, UK*

Avebury and Stonehenge, two iconic prehistoric sites in the heart of England, both listed on UNESCO's list of world heritage have undergone intensive research during the past century. Nevertheless, evolving technologies open access to new data on a landscape scale, thus adding more and surprising information helping to reach out beyond the state of the art. A joint international team has investigated the area between Windmill hill and Silbury hill around the henge monument at Avebury. More than 1000 hectares have been covered so far and a resolution of 12.5 cm. These big data have already helped to change the overall picture of the use of the landscape from early Neolithic times until the medieval period. The process of inclusion of already existing monuments into the landscape pattern, respect for existing monuments of religious character by later occupation will be explained during this presentation.

[155] *Chair*

Lueth, Friedrich [155] see Ruby, Bret

Lueth, Virgil [413] see Sternberg, Evan

Luin, Camilo [384] see Beliaev, Dmitri

Lulewicz, Isabelle (University of Georgia)

[34] *A Combined Bayesian and Zooarchaeological Approach to Understanding Local Histories of Socio-ecological Adaptation in Southwestern Florida, USA*

We present current research at the Pineland Site Complex (8LL33, etc.), a large shell midden-mound site in southwestern Florida occupied by the Calusa from around AD 50 up to historic contact. This well-preserved and well-studied archaeological site provides new insights into the relationship between subsistence practices of populations living along the Gulf Coast and the onset of the Little Ice Age (AD 1250-1850). In this paper we combine Bayesian statistical analyses of radiocarbon dates with zooarchaeological analyses of a recently excavated water-logged midden to provide a high-resolution view of what changes occurred during the Little Ice Age. Our research illustrates the potential of Bayesian analysis of multiple radiocarbon dates in combination with zooarchaeological analysis to provide insight into the relationship between the analyzed contexts and the larger site and environmental histories. Such micro-scale temporal perspectives are necessary in order to provide more detailed understanding of variations that occur within complex socio-ecological systems such as these.

[34] *Chair*

Lulewicz, Isabelle [70] see Pluckhahn, Thomas

Lulewicz, Jacob (Washington University in St. Louis)

[308] *Women's Networks and the Foundations of Mississippian Politics*

Mississippian societies were undoubtedly underwritten by networks of kin, clan, and other social relationships that are difficult to discern in the archaeological record. Structures of social networks provide contexts for social, political, and economic institutions and serve as conduits through which these institutions are generated, transformed, and maintained. We argue that a social network approach is uniquely appropriate to address themes of social relatedness in the archaeological record. We draw on continental, regional, local, and intra-community datasets to explore the social networks through which Mississippian peoples of Southern Appalachia forged identities, fostered communities, and mediated uncertainty. We focus in particular on a ceramic dataset from eastern Tennessee derived from whole vessels found in 79 burial contexts across 18 communities. We apply formal network analyses to dimensions of ceramic production and style to highlight both inter- and intra-community relationships indicated by distinct communities of practice and social signals. In doing so, we explore the social diversity among Mississippian communities and patterns of kinship that would have underwritten political institutions. These realms of social relatedness likely were solidified through women's networks and political participation, yet served as durable foundations of Mississippian sociopolitics more broadly.

[308] *Chair*

Lulewicz, Jacob [348] see Meeks, Scott

Lun, Casey [361] see Xie, Liye

Lunagómez Reyes, Roberto (Museo de Antropología de Xalapa-UV)

[411] *Jomon y Olmeca: Colaboración museográfica entre Japón y México*

Después de una exposición museográfica binacional entre Japón y México en los años 2010 y 2011, se ha podido consolidar una colaboración académica entre instituciones y universidades japonesas con el Museo de Antropología de Xalapa-MAX. Esta ponencia expondrá los logros académicos que han permitido tener una continuidad entre las instituciones mencionadas y las perspectivas, tanto de investigación de campo, así como de futuras exposiciones museográficas encaminadas a difundir y divulgar la importancia de las culturas tempranas de Jomon de Japón y Olmeca de México.

Lundin, Deil [208] see Diehl, Michael

Lundin, Deil and John Langan (AZTEC Engineering Group, Inc.)

- [357] *Digging the Tucson–Ajo Highway: Eight Years of Transportation-Funded Archaeology along Arizona State Route 86 and New Perspectives on Eastern Papaguería Prehistory*

The eastern Papaguería, a region of south-central Arizona, has historically not been the subject of intensive archaeological study due to its agricultural marginality, sparsity of large village sites, and lack of development that would prompt compliance-driven archaeology. Excavations sponsored by the Arizona Department of Transportation and Federal Highway Administration along Arizona State Route 86 between 2010 and 2018 have yielded some of the only available subsurface data pertaining to small sites in the area between the Tucson Basin and Western Papaguería. Portions of twenty-five sites were investigated; this paper presents a summary of the results. Late Archaic components were identified at some sites. The sites yielded evidence important to understanding mortuary practice in the period between A.D. 150 and 1450, including the first definitive evidence for cremation in the region and the existence of a cairn-burial complex that may have roots in the Archaic period. Previous interpretations of the region's prehistoric occupation have suggested temporary or transient use for seasonal resource procurement by the Hohokam occupants of adjacent riverine valleys. This concept is reassessed using the new data to suggest long term and/or more permanent occupation is likely to have characterized human settlement of the region during prehistory.

Lundquist, Lance [241] see Van Hoose, Jonathan

Lunniss, Richard [286] see Bythell, Abigail

Lunniss, Richard [314] see McEwan, Colin

Lunt, Sara [306] see Kimbell, Caroline

Luokkala, Brooke [82] see Coutros, Peter

Lupo, Karen [82] see Schmitt, Dave

Lupo, Karen (Southern Methodist University) and Dave Schmitt (Southern Methodist University)

- [415] *The Edible and Incredible Hare*

Zooarchaeological applications of the Prey Choice Model (PCM) are often based on the assumption that prey body-size is a robust proxy for prey rank and post-encounter return rate. In zooarchaeological assemblages, co-variation in the abundances of large and small-sized prey are often viewed as reflecting changes in foraging efficiency and are usually attributed to depressed encounter rates with large-sized and high ranked prey. But ethnographic and experimental studies show that hunting technology and techniques can greatly alter the efficiency and failure rates of hunting different prey. Using empirical data from several different ethnographic and ethnohistoric sources we show different hunting techniques used to procure leporids can be more reliable and productive than hunting certain large game. In the case of hares, noncaloric currencies such as sociopolitical gains and the thermal properties of hides may have also incentivized hunting these prey. We present archeological data from sites in the Bonneville Basin of western North America spanning the Holocene that show that leporids were more frequently targeted than larger-sized and presumably high ranked game, even when the latter were abundant on the landscape.

Luscier, Adam [11] see Murphy, Shayna

Luthman, Sarah (University of Oklahoma) and Meghan Dudley (University of Oklahoma)**[297] *Investigating a Shelter in Oklahoma Schools: Bringing Museum Artifacts into the Classroom***

In Oklahoma, giving K-12 students hands-on experiences with real artifacts can be challenging when collections are inaccessible in museum repositories. To make archaeology accessible to all students at the national level, Project Archaeology's Investigating Shelter (2009) for grades 3-5 supplements social studies and science curricula, using archaeological methods and anthropological themes to teach children about the past. The culminating activity of this unit is a hands-on module in which students place replica artifacts or pictures of artifacts onto a map of a real archaeological shelter and make inferences on the kinds of activities that occurred there. The Oklahoma Public Archaeology Network (OKPAN) has partnered with Oklahoma school teachers, descendant communities, the BLM, and Plains archaeologists to create a Project Archaeology module based on data and artifacts from a real archaeological site in Oklahoma. This work brings us one step closer to our goal of making local archaeology accessible to all students in their own classrooms.

Luze, Meredith [53] see Billeck, William

Luzzadder-Beach, Sheryl [63] see Krause, Samantha

Luzzadder-Beach, Sheryl (Department of Geography and the Environment, University of Texas At Austin), Timothy Beach (Department of Geography and the Environment, University of Texas At Austin), Colin Doyle (Department of Geography and the Environment, University of Texas At Austin) and Greta Wells (Department of Geography and the Environment, University of Texas At Austin)

[63] *Three Rivers Watersheds: Regional Water Resources of Northwestern Belize and Beyond*

This research seeks to understand the interconnections and interactions of the water resources of Northwestern Belize, via its contributing Three Rivers Watersheds. The Three Rivers Watersheds drain Guatemala, Mexico, and Belize via the Rio Azul/Blue Creek, Rio Bravo, and Booths River systems. These Three Rivers merge to form the Rio Hondo, the present-day Mexico-Belize Border. Beyond the Three Rivers, nearby watersheds include the New River and Freshwater Creek systems draining the coastal Plain of northern Belize. This portion of the karstic Yucatan platform belies a remarkably diverse and complex hydrologic and geochemical system that served the Ancient Maya in the past, and modern communities today. Our goal is to examine the connections between surface and groundwater resources in the central and southeastern portions of the Yucatan Platform in the Maya Lowlands, to better understand the regional hydrology serving Ancient Maya communities, and to understand the broader geologic contributions and influences to water chemistry, wetland formation, and water and land use.

Lv, Shaowu [389] see Wang, Jiaqi

Lycett, Mark (University of Pennsylvania) and Phillip Leckman (Statistical Research, Inc.)**[84] *'The Shape which all that which is Settled has is that of a Cross': Negotiating Inscription and Experience in the Sacred Landscapes of 17th Century New Mexico***

In the emergent social geography of empire, Franciscan missions were agents of spatial production as well as colonial establishment. Their foundation, form, and operation instantiated claims to and about society, dominion, and the culmination of history. These claims were forged within an already extant, meaningful, and ritually significant landscape defined by the dynamic experience of the region's Pueblo inhabitants and marked by a nested complex of ceremonially resonant features. Missionaries inscribed their own image of sacrality upon Puebloan ceremonial geographies, as embodied in distinct physical markers radiating out from the mission and its associated architectural complex. This paper explores these contingent and contested sacral landscapes through an examination of recent archaeological research in the Middle Rio Grande valley, with a focus on the Galisteo and Albuquerque-Belen basins.

Lydon, Scott [193] see Lucido, Jennifer

Lyle, Nichelle (Department of Anthropology, University of Cincinnati) and Kenneth Tankersley (Dept. of Anthropology, University of Cincinnati)

[47] *Vertebrate Response to Little Ice Age Climate Change in the Ohio River Valley*

This paper examines vertebrate species from Fort Ancient archaeological sites in the Ohio River Valley, which date to the Little Ice Age. They are compared to vertebrate species from archaeological sites, which predate the Little Ice Age and from modern contexts. The results of this comparison suggest that vertebrate species exhibited individual responses to climate change. The distribution of some species remained unchanged while others, such as bison exhibited dramatic changes in their bio-geographic ranges.

Lynch, Elizabeth [329] see Piven, Alix

Lynch, Joshua [249] see Goebel, Ted

Lynch, Joshua (Center for the Study of the First Americans)

[269] *Exploring the Function and Adaptive Context of Paleo-Arctic Projectile Points*

This paper presents the results of a large-scale experimental archaeology project investigating variability in the projectile point technologies of Upper Paleolithic Siberia and late Pleistocene/early Holocene eastern Beringia. A series of 36 projectile points (12 lanceolate bifaces; 12 composite slotted caribou antler points inset with chert microblades; 12 unslotted caribou bone points) reflective of the morphological variability observed in the Beringian archaeological record were created and tested as components of three weapon systems (atlatl and dart; hand-thrusting spear; bow and arrow) using an actualistic target. The use wear patterns generated by these controlled launches were documented macro- and microscopically, then compared to use wear observed on projectile technologies from archaeological assemblages across Beringia. Examining the range of morphological, technological, and functional variation observed in these projectile technologies tests hypotheses proposed to explain why radically different projectile technologies co-occur in the late Pleistocene/early Holocene Siberian and Alaskan archaeological records. Understanding the functions of these important artifacts can inform on the significance of assemblage variability in Siberia and Alaska, adaptive response to resource fluctuations, and landscape use across the region and through time. Ultimately, these experiments have significant implications regarding the colonization of Beringia and the Americas.

Lyons, Diane (University of Calgary)

[13] *Discussant*

Lyons, Keith [85] see Ramsey, Joshua

Lyons, Patrick (Arizona State Museum)

[21] *To Curate or Not to Curate: Legal, Ethical, and Practical Considerations at the Arizona State Museum*

The Arizona State Museum (ASM), at the University of Arizona, is the oldest and largest museum of anthropology in the southwestern United States and the largest and busiest non-federal archaeological repository in the country. ASM, as the state's official archaeological repository, is required to accept collections recovered from state, county, and municipal lands in Arizona. In deciding whether to accept other collections, ASM personnel must consider each offer in the context of the institution's legal mandates, the ethical principles that guide the fields of archaeology and museology, and the practical realities of space and funding. In this paper, the decision-making process at ASM is described and illustrated using examples of collections accepted and collections declined. ASM personnel strive for clarity and consistency in such processes by prioritizing optional acquisitions based on the institution's mission, its collecting focus, a collection's (or an object's) research potential, and ASM's ability to provide appropriate care and access in perpetuity.

[93] *Moderator*

[93] *Discussant*

Lyons, Scott (University of California, Berkeley)

[74] *Historical Ecology and Archaeometallurgy on the 5th and 6th century Osaka Plain*

Extensive excavation records and legacy materials provide ample opportunities for novel research in Japan. This project seeks to open and demonstrate new avenues of inquiry using legacy data and previously excavated materials related to well-studied topics by linking environmental change to the production of iron implements, a major topic in Kofun Period research. While paleoenvironmental data are regularly collected from Japanese excavations, environmental perspectives are rarely explicitly foregrounded in narratives of the Kofun Period, which usually focus on issues of political economy. Specifically, this project uses paleoenvironmental data published from the 1980s onward in conjunction with archaeometallurgical analyses of previously excavated objects to examine human impacts and management of the forest landscape during the middle and late Kofun Period Osaka Plain. This presentation focuses on analyses of forging slags excavated from the Ogata site in Kashiwara City and the Mori site in Katano City to clarify changes in forging practices over this time period, and ties them to landscape management practices and human impacts through a chaîne opératoire approach. These analyses indicate changes in fuel use as widespread changes in local vegetation occurred.

Lyste, Kerry [328] see Ferris, Jennifer

Lytle, Whitney (University of Texas at San Antonio)

[217] *Ritual Deposits within the Eastern Pyramidal Structure at Group D, Xunantunich – Belize*

Between the 2012-2016 field seasons, the Mopan Valley Preclassic Project conducted investigations of an eastern pyramidal structure (Str D-6) at Group D, Xunantunich. Group D is a sacbe terminus architectural group which is connected to Xunantunich's main plaza. The location of the sacbe suggests that Group D was part of an important ritual circuit. Over 5 field seasons, we have refined our understanding of the group's chronology and role within Xunantunich. During the course of excavations, several burials, ceramic deposits, and eccentric caches were discovered. Within this paper, we will discuss the architecture of structure D-6 as well as the analyses of materials within deposits and preliminary analyses of skeletal remains. Finally, we discuss how these deposits can help identify the group's overall function.

[217] *Chair*

Lyu, Peng (Institute of Archaeology, Chinese Academy of Social Sciences), Xiaobing Jia (Institute of Archaeology, Chinese Academy) and Yingxi Jin (Institute of Archaeology, Chinese Academy)

[361] *Human Behavior or Environmental Change: Zooarchaeological Research on Shell Midden Sites at Guanglu Island, China*

The zooarchaeological research on Xiaozhushan, Menhou and Wujiacun shell midden sites, which are located in Guanglu island, provides empirical materials to understand the transformation of animal resources acquisition patterns from fishing-hunting economy to livestock way. This paper analyses the reasons for the appearance of wild and domestic animals in Guanglu island and the internal relation between animal resources acquisition patterns and animal population structure. We consider that human behavior caused profound influences on the animal population as prehistoric people landed on this island about 7000 years ago.

Ma, Jian [78] see Tian, Duo

Ma, Kara (University of Toronto), Yongshan He (University of Toronto) and Chen Shen (Royal Ontario Museum)

[299] *The Mind of an Artisan in Early China: A Museum Collection Study*

This study aims to investigate the different ways artisans in early China (up to the 3rd century) learned their crafts, in order to better understand how certain types of artifacts such as pottery and bronze were made, and how new styles and designs emerged. In early China, craftsmanship was usually inherited through familial traditions or learned inside state workshops,

where skills and technologies were passed down in a relatively consistent and standardized way. However, new styles and designs also came into being. What might have motivated artisans to innovate or to follow convention, and where did they derive new inspiration? How did the style of a type of objects evolve over time? How were the skills and designs transferred among different mediums? What role did material agency play? This study intends to identify traces and types of learning of ancient artisans and to shed light on the interaction between artisans, material, and objects by examining artifacts from the Chinese collection at the Royal Ontario Museum (ROM).

Mabulla, Audax [154] see Grillo, Katherine

Maccarelli, Laura [39] see O'Neil, Megan

MacDonald, Brandi (University of Missouri Nuclear Research Reactor), Rudy Reimer (Departments of Archaeology and First Nations Studi), Catherine Klesner (Department of Materials Science and Engineering, U) and David Stalla (Electron Microscopy Core, University of Missouri)

[211] *Insights into Rock Art Pigment Provenance and Microenvironment at Ashlu Rockshelter, British Columbia, Canada*

Advances in microanalytical methodologies enable archaeologists to examine characteristics of rock art pigment and surrounding microenvironment to nanoscale resolution. The information gleaned through microanalysis is valuable for reconstructing archaeopigment preparation technologies and provenance, and to evaluate the condition and stability of rock art features. We present the results of a multi-method investigation of a mid-elevation, seasonally occupied rockshelter on the slopes of Nepti'il. The site dates to 1410-1460 cal BP with extensive rock art panels and is in the center of Squamish Nation Territory, British Columbia (Canada). Using a combination of techniques including SEM-EDS, XRD, and Raman spectroscopy, we have determined characteristics of paint preparation and stability, post-depositional alteration of pigment layers, and important micro-karstic features at the interface between rock substrate and panel. Moreover, we compare the elemental and mineralogical characteristics of the pigment to a database of previously analyzed local and non-local pigment sources and artifacts, and identify a probable candidate for the source of the raw materials used to make paint. We discuss the significance of our results in comparison to the other forms of material culture excavated from the site.

[341] *Discussant*

MacDonald, Brandi [389] see Klesner, Catherine

Macdonald, Danielle [116] see Williams, Nancy

Macdonald, Danielle (University of Tulsa)

[186] *A Space for Living and Dying: The Life-History of Kharaneh IV Structures*

The built environment delineates space for daily actions and important moments. Separating the occupants from the external world, walls can create barriers between the outside or can build communities within them. Recent excavations of two structures at Kharaneh IV, an Epipalaeolithic site in Eastern Jordan, provides a window into the life-history of the community by reconstructing the life-history of the buildings. Kharaneh IV's large size and dense artifact deposits indicate that it was a hunter-gatherer aggregation locale during occupation and a focal point for regional interaction. Situated at the edge of an extinct wetland, the inhabitants of Kharaneh IV used the structures for everyday actions and important rites of passage. In this presentation, we explore the life-history of the two structures, assessing changes in the use of space over time, to understand the changing lives of the people who aggregated at Kharaneh IV.

[186] *Chair*

Macdonald, Danielle [365] see Stemp, W. James

MacDonald, Douglas (The University of Montana)

- [147]** *The Role of Geomorphology and GIS in the Identification of Paleoindian Archaeological Sites at Yellowstone Lake, Wyoming, U.S.A.*

We discuss the role of geomorphology in identifying early Paleoindian archaeological sites at North America's highest-elevation natural lake, Yellowstone Lake, Wyoming. Prior research proposed geomorphological models for the ages of Yellowstone Lake paleoshorelines that mark former lake levels after Late Pleistocene glacial retreat. Based on results of 10 years of archaeological research at the lake, we confirm the accuracy of these paleoshoreline models and present a geographic-information-systems (GIS) predictive model for Paleoindian site locations. Results of an archaeological survey for Paleoindian sites along ancient shores of the northeastern portion of Yellowstone Lake indicate that the GIS and the paleoshoreline models are robust Paleoindian site location predictors.

- [61] Discussant**

MacEachern, Scott (Duke Kunshan University)

- [347]** *The Span of 'Slavery': Considering Systems of Domination and Labour in the Lake Chad Basin*

"The kings of the Sudan sell their people for no reason, and quite apart from any wars..." (Ahmad al-Ya'kūbī). The Lake Chad Basin was one of the anchor points of the trans-Saharan slave trade, through the millennium after al-Ya'kūbī wrote about the rulers of Kanem in the 9th century AD. This region had no equivalent to the gold-fields of West Africa, so that the trafficking of enslaved humans plays a central role in analyses of state development. However, the term 'slavery' seems inadequate to describe the variety of systems of domination and coercion historically subsumed under that rubric in the region: chattel and war slavery, sexual enslavement and forced marriage, capture and forced labour in egalitarian communities, and so on. This complexity continues to the present day, where rural groups say that children are periodically kidnapped for house labour and where the depredations of the Boko Haram insurgency have led them to be labelled hamaji, 'slave raiders'. This paper will consider material and historical evidence for the span of 'slavery' in the Lake Chad Basin, and particularly whether one explanatory model fits these varied phenomena.

MacFarland, Kathryn (School of Anthropology, University of Arizona)

- [127]** *Analyzing Similarity of Animal Style Art in Iron Age North Central Eurasia: A New Way to Study Continental Expression of Religious Symbolism*

Animal Style Art (ASA), an iconographic style expressed on monuments and material culture, is a geographically widespread phenomenon in north central Eurasia during the Iron Age (ca. 1,000 BCE – 100 CE). ASA analyses usually focus on stylistic difference or similarity. This poster reports an artifact-focused macro-scale (continental) study of ASA ($n = 4,633$ catalog lots), breaking down the elements of the style itself to holistically assess inter-regional expression. This discussion begins with an analysis of the diversity of the object types and associated proveniences included in this study, identifying limiting factors of inferences made from this dataset, assessed with Simpson's Diversity Index (Lyman 2008). The Raup Crick Index of Similarity (Raup and Crick 1979) is utilized to compare potentially similar occurrences of decorative attributes (i.e., stylistic elements as well as graphical content) common to two regions. A Geographic Information System is used to graphically illustrate the similarity score and give further context to inferred inter-regional relationships. This approach results in identification of a religious landscape among ten regions to varying degrees throughout the Iron Age. The methodology and line of inquiry described in this research reinvigorates study of ASA, a continental-scale iconographic phenomenon, and symbolic studies in general.

Machado, Juliana (Federal University of Santa Catarina) and Jozileia Daniza Kaingang (Federal University of Santa Catarina)

- [2]** *Women's Territorialities within Indigenous Societies in Brazil: Past Discourses, Present Relations*

The aim of this paper is to contribute to a still scarce reflection on the practices, their effects and meanings, of women within indigenous and traditional societies in their territorial processes, from interdisciplinary and collaborative perspectives. This research is sought to consolidate an already existing network of collaboration between historians, archaeologists, anthropologists, and indigenous and riverine women in an attempt to understand the practices, roles and processes of identification/recognition and representation conquered and attributed to indigenous women particularly in the contexts of training, use and maintenance of their territories. For the development of this research I will use three methodological approaches: the compilation and writing of biographies of women; analysis of ethnoarchaeological research data; and the systematization of archaeological, historical and ethnographic data published related to women and their relationship with

territoriality processes. The development of this research aims at diminishing the invisibility of women in historical, pre-colonial, colonial and present-day narratives in the Brazilian context, as opposed to their constant presence in myths and their importance in the forms of organization, leadership and indigenous social representation from the European conquest to the present day, particularly in territorial management, agriculture and the struggle for land.

Macias, Emmanuel [117] see Holsten, Jarrett

Macias Quintero, Juan Ignacio (UNICACH)

- [81] *Contacts before "Contact". Comments about the Interaction between Nomads and Sedentary Societies in Northern Mexico Desert Highlands*

This paper presents an analysis of the contacts process between sedentary farmers and nomadic groups who inhabited the Mesoamerican Northern Frontier, before the XVI Century. Archaeological previous research suggested that villages standing on the northern mesoamerican frontier, were used as outposts for contain nomadic raiders. However, we lack of data for support such conceptions. Besides, other studies underestimate the capabilities of nomadic groups for promote extraregional contacts. The contact studies might help us in to get a better understanding of changes developed in northern frontiers societies during the classic and postclassic period. Some of the consequences could affect the hunter gatherers organizational composition, the mobility, and the adoption of storage technology, and ancillary crops. Here I present the result of a recent study carried out in the Zacatecas highland deserts. The research analyzed open air camps, sherds, sediments, starch grains, and landscape, with the aim to assess and contrast the ideas expressed before. We hope contribute to increase our knowledge about the effects of interaction in hunter gatherer societies in northern Mexico before the Contact with Spanish and European societies.

Macias Quintero, Juan Ignacio [270] see Martinez De Luna, Lucha

Mackay, Alex [277] see Watson, Sara

MacKenzie, Mark [110] see Clark, Lauren

Mackie, Madeline [110] see Zarzycka, Sandra

Mackie, Madeline (University of Wyoming), Todd Surovell (University of Wyoming), Matthew O'Brien (California State University, Chico) and Robert L. Kelly (University of Wyoming)

- [368] *The La Prele Mammoth Site: A Clovis Mammoth Site with an Associated Campsite, Converse County, Wyoming*

One of the biggest sticking points in the ongoing debate about Clovis subsistence is the small sample size of human killed extinct megafauna. While just over a dozen terminal Pleistocene megafauna kill sites have been identified in North America, there are only two cases where campsites have been found in association with butchered extinct megafauna remains. The La Prele Mammoth site (48CO1401) is an approximately 13,000 year old Clovis site which contains the remains of a single Columbian mammoth (*Mammuthus columbi*). Recent excavations at the site have identified at least two hearth-centered areas associated with the mammoth processing area. These associated activity areas are consistent with domestic spaces as they contain a diverse tool assemblage, butchered bison remains, ocher, a bone bead, and bone needles. In the New World, domestic spaces have never been found in such close proximity to extinct megafauna remains. The identification of a campsite associated with proboscidean remains has implications for understanding cooperation and other activities which took place during megafauna butchery at the end of the last Ice Age.

MacLellan, Jessica (University of Arizona)

- [309] *Regional Variation in Preclassic Maya Household Ritual and Social Organization: Investigations at the Karinel Group, Ceibal*

Recent investigations at the Karinel Group, an early residential area at Ceibal, Guatemala, show that the roles household rituals played in the development of complex societies varied across the Maya lowlands during the Middle Preclassic period (c. 1000-350 BC). In northern Belize, rituals focused on ancestors increased social inequality among kin groups, beginning around the transition to sedentism. In other parts of the lowlands, including Ceibal, rituals on circular platforms constructed horizontal relationships within communities, counteracting public rituals carried out by a small number of specialists. At Ceibal, notable for its early ceremonial plaza and its connections to Chiapas and the Gulf Coast, household rituals had little in common with public ceremonies until the transition to the Late Preclassic period. At that point, across the lowlands, domestic ritual practices became more centralized and elite households became more involved in public ceremonies.

- [309] *Chair*

MacMillan, Vincent [190] see Palonka, Radoslaw

Macrae, Scott [300] see Iannone, Gyles

Macrae, Scott (Trent University)

- [300] *Water Management in the Land of the Terribly Hot: A Hydrological Study of the Bagan Settlement Zone*

Located along the Ayeyarwady river, in the dry-zone of Upper Myanmar, is an area once described as “the land of the terribly hot”, a land where the Classical Burmese capital of Bagan (11th to 14th centuries CE) is found. Home to over 4,000 monuments, a large and diverse population lived within the mixed urban-rural settlement zone. This paper will address how this successful city supported such a large population. While the monarchy controlled six major production enclaves across their kingdom, only a limited number of studies have addressed the local production capacity of this region. When considering the agricultural potential of this area, the question of water management comes to the forefront. Dominating this arid landscape is the Thetsoe-Taung range, a large string of mountains 11 km southeast of Bagan. Located at the base of this range is the Mya Kan reservoir, an important nexus for the dispersal of water across the Bagan settlement zone. In this paper, the water management strategy implemented across Thetsoe-Taung range will be discussed. Research will draw on the survey of numerous reservoirs, canals, and modified catchment zones. A preliminary understanding of this important water source, which ultimately supported the Bagan settlement, will be presented.

- [300] *Chair*

MacWilliams, A.C. [263] see Hard, Robert

Madeline, Ronald [37] see O'Mansky, Matt

Madrigal, T. Clegg and Suzanne Pilaar Birch (Dept. of Anthropology and Dept. of Geography, Univ)

- [368] *Archaeology and Stable Isotope Ecology of the Passenger Pigeon: Tracing the Prehistory of an Extinct Bird*

The passenger pigeon, once the most abundant bird in the world, became extinct barely a hundred years ago. It has been assumed that the passenger pigeon was equally abundant prior to the European colonization of North America, but some have argued that the bird was nowhere near as common in prehistory. Because so much of what is known is based on historical records and anecdotal accounts, a central problem is the lack of knowledge regarding the ecology and behavior of this species and the extent to which passenger pigeons were used by prehistoric Native Americans. We review the paleontological and archaeological record of the passenger pigeon and its interactions with humans throughout the United States and Canada. We also report the results of stable isotope analyses of passenger pigeon bones that provide additional information on their ecology and migratory behavior, as well as Native American seasonal subsistence patterns.

Madsen, Christian K. [251] see Harmsen, Hans

Madsen, Christian K. [251] see Smiarowski, Konrad

Madsen, Christian K. (Greenland National Museum/The National Museum of Denmark), Jette Arneborg and Ian Simpson

[269] *Farms of Hunters: Medieval Norse Settlement, Land- and Sea-Use in Low Arctic Greenland*

The Norse that settled in Greenland between c. AD 985-1450 depended greatly on the harvesting of local to regional Arctic marine resources for both subsistence and oversees trade. However, the mechanics and organization around this important marine economy have only left a limited imprint in the archaeological record, which is dominated by evidence of terrestrial farm- and shieling activities. The Winter is Coming Project (WiCP) considers long-term Norse settlement, organization, and land- and sea use in environmentally marginal parts of the Greenland settlements. Initial findings suggest that the Norse living in such areas managed by adjusting their farming and land use setup, and by relying on advantageous access to Arctic marine resources, i.e. becoming "marine farms." The study highlights the benefits of applying a social-ecological systems perspective across varying spatiotemporal scales, from single feature to regional settlement patterns. Only by asking "where, when, and for whom?" can we begin to explain complex, long-term human-ecodynamics, resilience, and sustainability in the past.

[91] *Chair*

Madsen, Mark [365] see Lipo, Carl

Maeyama, Kimberly [129] see Magoon, Dane

Maeyama, Kimberly (Defense POW/MIA Accounting Agency) and Megan Ingvoldstad (Defense POW/MIA Accounting Agency)

[129] *Creative Problem-Solving for Unconventional Conditions: Archaeological Recovery of a WWII Aircraft Crash Site, Ko'olau Mountain Range, Island of O'ahu, State of Hawaii, U.S.A.*

Conventional archaeological sites, with their relatively level topography and wide-open spaces to accommodate excavations, are not typically encountered by the Defense POW/MIA Accounting Agency (DPAA) Archaeologist. The majority of sites encountered by DPAA field scientists are better defined as unconventional, due to the extreme climatic conditions, steep terrain, as well as the often austere and remoteness of location. During the summer of 2016, recovery operations occurred at one such unconventional site: a WWII aircraft crash nestled high in Ko'olau Mountain Range, Island of O'ahu, State of Hawaii. This crash site is but one of the many examples of unconventional archaeological sites that are common to DPAA field activities. Extreme conditions experienced during this recovery include steep slopes, active waterways, extreme weather, helicopter support coordination, excavated soil management and processing challenges, all of which were performed in accordance with strict environmental protection requirements. Challenging sites such as this require DPAA field scientists to creatively problem-solve, relying upon strong applied archaeological method. This recovery operation illustrates the delicate balance achieved by DPAA field scientists in their pursuit of potential evidence at sites that do not meet the norm, while maintaining the high-scientific standard expected by the Agency.

Magargal, Kate [8] see Parker, Ashley

Magargal, Kate (University of Utah)

[35] *How Firewood Access Structures Settlement Patterns*

In desert environments resources are typically distributed heterogeneously. This variability required prehistoric humans to evaluate trade-offs over accessing spatially distinct patches. A potentially important and largely unexplored resource in these trade-offs is firewood. This work examines the distribution of archaeological sites along the watershed of the Dolores River of southwestern Colorado and southeastern Utah. Coupling a novel extension of the ideal free distribution model with

new archaeological survey data, I examine how the distribution of sites varies with inferred access to firewood, and other critical resources, including water and food. The results illustrate that foragers experience a spatially-imposed trade-off when optimizing settlement locations. The implications of this under-explored issue are addressed and future directions for research are discussed.

Magee, Shelby [315] see Hayashida, Frances

Maggi, Roberto [195] see Rellini, Ivano

Magness-Gardiner, Bonnie

[341] *Discussant*

Magoon, Dane [129] see Cosgriff-Hernandez, Meghan-Tomasita

Magoon, Dane (Defense POW/MIA Accounting Agency)

[129] *The Intersection of Multiple Conflicts: The Excavation of an F-4C Crash Site in the Midst of the Dien Bien Phu Battlefield*

Between 2014 and 2017, archaeologists with the Defense POW/MIA Accounting Agency (DPAA) excavated an active rice paddy in northwest Vietnam in search of two missing U.S. service members from the Vietnam War. The incident aircraft, an F-4C, was shot down on March 15, 1966 near the town of Dien Bien Phu. During the excavations, DPAA archaeologists recovered evidence of the incident aircraft and osseous remains, but they also unearthed evidence of trenches and barbed wire associated with a prior engagement that occurred in 1954. During the French IndoChina War, French and Viet Minh forces fought for control of this remote outpost. The siege lasted for almost two months before General Giap overran and defeated the French forces. The recovery efforts conducted by DPAA produced evidence reflecting both events, representing the intersection of multiple conflicts that occurred just over a decade apart. Using historic imagery and topographic mapping, Site VM-02293 was deconstructed to examine the relationships between the later aircraft crash event and the earlier battlefield landscape. The results supported the initial association of the osseous materials with the aircraft crash event. Ultimately, through additional forensic analyses, the osseous remains were positively identified as both missing American individuals.

[129] *Chair*

Maguire, Leanna (Kent State University), Briggs Buchanan (The University of Tulsa) and Metin Eren (Kent State University)

[67] *The Role of Isometric Scaling on Stone Projectile Point Durability: An Experimental Assessment*

The experimental study of stone projectile points created via flintknapping has shed light on issues of culture, penetration, durability, aerodynamics, resharpening, among several other topics. Here, we present an experiment that systematically assesses the role that isometric scaling, i.e., size, plays in stone point durability. Thirty obsidian projectile points were knapped by M. Eren, all virtually identical in shape, but differing in size. All thirty were hafted onto arrow shafts in an identical manner and shot in the controlled ballistics range of Kent State's Eren Laboratory for Prehistoric and Experimental Archaeology. Frequency of breakage, amount of breakage, shaft damage, and impact scar morphometrics were all recorded and compared against the recorded size of the point.

Mahan, Chase [89] see Van Etten, Heidi

Mahan, Chase**[218] *Sourcing a State: A Systematic Survey and Statistical Analysis of Wyoming Archaeological Assemblages of Lithic Raw Materials***

This pilot study will systematize the spatial distribution of lithic raw materials in Wyoming by using statistical methods. It revisits decades of curated assemblages from the University of Wyoming Archaeological Repository and places them on the geological landscape using GIS and cluster analyses. Through a systematic sampling strategy of the lithic raw materials within the collections, localities throughout Wyoming are tested to gain a greater understanding of this complex lithic landscape. Operating under the assumption materials common in lithic assemblages are more likely to occur close to site than rare materials, this study informs our understanding of how hunter-gatherers procured raw materials. Prehistoric peoples effectively acted as field geologists, collecting and curating raw material on the landscape. This preliminary analysis uses qualitative macroscopic attributes of numerous samples from across Wyoming and the substantial sample size allows for meaningful statistical analyses such as cluster analysis. Using the La Prele Mammoth site's lithic assemblage as a case study to test these methods reveals the utility of sourcing lithic artifacts, particularly in the Intermountain West where there is abundant lithic diversity with discontinuous source areas. It is an endeavor well overdue in a state with great geological diversity.

Mahar, Ginessa (University of Florida) and Kenneth Sassaman (University of Florida)**[70] *Stop Seeing Like a State: Relational Complexity among Small-Scale Societies of Gulf Coastal Florida (Who Routinely Gathered in Large Numbers)***

Interventions of modern nation-states in the affairs of “underdeveloped” nations often fail for imposing standard categories on highly variable and historically situated local practices. The same might be said about scholarship on “complex” hunter-gatherers. Rather than oversimplifying by imposing order vis-à-vis state-level criteria (e.g., institutions of government, social stratification, religion, subsistence), archaeologists have the opportunity to investigate organizational variation beyond social categorization. Doing so requires a logic based in “relational complexity,” a logic akin to heterarchy in its transient qualities and to a network in its multisited qualities. Beyond that, relational complexity invites consideration of nonhuman agents and nonlinear temporalities. In this regard, there are no complex hunter-gatherers as much as there are complex relationships of communities to other times, places, beings, and forces. To demonstrate such an approach, we look to a case study on the shores of the North Florida Gulf Coast, where large, temporary gatherings were structured synchronistically, involving the coordination of labor, specialized technologies, and the movements of persons, non-human agents, and celestial bodies within a ritually charged landscape. Rather than being a category or trait list, complexity was practiced by historically oriented, future minded, small-scale human societies.

Maher, Lisa (University of California Berkeley)**[186] *Built Environments of Epipalaeolithic Southwest Asia: A Life History of Place***

A place is structured and given meaning through human experiences at both individual and group levels. Places are created through repeated human action and made tangible in the landscape by material culture. These places become part of a built environment, marked by daily routines or habitus. At the 20,000-year-old aggregation site of Kharaneh IV in Jordan, the remains of several recently excavated hut structures provides insight into the creation and maintenance of place. Exploration of the life histories of these structures, including their construction, maintenance, and the organization and differential use of space is provided by a microstratigraphic analyses of their deposits and associated material culture. In-depth study of the traces of human activities—as activity areas, taskscapes, life histories, object and sediment (or even place) biographies—left behind by daily practices yield high-resolution data on these structures as economically, socially and symbolically-charged spaces and provide insight into how people organized their world, creating a life history of place, or ‘storied landscape’. At Kharaneh IV the life histories of hut structures, as told by pairing geoarchaeological (micromorphological) and artifact datasets, provide a glimpse into the lives woven into and around these places as integral to the construction of hunter-gatherer communities.

[13] *Discussant*

Maher, Lisa [186] see Macdonald, Danielle

Maher, Ruth (William Paterson University), Lindsey Kemp, Nicole Burton (Bradford University), Julie Bond (Bradford University) and Steve Dockrill (Bradford University)

[251] Geo-referenced Spatial Data Analyses on Coastal Erosion Sites: The Final 3D Examination of the Pictish Smithy at the Site of Swandro, Orkney Islands

Coastal erosion sites contain the same complexity as any other sites, however, the sequences are often truncated and the recovery conditions require adaptive approaches. During the summer of 2018, the excavation of Structure 3, the 'Pictish Smithy', concluded. Here we present the final report on the 3D spatial analyses of Structure 3. Data was collected using a total station and PenMap, photogrammetry, and 3D laser scanning focusing on artifact and soil residue (XRF) locations and distributions as well as structural elements. Using GIS to explore the varied spatial relationships of this complex deposition sequence, this paper presents the final results of the micro-analysis of a single Late Iron Age structure and the potential for future integrated, on-site spatial management.

Mahoney, Gosia (University of Nebraska - Lincoln), Paul Hanson (University Of Nebraska - Lincoln) and Dawn Bringelson (Midwest Archeological Center)

[45] Understanding Archaeology in the Dunes: OSL Dating of the Tolleston Beach at Indiana Dunes National Lakeshore and Its Implications for Interpreting the Archaeological Record

The puzzling scarcity of archaeological sites on the Tolleston Beach at Indiana Dunes National Lakeshore prompted an investigation into the development of this dune field in an attempt to determine whether the distribution of known archaeological sites is governed by ancient human behaviors, or influenced by its dune setting, which can affect site preservation and discoverability. In order to accurately understand patterns of past human occupation, it is important to know the timing and extent of dune reactivation, specifically, whether it was frequent enough to influence settlement patterns in the past or if it was extensive enough to disturb archaeological deposits later on. Soil samples collected from shovel test pits and from vibracores on the crests of two compound parabolic dunes were dated using Optically Stimulated Luminescence to refine the chronology of the Tolleston, determine the age of near surface deposits (those accessible to archaeologists using standard field methods), and to evaluate the validity of applying those methods in this environment. The benefits and challenges of using OSL dating in archaeological contexts are also discussed.

Mahoney, Maureen (Seminole Tribe of Florida THPO), Dave Scheidecker (Seminole Tribe of Florida) and Paul Backhouse (Seminole Tribe of Florida)

[19] Distrust Thy Neighbor: Examining Reservation Period Camps through Tribal Archaeology and Story Mapping

The most recent history of the Seminole Tribe of Florida (STOF) and its settlement on Federal Trust land is little understood. Settling onto the various reservations in the 1930s, community members organized the layout and location of their camps based on sociohistorical beliefs stemming from a distrust of their new American neighbors counterbalanced by the need to rely on reservation period infrastructure and access to commodities and services. These historic settlements are noticeable in the bottles, tin cans, and other remnant artifacts, but contain a much more powerful history with the addition of oral histories of the community members that took part in these early reservation settlements. Noting the shifts in camp location and organization over a broad period tells a story of important community functions and the evolution of the reservations. The various locational and content changes of these settlements are recorded by the Tribal Historic Preservation Office (THPO), who then uses Geographic Information Systems (GIS) to draw together the oral history and archaeological information in the telling of these important stories.

Mahoney, Meredith

[262] Mapping Lithic Surface Scatters with Drones

Combining traditional archaeological methods such as pedestrian survey with unmanned aerial vehicle (drone) mapping creates an opportunity for efficient data capture and analysis of the scale and spatial arrangement of archaeological sites. This poster presents a cost-effective approach to surveying and mapping surface scatters and illustrates how the application of this method at a Great Bend Aspect settlement site in Arkansas City, Kansas informs our understanding of domestic and agricultural space across the site. I also discuss how the process and results of this project each generate powerful opportunities to engage the public on the issues of site stewardship and looting.

Mahoney, Nancy (Montana State University)**[184] Stewardship and Community Outreach on the High Plains**

This paper assesses the present and historical role of outreach and collaboration with collectors in Montana. Understanding the historical context of interactions between professional archaeologists, amateurs, tribes, and the public is an essential foundation for the creation of effective education programs that achieve meaningful archaeological learning. This presentation will pay particular attention to the distinction between archaeological practice and outreach education as it pertains to public versus private lands in Montana.

Maier, Zach [119] see Renteria, Bernardo

Maigret, MaryAnne (National Park Service), Lori Miculka (National Park Service) and Erin Coward (National Park Service)**[46] Managing an Eroding Coastal Site at Pu'uhonua o Honaunau National Historical Park**

Perched sand deposits and pocket beaches dot the shoreline at Pu'uhonua o Honaunau National Historical Park on the island of Hawai'i. Keone'ele Cove, situated along the northern boundary of the park, is a key part of the cultural landscape where Hawaii's ruling class landed canoes and hosted gatherings, and where native Hawaiians continue these practices in ceremonies and park programs. Since the 1960s, the park has managed coastal erosion through limited beach nourishment and small-scale erosion control devices, and preservation of historic masonry seawalls. Archeological excavations in 2008 and 2009, as well as post-tsunami recovery work in 2011, confirm the presence of a mostly well-preserved cultural deposit in the sands of Keone'ele Cove. C14 samples yielded dates from as early as 1650 AD. Although the site is protected from visitor disturbance, it continues to be affected by erosion; impairment of this resource is a great concern. A combined cultural/natural resources study will formalize monitoring at the site to include photogrammetry, continued ground-based LiDAR scanning with comparative mapping, investigation of overall sand budget and sediment transfer dynamics, and propose both short-term and longer term strategies for stabilizing and preserving this important site.

Mailler, Mary and Spencer Mitchell (UC Santa Barbara)**[114] Satellite Imagery and Esri's ArcGIS Pro's Georeferencing Tools Confirm Arkansas City, Kansas Is the Locale of Etzanoa, a Historic Site Visited by Spanish Explorer, Juan Oñate, in 1601**

Using Esri's ArcGIS Pro's georeferencing tools to rubber-sheet a historic native map to satellite imagery confirms Dr. Donald J. Blakeslee's findings (2018) regarding a site located near the mouth of the Walnut River, in Arkansas City, Kansas. The site is likely the native town, Etzanoa, a settlement of the Ancestral Wichita and Affiliated Tribes visited by the Spanish explorer, Juan Oñate, in 1601. After rotating the Miguel Map 90-degrees clockwise and after applying Esri's georeferencing tools to adjust its scale, we determined its major geographic features aligned closely to those featured in satellite imagery taken of the Walnut and Arkansas Rivers of Kansas and Oklahoma respectively. Further, a second map of the area contemporary with the Miguel Map produced by the royal Spanish cartographer Enrique Martinez, when assessed with the same Esri georeferencing tools and satellite imagery, also supports Blakeslee's proposed location of Etzanoa and other nearby associated sites as dispersed along the Walnut and Arkansas Rivers. Upon a final review of the alignments between the maps and the corresponding satellite imagery, we concur; the proposed site for Etzanoa as Arkansas City, Kansas, near the mouth of the Walnut River is well supported.

Mainland, Ingrid [31] see Szabo, Vicki

Maitland, Brian (Fort Lewis College)**[8] Molecular Characterization of Pine Pitch on Treated Water Vessels in the Four Corners Region**

The use of pitch to coat historic water vessels represents the complex relationships between indigenous peoples and native plants in the American Southwest. Chemical analyses and comparisons were conducted with the intention of sourcing the pitch coating to a specific conifer species. Ponderosa (*Pinus ponderosa*) and Piñon (*Pinus edulis*), two species of the Pinaceae family, are the most common materials in the region for water vessel application. In order to distinguish these two species and other conifers that could have been used for the sealant, we compared raw materials with samples of pitch

coatings taken from historic water vessels and analyzed them via gas chromatography-mass spectrometry (GC-MS). The results allowed us to identify key molecular differences in the 46 pitch samples and identify similarities between the 14 taken from treated baskets. The results of the GC-MS analysis were then compared to eight pitch samples harvested from local trees, to identify past coating processes. The comparisons resulted in the species level identification of the pitch used for treating water vessels in the Four Corners Region. The preliminary results of the GC-MS analysis have led to a consistent molecular footprint for the applied pitch across multiple cultures of the Southwest.

Maki, David [104] see Mather, David

Maki, David, Timothy Matney (University of Akron), David Perry (University of Akron), Linda Barrett (University of Akron) and Lopa Afrin (University of Akron)

[262] Testing Geophysical Anomalies Using In Situ Shallow Subsurface Spectroscopy and Soil Magnetic Susceptibility Analysis

In 2015 the National Park Service's Archaeological Prospection Workshop was held at the Tobias Site (14RC8). Students and instructors evaluated the site using a variety of non-invasive prospection methods ranging from landscape-level LiDAR analysis to high sample density subsurface geophysical survey. The evaluation identified buried features and patterning within the site along with previously unknown components of the site. In 2016 geophysical anomalies identified during the workshop were tested using a Veris Technologies P4000 instrument which obtains soil spectra in the visible/near infrared region (350-2250 nm), electrical conductivity, and insertion pressure. The P4000 is a mobile probe that is pressed down into the soil up to a 1-meter depth. A 3-D array of spectra is obtained on a north-south and east-west grid. Representative soil cores were also collected during the study for chemical and magnetic susceptibility analysis. This poster will present the spectral, magnetic and chemical results by combining the data using chemometric analysis, which will correlate these data sets and use them to build a 3-D model of buried archaeological features.

Maksudov, Farhad [183] see Bullion, Elissa

Maldonado, Blanca (El Colegio de Michoacan, A.C.), Patricia Castro (El Colegio de Michoacán, A.C.) and Peter Tropper (University of Innsbruck)

[39] Experimental Investigation of Primary Copper Smelting in Central Michoacan

Copper was the main metal produced and worked in Mesoamerica, but data for pre-modern primary production and processing remain elusive. Systematic research at Itzíparázico, a Late Postclassic location in Central Michoacán, Mexico, has located evidence of copper production areas where significant amounts of smelting slags were found. Mineralogical and chemical investigations of slag samples indicate that the production activities carried out at the site involved primary chalcopyrite smelting, and revealed a sophisticated smelting method, possibly involving the use of furnaces properly designed and built to provide reducing conditions during the refinement of copper ores. The present work discusses recent research involving experimental smelting of copper ore (chalcopyrite) and the ensuing production of slag, followed by a comparison between the microstructural, mineralogical, and chemical characteristics of the archaeometallurgical finds and the experimental residues. A set of experimentally produced samples, have been chemically characterized using electron probe microanalysis (EPMA). The results obtained thus so far yield bornite + pyrrhotite during roasting and Cu droplets in a glassy matrix of olivine + glass during smelting, similar to the features found in archaeological slags. This research will allow the development of a model for the Late Postclassic Tarascan process of copper production.

Maldonado, Jesus [368] see Hofman, Courtney

Maldonado, Ronald (Westland Resources)

[17] Long Days Journey into Night: Collaboration and Research on The Navajo Reservation

Since the late 1800's starting with Washington Matthew, The Navajo People, ('Dine') have been asked to share their traditional stories and life styles. Research was never collaborative and always reinterpreted by others to suit their world views. Archaeology, ethnography and medical research was at the mercy of the person collecting the data and their personal views of how the data fit the academic norm. That changed in the Navajo Nation in the early 1990s. The Navajo

Nation Council created the Navajo Historic Preservation Department, and the Navajo Human Health Review Board (aka the Institutional Review Board, IRB) both decisions influenced how research was conducted within the exterior boundaries of the Navajo reservation. Two projects were initiated, the first a coal mine expansion that interrupted archaeology, and the second the protection of a sacred site on the Navajo Reservation claimed by the Hopi Tribe. Both projects showcased collaboration, community involvement, and most importantly the views and beliefs of the Dine.

Maldonado Vite, María Eugenia (Instituto Nacional de Antropología e Historia /México) and Kim Richter (Getty Research Institute)

[76] *Textile Tools and Technologies from the Postclassic Huasteca: Artistic and Archaeological Evidence*

During the Postclassic period, the Huasteca region along the northeastern Gulf Coast was an important producer of textiles made of zapupe (the local name for ixtle, that is, agave or yucca plant fibers) and especially cotton as evidenced in early colonial manuscripts, such as the Codex Mendoza and Los Lienzos de Tuxpan. Although to-date no significant Postclassic textiles from the Huasteca have been found archaeologically, this paper examines the visual representations of textiles and knotted strings that are parts of garments (like belts or armbands) in sculptures, murals, shell ornaments, and codices. This artistic evidence will be systematically analyzed to identify types of garments, patterns and ornamentations of textiles, and styles of knots. We will also examine the archaeological context from new excavations in the southern Huasteca, especially spindle whorls and organic materials. The analysis of the size of spindle whorls may indicate what fibers were used. Moreover, these archaeological remains will be compared to textile tools found in other parts of the Huasteca. We argue that the artistic and archaeological record supports sixteenth-century historical evidence that the Huasteca was a significant textile producer that increased production to fulfill the tribute demands of the Triple Alliance.

Malhi, Ripan [109] see Yarlagadda, Karthik

Malhotra, Andrew (Indiana University of Pennsylvania)

[169] *Alliance Formation & Social Signaling: Village Interaction among the Monongahela*

A general trend among many societies has been the growth of political complexes, and thereby alliance formation. New studies on the Monongahela culture, such as those undertaken by Dr. William Johnson and David Anderson (2002), seek to define the growing political complexity of the Monongahela during the Late Monongahela period (A.D. 1580-1635). This research expands on their ideas and Dr. John Nass's that the Monongahela, during the Late Monongahela period, were not just growing in political complexities within sites, but that they were also forming alliances across multiple sites. This study seeks to understand how scalloped lip ceramics and charnel houses can provide the key data to examine the formation of alliances and village interactions. The data used for this study is constructed through the analysis of scalloped lip ceramics that appear in Monongahela sites during that period. Using the concept of social signaling to show how scalloped lip ceramics, Charnel houses and evidence of the associated feasting and social inequality, may be used as an indicator of alliance formation. Spatial analysis of the data will be used to create a broad picture of village interactions during the Late Monongahela period, including a statistical analysis.

Mallol, Carolina [321] see Cooper, Aspen

Mallol, Carolina

[417] *Chair*

Mallouf, Robert (Center for Big Bend Studies) and Erika Blecha (Center for Big Bend Studies)

[396] *Black Rock Mortuary Cairn: A Case Study of Archaeologist–Collector Collaboration*

An unusual and highly significant Late Prehistoric mortuary feature in eastern Trans-Pecos Texas was discovered in 1992 by a group of relic collectors who carried out an uncontrolled excavation. The feature, which contained 7-9 human interments and over 500 associated objects, consisted of a circular, 6.0 m diameter stacked rock cairn on the summit of a sandstone ridgeline in the Pecos River drainage system. Cognizant of its scientific importance, the collectors eventually contacted the Texas Office of the State Archeologist concerning their discovery, thus initiating what would prove a complicated archaeologist-collector interaction with the ultimate goal of salvaging as much data as possible from the

destroyed cairn. Findings from the study are summarized, and the pros and cons of such collaborative efforts within the context of recent SAA deliberations are addressed.

Malo, Erika (Project Archaeology)**[184] Building a Stronger Network: Assessing and Reconfiguring a National Archaeology Curricula Delivery Program**

Project Archaeology, a national archaeology education program, relies on a diverse network of educators, museum professionals, and archaeologists certified as Master Teachers. Master Teachers provide nationwide professional development on the implementation of Project Archaeology's curricula. Master Teachers are trained through a weeklong program in Bozeman, Montana, called Project Archaeology Leadership Academy (PALA). The application process for PALA is highly competitive and participants receive food, lodging, and a travel stipend to attend. In return, participants agree to employ a good-faith effort to offer professional development once a year for four years. Offering professional development helps fulfill Project Archaeology's mission, distributes high-quality archaeology educational materials, and ensures the sustainability of the organization. In 2018, a voluntary survey was conducted of participants from every PALA class. The survey evaluated programmatic effectiveness, strengths, weaknesses, and inquired about any suggested changes. The results will be used to make modifications to the application process, training procedures, graduate incentives, and support offered to graduates. These changes will help ensure that Project Archaeology is as effective and efficient as possible while remaining on the forefront of archaeology education.

[184] Chair

Malott, Jillien [89] see Hernandez, Stevy

Malpass, Michael (Ithaca College)**[54] Archaeological Identifiers of Cultural Affiliation: The Case of the Middle Horizon(?) Site of Sonay, Peru**

The site of Sonay in the Camana Valley of southern coastal Peru was originally identified as a Wari-affiliated site, based on the close architectural similarities of its major structure to other Wari imperial sites. The two original radiocarbon dates from below the structure suggested an occupation at the very end of the Middle Horizon, long after it is thought influence from major Wari centers had disappeared. The lack of diagnostic ceramics confused the original interpretations, though the limited excavations were thought to be the cause of this issue. A later date for the structure, also from beneath the floor, suggested a Late Intermediate Period date. This paper will consider the problem of dating sites on architectural versus radiometric means, and come to a resolution of when this site was actually occupied, and by whom.

Man, Xingyu [389] see Yang, Shiyu

Mandel, Rolfe (Kansas Geological Survey)**[312] Revisiting Julie K. Stein's "Archaeological Sediments in Cultural Environments": The Nexus Between Lithostratigraphy and Geoarchaeological Research in the Great Plains and Central Lowlands, USA**

In her seminal 2001 book chapter, *Archaeological Sediments in Cultural Contexts*, Julie Stein emphasized that identifying and characterizing sedimentary deposits at archaeological sites is crucial to understanding the geologic context of the cultural deposits as well as site formation processes. Archaeologists have taken heed of Julie's advice and broadened their interest from just the artifacts to include the depositional history of the artifacts. This approach requires an interpretation of the history for all sediment comprising each deposit, including the sediment source, transport agent, depositional environment, and post-depositional alterations (especially soil formation). In this paper, the application of lithostratigraphy in geoarchaeological research is offered as a powerful tool for interpreting the depositional history of sediments and artifacts, and for determining where cultural deposits are likely to occur in buried contexts. Quaternary-age lithostratigraphic units are easily recognized and defined in the field on the basis of observable sediment characteristics, such as color, texture and carbonate morphology. Examples of geoarchaeological studies that employed lithostratigraphy at the site-specific and regional scale in the Great Plains and Central Lowlands are presented.

[366] Discussant

Man-Estier, Elena [403] see Naudinot, Nicolas

Manfio, Stefania (Stanford University) and Yann von Arnim (Mauritius Museums Council & Mauritius Marine Conse)

[347] Maritime Archaeology and Slavery in Mauritius: Le Coureur Shipwreck

Analyzing slavery through the lens of shipwrecks makes a significant contribution to the understanding of labor migration. However, beyond the labor diaspora, there are social dynamics that can be viewed through maritime heritage. The 'vessel', the ship itself, was a vehicle of culture contact and the study of the artefacts found in the shipwreck can give us significant information on the life at sea, and the relationships on-board. As a result, maritime archaeology provides evidence for the movement of people, while narrating the voyage into slavery, and what captives endured during this terrible transformation. Mauritius is a very special case study. The presence of an extraordinary number of wrecks, over 800, demonstrates the great potential of this island. Especially notable is the investigation of Le Coureur shipwreck, a lugger built in 1818 in Grand Port and sunk in 1821 with a cargo of about 100 slaves from Zanzibar. The sinking of Le Coureur off the Mauritian coast marks the true ending of the slave trade to this island. Accordingly, exploring the social, craft, and biographical aspects of this shipwreck contributes important new evidence and helps contextualize the period of slavery in this part of Africa.

Manin, Aurelie (University of York), Camilla Speller (University of British Columbia) and Michelle Alexander (University of York)

[419] From North America to Europe: Preliminary Biomolecular Results Regarding the Transatlantic History of the Turkey

While there is a growing body of studies on turkey domestication and use in North America, many questions remain unanswered regarding its introduction to Europe and its subsequent breeding. Which populations of turkeys were imported in Europe and when? How fast did they spread in the Old World? How did they integrate the pre-existing breeding economy? Through the application of a set of biomolecular approaches (archaeogenomics, peptide mass fingerprinting (ZooMS) and stable isotopes), this presentation explores the challenges in understanding the transatlantic history of the turkey. According to historical accounts, the turkeys were imported to Spain, from Mexico or Central America, in 1511. Through the mitochondrial DNA analysis of archaeological turkey bones dated from the 16th to 19th century, we evaluate the relationship between European turkeys and the different American populations to pinpoint their geographic origin. Stable isotopes from bone collagen allow us to identify a shift in turkey diet, consistent with their adaptation to the European poultry husbandry system. Finally, we highlight the difficulty of turkey bone identification in European assemblages due to the presence of different galliforms of similar size and introduce the use of ZooMS to improve species identification.

Manin, Aurelie [419] see Speller, Camilla

Mankel, Magda

[421] Walking the Migrant Trail: Mobilizing Landscape to Contest Border Enforcement Policies and Negotiate the Boundaries of Social Belonging

This paper presents an archaeological ethnography of the Migrant Trail and a very recent past associated with the militarization of the U.S.-Mexico border. Composed primarily of U.S. citizens, the Migrant Trail is a seven-day walk that protests U.S. immigration and border enforcement policies and commemorates migrants who died in their attempt to cross the Sonoran Desert. Using a critical heritage studies perspective, I explore what role landscape plays in remembering migrants, coming to terms with violent government policies, and re-bordering the boundaries of social belonging as they apply to migrants. Understanding how members of receiving democratic societies mobilize landscape to negotiate the meaning of national boundaries and protest violence is crucial if we are to work towards a more just future.

Mann, Evan (The Graduate Center, CUNY), Aida Romera (The Graduate Center, CUNY), Roland Tremblay (Ethnoscop Inc.) and Karine Taché (Queens College, CUNY)

[168] There Were Pots After All: Production and Use of Ceramic Vessels in the Upper Laurentian Region of Québec, Canada

Nomadic hunter-gatherer populations of the Eastern Subarctic were once thought to have largely rejected or ignored pottery technology. The archaeological recovery of ceramics at several sites north of the St. Lawrence Lowlands over the past few

decades has passed the status of anecdotal finds and seriously challenges this assumption. Questions remain, however, about the origins, production and use of these containers. Here we present recent ceramic data collected in the Upper Laurentian region of Québec (Canada) combining typological, technological, and organic residue analysis. This is part of a larger research project investigating how Northern Algonquin populations negotiated their identities through foods and foodways in the face of intergroup contacts and technological innovations.

Manne, Tiina (University of Queensland)**[415] Risky Business? Prey Choice in Pleistocene and Holocene Northern Australia**

Although archaeofaunal assemblages from northern Australia are limited, records indicate an early adoption of “broad-spectrum” diets. Inland, key prey items consist of small- to medium-sized mammals and reptiles, with large kangaroos being exploited less frequently. On the coast, shellfish, fish and marine turtles are featured alongside smaller-sized terrestrial prey. Published ethnographic data from the Western Desert has previously noted that prey size does not adequately predict rank, and that pursuit costs appear to play a more important role. Large kangaroos, for example, were viewed as a particularly risky enterprise, especially when suitable technology for capture had been left at home. In this paper, I examine new data from Pleistocene and Holocene faunal assemblages from northern Australia, and explore how animal behaviour may have affected prey rank.

[415] Chair

Manney, Shelby [75] see Gregory, Teresa

Manney, Shelby (Joint Force Command - U.S. National Guard)**[75] An Overview of Historic Preservation and Cultural Resource Law and Practice: Moving Beyond the Limitations of the Regulatory Environment**

The development of preservation laws and regulations spawned a new era and direction for the understanding of human culture. In the United States, the field of cultural resource management and the associated regulatory environment transformed the research fields of archaeology and historic preservation from explorations of the human past to mitigations of potential impacts to the human past. Once spawned by economic collapse with the great depression, WPA citizen archaeologists have been supplanted by Government and Tribal Preservation Officers and the rise of Cultural Resource Management firms to facilitate the implementation and execution of National and localized laws and regulations. With the subsequent increase in social and economic stability, the intersection between environmental and preservation laws have forced many research archaeologists and historians to the forefront of the rapid expansion of the human footprint across the United States. It is up to us to leverage the interdisciplinary aspects, laws, ethics, and practices to ensure we continue to preserve, understand, and document our shared human heritage for future generations.

[282] Discussant**[75] Chair**

Mannheim, Bruce [18] see Kosiba, Steve

Manning, Sturt**[73] Radiocarbon and Historical Archaeology in Iroquoia: Bringing Near-Calendar Dating Precision to Iroquoian Chronology with Radiocarbon – Methods, Issues and Potential**

This paper outlines the aims and methods of the Dating Iroquoia project by which we propose to achieve calendar chronological precision from radiocarbon for Iroquoian sites at, or better than, the level of individual settlement spans – i.e. calendar resolution at the level of approximately one to two decades. The focus is on careful sample selection, high-resolution radiocarbon dating, and then deploying suitable analytical approaches – especially appropriate Bayesian chronological modelling. Some case studies from initial work are presented and worked through which demonstrate issues and the potential: both in terms of independently evaluating (and quantifying) assumed temporal site sequences based on typological criteria, and in terms of supporting or questioning existing dates (and thus underlying assumptions). A

radiocarbon-based time frame for Iroquoia indicates a new history and a need to re-evaluate a number of existing assumptions.

Manning, Sturt [81] see Turkon, Paula

Mantha, Alexis (Champlain College, Saint-Lambert)

- [18] *Contrasting Use of Space among Neighbors: Puna versus Quechua/Suni Residential Settlements of the Rapayán/Tantamayo Region during the LIP*

Late Intermediate settlements in the Rapayán/Tantamayo region are distributed in two main ecological zones: quechua/suni between 2500 to 3900 m.a.s.l. and puna above 4000 m.a.s.l. The majority of residential sites occupy the quechua/suni ecological zone. These settlements display a fairly homogeneous architectural distribution with one or two multi-story buildings in the upper section, several individually organized house structures in the center, and a number of small chullpas in the lower-end. The puna settlements, on the other hand, consist mainly of fortified sites with no or just few house structures. A handful of them however were densely populated. The 22 hectares puna residential site of Winak for instance, displays similar architectural types as those observed in the quechua/suni residential settlements, but their spatial arrangement on the site differs markedly. For example, the houses are organized in groups around common patios, the chullpas are in the center of the settlement and delimited by a massive wall, and the multi-story buildings are in the lower part of the site. In this presentation, I discuss the social, political and ideological implications of these distinct spatial architectural layouts among quechua/suni and puna residential settlements.

Mantilla Oliveros, Johana Caterina

- [421] *Contesting Dispossession. Marronage's Mobility and the Emergence of a Landscape, 17th and 18th Century, Colombia*

Access to land is still a problem in Latin America and the Caribbean (as well as other places, mostly located in the global South). In that context, the landscapes and our analysis of them are directly crossed by power relations, conflict, the creation of borders, contestation of hierarchies, etc. The current landscape of the maroon community of San Basilio de Palenque and its surroundings, at the north coast of Colombia is full of historical and present marks of contestation. Its inhabitants (black communities, mestizos and indigenous) have been suffering for centuries the different types of displacement and dispossession. In this paper, I will present some of the results of my doctoral research related to the Maroon's mobility and the reshaping of the landscape in 17th and 18th centuries. I will argue that despite the many attempts of the Spaniards, the Maroons gained access and controlled the land successfully. Finally, I will offer some additional considerations regarding the political dimension of our interpretation of landscapes. This case shows that those "scars" are not "in the past" but "in the present", re-shaping lives, memories and still offering possibilities of contestation for the actual inhabitants of the region.

Manyanga, Munyaradzi [24] see Chirikure, Shadreck

Manzano, Bruce (University of Kentucky), David Pollack (University of Kentucky), Gwynn Henderson (University of Kentucky), Andrea Erhardt (University of Kentucky) and Jordon Munizzi (University of Kentucky)

- [419] *Fox Farm, a Large Fort Ancient Village in Mason County, Kentucky: Evidence of Turkey (*Meleagris gallopavo*) Management?*

Investigations of wild turkey (*Meleagris gallopavo*) remains from archaeological sites in Central America and the American Southwest have generated new data about the management and domestication of this species. We applied the methods used in those studies to our analysis of a large sample of wild turkey bones recovered from Middle to Late Fort Ancient (A.D. 1300-1650) deposits at Fox Farm (15MS1), a large, intensively occupied Fort Ancient farming village situated on an interior ridgeline in northern Kentucky. Our study seeks to understand how and why the residents of Fox Farm lived in this setting for such a long time. Our data show that site residents were taking immature turkeys and egg-laying females. Unlike at most sites, however, where relatively equal numbers of males and females are present, the Fox Farm assemblage contains twice as many males as females. These patterns are discussed with respect to what insights they reveal about the potential management of turkeys by Fort Ancient people. Evidence for turkey management would fit into a broader emerging model of the active management of key natural resources in the area surrounding the Fox Farm site.

Marcos, Jorge**[314]** *Discussant*

Marder, Ofer [95] see Yegorov, Dmitry

Marean, Curtis [32] see Smith, Eugene

Marean, Curtis (Arizona State University)**[368]** *A Model of the Extinct Palaeo-Agulhas Plain Ecosystem in Southernmost Africa*

Unlike some regions, Africa was not subject to massive and abrupt mammalian extinction events in the Late Quaternary, but some African regions were subject to abrupt extinctions of small numbers of species. The coast of South Africa records such an extinction event near the Pleistocene and Holocene boundary. These extinct species were all adapted to grassland environments and the fossil assemblages in the Pleistocene suggest a dominance by grassland species. However, this region today is the well-known Greater Cape Floristic Region (GCFR), a shrub-land ecosystem, and it does not currently contain appropriate grasslands for these species. Offshore and currently under water was a plain once exposed by lowered sea levels, and our research group has defined this as an ancient ecosystem we call the Palaeo-Agulhas Plains. This was the primary habitat for these extinct species, and the favored hunting grounds for the humans inhabiting the many well-known archaeological sites that have been excavated here. Our research group has conducted a wide range of multi-disciplinary studies that together allow us to build a model of this now submerged ecosystem, and here we summarize that model and contextualize this small-scale extinction event more broadly within the overall extinction of this ancient ecosystem.

[247] *Discussant*

Marek Martinez, Ora [136] see Gonzalez, Sara L.

Mariani, Guido S. [195] see Zerboni, Andrea

Marin-Aguilera, Beatriz (University of Cambridge)**[421]** *Colonial Borderlands and Conflicting Landscapes in Colonial Chile*

Chile was the most important and complex borderland of the Spanish Empire (1550–1818), in which colonial power and indigenous resistance were contested over centuries. Control over this frontier was of vital importance for the Spaniards because the main Pacific harbour was located there. The indigenous people, known as Reche-Mapuche, defeated the Incas and were never conquered. The Spaniards struggled as well to subjugate them, and eventually conceded their independence upon the acknowledgement of the Spanish King. Since Chile, and particularly Valdivia, gave access to the Pacific, many European powers tried to conquer the Reche-Mapuche people, among them the Dutch and the British. However, their attempts were similarly unsuccessful. Removed from the empire's core, the Reche-Mapuche communities shaped a very dynamic and productive colonial borderland that also functioned as a material crossroad between the Spaniards, the Dutch, the British, and other local communities. This paper explores the continuous reshaping of colonial landscapes through political and social struggles in the area of Valdivia, as well as the indigenous responses to new hierarchies and colonial warfare between the 16th and 18th centuries.

Marino, Marc (University of Arkansas), Lane Fargher (Centro de Investigación y de Estudios Avanzados de), Nathan Meissner (University of Southern Mississippi) and John K. Millhauser (North Carolina State University)**[68]** *The Organization of Prismatic Blade Production at Late Postclassic Tlaxcallan, Central Mexico*

Systems of craft production and exchange in Mesoamerica are often correlated with the socio-political circumstances in

which they formed, and such discussions are frequently applied to the organization of lithic industries, including the production of prismatic blades. Systems correlated with direct or centralized distribution networks are associated with reciprocity and redistribution, while decentralized devices are associated with more commercial mechanisms influenced by the forces of supply and demand. Other axes of variation are introduced to this model if elites or political agents in preindustrial economies sought to control or regulate commercial systems. In this paper we model elite and non-elite influence in the production and exchange of lithic goods by examining if relatively 'faceless' factors like commercial systems played key roles in mobilizing goods for exchange or consumption, or if factors oriented more towards reinforcing social relationships, such as reciprocity or redistribution, affected the production or consumption of lithic tools. We address this question using a dataset of roughly 19,000 lithic tools, flakes, and debitage recovered from Late Postclassic Tlaxcallan, Central Mexico (AD 1450-1521). We compare both public and private spaces, and also examine households of varying status to ascertain the organization of prismatic blade production in Prehispanic Tlaxcallan.

Marion, Sophia (Bates College)

[123] *The Connections within Togiak: An Attempt to Further Understand Colonial Impacts on a Multigenerational Village*

The purpose of this project is to explore the collaborative arch within the project's spider work framework. Everything in life is interwoven: where one is born has lasting effects on cultural norms, education, healthcare, socio-economic status, social-status, support networks, as well as physical environment. Creating a united poster will help readers to contextualize the topics together rather than just as separate entities. Goals for this poster include: answer why this work matters, show how each topic is truly related to one another, and stimulate discussion surrounding collaborative work within fields of anthropology and archaeology.

Mark, Robert [190] see Hays-Gilpin, Kelley

Mark, Robert (Ruperstrian CyberServices)

[252] *Using High Quality Structure from Motion 3D Models for Petroglyph Visualization*

Structure from motion (SfM) photogrammetry models can be used to visualize petroglyphs that are otherwise difficult to see in photographs. Three techniques require a high-quality model that has captured the surface geometry in the point cloud and mesh. 1) Online and free software permit viewing a model surface with user-controlled oblique illumination. 2) Free Meshlab provides a powerful tool, radiance scaling, that produces false color and/or gray-scale images based upon surface curvature. 3) Another technique, which I have called "Digital Rubbing", uses free CloudCompare to produce an image based upon local differences between the point cloud and a generalized fit to the surface.

Marken, Damien [113] see Cooper, Zachary

Marken, Damien [410] see Eppich, Keith

Marken, Damien (Bloomsburg University)

[410] *City of the Centipede, Part 1: Context, Boundaries, Community Organization, and Land-Use at El Perú-Waka', Petén, Guatemala*

Part I of II. The Waka' Archaeological Project (PAW) has conducted over a decade of archaeological investigations documenting the modification, layout, use, and chronology of monumental and residential landscapes of the Classic lowland city of El Perú-Waka'. These papers will evaluate current theoretical and methodological perspectives of ancient Classic Maya urbanism based on fifteen years of excavation and survey at El Perú-Waka'. Contextualized by the recent LiDAR survey of the region, Part I will identify the major landscape features that define Waka' urban core and present preliminary summaries of its settlement and land-use patterns. While El Perú-Waka' was a "typical" Classic Maya city in many ways, the PAW and LiDAR settlement and archaeological data reveal a distinctly "local" pattern of urbanization, landscape modification, and political history.

[234] *Discussant*

Markens, Robert and Cira Martínez López (Instituto Nacional de Antropología e Historia)**[197] Nourishing the Ancestors among the Zapotecs, Valley of Oaxaca**

From 500 BCE onwards, religion in the Valley of Oaxaca was organized in part as an ancestor cult as materialized by the appearance of household tombs in the archaeological record. Heads of households were laid to rest for a number of generations with offerings consisting most often of ceramic vessels, which in domestic contexts were used to serve food and liquid. Nourishing the souls on their journey to and residence in the underworld was basic to Zapotec worldview whereby the spirits of family member were perceived to act as intermediaries between the living and the supernatural. This paper considers the material and symbolic dimension of nourishing the ancestors by looking at the food remains recovered from tombs, mortuary practices recorded in the ethnographic literature and contemporary practices among traditional communities in the Valley of Oaxaca.

Markert, Patricia (Binghamton University)**[264] Main Street and the Central Square: An Examination of Spatial Decision-Making and the Frontier Narrative in the Alsatian Towns of Texas**

This paper examines the role of spatial decisions in acts of community place-making and identity construction on the built landscape. In particular, I look at these decisions within the broader context of the making and re-making of frontiers – plural in the sense that a frontier is never simply a boundary or geographic location, but a set of contested and constantly constructed ideas about space, progress, and nation-building. The research discussed here examines spatial decision-making in two Texas towns of Alsatian and German migrants, both of which emerged in the 1840s from an effort by the Republic of Texas to settle and secure the contested lands to the west of San Antonio. The towns share similar origins within a frontier narrative but have made divergent decisions about their town plans, access to resources, and approaches to heritage through time. As a result, the residents of the towns have created, challenged, or maintained ideas of the frontier in different ways. In this paper, I draw from oral history, historical and contemporary maps, and archaeological maps to discuss how these decisions about organizing space on the built landscape correspond to broader narratives about identity and belonging, from Alsace to the American West.

[264] Chair**Markham, Adam (Union of Concerned Scientists)****[251] Responding to Climate Change Threats to Archaeology through the World Heritage Convention**

Climate change is the fastest growing threat to World Heritage properties, including archaeological sites, worldwide. Warming temperatures, sea level rise, coastal erosion, permafrost thaw, drought, worsening wildfires and more intense rainstorms, hurricanes and typhoons are putting hundreds of thousands of archaeological sites at risk, including many World Heritage properties such as Neolithic Orkney (Scotland), Tasmanian Wilderness (Australia), Mesa Verde (USA) and Kujataa Greenland (Denmark). When the World Heritage Convention was signed in 1972, there was no hint that climate change would become the threat that it has since proved to be. Now however, there is a need to update the convention's policies to address climate change and promote effective responses to reduce climate impacts and increase resilience. There is also an urgent need to develop a rapid assessment climate vulnerability methodology which can be used for all World Heritage sites – both cultural and natural.

[251] Discussant**Markle, Elizabeth (New Mexico State University), Shannon Cowell (New Mexico State University) and Esméralda Ferrales (New Mexico State University)****[88] Recreation, Rockshelters, and Resource Management**

In the summer of 2018, New Mexico State University (NMSU) staff and students surveyed 120 acres on the Organ Mountains-Desert Peaks National Monument. The New Mexico Bureau of Land Management (BLM), which manages this monument, provided funding for this project. The survey occurred in seven high-priority parcels near Bishop's Cap, where frequent recreational visitation poses threats to cultural resources. Previous investigations identified rockshelter occupations dating to the Archaic and Formative period, and collections from those projects included very early maize varieties. This survey re-visited and recorded 10 sites and recorded 15 new sites, ranging in date from 1500 BC to AD 1954. Many of the

sites were negatively impacted by modern visitors. NMSU has made recommendations to the BLM about how best to manage these sites, and what kinds of research opportunities can be pursued in the future.

Marks, Jonathan (UNC-Charlotte)**[247] *On the Origin of Cultures***

As an analytic category, a culture shares many of the same difficulties that a species has in biology: notably, fuzzy boundaries, temporal instability, and extensive substructuring, which render it difficult to define adequately and comprehensively. Nevertheless, the symbolic world or semiotic matrix that any human learns and inhabits can be quite different from one partaken by other people elsewhere, and this is conveniently designated as culture. While there has been considerable speculation on the evolutionary origin and adaptive value of culture as a human mental capacity, there has been little discussion of the evolutionary meaning of another of its salient features: its diversity. Is there an evolutionary benefit to a species speaking different languages, for example, rather than just one? Further, how can we project cultural diversity back to the Paleolithic: Does a similarity of tool type imply a common language or belief system; and if not, then what are the implications for understanding ancient human life? Is culture monophyletic or is cultural diversity primordial, and if the latter, how can we reconstruct early human society?

Marks, Theodore [97] see Ostahowski, Brian

Marks, Theodore (The New Orleans Center for Creative Arts)**[152] *Sourcing Etendeka Dolerites in the Stone Age of Namibia***

Basalts and dolomites, associated with the Etendeka Large Igneous Province (ELIP), in northwestern Namibia, often make up the bulk of lithic raw materials present in archaeological assemblages from the region. Different igneous formations within the ELIP can readily be distinguished from one another by various geochemical means, but their huge geographic extent and complex networks of exposures forces us to consider various spatial scales of geochemical variability in inferring patterns of human activities from sourcing data. At the site of Erb Tanks Rockshelter in the Central Namib desert, dolerite in assemblages, dated ca. 17-19 ka BP, derives, exclusively, from sources distributed in a band along the Welwitschia Lineament Structure (WLS), while dolerite from later phases (ca. 8-12 ka BP), can be linked to a variety of likely sources in the ELIP. Combining these patterns from sourcing data with technological analyses, suggest shifts in the spatial scale and diversity of human land use and foraging practices in the region, from a more bounded inland/upland pattern (17-19 ka), to a wider-ranging pattern centered in the coastal deserts (8-12 ka).

Markussen, Christine, Ian Hough (Flagstaff Area National Monuments) and Blayne Brown (EnviroSystems Management, Inc.)**[259] *Photogrammetric Mapping at Three Sites in Wupatki National Monument***

In the fall of 2017, EnviroSystems Management, Inc. conducted architectural mapping of three sites at Wupatki National Monument, part of Flagstaff Area National Monuments, Coconino County, Arizona. The Monument required scaled planimetric drawings and cross-sections of standing architecture at WS323/Small Tower, WS1027/Cloud House, and WS1762/Coyote Water. These sites are located in the backcountry of the Monument which is also a wilderness study area prohibiting the use of drones for mapping purposes. The standing structures were more than 2-meters-high in some cases generating complications for safe placement of a 3D laser scanner. As an alternative to aerial imagery, laser scanning, and traditional field mapping techniques photogrammetric methods were employed to create a 3D model of the structures at each site. These models were created in AgiSoft PhotoScan Professional and converted into georeferenced orthophotographs. Scaled drawings were completed using ESRI ArcGIS. In addition to plan maps, cross-sections of standing structures were made using digital elevation models derived from the 3D models in ESRI ArcScene. A total of 25 masonry structures consisting of habitation rooms and associated features were mapped at the three sites. The work resulted in a cost-effective alternative to drone mapping and laser scanning for standing architecture.

Marquardt, William [9] see Walker, Karen

Marquardt, William

[70] *Are the Calusa Unique? Environmental Stewardship and Historical Contingency in the Pacific Northwest and Southwest Florida*

Coastal societies of the northern Pacific and southwestern Florida were once thought anomalous because they achieved sociopolitical complexity without agriculture. The Calusa are often cited as especially unusual, or as the “pinnacle” of complexity among fisher-gatherer-hunters because they achieved a tributary, state-like political formation by post-contact times. In this paper I re-evaluate such comparisons between the two coastal regions in terms of natural-resource stewardship, collective action, food production and processing, and the emergence of complexity. I argue that environmental characteristics, climatic fluctuations, and historical contingencies were major factors leading to the contrasts between southwest Florida and northern Pacific coastal societies.

Marquardt, William (University of New Mexico, United States Forest Service)

[380] *Toys or Totems? Exploring Ritual and Play in the Middle Rio Grande*

Miniature vessels are generally placed into one of three categories by archaeologists; children's toys, ritual offerings, or test pots to assess clay quality. Previous studies in the Southwest have explored these small bowls and jars as introductory entries to the potter's craft, made by small hands under the tutelage – or in emulation – of their elders (Crown 2014; Kamp 2001; Stinson 2004). A number of these vessels frequently show up in ritual or burial deposits, suggesting that at least some of these vessels may not be used strictly as child's toys. This pilot study explores a sample of 110 of these vessels from Pottery Mound, a Pueblo IV site in central New Mexico, to better understand work, play, and ritual in the late Prehispanic Southwest. A multivariate approach incorporating fingerprint ridge density, qualitative analysis, and spatial context is utilized to better understand the purpose these vessels may have served in the past. Preliminary analysis reveals a statistically significant relationship between the context in which miniature vessels are located and the probable age of the artisan. Vessels likely made by children tend to occur in midden deposits, while those made by adults occur more frequently in rooms or ritual spaces.

[380] *Chair*

Marquez, Heriberto (California State University, Monterey Bay)

[360] *A Closer Look at the Use of Cueva de Sangre through Skeletal Remains*

The use of caves is a part of an essential role in Maya cosmology and ideology. The Petexbatún Regional Cave Survey identified 22 caves and over 11 kilometers of cave passages between 1990 through 1993 at Dos Pilas, Guatemala. This study reexamines 205 human remains collected from Cueva de Sangre. Previous studies (Minjares, 2003) of the Cueva de Sangre skeletal material argue the site was used for the disposal of bodies based on the condition of the remains and their location within the cave. This seems to overlook the sacred role of caves and their use in numerous ritual practices. New data collected by this study identifies trauma and pathologies, allowing us to revisit the question of the cave's use by the ancient Maya.

Marsh, Erik J. [364] see Barberena, Ramiro

Marshall, Fiona [82] see Hu, Lorraine

Marshall, Fiona (Washington University)

[352] *Whose Donkey? Domestication and Variability*

Morphological, genetic, ethnographic and behavioral research on domestication has provided a basis for understanding variability in the process of donkey domestication. It is clear that the lack of herd-based sociality among wild relatives of the donkey and people's reliance on donkeys for transport create distinctive pathways for domestication of these animals. Here I explore dimensions of variability in the selection processes operating on donkeys in space and time. Donkey domestication has diverse geographic and cultural roots within Africa and Asia, and had different trajectories within pastoral and urban communities. Donkeys became fundamental to life among historic mobile communities in Iran and Afghanistan as well as Africa. They were used in Bronze Age trade routes of southwest Asia. What role, if any, did they play along the

Himalaya range and the Proto-Silk Route? In Africa, how did donkeys become incorporated into the varied communities that developed as pastoralism spread from northeast to eastern Africa? Unlike dogs or horses there has been little intensive selection of donkeys until modern times. Long term gene flow and highly variable selection patterns make domestication of donkeys an extreme example that contributes to thinking about animal domestication broadly.

Marshall, Jenail (Purdue University) and Michele Buzon (Purdue University)**[110] Microbiological Significance of Fermented Beverages: Reconstructing the Health and Nutrition of Ancient Agriculturalists**

Approximately 60 percent of all our antibiotics come from streptomycetes, a filamentous soil bacterium. Over 30 years ago, the first evidence of deliberate antibiotic use was among Sudanese Nubian agriculturalists through the consumption of beer that contained tetracycline. The range of archaeological research since the Nubian findings show the profound role of fermented grains in ancient agricultural subsistence patterns. The production of fermented beverages is a near-universal practice in both ancient and modern cultures. Brewed beverages are valuable sources of calories, B-vitamins, and proteins. In Ethiopia, a honey wine, T'ej, has been consumed for centuries and is among the oldest fermented brews still consumed by modern populations. T'ej fermentation relies on the microorganisms present in the fermentation containers but is unique in requiring the addition of gesho (*Rhamnus prinoides*). Furthermore, T'ej contains both alpha-amylase and beta-amylase enzymes - yeasts produce the latter while bacteria tend to produce the former. This study provides a biocultural perspective by reviewing the archaeological and historical evidence of consuming fermented beverages throughout the world. The implications for understanding the role that consuming fermented beverages played in health, social life and, socioeconomic relations remain fundamental to understanding paleonutrition in ancient societies.

Marshall, Maureen (University of Illinois Urbana-Champaign)**[359] Building Bronze Age Populations of the South Caucasus: Preliminary Bioarchaeological Results from the Kasakh Valley Archaeological Survey**

Bioarchaeological analysis of human remains excavated by Project ArAGATS in the Tsaghkahovit Plain, Armenia has allowed for a unique view onto Bronze Age life and has offered a glimpse into the lived experience of populations constituting early complex polities. Analysis of comparative collections from Horom and other sites in Armenia have yielded important contextual information for population level trends. Most notably, there is high incidence of cranial trauma in Late Bronze Age and Iron I populations, suggesting practices of violence that affected a significant portion of the population. However, small sample sizes and the incomplete nature of the collections and excavated remains has limited the scope of analysis. Our knowledge of social experiences and relationships has thus remained narrow. The 2016-17 excavation of Bronze and Iron Age tombs in the neighboring Kasakh Valley has added new information on the social aspects and rituals of mortuary practices, while the analysis of human remains has offered insight into previously underrepresented portions of the population, namely women and children. Combined, the analysis of mortuary practices and bioarchaeology allow for new perspectives on lived experience in the Bronze Age South Caucasus.

Marsteller, Sara (Arizona State University)**[183] A Bioarchaeological Approach to the Social Construction of Community Identities in Mountain Landscapes**

The Huarochirí Manuscript has made legendary the social relationships of pre-Columbian groups inhabiting the Andean mountain landscape that ascends steeply from the present-day coastal capital city of Lima, Peru, to the high-altitude Huarochirí Province. In this famous collection of ethnohistoric narratives, authored in the indigenous Quechua language, the group identities of the highland Checa storytellers and neighboring coastal Yunca populations are portrayed as antagonistic, yet simultaneously intricately intertwined. Archaeological investigations of these relationships, however, have focused extensively on locating a boundary between the two groups. The current paper demonstrates how a bioarchaeological approach that engages social theories of community formation and examines multiple social practices simultaneously can elucidate the complex nature of social interactions across mountain landscapes. Focusing on the middle Rimac Valley site of Rinconada Alta, where highland groups are reported to have replaced lowland groups, new mortuary contextual data are combined with previously published isotopic reconstructions of dietary and mobility practices and compared to those from the coastally located Armatambo site to shed light on community formation processes in this potentially contested area. Results suggest that mortuary rituals served as a means to reinforce social ties and promote solidarity among diverse community members.

Martin, Andrew [47] see Hajic, Edwin

Martin, Debra [142] see Harrod, Ryan

Martin, Debra (University of Nevada/Las Vegas)

[185] *Pueblo Warriors, Witches and Cannibals: Indigenous Concepts of Corporeality and the Bioarchaeological Record*

In Pueblo oral tradition, a persistent narrative exists regarding malevolent forces that commit transgressions while inhabiting the corporeal bodies of community members. Referred to as witches (although this is not a term Pueblo people would use) they bring about crop failures through droughts, and they cause famine, sickness and death. Once a witch has been identified and accused, punishment ensues. Execution of witches was common and the physical bodies needed to be completely annihilated through breakage, cutting, reduction and burning. The dangerous process of rendering witches powerless is carried out by warriors who must align with and transform themselves into supernatural beings. Afterward, they must then go through a labored body ritual to cleanse themselves. Witches can never be completely defeated and they are always a persistent threat. Incorporating a more emic perspective regarding factors that contribute to ontological insecurity can provide a rich context within which to interpret the ways that bodies are employed in an attempt to rectify dangerous transgressive forces. Prior research employing western notions about mortuary behavior regarding broken and damaged bones mistakenly interpreted them to represent only cannibalism.

[273] *Discussant*

[142] *Chair*

Martin, Erik (Far Western), Robert G. Elston (Department of Anthropology, University of Nevada), D. Craig Young (Far Western), Brian Codding (Department of Anthropology & Archaeological Center) and David Rhode (Desert Research Institute, Reno)

[323] *Theoretically Based Investigations of the Paleo-Indian Occupation of Grass Valley, Nevada*

The nature of human use of the central Great Basin during the Pleistocene-Holocene Transition (PHT) remains unclear. Ongoing archaeological research in Grass Valley, Nevada, focuses on understanding foraging behavior in changing PHT landscapes through expectations of Human Behavioral Ecology and geoarchaeological investigations for defining the extent of wetland habitats and potential for "old dirt". Results document a widespread paleosol in Grass Valley, predating Mazama tephra and representing an interlude of landscape stability within the climatic variability of the PHT. Both surface and subsurface archaeological materials suggest use of a variety of riparian, marsh, and upland habitats associated with desiccating Pleistocene Lake Gilbert. Findings call for a reconsideration of earlier archaeological research in Grass Valley and provide a greater understanding of PHT occupations in the central Great Basin.

Martin, Fabiana [26] see Borrero, Luis

Martin, Fabiana (CEHA-UMAG)

[364] *Re-evaluation of the Archaeology of the Pali Aike Lava Field*

A new research project will focus on the archaeology of the Pali Aike Lava Field, Patagonia, Chile by a restudy of the collections obtained by Junius Bird between 1936 and 1970. These objects are currently housed at the American Museum of Natural History, New York. Field work will reopen some of the sites excavated by Bird and also search for new relevant sites to study the early occupation of Patagonia. Some results of these studies will be presented, including a reevaluation of the Pali Aike site, many times invoked as sustaining an early peopling of South America.

Martin, Laura

[5] *Discussant*

Martin, Laura [85] see Adler, Rachel

Martin, Lauri [345] see Hyde, David

Martin, Marlon [421] see Acabado, Stephen

Martin, Michelle (Doctoral Candidate (History) University of New Mexico)

[124] *Historians in Action: Historical Research and Enhanced Interpretation at Chiricahua National Monument and Fort Bowie National Historic Site*

Nestled in the heart of the Chiricahua Mountains in southeastern Arizona, Chiricahua National Monument (CHIR) and Fort Bowie National Historic Site (FOBO) protect, preserve, and interpret the complex histories of human interaction with the landscape and the resulting conflict that erupted between indigenous residents of the region and various colonial powers that settled the region. Interpreting these wide ranging, complex, and at times painful narratives falls on the shoulders of National Park Service rangers and historians. Given the numerous roles played by NPS rangers, volunteer or contract research historians can play a critical role in assisting NPS staff by providing much-needed primary historical research and contextualization of the competing narratives at CHIR and FOBO thereby enhancing interpretive efforts at both sites. Historians in Action chronicles the work of several history and museum studies students from the University of New Mexico and their contributions focused on the interpretation of human habitation and interaction at both parks.

Martin, Samuel, Dominique Langis-Barsetti (University of Toronto), Joseph Lehner (University of Sydney), Emre Kuruçayırılı (Bogaziçi University) and Asu Selen Özcan (Institute of Nautical Archaeology)

[321] *Investigating Copper Ingot Production in the Bronze Age Mediterranean Using 3D Technologies*

The 1960 excavation of the Late Bronze Age (ca. 1200 BC) shipwreck at Cape Gelidonya, on the southwestern coast of Turkey, revealed a ca. 1.2 ton cargo of copper ingots and tools. The metal cargo is defined by its great diversity, yet the ingot assemblage is predominantly Cypriot in origin while the tool metal derives from sources across the Mediterranean region. A sample of 200 copper ingots and ingot fragments from the ship's cargo were selected for 3D digital reconstruction using photogrammetry and structured light scanning. The presence of two ingot types, oxhide and bun-shaped ingots, reflects a degree of standardization but significant variation within these types challenge traditional models of their production. 3D scans of the ingots helped to reveal fine surface details related to their production and transport. Measurements, including volumes and profiles, are used to determine quantitatively the variation among the ingot types. The size and shape of the ingots may suggest various traditions of production, reflecting diachronic and/or synchronic differences of origin in a single assemblage not unlike metal hoards known to terrestrial sites. This is an important first step in identifying the organization of the production and exchange of these goods in the eastern Mediterranean.

Martin, Simon (University of Pennsylvania Museum)

[199] *Politics of the Borderlands: An Epigraphic History*

The region now divided by the national boundaries of Belize and Guatemala was once home to a broad range of political entities. Noticeably, large centers with monumental inscriptions in the western and southern portions contrast with smaller and far less textually verbose sites in the Belize Valley. Although this makes for a clouded and imbalanced historical context, the evidence we have for the political dynamics between these two styles of institution through the seventh, eighth, and ninth centuries can play a critical role in understanding important cultural and social developments through this time. Even if many issues remain unresolved, the key contribution of historical archaeology lies in its ability to generate new questions for each of its two component epistemologies—the textual reflecting on the material and vice versa.

[79] *Discussant*

Martin, Worthy (IATH, University of Virginia) and Carolyn Heitman (CDRH, University of Nebraska - Lincoln)

[385] *Chacoan Complexities*

The Chaco Research Archive (CRA, chacoarchive.org) has been available since 2004 and the Salmon Pueblo Archaeological Research Collection (SPARC, salmonpueblo.org) launched in May of 2018. These web-based portals, as their names indicate, were both designed primarily with the academic researcher in mind. While these resources acknowledge the diverse descendant communities within the Southwest, neither has deliberately focused on eliciting robust Native perspectives to coincide with Euro-American forms of archaeological classification and interpretation. We are in the early stages of a new collaboration aimed at incorporating diverse cultural perspectives from descendant communities with archaeological information; to develop a plan for how best to support community-based initiatives through engagement with material culture; and to enhance existing archaeological records with Native perspectives. This pilot project will proceed in collaboration with several tribal historic preservation offices. In this paper we will discuss the design and potential benefits of this project.

Martín Benenzuela, Inocencio Rafael [417] see Lambrecht, Glenn

Martín Medina, Geiser (INAH), José Trinidad Escalante Kuk (Subdirección de Patrimonio Arqueológico del Ayunta) and Luis Daniel Domínguez Aguilar (Xíimbal K'áax A.C.)

[71] *El entorno sociocultural en los parques arqueológicos de Mérida, Yucatán, México*

A partir de 1970, la expansión de Mérida, propició una demanda de proyectos a partir de rescates y salvamentos arqueológicos. Esto permitió demostrar la ocupación prehispánica por medio de monumentos arqueológicos restaurados en espacios destinados a infraestructura urbana, sobre todo en varias zonas al oriente y poniente de la ciudad. Desde un inicio estos espacios fueron considerados como áreas de conservación, los cuales se transformaron de manera improvisada en parques o áreas verdes que en pleno siglo XXI, son evidencia de este pasado prehispánico en los actuales parques arqueológicos con infraestructura que los hace disfrutables, tanto en el aspecto natural como el cultural. Hasta la fecha, los 16 parques arqueológicos presentan diversas dinámicas en sus entornos inmediatos, relacionados a aspectos sociales, infraestructura y seguridad que permiten tener un panorama sobre la apropiación y/o desvinculación de los mismos. Esto está relacionado al marco normativo y responsabilidad sobre las autoridades competentes en velar por la integridad y preservación de los monumentos y espacios públicos. Recientemente la suma de esfuerzos y difusión entre asociaciones civiles, autoridades municipales e instancias federales han resultado en actividades junto a los usuarios, la apropiación de los parques arqueológicos, su conservación y las buenas prácticas en los mismos.

Martin, Houston [9] see Cannon, Kenneth

Martin, Lana [398] see Wake, Thomas

Martin-Apostolatos, Gwendolyn (University of Missouri, Columbia)

[9] *The High Cost of Living: Death and Social Identity of Missouri's Historic Columbia Cemetery*

The gravestones of Missouri's historic Columbia Cemetery demonstrate the evolving social identity of the population of Columbia, MO. These stone artifacts display information that reflects the mortuary values of the residents of this city, spanning more than a century. This study resulted in a database of local historic mortuary monuments documenting their demographic, morphological, materialistic, and stylistic characteristics. These traits were examined and evaluated in order to track the gravestone choice trends for the early inhabitants of Columbia, MO, specifically the first century after the founding of the city. With the passage of time the grave markers in Columbia, MO have reflected changing preferences from tall, statuesque limestone and marble monuments to more moderate granite headstones. The epitaph has gone out of style while the use of a uniting family headstone has soared in popularity. Overall this Midwestern town has had a decline in the use of elaborate monument use when memorializing the dead. These results point to shifting views on death within this community.

Martin-Apostolatos, Gwendolyn [337] see Trusler, Kate

Martindale Johnson, Lucas (Far Western Anthropological Research Group Inc.), Arlen Chase (University of Nevada Las Vegas) and Diane Chase (University of Nevada Las Vegas)

[255] *An Interpretative Framework and Description of Ritualized Obsidian from Caracol, Belize*

Ceremonial life at Caracol, Belize can be assessed through a technological and contextual analysis of ritualized obsidian objects. These items are typically termed "obsidian eccentrics", although "ritualized obsidian" more specifically enables a usable and socially interpretive framework based on archaeological context that relies less on symbolism for interpretation. Analyzing the obsidian contextually emphasizes historically important materials and associated crafting, exchange, and depositional practices. While we describe some obsidian as being ritualized as opposed to being quotidian, our primary purpose here is to describe the morphology, chronology, and spatial extent of ritualized obsidian at Caracol, Belize from the Late Preclassic through Terminal Classic Periods (ca 300 BC – AD 900). Towards this end, we present information on some 35 years of standardized excavation data to demonstrate the patterned ways obsidian was crafted into ritualized forms that were then deployed in important cyclical events that transcended our traditional interpretation based on social stratification and on ancient Maya household wealth or status.

Martinez, Daniel (Epsilon Systems Solutions, Inc.), Brad Beacham (Epsilon Systems Solutions, Inc.) and Nate Myers (Epsilon Systems Solutions, Inc.)

[213] *A Preliminary Analysis of the Spatial Distribution of Prehistoric Sites within a 4,300-Acre Block of the Tularosa Basin, White Sands Missile Range, New Mexico*

An ongoing cultural resource inventory on White Sands Missile Range in southern New Mexico identified over 100 prehistoric and multicomponent sites in the valley bottom of the Tularosa Basin, greatly exceeding the anticipated number of prehistoric resources for the approximately 4,300-acre study area. In an effort to elucidate a better understanding of the causal factors influencing site distribution within the study area, spatial analysis was conducted. This poster presents the preliminary results of this analysis.

Martinez, Desiree [210] see Kennedy Richardson, Karimah

Martinez, Desiree (Cogstone Resource Management)

[294] *An End to Irate Letters? Social Justice in Tongva Land*

For the past thirty years, Tongva leaders and cultural educators have created educational programs with local scholars in order to rectify the belief that the Tongva are extinct. In some instances, these programs were the result of irate letters from and protests by Tongva community members when exhibits, tours, interpretive signs, etc. were planned or installed without the community's participation, resulting in information that did not reflect our past, present, and future. This misinformation has hindered the Tongva community's ability to practice self-determination as it relates to the telling of our history, access to and protection of our sacred spaces and places and the repatriation to our Ancestors. In this presentation, the author will describe projects in which the wants and needs of the Tongva community were at the forefront, although for a few, it took some intense re-education in order to make the project proponents understand the implications their projects would have on the Tongva community.

[177] *Discussant*

Martinez, Eva

[103] *Social Interaction and Exchange Networks in Eastern Honduras: Late Classic-Early Postclassic Period (AD 600-1000)*

Ceramics have been the most reliable indicator of social interactions in eastern Honduras. However, these material indicators have also been described sometimes as being rather homogeneous throughout the region. On the other hand, some scholars point out intraregional variations regarding eastern Honduran ceramic assemblages and what they represent in terms of intra and interregional interactions. It has also been argued that in both eastern and northeastern Honduras no great number of commodities was mobilized through interregional exchanges with west-central regions of the country,

especially regarding obsidian procurement. Little has been said about commodity exchange among ancient communities within eastern Honduras. Based on ceramic and obsidian evidence, this paper will explore and re-examine interregional interactions within eastern Honduras, focusing on sites with similar and—apparently—late and short occupations (around AD 600-1000), namely: the Talgua Drainage, the Telica and Culmi Valleys in eastern Honduras and the Jamastran Valley in southeastern Honduras. An overview of these social trajectories from eastern Honduras is pertinent considering recent finds in the northeastern area, which highlight complex exchange networks in the region during the Late Classic and Early Post-Classic Periods.

Martinez, Gustavo [285] see Gutierrez, Maria

Martinez, Gustavo (INCUAPA-CONICET/ FACSO-UNICEN), Florencia Santos Valero (INCUAPA-CONICET/ FACSO-UNICEN), Erika Borges Vaz (INCUAPA-CONICET/ FACSO-UNICEN), Luciana Stoessel (INCUAPA-CONICET/ FACSO-UNICEN) and Gustavo Flensburg (INCUAPA-CONICET/ FACSO-UNICEN)

[364] *Distributional Archaeology in the Steppes on North Patagonia (Río Negro Province, Argentina)*

One of the most important legacies of Dr. L.A. Borrero to the archeology of Patagonia has been the application of distributional approaches. The objective of this paper is to present preliminary results obtained from the application of this approach to a recently investigated area lacking prior archaeological research: the plains located between the middle Colorado and Negro rivers (Río Negro province). This arid-semiarid landscape is characterized by xeric vegetal communities of the monte shrub elements. The predominant plateau-like relief is interrupted by high ancient geomorphic surfaces and dry lakes. Systematic surface sampling reveals: a) an overwhelming predominance of lithic materials with very little representation of pottery and absence of fauna, and b) that the highest concentration of materials is located around dry lakes.

No chronological dates of any kind have been obtained so far but based on material culture (pottery) a minimal chronology of the late Holocene is estimated. Whether hunter-gatherer societies used this interfluvial space as a transit area between the valleys and /or if was used in a more stable residential manner are hypotheses that will be tested in this work.

Martinez, Jupiter (INAH-Sonora)

[16] *The Cocospera Valley in the Prehistoric, Protohistoric and Missión Period: A Corridor of Cultural Exchange?*

There is a western geographical gap between the Trincheras and Hohokam archaeological traditions in the State of Sonora, Mexico. This area is the Cocospera Valley where the prehistoric sites have artifacts from Trincheras, Hohokam and Casas Grandes traditions. In the early mission period time the written records suggest this valley as a maximum boundary between O'ham and Athabaskan bands with a strong record of violence. In terms of density, presence and absence material culture and architectural patterns a cultural corridor can be suggested as a prehistoric and historic phenomenon.

Martinez, Kailey (New Mexico State University)

[263] *Resource Use and Sustainability of the Gila's South Diamond Creek Pueblo*

The Gila National Forest and Gila Wilderness are the names ascribed to rich mountainous land spanning between western New Mexico and eastern Arizona. This land was once home to the people of the Mimbres culture. The environments within the Gila vary due to different altitudes and precipitation, which also effect the types and amount of ecological resources, such as vegetation and prey species, available in those areas. The location of the Mimbres settlements, and the size of the settlement itself, would have greatly affected how the people were interacting with their surrounding ecology. Students, professors, and volunteers of New Mexico State University have spent two seasons excavating South Diamond Creek Pueblo, a four-room Mimbres habitation site located in the Northern Mimbres Region. In using preliminary data from zooarchaeological and isotopic analysis, this presentation will display how site locality and size could lead to differing patterns of resource usage and sustainability between South Diamond Creek Pueblo and larger, contemporaneous Mimbres villages.

Martinez, Maria (Smithsonian Institution, National Museum of the American Indian) and Michael Brandl (Austrian Academy of Sciences)

- [406]** *Reflecting on the History and Use of Rectangular Obsidian "Mirrors" from Central Mexico: Reinterpreting Old Museum Collections*

This paper highlights the relevance and potential of collections-based research through a case study of rectangular obsidian "mirrors" from Central Mexico, typically associated with the Aztec, housed at the Smithsonian Institution, National Museum of the American Indian (NMAI). To date these highly polished obsidian objects are found exclusively in museum contexts, and classified as "mirrors," however most recent research indicates that they are colonial objects that were most likely commissioned by the Spanish and used for various purposes. Spanish accounts imply that such objects were crafted by native flint knappers, however a general analysis of the morphology and the manufacture of obsidian mirrors has yet to be accomplished. Additionally, Spanish chroniclers indicate multiple obsidian crafting communities located near major obsidian sources. Raw material provenance studies could therefore reveal if there were multiple communities involved in the manufacture of rectangular obsidian mirrors, or if this art was exclusively practiced at one specific area still to be identified. This presentation focuses on six rectangular, highly polished obsidian objects from NMAI's collections previously interpreted as "mirrors," and will discuss their manufacture through techno-morphological analysis, the significance of raw material provenance, their potential functions, and why this specific material was chosen.

Martinez, Valentina [88] see Walter, Tamra

Martinez, Valentina [285] see Klemmer, Amy

Martinez, Valentina and Michael Harris (Department of Anthropology, Florida Atlantic University)

- [350]** *The Transformation of Long-Term Anthropological and Archaeological Engagements in Communities: Cases from Southern Manabi Province*

For the past 20 years, we have conducted research along the Ecuadorian coast in the province of Manabí. Over time, our work has evolved from that of strictly scientific issues to the incorporation of local community-based participatory research models. As other anthropologists have discovered, a continuous commitment with a research site leads to new and deeper forms of anthropological engagement with communities. These new modes of collaboration are simultaneously fruitful, practical, and precarious. In this paper, we present an evaluation of our work within the communities of southern Manabí Province and the consequent transformation of our relations with the inhabitants of the sector.

Martínez, Dante [375] see Gutierrez, Patricio

Martínez, Estela, Guillermo Martínez Mora (INAH), Patricia Olga Hernandez (INAH) and Adrián Velazquez (INAH)

- [192]** *Costumbres funerarias en la época del contacto en la Huasteca Potosina*

El contexto funerario de una mujer adulta nos muestra que, dentro de las conductas funerarias presentes entre las élites de Tamtoc, era tradicional ataviar al individuo con lujosos bienes procedentes de muy diversas regiones. Las costumbres funerarias y el estudio sobre el origen de los objetos de este ajuar nos permiten respaldar la idea de que la sociedad urbana de Tamtoc, al menos durante el periodo Posclásico (900 a 1521 d.C.) y hasta el contacto con los españoles, era una sociedad compleja, fuertemente jerarquizada que formó parte de la amplia red de interacción en la Costa del Golfo por donde circularon productos suntuarios de regiones tan distantes como Arizona, E.U.A., el Océano Pacífico o la región del Motagua en Guatemala. También nos sugiere, de alguna manera, como esta intensa red de interacción prehispánica fue utilizada inmediatamente por los conquistadores españoles para sus propios intereses.

Martinez De Luna, Lucha (Universidad de las Ciencias y Artes de Chiapas), Juan Ignacio Macias Quintero (Universidad de las Ciencias y Artes de Chiapas) and Blanca Salazar Corzo (Universidad de las Ciencias y Artes de Chiapas)

- [270]** *O'na Tök: A Zoque Center in Western Chiapas, México*

In June of 2016, the archaeological site designated O'na Tök was recorded as a primary center in the western portion of the

Central Depression of Chiapas, Mexico. Preliminary studies of cultural material recovered on the surface and test pits suggest the Zoque of O'na Tök participated in an exchange network with contemporary centers during the Early Preclassic until the Postclassic, with a peak period during the Middle Preclassic and Late Classic. The public architecture seems to share similar features with other contemporaneous sites in the surrounding area such as Ocozocoautla-Cerro de Ombligo and Chiapa de Corzo. However, evidence suggests the center was not built based on the designed layout of La Venta, an architectural configuration theorized to have been emulated by other Middle Preclassic centers throughout the region, nor does the site reveal an E-Group pattern, possibly indicating the center played a distinct role in the region. Based on the layout of the center, the geographic position, the variety of obsidian sources recovered, and various types of pottery represented at the site, we propose that the occupants of O'na Tök played a significant role, possibly as a regional trade center during the Preclassic and Late Classic period.

Martínez González, Javier [406] see Carino Anaya, Tanya

Martinez Lemus, Ramiro Edmundo [303] see Garnica, Marlen

Martínez López, Cira [197] see Markens, Robert

Martinez Mora, Guillermo [192] see Martínez, Estela

Martínez Rojo, Iziar (Escuela Nacional de Antropología e Historia [ENAH]), Serafín Sánchez Pérez (Escuela Nacional de Antropología e Historia [ENAH]) and Lane Fargher

[68] *El papel del suelo en la conformación del contexto arqueológico en el área de El Fuerte en la antigua Tlaxcallan*

Este trabajo de investigación se desarrolló en el actual estado de Tlaxcala en un área denominada “El Fuerte”, que formó parte del Estado tlaxcalteca en época prehispánica, y se inserta dentro del “Proyecto Arqueológico del Tlaxcallan. Hogares, Terrazas y Gobernanza en el Posclásico Tardío”. El presente trabajo es un acercamiento a la conformación del contexto arqueológico y la relación con su medio ambiente, entendiendo el papel que juega el suelo en esta conformación, pero también analizando la formación, composición y transformaciones, tanto antrópicas como naturales que el suelo ha sufrido a lo largo del tiempo. Este estudio se desarrolló a través de la aplicación de algunas técnicas de las geociencias, en específico de análisis físico-químicos y de la micromorfología; que proporcionaron datos para la elaboración de un enfoque que permitió conocer en qué suelo se construyó el sitio, los materiales que fueron utilizados y las transformaciones a las que fueron sometidos estos materiales por los humanos de la sociedad prehispánica que habitaron el área; así como la posterior degradación, reutilización y transformación de los mismos, que contribuyeron a la formación del contexto arqueológico.

Martínez Tuñón, Antonio (University at Albany) and Veronica Perez Rodriguez (University at Albany)

[307] *Ethnoarchaeological Survey in Santo Domingo Tonaltepec, Oaxaca*

The Tonaltepec Ethnoarchaeological Project focused on one of the few surviving pottery-producing communities in the Mixteca Alta region of Oaxaca. The project investigated whether Tonaltepec's contemporary tradition of pottery production can be traced back to prehispanic times. To do this, we conducted ethnographic research and video recordings with modern potters, along with a full coverage archaeological survey in the municipal territory. The survey not only recorded all archaeological evidence of ancient human activity and habitation, but also the location of clay and temper sources used in contemporary pottery production. The ethnographic and archaeological data recovered provide insights on the social organization and processes of pottery production and their role in influencing settlement patterns in the area. These data also provide information on the construction and abandonment of agricultural terraces and the spatial relationship between the raw material sources and the location of potters' households. Finally, Tonaltepec was the site of a violent conflict with a neighboring community in the early twentieth century, which resulted in the sudden abandonment of numerous households. This specific historical context paired with our survey results allows us to test models of settlement abandonment and their material correlates.

Martínez Vázquez, Dante (PAPACSUM), José Luis Punzo Díaz (PAPACSUM), Cinthia Marlene Campos (PAPACSUM), Alfonso Gastelum (ICAT-UNAM) and Max Ayala (PAPACSUM)

[375] Evidence of Early Human Occupation at “Cueva de los Hacheros”, Michoacán

In 2016, Dr. Jose Luis Punzo-Díaz attended to a complaint from the municipality of Turicato regarding the rockshelter Cueva de los Hacheros. As part of Proyecto de Arqueología y Paisaje del Área Centro Sur de Michoacán, the site was excavated. During excavations, the project discovered evidence of multiple periods of human occupation separated by different strata showing that the site was in use over a long period of time. The lower levels excavated demonstrated an aceramic context and artifacts found include arrowheads, stone spear points, human and faunal remains. The superior levels yielded pre-Classic materials including ceramic vessels, lithics, faunal and human remains with associated grave goods and shell ornaments. This poster focuses on the lithics from the aceramic layer, especially the stone arrowheads and stone spear points that are morphologically similar to other points found in early prehistoric sites in the southwestern U.S. and in northern and central México. Radiocarbon dates (12,000 B.P. and 11,000 B.P) determined that the site was in use in the late Pleistocene and early Holocene. The context and our analysis of the lithics and associateddebitage suggest that the site may have been a lithic workshop and hunter-gatherer camp.

Martinez-Hernandez, Angelica [253] see Flores Huacuja, Marlen

Martínez-Varea, Carmen María [144] see Real, Cristina

Martinez-Yrizar, Diana [38] see Acosta-Ochoa, Guillermo

Martino, Gabriele [195] see Rellini, Ivano

Martinón-Torres, Marcos [299] see Li, Xiuzhen

Marwick, Ben [127] see Wang, Li-ying

Marwick, Ben (University of Washington)

[175] Identifying Signatures of Selection in Archaeological Sequences

Both neutral drift and selection cause the frequencies of artefact types in archaeological sequences to vary over time. Discriminating between these two processes, based on a time series of artefacts from a site or region, is often important for answering archaeological questions. However, archaeologists have few tools available for detecting if there is a significant signal of selection for a specific artefact type over time. We draw on recent work in population genetics to explore statistical methods for detecting selection in archaeological assemblages. Here we present an archaeological application of the frequency increment test (FIT), which rejects neutrality if the distribution of normalized artefact-type-frequency increments exhibits a mean that deviates significantly from zero.

[27] Discussant

[175] Chair

Marwick, Ben [389] see Park, Gayoung

Mason, Rachel [237] see Hood, Rhea

Mason-Kohlmeyer, Lea [125] see Prasciunas, Mary

Massafra, Dario [144] see Kitagawa, Keiko

Massone, Mauricio [364] see Morello Repetto, Flavia

Masson-MacLean, Edouard [20] see Zona, Margherita

Masucci, Maria (Drew University) and John Hoopes (University of Kansas)

[314] Evaluating Precolumbian Contact between Ecuador and Costa Rica: A Ceramic Approach

Archaeologists have long noted similarities in ceramic technologies and traditions between Costa Rica and Ecuador. These are relevant for models of culture change, whether the result of direct interactions or parallel cultural processes in the emergence of social complexity. We test the alternatives of direct, long-distance contact along the Pacific coast or traditions that are parallel but independent. To date, assertions of relationships have been based upon inductive observations of similar ceramic traits such as polychrome fine-paste wares. However, the possibility that these were the result of direct, long-distance contact has yet to be tested through a systematic evaluation of specific hypotheses based upon contextualized evidence. In this paper, we focus upon archaeological data from the Pacific coasts of Costa Rica and Ecuador during the period of ca. 200 – 1200 CE as a means for testing whether, when, and how ceramic styles and technology of southern Greater Nicoya during the Bagaces and Silencio Periods were either directly or indirectly related to that of the Guangala ceramic phase of coastal Ecuador. Our analysis draws upon data from style, design, and iconographic data.

Masur, Lindi (University of Toronto)

[232] Foodways and Identity in the Great Lakes: Investigating Western Basin Tradition Food Production Using Starch Grain and Macrobotanical Analysis.

Recent excavations at the early Late Woodland (A.D. 1,000-1,300) Western Basin Tradition Arkona sites have called into question our conceptualization of Algonquian food production, landscape construction, and mobility in southwestern-most Ontario. Isotopic analyses have also revealed a vast underestimation of the amount of maize consumed by WBT peoples at this time, likely a reflection of the limited excavation and botanical analyses undertaken at these sites. This paper will present the results of paleoethnobotanical analyses including macrobotanical identification from flotation at the Arkona sites, as well as starch grain analysis of dental calculus from the nearby Lucier site. This paper will examine WBT food production and consumption practices as compared with their maize-bean-squash cultivating Iroquoian neighbors. New data suggests previous culture-historical models have created a false dichotomy between WBT 'hunter-gatherer' subsistence strategies and Iroquoian farmers. This paper will take a more nuanced approach to WBT identity as created through complex food production practices occurring at the periphery of Iroquoian territory and influence to provide more meaningful cross-cultural comparisons of foodways during the early Late Woodland period.

Matadamas Gomora, Diego (Tulane University) and Angel González López (University of California, Riverside)

[202] Considerations Regarding the Sculptures Commonly Called "Standard-Bearers"

Many images in the iconographic corpus from Pre-Hispanic Basin of Mexico belong to forms which were created and reproduced either in codices, mural painting, ceramics, and sculpture. Some examples are the attires of deities, specific icons used to represent natural elements, like rain, comets, even the Sun, and corporal postures used to communicate the identity of a character as well as the activities it performs. In the specific case of stone sculpture, the posture of "standard bearer" was commonly represented. In it, the character appears erect with its feet together, one or both arms flexed; the hands have one or two perforations, usually recognized as the hole to insert the bearer. Nevertheless, a detailed analysis shows that these sculptures were created to represent a broad range of characters, like deities or warriors, which will be the focus of the present paper. This kind of representations are also common in the Puebla-Tlaxcala Valley, and the Gulf Coast, and very rare in other macroregional areas like West Mexico, the Mixteca and the Maya area, revealing an interaction between these zones based on sharing ideological and iconographic elements, and conforming similar artistic styles during

Late Postclassic.

Matadamas Gomora, Diego [255] see Aguirre, Alejandra

Matadamas Gomora, Diego [406] see Murakami, Tatsuya

Matagne, Chris [118] see Smith, Alexander

Matheny, Deanne

[420] *Montezuma Village Revisited*

Montezuma Village, located in San Juan County, Utah, was a large prehistoric Ancestral Puebloan community center. Although the village was visited by explorers and archaeologists in the late nineteenth and early twentieth centuries, the first effort at documenting the entire village was in the early 1960s by Ray Matheny. Parts of the village were inhabited at least from Pueblo I through Pueblo III times. Despite significant damage from human and natural forces, substantial areas of the village remain available for study. Most of the village is on private land with one section on BLM land. Recent investigations at the village revealed more about its extent, layout, and occupation. Residue and soil studies were also carried out. The village has two great houses; one is a Chaco-era, multi-story structure with a compact footprint, a steep vertical back wall and at least three depressions. Its presence reflects participation in the widespread Chaco great house system. Many village structures appear to be late Pueblo II period, single-unit or multiple-unit pueblos,. Recent investigations contribute to a better understanding of the dynamic role Montezuma Village played as an important community center near the northern frontier of the great house system.

[420] *Chair*

Matheny, Deanne [420] see Wintch, Kenneth

Matheny, Ray [420] see Matheny, Deanne

Matheny, Ray, Winston Hurst and Joel Janetski (Brigham Young University)

[420] *An Introduction to the Archaeology of Montezuma Canyon, San Juan County, Utah*

Montezuma Canyon is a large entrenched north to south drainage in southeastern San Juan County, Utah. Significant tributary canyons join it along its course to the San Juan River. Our focus here is the canyon segment from near the head down to the Navajo Nation border. There are a few records of early explorers and archaeologists in the canyon, but in the early 1960s archaeological investigations began in earnest as Ray Matheny, then a Brigham Young University (BYU) graduate student, conducted a Master's thesis survey. The canyon's great archaeological potential was revealed by the sites documented, including Montezuma Village and Coal Bed Village, both large, complex settlements. As a BYU faculty member in the late 1960s to late 1970s, Matheny conducted annual field schools in the canyon. In the 1980s Joel Janetski continued BYU's interest in the canyon as he directed field schools focused on Nancy Patterson Village and its environs. Recent BYU-affiliated work in the canyon, including a field school at Coal Bed Village conducted by James Allison, is offering new perspectives. Prior and recent investigations provide a wealth of data to explore research questions about the Ancestral Puebloan occupation of the canyon and that of later groups.

Mather, David (Minnesota SHPO), Jim Cummings (MN Department of Natural Resources [retired]), David Maki (Archaeo-Physics, LLC) and Seppo Valppu (Independent Researcher [deceased])

[104] *Public Archaeology at Kathio National Historic Landmark: Structure and Archaeobotany of a Burned Earthlodge*

Kathio National Historic Landmark, in east-central Minnesota, is an important place within the ancestral homeland of the Dakota Nation. Petaga Point (21ML11) is one of the contributing sites within the landmark, and excavations there in the

1960s were a primary source for the Woodland Tradition ceramic sequence of the Mille Lacs locality. Elden Johnson excavated a burned semi-subterranean house feature in 1967, describing it as one in a cluster of five or more. In 2006, we found what appeared to be one of the houses, and investigated it over the next decade in a series of public archaeology projects through the annual Kathio Archaeology Day event. We excavated one 1x1 meter unit each year, forming a cumulative block. We found remnants of undocumented archaeological units, but also intact portions of the house with a burn layer of charred material, and stratigraphy indicating that the structure was an earthlodge. The program was designed as a "public watching" event. One archaeologist conducted the excavation while another interpreted the research process and findings to visitors. Botanical remains include wood from the structure of the house, seasonal foods indicating mid-summer, and potentially medicinal plants. Geophysics indicated a network of footpaths within the village.

Mathers, Clay (The Coronado Institute)**[162] Persistent, Multiscalar Disentanglement: Native-Spanish Trajectories in Early Historic New Mexico**

What began in 1540 with sustained, lethal confrontations between Southern Tiwa pueblo communities and the conquista campaign of Vázquez de Coronado, set in motion a history of relations in New Mexico regularly punctuated by acts of Native independence and disengagement, and by Spanish policies and countermeasures to establish colonial peace and authority. As one of the most densely populated and economically advantaged regions in the American Southwest, Southern Tiwa territory (Tiguex) was critical to the success of the colonial project in northern New Spain. Seen first by Spaniards as a possible resource extraction zone and for its encomienda potential, Tiguex later became a region to be definitively restructured and marginalized. Decoupling from the Spanish colonial project therefore not only had its origins at the earliest stages of contact, but was a Native-Spanish tendency maintained – in varying degrees - for nearly 150 years. This paper argues that significant, material aspects of disentanglement can be seen throughout Early Historic New Mexico, and at the scale of individuals, communities, regions, and inter-regional territories. Furthermore, it emphasizes the importance of tracing the deep history of these historical patterns, their long-term trajectories, and the role played by diverse colonial actors in different, multiscalar contexts.

[162] Chair

Mathews, Christian [125] see Walker, Emiliano

Mathiowetz, Michael (Independent scholar)**[243] The Casas Grandes Flower World and its Antecedents in Northwest Mesoamerica and the U.S. Southwest**

One of the key issues in the study of the Flower World complex is determining the chronology and nature of its transmission from Mesoamerica to the U.S. Southwest. Scholars contend that the most clear material culture and symbolic evidence indicates that the Flower World was present in the Southwest to a limited degree among the Chaco Canyon and Mimbres cultures after AD 1000 with few antecedents. Others suggest much earlier dates in the Southwest, perhaps corresponding with the onset of maize agriculture. Evidence from language studies offers insight, but clarity as to the origins and antiquity of this complex is needed. This presentation provides a macroregional analysis of the historical dynamics of the Flower World ideology encompassing northwest Mesoamerica, northern Mexico, and the greater U.S. Southwest. I propose that key tenets of Flower World symbolism appear with the Xochipilli complex in the Aztatlán region of west Mexico around AD 850/900. With expanding interaction networks linked to ritual economies, Mimbres and Chaco cultures adopted elements of the Flower World. By AD 1200/1300, a pronounced manifestation of this ideology took form in the Casas Grandes culture at Paquimé. This complex spread more extensively across the Southwest thereafter during the Pueblo IV period.

[243] Chair

Mathiowetz, Michael [314] see Pohl, John

Mathwich, Nicole (University of Arizona)**[385] Reinterpreting State Shifts Using Legacy Data: Colonialism and Zooarchaeological Assemblages in Southern Arizona**

Complex systems approaches to archaeological interpretation are well-established in the discipline and offer important ways for studying change over various scales. Large datasets and regional syntheses invite new applications of complex systems

to archaeological data. At the same time, indigenous and postcolonial perspectives have increasingly become foundational to project planning, data collection, and interpretation. Despite the importance of these two approaches to contemporary archaeology, researchers seldom interpret complex systems concepts and methods through indigenous ontological frameworks. The lack of substantial dialogue between these theoretical approaches results in uncritical applications of complexity theory which inadvertently reinforce scripts of settler colonialism. This paper reviews legacy faunal data from southern Arizona to challenge the prehistoric/historic break often used in the interpretation of archaeological materials. This case study of data reinterpretation examines how careful data sharing and indigenous perspectives can inform interpretations of state shifts in complex systems and colonialism.

Mathwich, Nicole [421] see Giomi, Evan

Matias, Roxane (ICArEHB), Sandra Lennox (Evolutionary Studies Institute, School of Geoscien), Ana Gomes (ICArEHB), Nuno Bicho (ICArEHB) and Jonathan Haws (ICArEHB)

[110] *Anthracological Analyses of the Iron Age Shell Middens Complex at Praia da Rocha, Inhambane, Mozambique*

In 2016, our teams carried out survey and excavation field work in the Inhambane Province, located in southern coastal Mozambique. At Praia da Rocha we have identified several previously unknown shell middens dated to the regional Iron Age (c. 700 BP). All sites are located within few hundred meters of each other and only one (Praia da Rocha 1) was, so far, excavated, revealing not only dense concentrations of shells, charcoals and potsherds, but also a human burial. This poster presents the taxonomic identification of charcoals coming from five of these shell middens and to compare them, with the goal of drawing a characterization of the acquisition of wood for fuel during the Iron Age in coastal Mozambique. Charcoals were recovered individually or by sieving at Praia da Rocha 1 and from bulk sediment samples collected from exposed profiles at each one of the other sites. They were analyzed using standard methods of light microscopy, considering features of the three main sections of charcoals: transverse, longitudinal tangential and longitudinal radial. Results revealed similar woody taxa across all shell middens, with a greater diversity of woody taxa associated with the human burial at Praia da Rocha 1.

Matisoo-Smith, Lisa [321] see Zalloua, Pierre

Matisoo-Smith, Lisa (University of Otago), Anna Gosling (University of Otago) and David Burley (Simon Fraser University)

[402] *A Tale of Tongan Chickens*

Lapita peoples transported a number of animal species in their colonizing canoes as they settled the islands of the Pacific. Included among the domesticated animals introduced by Lapita peoples were chickens (*Gallus gallus*). Later, Polynesians also transported chickens as they settled many of the islands of the Polynesian Triangle. The discovery of pre-Columbian archaeological chicken bones recovered from the site of El Arenal, on the south-central coast of Chile, has been the topic of significant debate. Ancient DNA and isotope data of these remains indicate that chickens were likely introduced by Polynesian voyagers and thus provide clear evidence of pre-Columbian Polynesian contact with South America. It has been suggested, however, that the DNA sequences obtained may have been the result of modern chicken DNA contamination in laboratory reagents. Recently obtained complete mitogenome data from early Tongan chicken bones will be presented and discussed in terms of debates regarding the origins and the timing of Pacific chicken introductions and evidence of prehistoric Polynesian contact with South America.

Matney, Timothy [262] see Maki, David

Matos, Ramiro [306] see Parsons, Jeffrey

Matson, R.G. (Univ of British Columbia) and William Lipe (Washington State University)

[313] *Setting the Stage: The Landscape Archaeology of the Cedar Mesa Basketmaker II*

During the Basketmaker II (BM II) many of the features that characterize succeeding Puebloan cultures were developed. There are two main BM II agricultural adaptations--the earlier canyon floodwater farming and the later mesa-top dry-farming. On Cedar Mesa, the earlier form is best known from the Turkey Pen site in Grand Gulch and the later adaptation from mesa-top surveys and excavations. The canyon adaptation (ca. 100 BC to ca. AD 150) is tentatively named the Turkey Pen Phase. The mesa-top form dates to AD 200-400 and has been named the Grand Gulch Phase. Some of the major cultural landscape features and basic settlement organization that characterize later Northern San Juan Pueblo cultures were first developed in the expansionary Grand Gulch Phase. We review aspects of the Cedar Mesa BM II and discuss how the cultural landscapes created in that period have implications for the later Puebloan cultures across the northern Colorado Plateau.

Matson, R.G. [362] see Battillo, Jenna

Matsumoto, Yuichi and Eisei Tsurumi (University of Tokyo)

[306] *From Kotosh to Pacopampa: Sixty-Years of Japanese Investigations on the Andean Formative*

From the excavations at Kotosh during the 1960's, the University of Tokyo school of Andean Archaeology has consistently carried out large-scale archaeological researches focusing mainly on the Formative Period of the central Andes. All the archaeologists participated in the excavations, from the first ones by University of Tokyo Scientific Expedition at the site of Kotosh till the current Pacopampa Archaeological Project by the National Museum of Ethnology team, continue to share a principal research theme, the formation process of early Andean Civilizations. Their researches can be characterized by multi-year and large-scale excavations focusing on a single ceremonial center such as Kotosh, Huacaloma, Kuntur Wasi, and Pacopampa, and cooperative public activities with local communities for the practical use of archaeological sites as cultural patrimony. The former has resulted in establishing fine-grained site chronologies while the latter produced a site museum co-managed by archaeologists and local populations. In this paper, the authors will summarize the sixty-year history of their researches on the Andean Formative in chronological order and consider their legacies to Andean archaeology both in research methodology and public activities.

Matt, Ira

[377] *Discussant*

Matthew, Laura

[162] *Discussant*

Mattioli, Tommaso [369] see Diaz-Andreu, Margarita

Mattson, Hannah (University of New Mexico)

[245] *Directional Color Schemes at Chaco Canyon: Quaternary Patterns in Ornaments and Minerals from Kiva Offerings*

The placement of colorful ornaments, marine shell, and minerals in discrete ritual deposits is a long-lived practice in the Ancestral Pueblo region. This tradition is exemplified in Chaco Canyon, where numerous ceremonial deposits comprised of such objects have been documented in kivas and other rooms within great houses. These materials display patterned variation in their distribution and co-occurrence in structured contexts, suggesting that they held symbolic significance. In this paper, I explore the hypothesis that the past meanings of ornaments and minerals in Chacoan kiva offerings may be linked to cosmological associations between specific colors and world quarters/directional quadrants. Color-directional schemes are common in traditional societies worldwide, and quaternary systems (those including four directions, each with a different color association) are particularly widespread among ethnographically documented North American groups, including the Pueblos. I also consider evidence for color circuit directionality (clockwise/counterclockwise) and changes in

offering contents over time.

Mauldin, Raymond [36] see McAuliffe, Richard

Maurer, Kathryn [224] see Connell, Samuel

Maurer, Kathryn (Foothill College), Niall Brady (ADCO, Ireland), Samuel Connell (Foothill College), Daniel Cearley (Las Positas College) and Ana Lucia Gonzalez (Foothill College)

[395] *The Castles in Communities Model: An Integrative Approach to a Field School, Research Project and Community Collaborative in Ireland*

Castles in Communities: Medieval Ireland Past to Present (CIC) is a multi-year project in Ballintober, County Roscommon, Ireland, with a trifold identity of an archaeological and anthropological field school, a research project focused on medieval Ireland, and a community collaborative focused on heritage preservation and celebration. The underlying premise of CIC is that the construction of knowledge about the past and its use as heritage today is best served through both excavation and ethnography, and with a firm commitment to the ethics, methods and theoretical implications of community-engaged archaeology. After four field seasons, CIC is beginning to see the results of our integrated model, and specifically how our work is being integrated into the construction and utilization of a local heritage narrative, a narrative which took center stage in Ballintober's 2018 bid for the national Pride of Place competition, and a narrative which is emerging as a potentially attractive one in tourism initiatives such as Ireland's Hidden Heartland. This paper will share highlights of our model along with some of the successes and challenges to date of our integrated and community-centered approach.

Maxwell, Ashley (University of South Florida), Kristina Killgrove (University of North Carolina) and Robert H. Tykot (University of South Florida)

[111] *The Langobards in Italy? A Look at Migration in Vicenza Using Oxygen Stable Isotope Analysis*

At the end of the Great Germanic Migrations in AD 568, Langobards from Pannonia entered and occupied 2/3 of the Italian peninsula. It is unclear how large these migrations were, as historical documents exaggerate mass movements; however, conservative estimates suggest they made up 8% of the Italian population. This research identified migrants in two 7th century AD Italian cemeteries from Vicenza, Dueville and Sovizzo, which contain evidence of the Langobard occupation. Oxygen stable isotope analysis was performed on 60 individual tooth enamel samples, and converted to drinking water using well established equations. The results indicate that 33% of the individuals from Dueville and 40% from Sovizzo have oxygen values outside the local range, for a total of 37%. Interestingly, the oxygen values for those considered non-local are enriched, potentially indicating Byzantine migrants from the coast, or from North Africa, with one individual having values suggestive of the Pannonian region. This is not surprising given migration and mobility throughout Italy has been established for centuries. The lack of identifiable Langobards in this study could be due to the generation of Langobards in the cemeteries, or it is comprised of the local population under Langobard rule.

Maxwell, David [2] see McCauley, Brea

Maxwell, Timothy (Museum of New Mexico, Office of Archaeological Studies) and Rafael Cruz Antillón (Instituto Nacional de Antropología e Historia)

[296] *Explorations East of Paquimé*

Since 1994, the Instituto Nacional de Antropología e Historia has conducted archaeological surveys and excavations in the river valleys and drainages in the Casas Grandes region east of Paquimé in northern Chihuahua. Sites from the Archaic through the terminal Casas Grandes periods were found and recorded. Spanish Colonial artifacts from Camino Real traffic were also noted at some places. Surface collections were made as well as occasional testing or recovery of exposed human remains. Sites recorded or studied include campsites, open-air sites, farmsteads, and villages. Evidence for localized pottery production and turquoise processing was examined in detail at several sites. There are indications that sites along the Rio Carmen were politically independent from Paquimé but that a trade relationship existed. An overview of findings is presented.

Maxwell, Timothy [413] see Thibodeau, Alyson

May, Alejandra (Purdue University), Evalyn Stow (Purdue University), John Rapes (Purdue University), Benjamin Schiery (Purdue University) and Erik Otarola-Castillo (Purdue University)

[127] *The Effect of Climate Change on the Niche Space of North American Proboscideans*

Most researchers agree that the extinction events of North American megafauna, including proboscideans, occurred approximately 13,000 years ago. The reason for the demise of these creatures, in particular proboscideans such as mammoth and mastodon, is a matter of debate. There are three accepted general hypotheses explaining the extinction of these North American megafauna: (1) human over-hunting (2) climate change leading to a reduced niche, or (3) a combination of climate change and human over-hunting. While two of the three hypotheses invoke climate and environmental change as a factor impacting proboscidean extinctions, how climate change might have affected the suitability of the proboscideans' environments remains unclear. Here, using archaeological and paleontological location data and paleoenvironmental reconstructions of key environmental variables, we reconstruct and examine the niche space occupied by North American proboscideans and investigate the effects of climate-variable changes on niche space fluctuations between 30,000 and 10,000 years ago. Studying the impact of climate change on the proboscidean niche should facilitate parsing the non-human effects on their disappearance, and increase focus on the effects that human hunting might have had on these mammal extinctions.

May, Jenna [17] see Guilfoyle, David

May, Kenzie [176] see Jones, Emma

Mayfield, Tracie (University of Southern California) and Simmons Scott (University of North Carolina, Wilmington)

[198] *From the Canopy to the Caye: Two of Britain's Colonial Ventures in Nineteenth-Century Belize*

During the nineteenth century, Latin America was a hotbed of trade and commerce driven principally by extractive industries such as agriculture and hardwood collection. Such ventures required large injections of capital into the creation and maintenance of productive landscapes as well as for hiring, housing, and feeding the workers who provided labor. Our presentation will explore two such sites in Belize: Lamanai, an inland site, which is located in northwestern Belize and San Pedro Town, located off the coast of Belize on Ambergris Caye. During the nineteenth century British colonists established settlements at these sites: at Lamanai, to plant sugar cane and harvest hardwoods and on Ambergris Caye to cultivate coconuts. Along with wild fauna, chicken, beef, and bottled, canned, or barreled products such as soda water, salted pork, and potted meat, the residents of nineteenth-century Lamanai and San Pedro Town were also active consumers of tobacco and bottled alcoholic beverages. In addition, earned labor money was used to purchase bottled medicines, health and hygiene products (e.g. chamber pots), and wearable objects such as buttons and boot heels. We compare and contrast these two contemporary sites, situated in different landscapes, but both within the Latin American, British colonial-industrial complex.

Mazumdar, Shyamalava [232] see Chakraborty, Kalyan Sekhar

Mazzetto, Elena

[304] *Quail in the Religious Life of the Ancient Nahuas*

In documentary sources recording Nahuatl culture of the Late Postclassic period, a bird called zollin, identified as a quail (*Cyrtonyx montezumae*) is especially prominent. Indeed, these small birds were often chosen to be sacrificed before the divine effigies and, in some cases, to be consumed during ritual events. Despite the significant role played by quail in Nahuatl social and religious life, this bird has been neglected in the study of central Mexican cultures. This paper focuses on the symbolism of quail in rituals of the ancient Nahuas, including their physical characteristics and their representation in the codices, as well as their role in religious life. This paper analyzes the rites involving quail, the divinities and the associated characters, as well as the specific contexts. Finally, this research explores the relationship between this data and archaeological evidence documenting fauna discovered by the Templo Mayor Project and the Urban Archeology Program,

in Mexico City.

Mazzucato, Camilla [388] see Twiss, Katheryn

McAllister, Martin (Northland Research, Inc.)

[135] *Chair*

McAllister, Martin [135] see Kober, Brent

McAllister, Ray (Oklahoma Anthropological Society) and Sharon McAllister (Oklahoma Anthropological Society)

[297] *Working Towards Collaboration: a Model of Interaction between Archaeology Professionals and Avocationalsists*

Avocationalsists are a valuable asset for museum curators and collection analysts. Budget-strapped institutions can benefit from a structured program of volunteers trained to clean, sort, analyze, and catalog artifacts for inclusion into museum collections. From an existing strained relationship, archaeology lab managers and volunteers in Oklahoma have developed a working program that has significantly reduced a backlog of artifacts collected through the years. Our presentation examines the experience of artifact processing from an avocationalsist's point of view. We will discuss strategies that resulted in meaningful accomplishments for our state archaeology labs as well as rewarding experiences for the volunteers involved.

McAllister, Sharon [297] see McAllister, Ray

McAnany, Patricia (University of North Carolina, Chapel Hill)

[79] *Contributions of a Three-K'atun Archaeologist to Theorizing the Classic Maya Past*

Theory—the workhorse of evidence—is a powerful engine that can revolutionize understanding or create a huge misstep. To theorize the past is to generalize principles and processes of human practice that surpass cultural boundaries. By participating in these larger networks of meaning, theorists hope to link the specific with the general in a truly resonant fashion. But the meaning(s) of material remains for peoples of the past remain(s) an elusive thing, which by no means is made more transparent by past use of a written script. A strong contribution of Stephen Houston's scholarship lay in deftly amplifying theoretical frameworks that resonate with Maya materials. The implications of this scholarship for our understanding of a range of material remains from hieroglyphic texts to LiDAR imagery is considered. A Maya archaeologist who came of age during the golden years of the decipherment, Houston's social contextualization of Classic Maya southern lowland royalty defies comparison as does the career of this remarkable scholar who is both humanist and social scientist.

[165] *Discussant*

[244] *Chair*

McAnany, Patricia [244] see Clark, Dylan

McAttackney, Laura (Aarhus University)

[279] *Subverting Forced Confinement? Methodological Approaches to Re-peopling Archaeological Studies of Institutions*

Archaeological studies of institutions have had varying degrees of success in moving beyond the intentions of their builders - and their often-imposed material culture - to understand how the inhabitants lived in and experienced them. Our overarching interest in analyzing, recording and interpreting material remains can sometimes prevent us from moving beyond the 'stuff' to actually grapple with the experiences of institutions as concepts. I argue we should attempt to record the negotiations between structure and agency; subversion and compliance in order to figure out how they co-existed rather than focus solely on material remains. This paper will use the case-study of a largely extant Magdalene Laundry in Dublin,

Ireland, to explore how we can utilize an archaeological sensibility while incorporating the testimonies of surviving inhabitants into our recording of these places. In particular, this paper will discuss both the benefits and drawbacks encountered in utilizing site-responsive oral testimonies with elderly, former inhabitants of religious-run institutions. It will conclude there is a need to consider how we include the experiences of forced inhabitants as not only providing insights into how these places actually functioned but also as a social justice imperative.

McAuliffe, Richard (Texas State University), Stephen Black (Texas State University) and Raymond Mauldin (Center for Archaeological Research, University of)

[36] Central Texas Plant Baking

Burned rock middens, large accumulations of thermally fractured stone and charred earth representing earth oven facilities, are ubiquitous in the hunter-gatherer archaeological record of Central Texas, upon and near the Edwards Plateau. The subject of study for over a century, work in the late 1990s and early 2000s compiled radiocarbon dates from these features suggesting their use began as early as 9000 cal BP, but may not have peaked until between 800 and 1000 cal BP. This paper updates those earlier studies through the addition of radiocarbon dates run over the past 15 years and summarizes what has been learned about the underlying technology and the targeted resources. Our review suggests that while the processing of a variety of resources likely contributed to burned rock midden accumulation over their roughly 8000-year use trajectory in Central Texas, in most cases these features served to bake a narrow range of plants to satisfy mainly dietary concerns. Evidence of subsistence, technology, and dating are used to synthesize an understanding of these plant baking facilities in Central Texas.

McBride, Kevin (University of Connecticut)

[72] The Utility of Metal Detector Surveys in CRM

Metal detectors are rarely employed in CRM research yet their utility in locating historic sites of low visibility and artifact density have been effectively demonstrated in Battlefield Archaeology studies. This paper will argue for the importance and utility of metal detector surveys in CRM through several case studies that compare the results obtained from shovel test pit surveys followed by metal detector surveys. These examples indicate that shovel test pit surveys, even at 5-meter intervals, are completely ineffective in locating more ephemeral seventeenth and eighteenth century Native- and Euro-American domestic sites.

McBride, Kevin [145] see Willison, Megan

McCabe, Kendra and William Billeck (Department of Anthropology, National Museum of Nat)

[9] Chronological Composition Variation of White Glass Beads from Plains and Midwest Sites

Small drawn white beads are ubiquitous throughout archaeological sites in the United States but historically provided little chronological information due to their uniform appearance. Portable X-ray fluorescence provides a nondestructive means of determining relative amounts of elements used in glass bead opacifying agents. This study tested the chemical composition of 490 drawn white glass beads from Plains and Midwest archaeological sites with known dates from the 17th-19th centuries. Each bead was tested Bruker Tracer III-V portable XRF under vacuum with a 12mil Al, 1mil Ti, 1mil Cu filter, and the resulting spectra were analyzed with Bayesian statistics then normalized relative to the machine's rhodium backscatter. The study found the beads from early 1600s sites were lead and tin-rich. Beads from the late 1600s to late 1700s sites were antimony-rich with low lead in beads <4mm and varying levels of lead in beads > 4mm. Early 1800s sites had antimony-rich and arsenic-rich beads. In late 1800s sites, beads >4mm had high levels of lead and antimony while only arsenic-rich variant was found in beads <4mm. Understanding and identifying chronological patterns in the chemical composition of opacifiers in otherwise indistinguishable beads may assist dating objects and sites.

McCafferty, Geoffrey (University of Calgary)

[28] Feathery Serpents of the Greater Nicoya Region

Polychrome pottery from the Greater Nicoya region of Central America prominently features 'feathery serpents' that have been associated with the Mixteca-Puebla tradition of greater Mesoamerica. A closer look at the variety of 'feathery serpents' has discriminated between more Borgia-like images and others that are less prototypical, including features such as legs

and shield patterns on the back. Feathered serpents have been at the core of debates over whether or not the Greater Nicoya region should be considered part of the Mesoamerican culture area. Recent excavations have refined the chronology of Greater Nicoya polychromes, especially in Pacific Nicaragua, such that these so-called "Mixteca-Puebla" diagnostics now pre-date polychromes from central Mexico. This paper will muddy the waters of how we define "Mesoamerica," at least for the Postclassic period, with suggestions about the importance of religious and economic interconnectedness, and the directionality of cultural influences.

[412] *Discussant*

McCafferty, Geoffrey [349] see LeBrell, Emilie

McCafferty, Geoffrey [412] see Rice, Shaelyn

McCafferty, Sharisse [349] see LeBrell, Emilie

McCafferty, Sharisse (University of Calgary) and Geoffrey McCafferty (University of Calgary)

[412] *Religious Practices of Pre-Columbian Pacific Nicaragua*

Colonial period ethnohistorical sources recorded the religious practices of the Contact period Nicaraos of Pacific Nicaragua, including a pantheon of deities, use of a ritual calendar, and other ceremonies. These were closely affiliated with the religion of Nahua central Mexico, linked to the purported migration of Nahuatl-speakers into the region in the final centuries prior to European contact. Relatively little information, however, was provided about the religious practices of other ethnic groups in the cultural mosaic of Postclassic Nicaragua, and no historical sources are available for earlier time periods. This paper will summarize what can be gleaned from archaeological evidence from the 2000 years of pre-Columbian prehistory, with particular reference to mortuary practices, ceramic figurines, iconography, stone sculpture, and petroglyphs. The implication based on these data is for an animistic/shamanistic religion without recognizable 'deities,' a spirituality tied to natural elements, at least for societies pre-dating the alleged Mexican migrations.

McCafferty, Sharisse [412] see Rice, Shaelyn

McCaffery, Harlan [419] see Mendel, Catherine

McCall, Grant (Center for Human-Environmental Research) and Russell Greaves (Center for Human-Environmental Research)

[41] *The Ethnogeology of Sedimentation and Land Formation in the Lower Mississippi Delta of Plaquemines Parish, Louisiana*

The Lower Mississippi Delta is one of the most dynamic geological landscapes in world, experiencing a complex mix of alluvial sedimentation and coastal erosion. Additionally, both historic and prehistoric human populations have been drawn to this region by virtue of the extreme productivity of the estuarine environments created by the interactions between freshwater and saltwater ecosystems. Consequently, human societies have developed a range of adaptive solutions for dealing with the physiographic and ecological challenges of living in such a geologically and ecologically dynamic location. Our paper looks at the activities of modern fishing communities in lower Plaquemines Parish, Louisiana, and documents the sophisticated perspectives of this population in understanding the geological and ecological processes related to alluvial sedimentation, coastal erosion, and the balance of freshwater and saltwater environments. These modern ethnographic observations also are relevant to developing ethnoarchaeological analogies about impermanent coastal and riverine settlement dynamics and subsistence. We pay particular attention to the results of recent crevasses along the natural levees of the Mississippi and the effects of human-made sediment diversion projects in forming new land surfaces. Finally, we offer some thoughts on prehistoric settlement systems based on the knowledge of modern fishing communities in the region.

[152] *Discussant*

McCanna, Aaron (University of New Mexico) and Matthew Schmader (University of New Mexico)

[112] *Three-Dimensional Modeling Applications for Cultural Preservation*

Three-dimensional modeling of archaeological sites has been used in scholarly papers as well as in museum displays to illustrate the original appearance of the archaeological site. In addition to these valuable applications, three-dimensional modeling of partially-excavated or no-longer-standing archaeological architecture has significant value to the field of cultural preservation. This project focuses on a portion of the partially excavated Piedras Marcadas Pueblo, located in the Albuquerque Open Space. Using architectural modeling programs such as SketchUp, the Pueblo was partially reconstructed with two-foot tall interior and exterior walls that were known to exist. The three-dimensional rendering of this floor plan can help inform further excavations and interpretations. Further work on this project will entail interpreting features of the Pueblo that no longer physically exist, using stylistic and structural information from similar Pueblos such as Zuni Pueblo and Taos Pueblo. The goal of this poster is to illustrate the value of undertaking this process. Digitally rendering the site from known features enables us to preserve the site from typical erosional forces, as well as provide a foundation with which to interpret what the site may have looked like in its original form.

McCarthy, Andrew (University of Edinburgh and CSN)

[366] *Signs of Shared Identity: Neolithic Incised Stones in Cyprus and Beyond*

Enigmatic incised stones dating to the Aceramic and early Ceramic Neolithic periods indicate an element of persistent shared material culture between Cyprus and the Levant in spite of cultural trajectories and material culture assemblages that were beginning to diverge from one another. The stratigraphic sequence at the site of Prasteio-Mesorotsos in the west of Cyprus is examined here showing moments of continuity and change between these periods. This site will be looked at in the wider context of Cyprus and the Near East and the incised stones found at Mesorotsos will be discussed in relation to the PPNB and Khirokitian periods and the emergence of the Ceramic Neolithic. The development of an increasingly substantial settlement at Prasteio-Mesorotsos, coupled with the sensitive material culture expressions that were shared between settlements, indicate that an independent Cypriot identity was beginning to emerge that relied increasingly less on interaction with the mainland and more on negotiating territory in Cyprus itself.

McCarthy, Katherine

[406] *An Empire of Water and Stone: Aztec Kingship and Sacred Landscapes*

My project will center around the Acuecuexco Aqueduct Relief (also referred to as the Ahuitzotl's Aqueduct Relief) and its implications as a monument celebrating a public works project by an Aztec emperor. Only one other comparable example is known to date: the Chapultepec carving of Montezuma II. Although the later carving has received significantly more attention in the scholarship, both works remain open for further study and interpretation. Neither have been fully analyzed as public works projects connected to the influx of water to the capital city. Due to the incredible value of water to the physical and cultural stability of the empire, I hope to build off of Barbara Mundy's studies on water in the Aztec Empire to fully understand the significance of these monuments to the city and the image of the rulers they portray. I will also seek to follow the monuments throughout history in a trans-conquest study, connecting the ancient propaganda through the colonial period into its modern manifestations. This paper will aim to shine a light on these monuments and contextualize their roles as public monuments and negotiating points between Aztec kingship and sacred landscape.

McCarthy, Melissa (California State University, Sacramento)

[172] *Dental Health and Activity Indicators in the Burials from the Godet Cemetery*

Sint Eustatius (Statia) is a Dutch Caribbean island with historical evidence of three main cultural groups: native people, people of African descent and people of European descent. As a hub of 18th century trade for various colonial powers, Statia is an important location for using archaeological and forensic bioarchaeological analyses to study globalism and colonialism. Examination of the dentition from burials from an 18th century cemetery excavated between 2012 and 2018 was conducted to explore dental health and activity patterns of individuals interred in this cemetery. Teeth from both adults and subadults, likely of African ancestry, were available for analysis. This study employs evidence from dental caries, enamel attrition, dental calculus, and enamel defects to assess dental health and diet. Activity indicators, such as antemortem chipping and wear facets, were also documented. Despite belonging to an enslaved and/or marginalized

population, dental health during childhood and adulthood was relatively good. Chipping on the facial surface of some anterior teeth suggests the use of teeth for grasping hard objects, such as straight pins. The presence of pipe facets paired with the biological ages of some individuals indicate they were younger tobacco smokers.

McCarty, Sue (James Madison University)

- [267] *Killed Pots and Running Herds: Late Neolithic Halaf Phenomenon Ritual Practice at Kazane Höyük, Southeastern Turkey*

Unlike the Pre-Pottery Neolithic of the Fertile Crescent, the Late Neolithic Halaf phenomenon (5,900-5,350 Cal. B.C.E.) in southeastern Turkey, northern Syria and Iraq is not well known for costly activities that can be linked to symbolic ritual behavior, as seen at sites like the earlier Göbekli Tepe. Although it produced a rich corpus of ceramic motifs, stamp seals, and tokens incorporating naturalistic figures, there are no public ritual structures. Expressions of spiritual practice are limited to a varied array of mortuary styles and clay figurines. The following talk explores symbolic behavior and ritual practice from the largest known site of the Halaf phenomenon, Kazane Höyük, in southeastern Turkey. In particular, it shows that activities that may be linked to ritual are incorporated into personal, household-level decisions and practices. Material evidence for systems of belief in the excavated materials from Kazane does not strongly support unequal access to prestige or ritual resources, nor does it suggest a preference for investing community-wide labor into the construction or creation of ritual objects or structures. Like evidence for Halaf social inequality in general, ritual practice at Kazane does not follow trends consistent with incipient vertical hierarchies in later periods, including the following 'Ubaid.

McCauley, Brea (Simon Fraser University)

- [2] *Upper Paleolithic Handprints with Missing Fingers: An Ethnological Perspective*

Handprints with missing fingers occur at a number of Upper Palaeolithic rock art sites in Europe. It has been argued that they represent hand signals or a counting system, but there are reasons to believe that they were actually produced by individuals whose fingers had been amputated. Here, we report a cross-cultural study that was designed to shed light on this phenomenon. We identified 121 societies from Africa, Asia, the Americas, and Oceania that engaged in finger amputation at the time of ethnographic data collection, and we were able to distinguish ten different finger amputation practices within this sample. When the contexts and what we know about the participants are taken into account, the scenario that best fits the incomplete handprints is removal of fingers during life in order to appeal for supernatural assistance. This has interesting implications for social life in the Upper Palaeolithic, for traumatic religious rituals have been found to foster strong interpersonal bonds among group members and hostility towards members of other groups.

- [2] *Chair*

McClain, Aleksandra [351] see Sykes, Naomi

McCleave, Christine [294] see Miron, Rose

McClellan, Carolyn (Sacred Sites Research) and Lawrence Loendorf (Sacred Sites Research)

- [369] *Legend Rock Remembered*

Legend Rock is a world-renowned petroglyph site located north of Thermopolis, WY. Considered a sacred site by the Shoshone Indian Nation it features impressive and significant petroglyphs within the Dinwoody tradition. This presentation focuses on the management plan created between Wyoming State Parks and the Bureau of Land Management with input from the Buffalo Bill Historical Center, the University of Wyoming, regional American Indian nations, local communities, and interested individuals to develop the management of the site.

McClelland, John (Arizona State Museum)

- [93] *Discussant*

McClung de Tapia, Emily [38] see Acosta-Ochoa, Guillermo

McClung de Tapia, Emily (IIA-UNAM MEXICO)

[38] *Discussant*

McCollum, Megan [160] see Schultz, John

McConnan Borstad, Courtney, Adrienne Offenbecker (University of Calgary) and M. Anne Katzenberg (University of Calgary)

[258] *Isotopic Analysis of Dietary Variation at Casas Grandes, Mexico*

Stable isotope analysis of prehistoric human remains has complemented other dietary reconstruction techniques for many years. It provides biologically-based data that allow an examination of what was actually consumed.

Using 70 individuals from Paquimé and 14 from the nearby Convento site, we examine whether bone collagen $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values are correlated with estimated sex, age, time period, non-local origin, and status at prehistoric Casas Grandes. Although outlier values are identifiable, the only significant difference is between $\delta^{13}\text{C}$ values from the Viejo (700-1200 CE) and Medio periods (1200-1450 CE). We explain this as the influence of a C4 and CAM isotopic environment, which result in low isotopic variation for most diets. The significant difference between the earlier and later period mean $\delta^{13}\text{C}$ values is attributed to an increase in the consumption of maize or animals that consumed C4 or CAM plants during the Medio. Stable nitrogen isotope values remain relatively constant throughout, making it difficult to detect changes in trophic level using stable isotope values. This study presents the largest dietary stable isotope data set from the Casas Grandes region. The results show that isotopic methods of detecting dietary variation are best used in conjunction with other archaeological evidence.

McConnell, Joseph

[322] *Evaluating "Folsom" Points in the Blackwater Draw Museum's Calvin Smith Collection*

Folsom projectile points are housed and displayed by museums around the country, but many are donated by collectors without the accompaniment of information documenting their original archaeological context. As a result, questions surrounding their authenticity hamper their ability to contribute to collections-based archaeological research of the Folsom time period. This poster presents the results of a technological and morphological analysis of Folsom points recovered from a variety of secure archaeological contexts. Observations of fundamental characteristics present in this dataset were used to evaluate the authenticity of a collection of projectile points donated to Eastern New Mexico University's Blackwater Draw Museum and Curation facility that were labeled as "Folsom points". The goal of this research is to provide the museum with an empirical investigation that may validate reference to the artifacts as "Folsom" and their inclusion into Folsom-era research, and generate a method for authentication that may be useful for other institutions across the country.

McCool, Weston (University of California at Santa Barbara) and Joan Coltrain (University of Utah)

[286] *Using Trauma Distributions, Victim Profiles, and Differential Scavenging to Infer Characteristics of Prehistoric Warfare: A Case Study from the Peruvian Late Intermediate Period (AD 1000–1450)*

Non-state warfare has the potential to effect myriad aspects of people's lives. The last several decades of archaeological research have revealed that conflict has shaped much our evolutionary history and regional population trajectories. Despite the importance of prehistoric warfare, it remains a substantial challenge to elucidate the basic characteristics of conflict. Frequency, predictability, and mortality all play critical roles in influencing the impacts of warfare. An understanding of the basic nature of warfare in particular regions can permit more formal expectations regarding how conflict effects human populations. It may also allow a more in-depth understanding of the behavioral pathways by which conflict leads to compromised health and changing social systems. Osteology can provide methodological inferences into warfare's character by revealing who the victims of conflict are, the ways in which they were harmed, and the possible locations where victims were killed. This poster showcases five osteological tests to reveal the salient characteristics of non-state warfare using a Late Intermediate period population from the Nasca highlands of Peru as a case study.

McCormack, Valerie and Kary Stackelbeck (University of Oklahoma)**[75] Creative Mitigation to Counter Resource Losses from the Lake Cumberland Drawdown, Kentucky**

In early 2007, signs of a dam failure triggered the U.S. Army Corps of Engineers to implement an emergency drawdown of Lake Cumberland in south – central Kentucky. Reducing the water elevation by 10 feet caused 1400 miles of shoreline to be exposed. While the emergency prevented a life-safety catastrophe, the drawdown created a new erosion zone and exposed archaeological sites to looters. The results of conventional archaeological surveys revealed damage to sites that called for “after-the-fact” mitigation. Alternative and creative mitigation became a necessary approach for USACE to meet its obligations under the National Historic Preservation Act. This paper will discuss the creative brainstorming among USACE, the Kentucky State Historic Preservation Officer, and tribes that led to three alternative mitigation measures aimed at educational outreach, raising public awareness, and staff training. The paper will discuss problems experienced during the implementation and assess the success of each measure. Finally, we will present lessons learned for others considering alternative mitigation.

McCormick, David (Yale University), Zachary Hruby (Northern Kentucky University), Olivia Navarro-Farr (The College of Wooster), Michelle Rich (Dallas Museum of Art) and Keith Eppich (Tyler Junior College)**[255] The Symbolism and Technology of Classic Maya Tomb Debitage from El Peru-Waka**

Obsidian blades and relateddebitage from four elite tombs recently excavated at El Peru-Waka have the potential to answer the question of why and how the ancient Maya placed this material above, around, and sometimes within the burial chambers of the Classic Maya elite. We explore how thisdebitage may have been considered a ceremonial class of lithic rather than what archaeologists might typically consider nothing more than manufacturing waste. Special attention is paid to the detailed technological analyses of obsidians from four distinct tomb contexts; the first analysis of its kind.

McCoy, Mark (Southern Methodist University)**[316] Setting the Agenda for the Next Phase in Obsidian Studies in Aotearoa (New Zealand)**

Studies of obsidian artifacts from sites across Aotearoa (New Zealand) in the 1960s-80s, were critical to identifying a major decrease in mobility, just prior to the onset of endemic warfare, marked by the construction of thousands of fortifications by the ancestors of Māori. Unfortunately, initial enthusiasm was followed by stagnation in research. A number of factors are implicated in the sluggish rate of novel findings, including: a lack of faith in the reliability of geochemistry-based source assignments; small sample sizes; poor spatial-temporal controls; and failure to publish primary data on artifacts. Over the past decade, we have seen a resurgence of research with the adoption of pXRF. We now have reliable source assignments and lithic technology data on thousands of individual artifacts. Our interdisciplinary research group has used this data to model social networks as a window into the origins of Māori society. This new chapter in obsidian studies brings with it new and lingering issues, likely common to other regions, that must be overcome: what to do with legacy data; how to combine data to create appropriate spatial-temporal units; and how to visualize the complex links between communities evident in social network analyses.

[77] Discussant

McCoy, Mark [408] see Johnson, Adam

McCrackan, Jennifer, Nick Poister, Charles P. Jackson (New Mexico State University) and Eric Weaver (National Park Service)**[381] Nature and Culture, Fire and Ice: The Caves of El Malpais National Monument**

Cave surveys and archaeological inventories conducted over the course of six months of over 40 caves at El Malpais National Monument have revealed both ritualistic and utilitarian purposes. Located in northwestern New Mexico, the monument, largely composed of multiple lava fields is within the larger Zuni-Bandera volcanic flow. Hundreds of recorded archaeological sites ranging from prehistoric campsites and stone circles to elaborate Chacoan-style greathouses and kivas have been identified within the monument. There are over 300 recorded lava tubes, consisting of unique microclimates, habitats, geological features, and are valuable sources for other climatic, natural, and cultural data. These caves, in particular those containing perennial ice, host an array of rock alignments, pottery and lithic scatters, were utilized for water collection, refrigeration, and ritualistic uses. Looking at the larger archaeological picture, there is a clear connection between many cave and surface sites, and a difference in cave usage practices depending on where a site is in the park. The region

is steeped in native creation legends and a rich archaeological history that is little understood as to how it directly relates to the park's geological and cultural landscapes, the caves, and the nearby sacred site of Mount Taylor.

[381] *Chair*

McCray, Brian (Vanderbilt University)

[98] *To Wear or to Trade: Analyzing Bone Pendant Artifacts from the Peruvian Montaña*

In the montaña, the forested eastern slopes and adjacent upper Amazon, inhabitants were involved in regional and interregional trade networks connecting the Andes and Amazon. Given that material correlates for often ephemeral lowland goods are difficult to recover archaeologically worked bone artifacts are an important piece of data indexing lowland connections. Border intermediaries in the Ecuadorian montaña used strings of shell beads, sometimes called carato, to facilitate exchange, and bone adornments are used as part of lowland garb in modern rituals invoking relations between these regions. This paper reports worked bone artifacts from the lower montaña archaeological site of Wimba, in Amazonas province, Peru, occupied during the Late Intermediate Period and Late Horizon (ca AD 1000-1530). These materials are conceived both as worked bone adornments, and as circulated objects within exchange networks. Understanding the diversity in shape, size and material of these artifacts and those found at neighboring sites has implications for the prehistory of the montaña and the nature of cultural exchange at this ecological interface. This research interrogates how bone artifacts reflect a conversation between local and nonlocal value systems and contextualizes them within new understandings of alterity as structuring social interaction in the Andes and Amazon.

McCulloch, Robert [364] see Morello Repetto, Flavia

McCurdy, Leah [92] see Dixon, Neil

McDaid, Chris (US Army, Fort Eustis, VA)

[133] *Monitoring and Managing Eroding Archaeological Resources*

Fort Eustis is an approximately 8,000 acre peninsula bound by the Warwick and James rivers in Virginia's Tidewater region. There are 234 identified archaeological sites on Fort Eustis that range in age from 10,000 BCE to the early twentieth century. In 2010 the Fort Eustis Cultural Resources Management Program began an archaeological site monitoring program. The data from that effort indicated that erosion along the rivers and creeks was a significant threat to the archaeological record of Fort Eustis. An analysis of the monitoring results identified thirty-one sites that warranted having management strategies developed. The resulting study has been the basis for a program of temporary stabilization, National Register of Historic Places evaluations, and more permanent shoreline stabilization. This paper will address how the Fort Eustis Cultural Resources Management Program is developing a methodology to determine which sites warrant protection in place, which warrant data recovery, and which warrant no protective measures.

McDonald, Josephine (University of Western Australia)

[305] *Pahranagat Patterned Bodies and Big Horn Sheep*

The Lincoln County Rock Art Areas of Critical Environmental Concern (ACEC) Inventory Project in Nevada focused on the rock art from the Mount Irish, Shooting Gallery and Pahroc ACECs. All three of these areas form part of a distinctive style region within the Great Basin. This is defined by the presence of the Patterned Bodied and Solid Bodied Figures which were first identified by Heizer and Hester in the 1970s. These distinctive anthropomorphic forms are found within a larger assemblage which is dominated by bighorn sheep and geometric forms. The large dataset accumulated during the Lincoln County project mobilised significant legacy data as well as created an archaeological context for this important rock art province. Stylistic analyses conducted within the three ACECs has been augmented by the inclusion of several additional site complexes which also contain these distinctive motif forms. This paper discusses the chronological and spatial implications of these anthropomorphic motifs within the local region and Great Basin more generally.

[305] *Chair*

McDonough, Katelyn (Department of Anthropology, Texas A&M University)**[249] *The Western Stemmed Tradition During the Younger Dryas: The Newest Evidence from Connley Caves, Oregon***

Recent excavations at the Paisley and Connley Caves have uncovered coeval Younger Dryas occupations with different but complementary Western Stemmed Tradition artifact assemblages. Whereas the perishable artifact assemblage at Paisley Caves provides important health and subsistence data, the large lithic assemblage at Connley Caves has the potential to provide substantial insights into Western Stemmed lithic technology. This paper discusses the newest evidence from Connley Caves 4 and 5, where various styles of Western Stemmed projectile points and a diversity of other tools have been found in association with directly dated cultural features. In addition, spatial distributions of lithic and osseous tools hint at possible activity areas, and hearth features inform about subsistence. Data from the Paisley and Connley Caves sharpen our understanding of a previously uncertain record of human occupation in the Northern Great Basin during the Younger Dryas, suggesting that human populations were probably larger and more widespread than traditionally recognized.

[249] Chair

McDonough, Katelyn [323] see Donham, Megan

McEwan, Colin (Dumbarton Oaks)**[314] *Reevaluating an Offering Cache from Isla La Plata, Ecuador***

From the Middle Formative onwards, La Plata Island was gradually incorporated into developing local and regional networks of exchange along the Pacific littoral of Ecuador. The island also became the focus of increasing ritual activity evidenced in the material remains of offerings made on the coastal bluffs and at the principal landing point at Drake's Bay. Here a multi-component deposit at Site OM-LP-PL 14 is comprised of successive deposits of worked stone plaques, ceramic figurines, marine shell and other exotic materials. Using comparative data from Salango and other sites, this paper undertakes a re-evaluation of the chronology and content of the offering sequence and its changing relationship to the cultures of the adjacent continental mainland.

[350] Discussant**[314] Chair**

McFarland, Jeremy [30] see Cortes-Rincon, Marisol

McFarland, Jeremy (Humboldt State University) and Marisol Cortes-Rincon (Humboldt State University)**[409] *Mapping the Maya Hinterlands: A LiDAR-Derived Approach to Identify Small-Scale Features in Northwestern Belize***

This paper will discuss the processes and methods of relief visualization of LiDAR-derived digital elevation models (DEM's) and classification of secondary data to identify archaeological remains on the Maya landscape in northwestern Belize. The basis of the research explores various GIS and cartographic techniques to visualize topographical relief. Graphic terrain maps assist archaeologists with predictive settlement patterns. The Relief Visualization Toolbox (RVT 1.3) aids to visualize raster DEM datasets in the predictive identification and interpretation of small-scale archaeological features. This dataset and methodology can be utilized to answer questions of population estimates, mobility costs, and effectiveness of ancient technological agricultural systems.

McGill, Dru (North Carolina State University)**[60] Discussant**

McGovern, Thomas [31] see Szabo, Vicki

McGovern, Thomas**[31]** *Chair***McGrath, Alyssa (University of Notre Dame) and Mark Golitko (University of Notre Dame)****[126]** *Chemical and Mineralogical Examination of Surface Encrustations on Middle Bronze Age Pottery from Békés 103, Eastern Hungary*

Ceramic sherds found at Békés 103, a primarily Middle Bronze Age cemetery on the Great Hungarian Plain, are often covered in a dense white concretion that must be removed before restoration and study of the vessels commences. These white concretions complicate further study of ceramic provenance and residue analysis at the site. We use a combination of pXRF, EPMA, FTIR, and LA-ICP-MS on ceramics and soil samples taken in association with these vessels to understand the composition of these concretions and how sherds have interacted with their burial environment. Hypothesized sources include cremated bone and post-burial uptake of soil phosphate. Knowledge of the chemical composition of these surface concretions will allow further study of how the burial environment of the Békés 103 ceramics impacts their paste composition.

McGrath, James (University of Iowa)**[110]** *Colorimetric Analysis of the PP5-6 Ochre*

This poster presents the results of recent colorimetric analyses of the archaeological ochres from Pinnacle Point 5-6 (PP5-6), Western Cape Province, South Africa. Ochre colors are derived from digital photographs of streak plates and quantified in CIE L*a*b* color space. Results presented here indicate that the vast majority of ochres from this site produce red hued streaks, with some variation in streak hues and chromas throughout the PP5-6 sequence. These results are discussed in light of recent arguments for Late Pleistocene color-based selection preferences and color-influencing taphonomic processes.

McGuire, Randall (Binghamton University)**[83]** *What Can Archaeology Tell Us about Refugees and Forced Immigration?*

The authors in this session use archaeological methods to analyze refugees and forced migrations. We seek to better understand the material ramifications of migration in the lives of individuals. We wish to understand the tangible, material consequences of migration at a human scale. The papers in the session spring from historical archaeology and the archaeology of the contemporary. We study the experiences of refugees and immigrants as a material process. We use archaeology to find detail in the seeming chaos of migration in the past and the present. Our studies reveal the complex relationship that the material shares with social relations, meaning, and agency. The study of mute, ancient artifacts forced archaeologists to develop techniques to understand the human condition without discursive evidence. We use these techniques to provide a distinctive perspective on migration that integrates archaeological methods with history and ethnography. An emphasis on the human condition and a commitment to making the exotic familiar and the familiar exotic makes this archaeology intensely anthropological and differentiates it from most histories. Ultimately, we recognize the political nature of archaeology, explicitly advocate for communities, and seek help those communities to address contemporary issues and/or create usable pasts.

[16] *Discussant***[83]** *Chair*

McIntosh, Brandon [66] see Walton, Lauren

McIntosh, Brandon (Washington State University) and Andrew Duff (Washington State University)**[419] Investigating Turkey Husbandry on the Chacoan Frontier: Stable Isotope Results from Three Pueblo II Great House Communities in West Central New Mexico**

Growing research in animal domestication in the prehistoric western hemisphere has revealed a complex relationship between humans and the only originally domesticated animal in North America, the turkey (*Meleagris gallopavo*). Research suggests reasons for turkey management ranged from the use of their feathers in ritual to their value as significant protein resources during/after the transition from foraging to food production in North America. Reasons for managing turkeys varied cross-culturally, and its timing appears to vary across space. Therefore, additional research is required if we are to fully understand the role of turkeys in North American cultural evolution. Questions remain regarding when and where turkey domestication was practiced across the Southwest. This paper provides additional insight by presenting stable isotope analysis of turkey remains from Cox Ranch, Largo Gap, and Cerro Pomo pueblos on the western frontier of the Chacoan world in west central New Mexico. The level to which turkeys there relied on human caretakers for sustenance reveals their value at a time when food production was firmly established as a mode of subsistence. The results of this study expands our understanding of turkey husbandry in the Southwest specifically, and the complexity of food production in North America generally.

McKee, Arlo [36] see Lawrence, Ken

McKee, Brian (University of Arizona)**[373] The Archaeology of Indigo Production in Morazán, El Salvador**

The production of indigo dye dominated the economy of El Salvador for over 250 years, from the late sixteenth century decline of the cacao and balsam industries to the mid-nineteenth-century rise of coffee production. The Proyecto del Inventario de los Sitios Arqueológicos del Departamento de Morazán documented five indigo works (obrages de añil) in 2015 and 2016 in the northeastern Salvadoran department of Morazán. Although obrages have been recorded elsewhere in El Salvador, none had previously been investigated in Morazán. This poster reviews the history of indigo production in El Salvador. The technology of indigo agriculture and indigo dye production are examined with particular attention to features that would be archaeologically visible. A model is constructed to evaluate the identification of archaeological sites as obrages, including a detailed examination of the Morazán sites, presenting evidence to assess whether or not they were localities of indigo production. Productive avenues of future research are proposed, and the rebirth of indigo production in recent decades and its role in modern textiles and its potential for tourism are examined.

McKenna, Morgan (Idaho State University), Gabriel Wrobel (Michigan State University), Amy Michael (University of New Hampshire), Amy S. Commendador (Idaho Museum of Natural History) and Patricia McAnany (University of North Carolina)**[370] Understanding the Diet of Late to Terminal Classic Period Maya Groups in the Sibun River Valley, Belize, through Food Web Reconstruction**

A stable isotope based dietary study, coupled with previously collected zooarchaeological and botanical data, expands our understanding of ancient Maya dietary variation in the Late and Terminal Classic periods in the Sibun River Valley of central Belize. A food web was created based on the analysis of stable carbon and nitrogen isotope ratios in plants and animals native to the study area (including white-tailed deer, brocket deer, turkey, parrotfish, and peccary). Comparison of this web to isotopic data derived from bone collagen and carbonate samples of human skeletal material representing ~50 individuals from three different Sibun sites is incorporated within a probabilistic model for the types of foods eaten and their relative proportion within the diet. The data shows variation in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values between the sites, suggesting differences in diet related to differences in geography and perhaps social status.

McKenzie, Emily (University of Alabama), Taylor Puckett (University of Alabama), Lawford Hatcher (University of Alabama) and Katherine Chiou (University of Alabama)**[370] What's in a Seed?: Identifying Archaeological Chili Pepper Remains from Mesoamerica**

The chili pepper (*Capsicum spp.*) has cemented its place in ancient and modern Mesoamerica as a fixture in medicine, ritual, and cuisine. The timing and context of its domestication which began around 10,000 years BP, however, remains unclear. To address this, we conducted morphometric analyses of a diverse array of modern seeds from multiple species of wild and domesticated Mexican chilies and used that data to create a basis for identification and comparison of species and

varieties within the genus *Capsicum*. This methodology was then applied to the identification and study of archaeological seeds from multiple sites within the Mesoamerican region spanning thousands of years. From this analysis, we can document the diversity of chili peppers across time and space within the region and gain clearer insight into its impact on the lives of ancient peoples, as well as how patterns of its domestication are interwoven within—and influenced—by greater political, social, and cultural changes.

McKeown, Ashley (Texas State University)**[172] *Introduction to Exploring Globalization and Colonization Through Archaeology and Bioarcheology NSF REU Site***

The Exploring Globalization and Colonization Through Archaeology and Bioarchaeology National Science Foundation (NSF) Research Experiences for Undergraduates (REU) Site located on the Dutch Caribbean island of St. Eustatius (Statia) provides field and laboratory research experiences for undergraduate students from across the United States. The project's research goal is to understand how individuals, families, communities, and governments shaped the natural and built environment and developed strategies through consumer purchases and social networks to respond to globalization and colonialism. The 2018 investigations focused on Fort Amsterdam and a nearby cemetery where investigations found evidence of occupations and human remains dating from around 1720 to circa 1810.

[172] Chair**McKillop, Heather (Louisiana State University)****[242] *Salt in the Classic Maya Economy: The Paynes Creek Salt Works, Belize***

Although submerged by sea-level rise and invisible in the modern landscape, briquetage and wooden posts of salt kitchens at underwater sites at the Paynes Creek Salt Works, Belize provide a model for salt production elsewhere in the Maya area where wooden buildings have not preserved. The basic unit of production at the salt works was surplus household production. In addition to being a biological necessity and flavor enhancer, salt was valuable as a storable commodity in the form of salt cakes. Salt cakes were made in standard sizes for marketplace trade as currency equivalencies as occurred historically at salt springs in the Maya highlands. Salt was transported by canoe to inland marketplaces during the Classic period (A.D. 300-900). A wooden canoe paddle, several fragments, and a wooden canoe document boat travel.

McKillop, Heather [372] see Sills, E. Cory

McKillop, Heather [373] see Weaver, Kobi

McLeester, Madeleine (University of Notre Dame)**[239] *Ritual Traces and the Challenges of Detecting Late Precontact Rituals at Midewin National Tallgrass Prairie, IL***

Ethnographic accounts of indigenous communities throughout the United States illustrate the many ways that ritual activities were deeply embedded into everyday life. However, moving to the American Midwestern archaeological record, treatments of ritual are typically limited to large, ceremonial sites and these everyday rituals remain overlooked. This paper explores the traces of ritual activities and complex challenges of detecting them at a 17th century village, Middle Grant Creek, at Midewin National Tallgrass Prairie in northern Illinois. Since 2016, excavations have focused on refilled, subterranean storage features. These features have produced unusual artifacts, including marine shell, painted pottery, and, perhaps unique to this site, red painted freshwater mussel shells. Alongside these data, thermal drone imaging detected a 28m, sub-rounded hexagonal enclosure, interpreted as a potential earthwork associated with ritual activities, possibly part of the Midewin rite. However, the archaeological signature of this enclosure has not yet been detected in our recent excavations. Combined, these data provide only glimpses of ritual activity at this village. This paper discusses the challenges of neither overstating nor understating the archaeological evidence of ritual at this late precontact site, and how, by adopting an integrated, comprehensive perspective, we can begin to address these challenges.

[239] Chair

McLeester, Madeleine [239] see Schurr, Mark

McMahan, David [10] see Wygard, Brian

McManamon, Francis (Center for Digital Antiquity - ASU)

[188] *Promoting an Archaeological Perspective in Repatriation, Consultation, National Monuments, and Data Science*

Keith Kintigh is having quite a career in archaeology. I use the active voice because, as those of us who work with Keith well know, he's not finished yet! Throughout his career, Kintigh has promoted the benefits and values of an archaeological perspective steadfastly. Since the 1980s, Kintigh has played important roles in the development and implementation of the Native American Graves Protection and Repatriation Act (NAGPRA). He was among the drafters and negotiators of this important law and represented the archaeological profession in monitoring federal agencies as they undertook NAGPRA-related activities and developed programs. During the Clinton Administration, Kintigh advised Secretary of the Interior Bruce Babbitt on his plan for the National Monuments established or expanded by President Clinton. Most recently, Kintigh is leading professional efforts to improve archaeological research through the development of a digital data management infrastructure. Through his own collaborative research, publications, and other activities Kintigh is urging heightened professional attention to the effective use of digital data and professional practices that ensure the long-term preservation for future uses of archaeological data.

[237] *Discussant*

McNeil, Cameron L. (Lehman College, CUNY)

[243] *The Flowery Places of the Copan Maya and the Species They Used to Create Them*

Clues to the creation of flower-laden spaces in ancient Maya temples, tombs, and palaces lie on the floors of the best-preserved of these structures. The Copan Acropolis has proved to be a particularly good site for the recovery of well-preserved pollen grains from flowers that adorned ritual spaces. Scholars have described temple spaces as thick with the odor of burned copal, pine, and offerings, but added to this was the fresh and heady fragrance of greenery and blooming buds, imparting a fecund perfume to the areas of ritual supplication. These botanical offerings and adornments were undoubtedly tied to mythical associations, as they are today in modern Maya ritual houses. Analysis of pollen from sediment cores, and macroremains from middens, aided in the interpretation of ritual botanical materials, emphasizing the importance of understanding the complete ecological context of a community in the interpretation of species commonly found in ritual spaces. Few archaeological projects in the Maya area take floor samples for pollen analysis from buried temples and tombs. As this paper will demonstrate, this is a tremendous loss regarding our understanding of ancient Maya ritual practice.

[103] *Chair*

McNeil, Cameron L. [103] see Diaz Garcia, Mauricio

McNeil, Lynda and David Shaul (School of Anthropology, University of Arizona, Tucson)

[44] *Itamu umumi yooya' ökiwni ('We will arrive as rain to you'): Evidence of Historical Relationships among Western Basketmaker, Fremont, and Hopi People*

Noel Morss (1931) and researchers into the 1990s defined Fremont Culture in terms of the "Anasazi," leaving unanswered the question of the ethnic and linguistic identity of the Formative Era Fremont people. This paper expands upon the findings of two recent studies: (1) Eastern Basketmakers (EBM) were Kiowa-speakers (Ortman and McNeil 2017) and (2) Western Basketmakers (WBM) were mainly Hopi-speakers (McNeil and Shaul 2018). In this paper, we argue that migrating Hopi-speaking farmers interacted with Kiowa- and Tiwan-speaking farmers in the Colorado-Utah borderlands. The supporting evidence includes: the exchange of loanwords between Tanoan (Kiowa, Tiwan) and Hopi speakers; the mixture of EBM II and WBM II archaeological material at Basketmaker II sites; and the blending of EBM and WBM variants of San Juan Anthropomorphic rock art styles. Finally, the paper examines a subtype of the Classic Vernal rock art style believed to be ancestral to historic Hopi Katsinas, agriculture, and rain-making rites.

McNeill, Judith [29] see Ikehara-Quebral, Rona

McNeill, Patricia (University of California, Davis), Bryna Hull (University of California, Davis) and Teresa Steele (University of California, Davis)

[110] Does Exposure to Heat Alter Stable Isotope Values of Ostrich Eggshell?

Archaeological sites in Africa and Asia often contain large amounts of eggshell fragments from ostriches (*Struthio spp.*), indicating that these birds and their eggs were a valuable source of protein and calories for hunter-gatherers. Despite their abundance, however, ostrich eggshell (OES) remains understudied. Stable isotopic values preserved in archaeological OES can provide significant data regarding paleoclimates (Carbon, Nitrogen, and Oxygen) and human foraging ranges (Strontium). The Middle and Later Stone Age site of Varsche River 003 (VR003; South Africa) has produced OES from all contexts; however, like many comparable sites, much of the OES, especially in the older layers, has been burned to some extent. The physical nature of OES can endure with integrity; the crystalline matrix is as strong as tooth enamel and can provide a time-capsule-like effect, securing mineral isotopes without degradation over time. Isotopes from the organic portion of OES (collagen) may not react in the same way as the mineral portion, and an understanding of how heat effects the isotopic values of OES is vital for sample selection to ensure reliable data. Using modern OES that has been exposed to varying degrees of heat, this study explores if heat alters stable isotope values of ostrich eggshell.

McNeill, Patricia [409] see Haas, Randy

McNellis, Tanigha [26] see Johnson, Amber

McPherson, Caitlin [190] see Astroth, Kirk

McSherry, Christina (University of Nevada Reno)

[115] Can Firing Position of WWII Soldiers Be Determined by Shell Scatters? Preliminary Data from Experimental Archaeology

This poster describes results from an experiment designed to determine if there is consistency in the shell scatter patterns of the Colt 1911, Thompson M1A1 Submachine Gun, M1 Carbine and M1 Garand, all common weapons of the American World War II Soldier. Forensic Ballistic evidence has proven to be a valid method of inquiry when determining the movements of the individual during battle. This experiment endeavors to take the understanding beyond just movement to the firing position (kneeling, standing, prone etc.) of an individual soldier and to understand if this position can be determined in an archaeological context from the shell scatter pattern in the weapons listed above. The experiment conducted was limited in scope to determine the potential of this type of research and consisted of firing full clips of each weapon in firing positions described by period training manuals and films. The weapons and ammunition were consistent with the military weapons of the period. The resulting shell scatters were mapped to determine the correlation between shooting position and the position of the shells. The preliminary results of the limited experiment are presented here as well as recommendations for continuing the research.

Means, Bernard (Virtual Curation Laboratory)

[136] Start the Presses? John Alden Mason as Mesoamericanist and a Reluctant New Deal Archaeologist in the 1930s

What lessons does incomplete, delayed, or lack of publishing hold for archaeologists working in the field today? During the 1930s (and after), J. Alden Mason was a curator at the Penn Museum in Philadelphia, and is possibly best known for his work during that time at the site of Piedras Negras in northwestern Guatemala and his inviting of Tatiana Proskouriakoff to this site. Her work with Maya hieroglyphics from this site was integral to the recognition that Maya glyphs reflected historical events. Yet, the excavations at Piedras Negras in the 1930s were not published until 2005, preventing other scholars from building on this work. Delayed publication—one after his death—is not only Mason's archaeological "sin." Many foundational projects are lacking field records and missing artifacts. Acknowledging this history should be part of revising archaeological knowledge and teaching the ethics of our often destructive investigations.

[61] *Discussant*

Meanwell, Jennifer (MIT), Linda Seymour (MIT), Elizabeth Paris (University of Calgary) and Carlos Peraza Lope (INAH-Yucatan)

[407] *Links between Maya Green and Maya Blue at Mayapán, Yucatan, Mexico*

Elaborately decorated and painted objects, most typically murals and incense burners, were a central part of the religious and cultural life at the Postclassic period Maya capital of Mayapán. These objects required great skill to produce and requisite control over a variety of materials, including plaster, pottery, and the pigments used as colorants. One commonly used pigment was Maya Blue, a hybrid mineral-organic pigment produced by mixing palygorskite clays with indigo, and heat treating. Previously, we have documented the use of Maya Blue at Mayapán, and here we present new data about the phases present in the blues and greens used at Mayapán, as well as how these different colors were produced, using Raman spectroscopy, electron microscopy, and experimental replication. These new data offer insight into the relationship between the Maya Blue and Maya Green, and technical aspects of pigment production by the city's artists.

Medchill, Brian (Gila River Indian Community Cultural Resource Management Program), Chris Loendorf (Gila River Indian Community Cultural Resource Management Program) and Kyle Woodson (Gila River Indian Community Cultural Resource Management Program)

[194] *From Upper to Lower Santan: Platform Mound Community Organization within the Santan Canal System in the Middle Gila River Valley*

Recent and extensive Data Recovery investigations have been completed at sites along the prehistoric Santan Canal system in the Middle Gila River Valley, including both the Upper Santan and Lower Santan Platform mound communities. This work is being conducted by the Gila River Indian Community Cultural Resource Management Program as part of the Pima-Maricopa Irrigation Project. These investigations have substantially improved our understanding of settlement organization within the Santan area, including the temporal and spatial distribution of habitation areas. In contrast with nearby area such as the Tonto Basin, the late Classic inhabitants in the Santan area did not densely aggregate and instead remained in comparatively small (4 to 5 room) and dispersed settlements. While numerous Preclassic rooms are present in the immediate proximity of the two mound precincts, the nearest late Classic habitation areas are more than 0.5 kilometer away from either mound, and most settlement locations are 1 to 3 kilometers distant. This presentation explores the implications of this patterning, as well as other regional differences within the Hohokam area.

Medeiros da Silva, Francini [404] see Shock, Myrtle

Medina, Cecilia [71] see Lizama Aranda, Lilia

Medina, Shelby (California State University Los Angeles), Jessica Rodriguez (California State University Los Angeles), Paul Gerard (California State University Los Angeles) and Rene Vellanoweth (California State University Los Angeles)

[210] *Were Large Mammal Limb Bones Processed to Extract Marrow and Render Grease at the Danielson Ranch site (CA-VEN-395)?*

Danielson Ranch (CA-VEN-395) is a multi-component site containing both significant prehistoric shell midden deposits and a historical ranch complex. CA-VEN-395 consists of five discrete loci dated to between 2690 and 860 cal BP, with the most recent occupation as late as 290-60 cal BP. Excavation revealed vertebrate faunal remains representing specimens from five animal classes (Aves, Mammalia, Reptilia, Chondrichthyes, Actinopterygii), but consisted primarily of small and large terrestrial mammals. A majority of the identifiable elements were from the skulls, feet, and vertebrae of these animals, leaving limb bones grossly underrepresented. Recent studies on bone fragmentation, however, have revealed the importance of undifferentiated bones in archaeological assemblages as evidence of marrow and grease extraction or their transformation into other artifacts (e.g., bone gorges). For this study, we used body part representation, bone size class, and fragmentation patterns to confirm that people at the site were processing limb bone to extract marrow and render grease. Our results have implications for quantifying zooarchaeological remains and expanding interpretations of their patterns in the archaeological record.

Medrano, Angélica María**[367] *The Weapons of the Mixton War (1541-1542)***

The weapons used during the Conquest of Mexico have been described in ethnohistorical sources, both in documents written by the soldiers and in codices. The primary weapons described are steel swords, crossbows, cannons and the arquebus. From the Mixton War of 1540-1542, military material culture has been recovered from one of the battlefields: the Peñol of Nohistlan identified in the site archaeological El Tuiche, where vestiges of Spanish weapons consist of crossbow boltheads and arquebus shot. Regarding indigenous warriors' weapons, the use of bow and arrow, darts and macuahuitl are considered. The physical evidence of these weapons are projectile points and bifacial and obsidian blades; however, these artifacts may be linked to other daily activities. At the Peñol de Nohistlán/El Tuiche more than a hundred lithic artifacts were found in surface and buried contexts, so the question arises: are these lithic artifacts from indigenous weapons of the Indian allies, or their enemy?

This paper will discuss the analysis of these materials, taking into account their typology, spatial distribution and contexts, in particular the lithic artifacts collected in the contexts where the crossbow boltheads and arquebus shot were found.

Medrano Enríquez, Maby [367] see Montoya Mar, Francisco

Meehan, Pascale (University of Colorado, Boulder), Arthur Joyce (University of Colorado, Boulder), Sarah Barber (University of Central Florida) and Marc Levine (University of Oklahoma)**[394] *Early Postclassic Copper Objects from the Lower Rio Verde Valley, Oaxaca, Mexico***

Some of the earliest examples of metallurgy in Mesoamerica come from sites in the West Mexican region where metalworking, especially of copper objects, was introduced by Ecuadorian traders in the 600s-700s C.E. The recent discovery of copper items including bells and hammered copper sheets from Early Postclassic contexts (800-1100 C.E.) in the Lower Rio Verde Valley, Oaxaca, indicates that people living further south along the Pacific coast were also able to access copper items, at a period earlier than was previously thought. This paper presents the Early Postclassic copper items from the Lower Rio Verde Valley and situates them within the context of early Mesoamerican metalworking, as well as within local and regional trade networks.

Meeks, Scott (Tennessee Valley Archaeological Research), Jacob Lulewicz (Washington University, St. Louis), Shawn Patch (New South Associates), Kevin Smith (Middle Tennessee State University) and Lynne Sullivan (University of Tennessee, Knoxville)**[348] *Middle Cumberland to Dallas: Constructing Peace in the Valley***

Based on artifact styles, regional archaeologists in the 1940s first proposed movement of Mississippian people from the Middle Cumberland Region to the Great Valley of East Tennessee. Lacking absolute dating techniques, these researchers had limited understanding of the timing or contemporaneity of the archaeological phases they were defining in these regions. High-precision dates both from older collections and new excavations now are making it possible to refine chronologies in both regions and to align observed cultural changes. By 1300 CE, the people of the Middle Cumberland region were on the move, a migration related at least in part to climatic instability including multiple drought episodes, resulting in a depopulation known as the Vacant Quarter. Beginning the 1200s CE, dramatic change from an apparent in situ Early Mississippian development in East Tennessee included rapid building of fortifications and changes in settlement patterns, mortuary practices, architecture, and pottery styles. We review these changes in the context of chronology, climate data, and cultural change in the greater region.

Mehmetaj, Haxhi [42] see Galaty, Michael

Mehta, Jayur [97] see Ostahowski, Brian

Mehta, Jayur (Florida State University) and Christopher Rodning (Tulane University)**[348] Environment, Climate, and Mississippian Origins in the Lower Mississippi Valley and the Mississippi River Delta**

The Lower Mississippi Valley (LMV) and Mississippi River Delta (MRD) are dramatically impacted by long-term and seasonal fluctuations in water levels, storm cycles, and flooding. In both regions, unpredictable storm events, upstream changes in water flow, and increased water salinity (as well as a host of other factors) led to environmental changes that influenced the development of Mississippian societies during the last 500 years before European contact. Mississippian societies are defined by a suite of cultural characteristics such as wall-trench architecture, reliance on specific lithic material sources, shell-tempered pottery, and maize agriculture. These traits appear at different times in the LMV and MRD, and in some cases, they were associated with large-scale ecosystems changes such as transitions from forests to parklands and grasslands, a process which was likely exacerbated by anthropogenic fires. Considering these coupled paleoenvironmental and archaeological datasets, this paper evaluates features of Mississippian societies in the LMV and MRD, the chronology of their appearance in these areas, and comparisons and contrasts between the LMV and MRD and other hearths of Mississippian development across the Eastern Woodlands. This research strives to correlate long-term patterns of climatic and environmental change with the development of Mississippian societies and responses to European contact.

Meier, Jacqueline [415] see Morin, Eugene

Meierhoff, James (University of Illinois at Chicago)**[198] 350 Years after the Conquest: British Influences on a Multiethnic Refugee Maya Community**

In the late-nineteenth century, Maya refugees fleeing the violence of the Caste War of Yucatan (1847-1901) briefly reoccupied the ancient Maya ruins of Tikal. Unlike the numerous Yucatec refugee communities established to the east in British Honduras, those who settled at Tikal combined with Lacandon Maya, and later Ladinos from Lake Petén Itzá to form a small, multiethnic village in the sparsely occupied Petén jungle of northern Guatemala. This paper discusses the analysis of the mass-produced exotic consumer goods brought to Central America from the port at Belize which found their way into the homes deep in the Petén jungle at Tikal. Also included is a discussion on what the villagers may have been trading to obtain the copious foreign made products. This Petén assemblage demonstrates that different patterns of consumer choice were practiced at Tikal in regards to the eastern Yucatec refugee villages. These new patterns of consumerism coincided with an easing of ethnic markers, and facilitated a blending of ethnic identities at Tikal; a phenomenon which may have parallels in modern refugee behavior.

Meiggs, David [144] see Carvalho, Milena

Meindl, Richard (Kent State University) and Michelle Bebber (Kent State University)**[365] The Diversity of Old Copper Culture Projectile Points**

The Old Copper Culture (OCC) (4000-1000 B.C.) of the Lake Superior Region of North America features a wide variety of utilitarian tools manufactured from native copper. Here, we assess the technological diversity of copper projectile points found in the region spanning Wisconsin, Michigan, and Minnesota U.S.A., as well as artifacts found in Ontario, Quebec, and Manitoba, Canada. A sample of over 300 spear points was classified using paradigmatic classification, from which estimates of diversity were calculated for the OCC heartland and periphery. Our analysis provides insight into lesser known aspects of the Old Copper Complex such as the presence of localized variants, technical specialization, and knowledge transmission, while elucidating the ways in which Archaic groups at the periphery of the OCC heartland may have deviated from the core area. Diversity research on copper tools can clarify not only social and cultural patterns, but also may offer insight into ecological and environmental constraints on copper point form during the Archaic period.

Meinekat, Sarah (University of Tübingen), Christopher Miller (University of Tübingen), Emily Milton (Michigan State University) and Kurt Rademaker (Michigan State University)**[45] Quebrada Jaguay-280 (QJ-280) under the Microscope: A Geoarchaeological Investigation of the Site Formation and Anthropogenic Features at a Peruvian Coastal Site**

Some of the earliest evidence for human settlement of Peru comes from lowland sites along the arid Pacific coast. Localities at Huaca Prieta, Quebrada Tacahuay, and Quebrada Jaguay demonstrate that during the Terminal Pleistocene, people had

settled the coast and had incorporated marine resources into their subsistence strategy. Excavations led by Daniel Sandweiss at QJ-280 in the 1990s identified basal dates from the Terminal Pleistocene. QJ-280 contains numerous formal stone tools and lithic debitage, along with features related to house structures and a rich assemblage of marine faunal remains. However, only little is known about the site use, seasonality, and taphonomic processes. In the summer of 2017, QJ-280 was re-excavated to improve the chronology, illuminate its relation to highland sites, and to understand the site's formation and life history. Here, we present the first results from the geoarchaeological investigation of QJ-280, combining high-resolution micromorphology and GIS data. This approach allows us to understand, visualize, and contextualize features – such as house floors, combustion features, and post-holes – to an extent that is impossible to reach by conventional archaeological techniques alone.

Meissner, Nathan [68] see Marino, Marc

Meissner, Nathan (University of Southern Mississippi)

[199] *The Porous Boundary: Understanding Late Postclassic Belize-Petén Interactions through Lithic Technology*

The Late Postclassic and Early Contact Periods (A.D. 1400-1697) of central Petén and western Belize are typically characterized by intensive interaction and migration during a time of shifting geo-political divisions. One of the divisions in Belize known as Dzulunikob (loosely, “foreign people”) remains enigmatic in terms of archaeological research, and contacts with Petén are poorly understood. This paper examines various sociopolitical identities across the Petén-Belize border from a technological perspective that includes elements of vertical (generational) and horizontal (contact-related) transfer in lithic technology. Data interpretations suggest not only differences in resource acquisition and production, but also in the use-life of stone tools during a time of known interaction, conflict, and population movements among groups. In addition to marked differences between the two subregions, research reveals unexpected technological similarities between Belize and historic Lacandon populations in Chiapas that could indicate a secondary western movement or technological sharing among groups. Such information adds to our understanding of fluid boundaries of Late Postclassic polities from perspective that is often ignored.

[103] *Discussant*

Mejía Ramón, Andrés [113] see Munson, Jessica

Mejía Ramón, Andrés [373] see Villasenor Iribar, Eunice

Mejía Ramón, Andrés (The Pennsylvania State University)

[409] *A Demography of Materials: High Resolution Multispectral Photogrammetry in Theory and Practice*

The recent availability of small multispectral sensors small enough to equip on unmanned aerial systems (UASs) now allows archaeologists to survey the landscape at increasingly finer resolutions (10-20 cm) with topographic and compositional data. While at present the number of published archaeological studies using UAS-equipped multispectral cameras is small, there is a consensus that the resulting data products are capable of detecting certain buried features. Nevertheless, despite the number of methodological and theoretical considerations associated with data available at final scales the basic principles and forms of analysis reported thus far are identical to those performed at broader scales of analysis and do not exploit the full swath of additional information higher-resolution data can provide. At the heart of the issue is the Modifiable Areal Unit Problem (MAUP) applied to spatial resolution. The MAUP describes the phenomenon where the same analyses lead to diverging results depending on the scale and boundaries by which data is aggregated. Using data from different parts of Mesoamerica, I present a novel community-based spectral analysis method avoid the MAUP by considering the proximal and ultimate mechanisms that allow archaeological features to be visible in multispectral imagery and their theoretical and methodological implications.

[234] *Discussant*

Melgar, Emiliano [39] see Solis, Reyna

Melgar, Emiliano (Museo del Templo Mayor-INAH)**[192] Unveiling the Artisan Secrets of the Lapidary Goods from the Great Temple of the Aztecs**

Recent studies have demonstrated that the cultural provenance and diversity of the goods found in the offerings from the Sacred Precinct of Tenochtitlan are more complex than the archaeologists thought, overlapping their acquisition by tribute, exchange, war prizes, or looting. In the case of the lapidary objects, the majority of prior researchers divided their cultural provenance by their visual characteristics, especially the iconography, without comparing the raw materials, the technology, and the possibility of emulation of styles. In this paper, we present the mineralogical identification of new stones and geological sources with the employment of EDS, p-XRF and Micro-Raman Spectroscopy; and the traceological analysis of them with experimental archaeology and SEM. As a result, we confirm the presence of different lapidary traditions, unveiling some craft secrets of these items, detecting new styles and relics unreported by other researchers, and the existence of emulations of specific prestige goods. These studies allowed us to discuss their local or foreign origins, and improve their cultural affiliation and provenance. Finally, we compared these results with other lapidary assemblages, in order to discuss their place of production.

[192] Chair**Melton, Mallory (University of California Santa Barbara) and Matthew Biwer (University of California Santa Barbara)****[356] New Starch Grain Results and a Synthetic Approach to Foodways at Quilcapampa La Antigua**

The mundane and commensal foodways of Wari and Wari-influenced peoples is a burgeoning area of interest that has the potential to illuminate various aspects of Wari identity. The Middle Horizon period was a particularly turbulent time in terms of identity politics. The establishment of Wari satellite colonies created new locations of culture contact and active negotiation between colonizer and indigenous, resulting in a multitude of interactions throughout the Empire. This paper reports on the identification of starch grains collected from manos and ceramic cooking/serving wares from Quilcapampa (AD 600-850), a Wari-affiliated Middle Horizon period (AD 600-1000) village located in the hyper-arid environment of the Siguas Valley, Arequipa, Peru. In addition to presenting new starch grain results from artifact residues, we integrate microbotanical and macrobotanical results, a type of synthetic approach that is unprecedented for the region and time period. Collectively, microbotanical and macrobotanical identifications shed new light on food processing practices and spatial organization of activities in this Wari-affiliated village.

Menchego, Timothy**[342] Discussant****Mendel, Catherine, Deanna Grimstead (The Ohio State University), Joan Coltrain (University of Utah), Harlan McCaffery (Eastern New Mexico University) and Tiffany Rawlings (State University of New York College at Brockport)****[419] Persistence in Turkey Husbandry Practices in the Southwest and Four Corners Region: The Isotopic and Ethnohistorical Evidence**

aDNA analysis reveals an independent domestication event of Turkey (*Meleagris gallopavo*) occurred in the Southwestern United States between 200 BC—AD 500. While this event was distinct from the domestication of turkey within the Mesoamerican world approximately 2000 years ago, we still know little about turkey husbandry within prehistoric agricultural groups from the Southwest and Four Corners Region, USA. Our research applies carbon and nitrogen isotope analyses to a sample of archaeological turkey bones from the Tohatchi Flats region of the Chuska Mountains, New Mexico, USA. To contextualize these samples, we compare them to wild modern turkey isotope data and previously published archaeological turkey isotope analyses. Results strongly resemble ethnohistorical accounts of these regions, where diverse practices would result in varying stable isotope ratios, including the capture and integration of young wild turkeys, taking wild eggs for flock hens to raise, “penning” in kitchens, “penning” in coops, free ranging, and tethering. Notably, archaeological turkey samples display distinct patterning through time (Basket Maker III – Pueblo III), which is reflective of the varied ways turkeys were tended to ethnohistorical accounts and suggests significant variation in husbandry practices and perhaps the shifting meaning of turkeys within Puebloan societies.

Mendel, Catherine [419] see Peart, Daniel

Mendelsohn, Rebecca (Institute for Mesoamerican Studies)

[314] Jade, Scepters, and Seats of Power: Symbols of Authority on the Central American Coast, 300 BC-AD 300

This paper documents a widespread shift during the period from 300 BC-AD 300 toward symbolism associated with authority and rulership along the Pacific coast, throughout the region spanning between southern Chiapas and the Nicoya Peninsula of Costa Rica. During this period, several notable changes in burial patterns, status-affirming objects, and iconographic motifs occurred, suggesting that inequality became more institutionalized among Pacific coastal cultures. This paper addresses some of these common motifs and practices associated with authority while addressing the regional diversity in the application of these themes. Specifically, this paper addresses four classes of artifacts discovered in burials and other elite contexts dating to 300 BC-AD 300. These objects, including Usulutan pottery, jade ornaments, zoomorphic scepters, and “seats of power,” illustrate shared concepts of political authority.

Méndez, César (Centro de Investigación en Ecosistemas de la Patagonia) and Amalia Nuevo Delaunay (Centro de Investigación en Ecosistemas de la Patagonia)

[33] Assessing Shellfish Discard for Discerning between Field Processing or Residential Relocation in the Subtropical Pacific Coast of South America

Variability in site structure and shellfish assemblages from hunter-gatherer sites in the Pacific coast of Los Vilos (31°50' S, South America) has been attributed to changes in field processing decisions across the Holocene. However, these changes have not been evaluated considering explicit models. Prey choice and central place foraging models predict which resources to exploit and how would be the best way to transport them, respectively. This paper will combine them to explore the variability of shellfish assemblages at three time periods (12,000-9,000, 8,000-4,000 and 4,000-2,000 cal BP) in which residential and logistical organization alternated over coastal land use decisions. Differences are particularly observable on the treatment of the loco (*Concholepas concholepas*), an abalone-type mollusk with the largest size and higher meat yields on this coast. Other shellfish, like bivalves and less productive gastropods, are recorded only at residential sites at different points in time, which indicates that they were not subjected to field processing. Finally, the exploitation of higher variability, including low-ranking specimens between 4,000-2,000 cal BP, may be explained by a major shift in the use of coastal environments including a more active foraging role of children when residential sites were located closest to the shoreline.

[364] Chair

Méndez, César [364] see Reyes, Omar

Méndez, Humberto (PAPACSUM), Carlos Flores (PAPACSUM), Fernanda Navarro (PAPACSUM), Lissandra González (PAPACSUM) and José Luis Punzo Díaz (PAPACSUM)

[375] Tarascan Experimental Metallurgical Technology

In pre-Hispanic Michoacán, the use of metals such as copper, silver, gold, and some of their alloys is indisputable. Whether for everyday use, ornamental and prestigious use, or even for a warlike purpose, the metallic tools allowed the former inhabitants of the state to achieve a hegemony over the region, reaching a high status that came to rival its neighbors in the Basin of Mexico. However, with the passing of the centuries, the metallurgical techniques and processes which were used for the transformation of the ores rich in these materials and the manufacture of the articles were lost or modified and mixed with Spanish techniques. That is why the need arises to try to recover this knowledge, using the help of methodological tools such as ethnography, the analysis of operational chains, and experimental archeology. This experimental work will try to reproduce an operational chain from the transformation of metal-rich ore to different finished objects, such as axes, rattles, tweezers, figurines and needles. This work is based on different historical and ethnographic sources because, in the region, there are copper foundry workshops that keep some reminiscences of techniques as well as different adapted goldsmithing techniques.

Mendez Bauer, María Belén (Universidad Nacional Autónoma de México)**[303] Under the Hills: Archaeology of the Quetzaltenango Valley**

In prehispanic times the tops of the mountains and volcanoes were used as natural markers of geographical spaces; many of these points served as referents in the construction of cultural landscapes based on the sacred. The valley of Quetzaltenango, in western Guatemala, is surrounded by ten prominent hills and volcanoes. In addition, the western highlands has more references in colonial literature to land titles than other areas. In this paper, the history written in ancient documents and the Popol Vuh are taken up, to locate the Postclassic populations of the area and their relationship to their landscape. Special emphasis is put on the conflict reported between Mam and K'iche'ib in the north of the valley in the Ostuncalco area, which began in the early Postclassic period and continued until 1785. During this time, a spring of water was being disputed, which, besides being considered a natural limit, had a symbolic charge. This study exemplifies the close relationship between landscape, history and archaeology.

Mendez Bauer, María Belén [309] see Poston, Victoria

Mendizabal, Tomás [398] see Wake, Thomas

Mendoza, Rubén (CSU Monterey Bay)**[193] Conjuring the Archaeology of Aztlan - Through the Looking Glass and Material Lens of the Chicana/o Counterculture, 1976-2018**

With a pedigree firmly rooted in the evolution of the American automobile, lowriders trace their origins to the low-slung custom cruisers and social clubs of the 1930s and 40s. In effect, Mexican immigrants of that time were drawn to mutual aid societies in their quest for identity, kinship, camaraderie, and support. This thereby fueled the rise of lowriders and lowrider automobiles and the pop-cultural milieu of the time. Such youth-oriented social formations proved timely manifestations of the changing Chicana/o countercultural landscape of the 1950s through 1990s. The Hispanic towns and barrios of the American Southwest set the stage for the resurgence of the legendary Aztlan, deemed an ancestral crucible for the Chicano/a social movements of the 1960s. Drawing on a 40-year corpus of visual and documentary materials collected via participant observations and urban archaeological surveys undertaken in El Paso, Texas, Phoenix and Tucson, Arizona, Denver, Colorado, and Los Angeles, Delano, and Bakersfield, California; this illustrated presentation reviews findings from a decades-long program of urban archaeology, modern material cultures, and ethnohistory undertaken to monitor and evaluate the material cultural correlates identified with the proliferation of Chicana/o countercultural identities spanning lowriders, pintos, spooks, sprayheads, tecatos, clikas, homeboys and girls.

Mengyán, Ákos (Eötvös Loránd University), Zachary Bible (Maryville College), Paul R. Duffy (University of Toronto) and Györgyi Párditka (University of Michigan)**[126] Styles for Miles: A Regional Analysis of Ceramic Design Elements in Bronze Age East Hungary**

Variation in ceramic design elements often informs two different kinds of stories—first, about the intentional and conscious displays on the part of the potters, and second, about the habits and unintended consequences of learned traditions in communities of practice. This poster investigates ceramic stylistic patterning at Békés 103, a Bronze Age (late second millennium BC) cemetery on the Great Hungarian Plain in the Eastern part of Hungary. We document specific design elements (such as bosses, channels, nodes, and brows) among the vessels and compare them to assemblages from three Bronze Age sites within 15 km of the cemetery known from previous surface collections. Our aim was to look for similarities and differences between sites in the width, height, and depth of design elements, a form of variation created as the unintended consequence of learned traditions. We find both evidence of likely unintended differences between potting communities, in addition to conscious differences in motif use between assemblages, a pattern probably informed by the identities and conscious decisions of potters.

Mentzer, Susan (Senckenberg, Univ. of Tübingen), Bertrand Ligouis (University of Tübingen, Laboratories for Applied), Christoph Berthold (University of Tübingen, Competence Center Archaeo), Christopher Miller (University of Tübingen, Senckenberg) and Sarah Wurz (University of the Witwatersrand)

[417] Chemical Diagenesis of Charcoal and Charred Organic Material in South African Middle Stone Age Rockshelter Sites

Several South African Middle Stone Age (MSA) sites contain deposits rich in anthropogenic materials whose preservation was impacted by extreme burial environments. The specific chemistries of the burial environments are evidenced by dissolution of archaeological materials and/or precipitation of secondary minerals. In sites such as Elands Bay Cave and Klasies River Mouth, charcoal and fragments of charred organic materials also appear to undergo structural changes and in some cases are partially or fully replaced by secondary carbonate and phosphate minerals. These changes have been identified in microscopic remains present in micromorphological samples using organic petrology, micro-FTIR, micro-XRD and micro-XRF. The chemical diagenesis has negatively impacted the recovery of organic materials using traditional methods (e.g. flotation, sieving), yet the microcontextual analyses reveal a rich organic record at these sites.

Mentzer, Susan [417] see Stahlschmidt, Mareike C.

Menzer, Jeremy (Environmental Dynamics PhD Program, University of Arkansas)

[110] Applying Simple Magnetic Depth Estimation Techniques to Archaeo-geophysics

Magnetometry is probably the most widely used archaeo-geophysical technique in the world, despite its major drawback of an absence of depth information to an anomalous source. Many users, novices in particular, are under the impression that magnetometry does not or cannot provide depth information. Yet, depth estimation techniques are commonly utilized in geologic studies. This study applies multiple depth estimation techniques to modeled and real-world data collected at an archaeological test site and from multiple sites in Tennessee. They include the half-width rules and multi-height gradient techniques. As current archaeo-geophysical software is not capable of depth estimation procedures, these advanced methods were coded in the Python programming language to yield processing software that has been made available to other users. The potential benefits of deriving depth information to magnetic sources is discussed in the context of testing a variety of anthropological and archaeological hypotheses.

Mercader, Julio [2] see Lee, Patrick

Mercader, Julio, Fergus Larter (University of Calgary), Julien Favreau (University of Calgary), Jamie Inwood (University of Calgary) and Maria Soto (University of Calgary)

[32] Microremains on Stone (Tools): Discriminating Function-Related from Natural Residues

Plant microremains from stone tools speak to ancient hominin behaviour if genuinely related to usage. Residues, however, attach to rock surfaces naturally. My objectives are to identify pathways for microremain adherence prior to and after burial; study residue abundance in relation to petrography, microstructure, and rock topography; and analyse spatial relationships. My methods are: recovery of 40 stones from natural setting; petrography and analysis of coatings and micro-fractures; GIS analysis; residue extraction, density separation, microscopy, and taxonomy; and quantification. The results indicate that cobbles show coating and recrystallization. Residue is trapped through accretion of biogenic materials. Kernel density estimation of residues and nearest neighbour analysis detect scatters of randomly dispersed accumulations. Microplant residues include phytoliths (52%), starch granules (32%), as well as palynomorphs, diatoms, and spicules (16%). Rocks from the subsoil yielded phytoliths (55%), starches (41%), and other particles (4%). Starch increases in subsoils, diatoms are more frequent on the surface, while palynomorphs are a major component in subsurface rocks. Phytolith and starch morphotypes differ in surface versus buried cobbles. A comparison between these rock residues and freestanding microremains from surrounding soils also exhibited variations.

Mercado-Allinger, Patricia

[292] Discussant

Meredith, Clayton (University of New Mexico) and Keith M. Prufer (University of New Mexico)**[174] Forager Mobility Patterns in Southern Belize: Preliminary Results from a Holocene-Length Record**

Despite considerable research on mobility patterns of the Classic Lowland Maya, the mobility of pre-ceramic foragers is understudied. Elsewhere, logistical mobility strategies have been documented for archaeological and ethnographic forager populations in tropical forest biomes. Most often these strategies are related to seasonally variable resource availability. Given the seasonal distribution of precipitation in the Southern Maya Lowlands, long-range seasonal mobility centered on resource acquisition is a possible response to predictable variation in resource availability. We present strontium and oxygen isotope analysis of tooth enamel of Paleoindian, Archaic, and agriculturalist burials excavated at Mayahak Cab Pek, Saki Tzul, and Tzib'te Yux rockshelters to examine mobility patterns across stages of life-history. Our results suggest that long-distance mobility, though apparent over decadal scales, did not occur as a seasonal activity during the Archaic or Paleoindian periods. These results have implications for interpretation of foraging strategies, raw material trading, and population interactions throughout Mesoamerica among pre-agricultural populations.

Meredith-Williams, Matthew [277] see Herries, Andy

Merewether, Jamie [86] see Hughes, Katherine

Merkle, Ann and Michael Frachetti (Washington University in St. Louis)**[101] Mobility and Highland Medieval Urbanism of the Nomadic Qarakhanids (9th-11th c. CE, Uzbekistan)**

Recent discoveries of a series of highland urban sites (located over 2000m elevation) in the Pamir foothills of Uzbekistan inspire a full reconsideration of the political and economic organization of the Qarakhanid Khaganate and their relationship to both lowland and highland cities. The Qarakhanids controlled Central Asia from the 9th-12th c. CE, yet their archaeological signature remains limited and biased toward agricultural settings. Here we present recent archaeological data from their highland urban settings, illustrating a previously undocumented model for "nomadic" highland urbanism and its impact on the trade and political structure of the medieval Silk Road.

Merkle, Ann [183] see Bullion, Elissa

Merrill, Michael (Arizona State University)**[396] A Methodology for Comparing and Evaluating Seriation Algorithms Applied to Archaeological Data**

According to recent literature, correspondence analysis is the method of choice for frequency seriation. However, this does not consider the effects of data heterogeneity or typology on the orderings produced by this method. This relates to a more fundamental issue of how to evaluate the effects of heterogeneity and typology on seriation results, as well as how to determine which of a set of seriation algorithms produces the more likely seriation ordering on a particular data set, and if so, why? In this paper we present a new methodological framework that: (1) identifies which parts of a data set are amenable to seriation, (2) identifies the likely number of minimally heterogeneous components in a data set in a way that is sensitive to emic distinctions, and (3) operationalizes a Bayesian stochastic seriation model to evaluate which of a set of seriation algorithms produces the more likely ordering on a given data set. When this new framework is applied to heterogeneous mortuary data set from a coastal Chumash village in southern California, the results suggest that correspondence analysis does not produce a likely seriation ordering.

[396] Chair

Merriman, Christopher [124] see Birkmann, Joseph

Merriman, Christopher (University of New Mexico)**[187] Paleoindian Settlement and Mobility in the Northern Jornada del Muerto**

The Northern Jornada del Muerto in Socorro County, New Mexico has long been known for its extensive Clovis and Folsom occupations. In addition to early Paleoindian techno-complexes, the Plainview/Goshen/Belen and Cody complexes are also well represented. This is mostly due to the work of Robert H. Weber, Ph.D. geologist and avocational archaeologist. For fifty years he discovered, mapped, documented, and collected artifacts from sites across Socorro and Catron Counties, and in 2008 the artifacts, notes, and maps in his collection were donated to the Museum of Indian Arts and Culture in Santa Fe. The assemblage of over 750 Paleoindian projectile points and preforms from dozens of sites across the Northern Jornada del Muerto basin provides an excellent opportunity to examine diachronic change in a broad range of Late Pleistocene-Early Holocene hunter-gatherer behaviors. After providing an overview of the Weber Collection this presentation will discuss variation in settlement and mobility patterns across Paleoindian techno-complexes.

Merriman, Christopher [219] see Dennehy, Timothy

Merritt, Stephen (University of Alabama at Birmingham)**[402] Cut Mark Size Does Not Change during Butchery: Implications for Reconstructing Tool Use and Carcass Processing**

Animal carcass butchery occurs when technological factors (tool attributes) and butchery behavior (distinct actions like defleshing, disarticulation) intersect with animal anatomy (morphology of musculoskeletal tissues or regions), and potentially encodes information about these contexts via bone surface modifications. This study examines cut mark cross-sectional width and depth change during a sequence of experimental butchery trials. It addresses whether cut mark size reflects dulling tool edges and whether mark size supports inferences about the sequence of carcass parts defleshed with the same tool. An experienced butcher used one replicated chert flake or bifacial core to deflesh the forelimb, hindlimb and pelvis from one side of a cow carcass. The order of carcass segment defleshing was systematically varied across eight trials. Cut mark samples from limb midshafts and pelvic rami produced by each tool were compared with a repeated measures ANOVA model. Analysis suggests similar patterns for each tool type: cut mark width is greater in the third segment than the second, and cut mark depth is similar throughout the defleshing sequence. Without robust differences in cut mark cross-sectional size across the butchery sequence, it is premature to interpret tool use life and the carcass part consumption sequence from archaeological cut marks.

[402] Chair**Mesia-Montenegro, Christian (Universidad Cientifica del Sur)****[315] Evolutionary Dynamics during the Central Andes Formative: Modelling Power and Inequality through Religion**

An essentialist view of the Central Andes Andean Formative would characterize social formations of this period as religious centered ones in which the organized religion played a central role in the emergence and maintenance of centers as a social force that would bring cohesion and satisfaction to those affiliated with such centers (*sensu* Durkheim). Au contraire in this paper I would like to model a different explanation bringing together Weberian idealism and Marxist materialism as evolutionary categories that adequately explain power and inequality through religion as a filter, driving selection units for the survival and reproduction of those who held power. Religion was a crafted tool orchestrated by authorities in order to hold privileges, being the real conundrum to convince those who did not power about the need to maintain power and inequality relations as such and even normal. This model will be framed under Universal Darwinism theory. Special attention will be put in the Middle and Late Formative sub periods, using data available from ceramics, iconography and monumental architecture.

Messenger, Phyllis (University of Minnesota)**[135] Archaeologists' Role in New Approaches to Heritage Studies and Heritage Protection**

If conceptions of heritage are based on a community's shared values, then it should follow that protection of heritage assets would also be built on those shared values. However, we live in an imperfect world of diverse, often competing stakeholders who assign different values to heritage. Nevertheless, archaeologists and other heritage professionals are developing new interdisciplinary approaches to teaching and learning about heritage in respectful, inclusive, and socially engaged ways that can contribute to greater understanding of the importance of heritage protection. This presentation offers case studies in

which heritage professionals incorporate values considerations, civic engagement opportunities, and stakeholder perspectives in their interdisciplinary teaching and practice. New opportunities for knowledge sharing about heritage protection, laws, and enforcement emerge through interdisciplinary teaching and learning; critical thinking skills lead to more complicated and inclusive understandings of community heritage. Students and early career professionals are putting these learnings into practice. In turn, their understanding of heritage protection issues influences their interactions with community and descendant stakeholders, as well as with law enforcement and land management professionals. This presentation reflects on how new approaches to teaching and learning in heritage studies can contribute to the goal of heritage protection and preservation.

[377] Moderator

Metz, Alexander [312] see Crothers, George

Metz, Holly

[21] *Beyond Ethical, Legal and Practical Considerations: Unprovenienced Archaeological Items at Descendant Tribal Heritage Centers and Museums*

The mission of the Huhugam Heritage Center, which is both a tribal and federal repository, is to "ensure our Akimel O'otham and Pee Posh cultures flourish for future generations." This includes not just the physical remains of ancestral culture, but the cultural practices themselves. While we care for the ancestors' items by current preservation and management standards, we also prioritize accepting and caring for them in a way that is culturally appropriate. As a tribal museum and cultural gathering place, the Huhugam Heritage Center must ensure it feels culturally safe for O'otham and Pee Posh guests, while also sometimes serving as a "repository of last resort." Because unprovenienced archaeological Huhugam (Hohokam) items with unclear histories may have come from burial contexts, the decisions around them have an even greater complexity for us than ethical, legal and practical considerations alone.

Meyer, Dominique [113] see Stanton, Travis

Meyer, Emma

[291] *The Burgess-Williams Site: An Early Euro-American Settlement on Grand Island*

The Burgess-Williams Site on Grand Island, Michigan, is a mid-nineteenth-century homestead located on the south shore of Lake Superior. The 2009 and 2010 field seasons produced over two thousand artifacts that have provided data for the continuing study of the frontier settlement of the island. The analysis confirms that the occupation demonstrates a frontier occupation, and the use of fine grained archaeological techniques has helped discriminate the specific, multiple occupations. This paper outlines the results of the archaeological testing and offers a discussion concerning the use of the site through the theoretical model of behavioral archaeology.

Meyer, Jack [397] see Scharlotta, Ian

Meyer, Jana [25] see Kirk, Scott

Meyer, Jana (University of Bonn, University of New Mexico)

[25] *Health and Resource Distribution at Tijeras Pueblo*

Tijeras Pueblo is a Pueblo IV site in Central New Mexico located on a natural travel route between the Western Great Plains and the Rio Grande Valley, which likely facilitated frequent contact between different cultural groups. This study addresses two interconnected research goals: first, to examine burial and skeletal data for indicators of distinct cultural units within the site, and second, to test whether membership in such units affects the access to nutritional resources and therefore the health of an individual. Using geographic information systems (GIS), I define spatial units based on the distribution of burials within the site. Osteological data - including age, sex, skeletal non-metric traits and health indicators – as well as burial data and spatial information, then serve to examine the interrelatedness between spatial units, phenetic groups, and burial

practices, in order to assess the cultural significance of those spatial units. Data are drawn from a sample of 55 individuals of varied demographic composition from known burial contexts excavated during the 1970s in Tijeras Pueblo. Results from these analyses are interpreted with special attention to the site's location in a border area of the Ancestral Puebloan World.

Meyer, Lauren (Vanishing Treasures Program, National Park Service)

- [85] *Preserving Our Vanishing Treasures: 20 Years of Collaboration, Community Building, Traditional Craft and Conservation Science*

The Vanishing Treasures Program of the National Park Service is a multi-regional effort that supports the preservation of cultural heritage in the Western United States; facilitates the perpetuation of traditional skills through staff-, youth- and partner-focused training; and promotes connections between culturally associated communities and places of their heritage. Comprised of a network of NPS preservation experts and partners, VT strives to address critical preservation needs using both traditional and modern approaches.

For over 20 years, Vanishing Treasures has been working to preserve some of the most significant and fragile cultural heritage in the western United States. Beginning in the 1990's as a grassroots effort to address deficiencies in staffing and funding needed to effectively preserve cultural heritage extant in parks in the arid west, and expanding in the 2010's to support this work across three regions of the National Park Service, VT has been a model of collaboration, adaptation, partnership, and action. This session will focus on introducing the VT Program, as will it provide an overview of the impact that the program has had over the course of its existence on parks, staff, partners, and, most importantly, the resources that we preserve and protect.

Meyer, William (Villa Maria College) and Kristen Barnett (Bates College)

- [136] *Does the Archaeology Curriculum Condemn Us to Repeat the Sins of the Past?*

Despite the early prominence of indigenous archaeologists like Arthur and "Birdie" Parker, Native practitioners remain a minority in the discipline. This exacerbates an already vexed relationship between archaeologists and Native peoples. Tensions flare in cases like that of Kennewick Man / The Ancient One, highlighting disagreements about what forms of knowledge matter; how such knowledge is produced; and what relationships link us to past peoples. Similar tensions emerge in the anecdotes of indigenous archaeologists, who describe existential discomforts, structures of privilege/oppression, and compromised academic and field situations. Small wonder that so few Native students are drawn to major in archaeology today. While many of the proposals offered in "Teaching Archaeology in the Twenty-First Century" (2000) might alleviate these tensions, changes to the standard archaeology curriculum have appeared only slowly and inconsistently. Further, in recognizing the interests of descendant communities as distinct from those of the archaeologist, even these initiatives risk implying that Native people cannot be archaeologists. If we wish to avoid the sins of the past, to overcome educational inequalities in the communities where we work, and to honor the SAA's published commitment to diversity in the discipline, we must imagine a curriculum that attracts and includes Native students.

Meyers, Joshua [72] see Peterson, Ryan

Meyers, Kelsey Noack [77] see DeMuth, Robert

Meyers, Maureen (University of Mississippi)

- [76] *Shells, Drills, and Lithic Tools: Indirect Evidence of Textile Production at a Mississippian Frontier*

Textiles served as symbols of status and ideological belief systems in Southeastern Mississippian chiefdoms. They also were markers of identity. Remains of fabric are not often found in the Southeast, due to poor preservation in the region. Those that have been analyzed reveal that a range of colors was used to indicate status and that fabrics were often decorated with ornaments. The evidence of textile production in the Southeast should therefore also include evidence of dyeing fabrics and production of ornaments. Such ornaments likely included shells, as seen on fabrics at sites like Cahokia. The 14th century Mississippian frontier Carter Robinson site in southwestern Virginia contains some evidence of textile production but more substantial evidence of fabric dyeing and ornament production. This includes the presence of over dozens of shell beads showing all stages and multiple methods of bead production, two kilograms of modified gastropod shell, dozens of drills and lithic tools, and possible evidence of mordants for dyes. Specifically, the shell appears modified to more easily sew onto fabric. This paper will present this evidence and specifically examine how the dyeing and ornamenting

of textiles functioned within a frontier hierarchical economy.

Meyrs, Patrisha L. [160] see Schultz, John

Meza-Peñaloza, Abigail (Universidad Nacional Autónoma de México, IIA) and Federico Zertuche (Universidad Nacional Autónoma de México, UCIM)

[56] *Comparison by Non-Metrical Traits of Xaltocan's Shrine vs. Teotihuacan in Mexico by Using a Non-metric Multidimensional Scaling Method*

There is little information about the biological diversity of the populations that inhabited the Basin of Mexico. In this work we focused on showing the phenotypic differences between 118 skulls of the Xaltocan sanctuary and 44 adult skulls from Teotihuacan. It is not clear how this variability relates to ethnic diversity because ethnicity and biology are not always correlated. However, given that the smaller settlements in the region during the Classic and Epiclassic periods had relatively low populations, the biological distances between individuals can help us to understand the population dynamics of the region. For phenotype differentiation, we use non-metrical traits (NMT) since they are well related with genotypes and are easiest to measure, even for incomplete skulls. We undertake an analysis by non-metric multidimensional scaling analysis (nMDS) for the Euclidean distances of the NMT.

Michael, Amy [121] see Blatt, Samantha

Michel, Lydia

[119] *Adapting Project Archaeology Curriculum in Southern New Mexico*

The purpose of this poster is to develop an educational curriculum on archaeology to be used for a K-12 audience by adapting an existing program, put forward by the BLM, Project Archaeology. This new curriculum, "The Archaeology of Home," seeks to engage the public within southern New Mexico and to convey the value of stewardship and preservation. The area of focus will be the Organ Mountains-Desert Peaks National Monument. The information gathered at the sites of Peña Blanca and Soledad Canyon will be employed and incorporated into an educational program. Specifically, the resources used will focus on the archaeology of home – the rock shelters at Peña Blanca and the rock house at Soledad Canyon. Additionally, the adapted modules will be test driven and evaluated with the help of the Anthropology groups on campus. Development of educational programs are important because there is a need and a responsibility to transfer scholarship from within the professional sphere to the public. Stewardship is the responsibility of everyone and that means the involvement of the educators, like those for K-12, is important, even imperative, to the improved protection and continued preservation of natural and cultural resources, particularly threatened ones like the rock shelter.

Michelaki, Konstantina-Eleni [387] see Rosenstein, Dana Drake

Michelaki, Kostalena (School of Human Evolution and Social Change, ASU), Gregory Braun (Department of Anthropology, University of Toronto) and Ronald G.V. Hancock (Department of Anthropology, McMaster University)

[301] *Exploring the Engagement, Imagination, and Alignment of Potters and their Practices in Neolithic S. Calabria, Italy*

In this presentation we use the results of a raw materials survey, replicative experiments in the field and the laboratory, and physicochemical and mineralogical analyses of local geological clays and archaeological ceramics from the sites of Umbro Neolithic and Penitenzeria in Southern Calabria, Italy to ask 3 questions: 1) How did Early-Middle Neolithic (ca. 5700-5000 BC cal.) 'communities of potting practice' engage with their taskscapes; 2) how did they imagine themselves as parts of broader temporal and spatial patterns; and 3) how did they align their practices with those of other communities locally and regionally to fit within broader structures? By investigating these questions, we can explore how local, mundane actions could shape and be shaped by social life, how power relations could be negotiated in small, politically non-hierarchical societies, how these locally grounded practices could be connected with larger regional processes, as well as how continuity and change could co-exist.

Micheletti, George J. (University of Central Florida), Sheldon Skaggs (Bronx Community College, CUNY) and Terry Powis (Kennesaw State University)

[199] *Identifying Late Classic Political, Economic, and Cultural Affiliations at Pacbitun, Belize*

For the ancient Maya of Pacbitun, the onset of the Late Classic period (AD 550-800) signifies a time of exponential site growth and heightened prosperity. While this florescence is evident in the archaeological record, recent studies have begun to demonstrate that this affluence was accompanied by significant political, economic, and sociocultural change. Situated beyond the southern boundary of the Belize River Valley, Pacbitun culturally identifies with this region but likely enjoyed a significant amount of political autonomy. However, caught between the Late Classic combatant kingdoms of Naranjo and Caracol, Pacbitun and the sites of the Belize Valley would have been subject to incorporation and/or subordination. Interestingly, recent investigations of Plaza A and the residential courtyards at Pacbitun not only indicate an intensified relationship with the Belize Valley during the Late Classic period but may also allude to affiliations with one of the aforementioned kingdoms. Moreover, an analysis of skeletal remains and associated grave furniture seemingly implies an even broader influential sphere at this time. Through an examination of ideological alterations to ritual and mortuary practices and an assessment of foreign trade goods from distant sources, the authors attempt to interpret political affiliations and autonomy at the site of Pacbitun.

Mickel, Allison (Lehigh University)

[77] *The Proximity of Communities to the Expanse of Big Data*

While members of the communities living near or on archaeological sites have frequently been hired around the world to dig on archaeological excavations, they have very rarely participated in the recording or documentation of those excavations. They have played even less of a role in designing the structures of either paper or electronic data management systems. In this paper, I examine the effect of this long-term exclusion using Çatalhöyük, Turkey as a case study. I argue that many of the long-term debates in digital archaeology, particularly considering the comparability versus the customization of data collected, acquire new valances when the interests and knowledge of local community members are taken into account. I maintain that in many ways, the advancements toward big data approaches in archaeology make it more difficult than ever for local communities to articulate their relationships and perspectives on archaeological material. Proximity, defined in many different ways, underlies the way that local communities think and speak about archaeological assemblages, and I illustrate the ways in which these proximities are at odds with the expansive view that “big archaeology” enables.

Micon, Jonathan (University of Georgia), Jennifer Birch (University of Georgia) and Louis Lesage (Huron-Wendat Nation)

[308] *Kinship, Clanship, and the Incorporation of Newcomers in Northern Iroquoian Society*

In this paper, we consider how institutions of social relatedness played crucial roles in Huron-Wendat society and how categories of biological and fictive kinship (e.g., lineages, clans, nations) structured processes of social integration, political affiliation, and adoption. We argue that flexibility in categories of social relatedness conferred an adaptive benefit on Iroquoian societies during the late precontact and early contact eras. We then use this framework to analyze data related to the relocation of populations from the St. Lawrence valley and their incorporation into neighboring communities and Nations during the late fifteenth and sixteenth centuries. Data on the distributions and frequencies of characteristic St. Lawrence Iroquoian artifacts on village sites in Ontario, Canada are utilized to infer the scale of population movement and processes of incorporation. We argue that the circumstances governing population movement worked in concert with institutions of social relatedness to facilitate the integration of St. Lawrence newcomers into Huron-Wendat social and settlement structures. As such, we argue that interpretive frameworks that explicitly incorporate categories and institutions of relatedness with traditional material culture analyses can shed new light on the incorporation of newcomers into middle-range societies.

Miculka, Lori [46] see Maigret, MaryAnne

Mierswa, Emily (Simon Fraser University) and Meghan Howey (University of New Hampshire)

[401] *Community Archaeology in Practice: Great Bay Archaeological Survey*

For the last three years, the Great Bay Archaeological Survey has excavated frontier contact period (1620-1750 AD) garrisons within the Oyster River watershed. These early reinforced New Hampshire homesteads are rare finds in New

England archaeology. The success of this research relies on treating community volunteers as equal contributors. Archaeologists cannot be the sole voice of local histories. This project works to actively decenter the expert/community divide long extant in the discipline by actively centering the public not just in involvement but in interpretation as well. Public archaeology and community engagement are buzzwords in conversations around the future of the field. We know we must have real buy-in from the broader public to remain relevant. GBAS offers one example of a way to actualize this, being a project that functions with a distribution of voice and power. This paper explores our approach to distributing voice and power, the strengths of our approach as well as pitfalls we have encountered that may inform other archaeologists engaging in community-centered archaeology.

Mietes, Esther [212] see Napolitano, Matthew

Mihailovic, Bojana [42] see Dakovic, Gligor

Milbrath, Susan (Florida Museum of Natural History)

[304] *Animal Imagery in the Postclassic Yearbearer Pages of the Codex Borgia*

Animals are prominent in annual rituals performed at the end of the year, as seen on page 49-52 of the Codex Borgia. Animals attacking each other and scenes of struggle involving animals and anthropomorphic gods are related to sequences in the yearbearer cycle that define the Calendar Round. Yearbearer ceremonies are featured in these directional almanacs form a cosmogram of time and space. Four birds perched on trees represent the four cardinal direction associated with four yearbearers that form a sequence of 52 years. Another set of trees shows scenes of sacrifice involving animals, but in the last yearbearer page human sacrifice is featured instead, an interesting variation that relates to ethnohistorical accounts. Other manuscripts in the Borgia Group show interesting parallels, including birds and directional trees associated with four different sets of yearbearers, and scenes of conflict between animals and deities. This patterning suggests that animals played an important role in yearbearer ceremonies performed at yearend, a liminal time of transition in the festival calendar of central Mexico.

[304] *Chair*

Miles, Aimee [212] see Levin, Maureece

Miller, Alven

[120] *Recording the NDVI of Sagebrush with the Use of a UAS in Relation to Sites at Lowry Pueblo*

Archaeological sites in the American Southwest are known to have indicator plants associated with these sites. At times these plants are used as 'site indicators', such as Wolfberry (*Lycium pallidum*) (Yarnell 1965). In addition, there is an anecdotal belief that archaeological sites in the Southwest can be identified by locating healthy, dense clusters of sagebrush. In order to test this hypothesis, I used an unmanned aerial system (UAS) (more commonly known as a drone) equipped with a multispectral camera (Fig. 1) to collect vegetation health and site location data at the Lowry Pueblo Community in Southwestern Colorado.

Miller, Christopher [45] see Meinekat, Sarah

Miller, Christopher (University of Tübingen), Jamie Hodgkins (University of Colorado, Denver) and Fabio Negrino (University of Genoa)

[195] *A Geoarchaeological Study of Site Formation Processes at Arma Veirana, A Palaeolithic Cave in Liguria, Italy*

Arma Veirana is a cave situated along the steep flanks of the Neva river valley, ca. 14 km from the modern-day Mediterranean coast in the mountainous interior of Liguria. The cave formed tectonically within marble, schist and other metamorphic rocks and presents a large but relatively short cavity. Excavations since 2015, conducted by a team of researchers from the USA, Canada, Italy and Germany, have uncovered several meters of deposits dated to both the Middle and Upper Paleolithic. Geoarchaeological investigations at the site indicate that the entrance to the cave has

suffered from periods of extensive rock fall and portions of the Paleolithic deposits have been subsequently eroded. However, micromorphological analysis shows that a significant portion of the cave's infilling is intact and in situ. Furthermore, micromorphology indicates that humans contributed to the accumulation of sediment within the site, notably in the form of combustion residues within the Middle Paleolithic layer "the Black Mousterian."

[417] *Discussant*

Miller, D. Shane (Mississippi State University) and Stephen B. Carmody (Troy University)

[35] *Fire on the Mountain: Colonizing South Appalachia in the Early Holocene*

We use the Ideal Free Distribution from Behavioral Ecology as a null model to interpret the distribution of previously recorded archaeological sites in the Tennessee and Duck River Valleys in central Tennessee from the appearance of Clovis sites in the terminal Pleistocene through the Early Holocene (~13,250 – 8,880 cal yr BP). We hypothesized that the distribution of Clovis sites would be skewed towards lower elevations, and then subsequent populations would spread to higher elevations over the course of the Younger Dryas and Early Holocene as boreal forests were replaced by mixed hardwood, deciduous forests. Our results are consistent with other studies that have proposed that the Cumberland Plateau and the Appalachian Highlands were not intensively occupied until well after the disappearance of the Clovis culture. Using data provided by the Digital Index of North American Archaeology, we expand our analysis to the entirety of the Tennessee River Valley to explore the colonization of the South Appalachian Mountain in the American Southeast.

Miller, Donald

[420] *Three Kiva Pueblo Revisited*

Three Kiva Pueblo Revisited

In 1969, the BYU Field School of Archaeology began intensive excavations at site 42Sa863, Three Kiva Pueblo, in Montezuma Canyon, San Juan County, Utah. Four seasons of field-work, including analysis of architecture, ceramics, lithics, and various artifact materials were reported in a 1974 graduate thesis. Three occupational components represented by successive building constructions are apparent at Three Kiva Pueblo. A total of fourteen rooms and three kivas were delineated. All but two rooms were excavated. A trash mound containing voluminous cultural material and burials was located southeast of the main house structure. West of the house mound is an additional shallow mound representing a ramada area which was utilized by peoples from all three component occupations. The site was occupied, modified or abandoned, and reoccupied, perhaps seasonally, from late Pueblo I to late Pueblo III times. In 1972 the site was stabilized, and no additional excavation has continued. This report is a revisit and update with consideration for continuing research in Montezuma Canyon and other sites in the northern San Juan area.

Miller, G. Logan (Illinois State University)

[205] *Temporal Changes in Wall Trench Structures at the Upper Mississippian Village of Noble-Wieting, McLean County, Illinois*

This presentation provides an overview of recent excavations at the Noble-Wieting village in McLean County, Illinois. Noble-Wieting is a nearly six-acre Langford Tradition mound and village site along the Kickapoo Creek, far from the Langford core along the upper Illinois River. The site has long been known for its unique geographic position as well as the association between Langford and Mississippian pottery. Recent excavations in the northern portion of the site, guided by geophysical data, revealed two partially superimposed wall trench structures. Excavated wall trenches and other features revealed information about above ground architecture, burning episodes, construction sequence, as well as continuity and change in the structure through the rebuild. Overall, the houses share some similarities with other Langford structures but also sheds light on unique architectural elements at Noble-Wieting, which likely represent material signatures of ethnogenesis at this multi-ethnic frontier community.

Miller, Heather M.-L. [232] see Chakraborty, Kalyan Sekhar

Miller, Heidi [34] see Wallman, Diane

Miller, Hollis (Department of Anthropology, University of Washington)**[401] Sugpiaq/Alutiiq History and Community Archaeology in Old Harbor, Kodiak Island, Alaska**

Russian colonial expansion into Alaska dramatically altered indigenous communities and landscapes. Motivated by valuable pelts and the desire to compete with other European powers, Russian fur traders crossed the North Pacific, constructing their first American settlement in 1784 near the modern village of Old Harbor on the Kodiak archipelago. Lacking the knowledge and technology to hunt sea otters, Russians relied on the conscripted labor of indigenous Sugpiaq/Alutiiq men to gather these furs. Similarly, Russians depended on Sugpiaq/Alutiiq women for their knowledge of local resources, fur processing, and qayaq cover production. Sugpiaq/Alutiiq people responded to the changes in politics, economics and environment strategically and situationally. In this talk, I consider current understandings of these changes based on ethnohistoric and archaeological evidence and present the results of a pilot archaeological survey of historic Sugpiaq/Alutiiq sites from throughout the period of Russian colonization (1784-1867 CE) in the region around Old Harbor. I discuss expectations for how research at these sites can illuminate daily negotiations of subsistence, gender and labor within a landscape of pervasive but shifting Russian power and interests, and Sugpiaq/Alutiiq resistance and persistence. I also discuss plans for a community archaeology project as integral to the investigation of these changing relationships.

[401] Chair**Miller, J. Reed (University of California - Riverside) and Kenichiro Tsukamoto (University of California - Riverside)****[280] Lidar Vegetation Analysis and Ground Truthing Efficacy at the Maya Archaeological Site of El Palmar, Mexico**

An essential component of analyzing lidar data is adapting them to the researcher's specific environmental situation, including the effects of local vegetation types on the identification of archaeological features. Doing so, can refine estimates of existing structures in non-surveyed areas and inform improved ground survey strategies in the future. At the Maya site of El Palmar, Mexico, we conducted a ground-truthing survey of different vegetation types associated with features initially digitized using a 94 km² lidar image and those newly discovered during fieldwork. These data were then compared to raster images developed to model vegetative cover based on factors such as vegetation height, density, and ground point returns. While the majority of vegetation types presented few obstacles to visibility in our case, we found that the most problematic types of cover were easily identified from the Lidar image itself. These results allowed us not only to evaluate the validity of raster vegetation models but also to compare methods for identifying less accurate areas of the Lidar image, creating more efficient survey plans that do not require time-consuming analyses of point-cloud datasets.

Miller, Jessica [368] see Butler, Virginia L.

Miller, Kye (PaleoWest Archaeology)**[254] The Architecture of the Navajo-Gallup Water Supply Project**

Architecture is an intimate element of material culture, and was employed by hunter-gatherers, farmers, and pastoralists for thousands of years throughout the Navajo-Gallup project area. The way in which individuals constructed and organized space within these structures are specific to different cultures, time periods, and functions. This paper summarizes architectural units excavated in the San Juan Basin as part of the Navajo-Gallup Water Supply Project over the last 6 years, including Archaic, Basketmaker, Pueblo, and Navajo components. These architectural types are summarized and placed in a larger context of other architectural units known to exist in the region.

[254] Chair

Miller, Kye [254] see Loven, Jeremy

Miller, Mary**[79] Bonampak Will Never Be Finished: Some Remarks in Honor of Steve Houston**

One might think that the 2013 publication of Miller and Brittenham on Bonampak would have closed discussion of these paintings for a few years. But the complexity and richness of the subject continues to yield both details and to add to the big picture of the three-room program of late 8th century Maya paintings in ways that extend the work of both that book and of

the work of Stephen Houston, who has published extensively on the subject for over thirty years. For example, through additional review of the battle in Room 2, it is now possible to see that the battle scene in Room 2 encompasses a stepped pyramid, previously unrecognized, large enough to be a dominant visual feature but represented at a scale with respect to human actors that is more diminished than the depiction of the pyramid—and its dramatic dancers—in Room 3. Additionally, the continuing scientific work on Maya pigments makes it possible to speculate on the possible meanings that the color juxtapositions in the paintings may have had.

Miller, Mel (University of Tulsa)

- [115] *Post-Depositional Ridge Rounding on Banded Ironstone and the Condition of the Fauresmith Artifacts at Bestwood, South Africa*

Transitional lithics have the potential to inform researchers about innovation during significant periods of human evolution. The Fauresmith, an Early Stone Age (ESA) to Middle Stone Age (MSA) transitional industry in South Africa, is marked by the appearance of blade technology and composite tools alongside continuing traditions of large cutting tools. This transitional period coincides with the evolution of advanced Homo species during the Middle Pleistocene. However, one of the difficulties in interpreting transitional assemblages is determining if they are a cohesive lithic tradition or a mixture of early and late assemblages. Using the Fauresmith site of Bestwood, South Africa, as a case study, this research explores post-depositional traces on lithic artifacts to understand formation processes at transitional sites. Using banded ironstone collected from the Kuruman Hills near Bestwood, experimentally produced tools underwent tumbling experiments to document stages of ridge rounding. Using two types of microscopy, fresh ridges were measured before experimentation and documented again after tumbling, allowing the creation of a wear rating system for banded ironstone. This system was then applied to over 200 artifacts from Bestwood. The results of this condition analysis of Bestwood artifacts from multiple areas of the site are presented here.

Miller, Melanie (University of Otago, Dunedin, New Zealand), Yu Dong (Institute of Cultural Heritage, Shandong University), Kate Pechenkina (Queens College, City University of New York), Wenquan Fan (Henan Provincial Institute of Cultural Relics and) and Sian Halcrow (University of Otago, Dunedin, New Zealand)

- [379] *Early Childhood Diet during the Bronze Age Eastern Zhou Dynasty (China): Evidence from Stable Isotope Analysis*

Diet and health are deeply intertwined, and childhood is a critical period where nutrition can have significant short- and long-term effects on the growing individual. Breastfeeding, weaning, and childhood dietary habits are culturally-mediated practices, and how a developing body is fed is a critical cultural experience with biological consequences. Stable isotope analysis of human teeth is one method to study childhood dietary patterns, with new techniques allowing for fine-grained dietary histories of individuals over different windows of time during youth. Previous research on the Eastern Zhou Dynasty (Bronze Age China) identified differences in dietary and health patterns between adult females and males, interpreted as the emergence of male-biased inequality during this time period. To fully understand the development of this pattern of sex-based dietary difference it is crucial to investigate infant and child feeding practices, as nutritional differences may have consequential effects on health outcomes later in life. We studied a sub-set of the same Eastern Zhou individuals' teeth using an incremental dentin sampling approach, with small sections of dentine collagen analyzed for carbon and nitrogen stable isotope data. Here we present the results of this study including analysis of breast-feeding, weaning, and childhood dietary patterns.

Miller, Myles [36] see Graves, Timothy

Miller, Myles (Versar)

- [84] *Bringing the Landscape Home: The Materiality of Placemaking and Pilgrimage in Jornada Mogollon Settlement*

Among prehispanic and historic societies of the American Southwest and Mesoamerica, mountains and caves had multivalent metaphorical and symbolic meanings relating to underworld, ancestors, water, and emergence. Mountains and caves are featured among origin and emergence myths and many contemporary Pueblo societies regard themselves as relationally constituted through such ideational landscapes. Symbolic and metaphorical representations were painted, carved, and modeled in many media, creating iconographic engagements with such beliefs. Other means of engagement with sacred landscapes include placemaking via shrines and rock art. Yet another critical form of engagement, one that is often overlooked, concerns the small material representations of sacred landscapes that were acquired during visits or pilgrimage journeys and transported back to settlements. These take the form of bundled associations of fossils, crystals, pigments, and speleothem often found in ritual depositional contexts. The bundled associations convey bundled meanings,

forming material links between ritual spaces in settlements and the surrounding landscapes. These objects reference the “pieces of places” described by Bradley, whereby material objects retain the significance of their origins and come to represent those locations on the landscape. This paper examines these macroscale material linkages between sacred landscapes, placemaking, pilgrimage, and constructed spaces.

[36] *Chair*

Miller, Pamela (Cultural Resources Media Manager, Air Force Civil Engineer Center, MW Region)

[282] *Discussant*

Miller, Stephanie (University of California, Riverside)

[371] *Connecting Communities: Materiality of Everyday Life along the Sacbe*

This poster offers an introduction to the Proyecto Sacbe Yaxuna-Coba, which is concerned with understanding how social and material life changed for people living along the longest causeway in the ancient Maya world. Up until now, much of the research on Maya sacbeob has focused on the morphology and spatial layout of these monumental features. This project, however, builds upon a growing emphasis in anthropological archaeology of peopling the past (Robin 2003), by critically shifting the frame of analysis away from the materiality of the road itself to looking at changes in the materiality of everyday life after a road transforms the socio-spatial landscape. Systematic archaeological investigations and scientific analyses of households situated at each end of the Yaxuna-Coba causeway provide an ideal opportunity to examine the significance and implications of sacbeob for the everyday life of ancient Maya people. In this poster, I present some preliminary findings from investigations of households at the Yaxuna end of the causeway, specifically looking at change over time in construction practices, domestic spatial organization, domestic burials, and shell crafting.

Miller Wolf, Katherine [30] see Plumer-Moodie, Hannah

Miller Wolf, Katherine (Indiana University East)

[199] *Society in Flux: Migration and Kinship during Sociopolitical Change in the Southern Lowlands*

In the midst of conflict and change people are instigators, bystanders, or unwilling victims of larger sociopolitical machinations. Those living in the Southern Lowlands in the prehistoric and historic periods were familiar with the results of fluctuations in the social structure brought about by the Maya elite or outside Colonial powers. This paper will examine the effects of conflict, co-existence, and shifting affiliations from a bioarchaeological perspective at the Belize-Peten border among the Classic period Maya and during the historic period at a Spanish mission. Situated within cultural context, bioarchaeological data will highlight the impact of sociopolitical change on the lives and bodies of those interred in this region.

Miller-Atkins, Galen [393] see Brown, James

Millet, Jason [213] see Shaw, Chris

Millette, James [39] see Gutiérrez, Gerardo

Milley, David (University of Calgary), Armando Anaya Hernández (Universidad Autónoma de Campeche), Nicholas Dunning (University of Cincinnati), Kathryn Reese-Taylor (University of Calgary) and Debra S. Walker (University of Florida)

[330] *Post-Classic Canal Excavations at Yaxnöhcah, Mexico*

Yaxnöhcah is a large site in Campeche, Mexico with evidence of continual occupation from the early Middle Preclassic into the Postclassic. In 2014, the Yaxnöhcah Archaeological Project commissioned a high resolution lidar scan of the region,

which has allowed for accurate modeling of surface hydrology and significantly contributed to our understanding of hydrological landscape modification at the site. One feature of particular interest was an irregularly shaped, deeply etched canal located in the Bajo Tomatal, just south of the narrow drainage that connects it with the Bajo Laberinto. In 2017 and 2018, we modeled and analysed the hydrology of the Canal, which, along with associated-complimentary fieldwork, has provided insight into the extent and purpose of the feature. Our excavations show that, while the canal may originally have been a natural feature, it was extensively modified, with clear evidence for considerable refurbishment during the Post-Classic and data suggesting an earlier date for initial construction. Furthermore, the modelling indicates that the canal was used as a control mechanism for redirecting and buffering waterflow between the El Laberinto and the Tomatal Bajos. This control would have significantly augmented the agricultural viability of the surrounding area.

Millhauser, John K. (North Carolina State University)**[38] Slow Violence and Environmental Inequality in the Valley of Mexico**

The Valley of Mexico project was unprecedented in its documentation of demographic, social, and environmental processes over millennia. Nevertheless, its findings are limited because participants did not systematically collect archaeological data about settlements after the Spanish Conquest. Although the Conquest was an unprecedented event, its aftermath was shaped by long-term process with deep historical roots. This paper reexamines the value of project data to understand the post-Conquest world in light of 'slow violence,' a term that Rob Nixon coined to call out the temporal and environmental dimensions of structural violence. If structural violence denotes covert and sanctioned inequality, slow violence denotes gradual and accretive changes to structures of violence, especially the unequal consequences of environmental degradation. This paper asks to what extent the project's data document pre-Conquest processes of slow violence and how these processes affected the aftermath of the Conquest. For answers, I compare pre-Conquest trends in settlement patterns, resource exploitation, and environmental change with evidence of the persistence of settlements after the Conquest. In so doing, I find that even decades after the completion of the Valley of Mexico project, the data remain vital as empirical evidence against which new theories can be evaluated.

Millhauser, John K. [68] see Marino, Marc

Millhauser, John K. [238] see Wesp, Julie

Millhouse, Philip [336] see Olesch, Dana

Mills, Barbara [3] see Chavarria, Sara

Mills, Barbara (University of Arizona), Sudha Ram (University of Arizona), Jeffery Clark (Archaeology Southwest), Scott Ortman (University of Colorado, Boulder) and Matthew Peebles (Arizona State University)

[259] cyberSW: A Data Synthesis and Knowledge Discovery System for Long-Term Interdisciplinary Research on Southwest Social Change

A major challenge in using archaeological data at large, regional scales is that information is not digitally curated or synthesized beyond individual projects. A number of recent synthesis projects in the U.S. Southwest show the great potential of these data for addressing important social science questions such as: What promotes the success or failure of some societies? How does migration transform social identities and create new social structures? And, what are the relationships between environmental and social changes? We are building on these prior projects to produce an online system that will allow users at different levels of expertise and access to view, analyze, and export data on past societies in the Southwest to address these and many other questions. The online analytical tools will allow individuals to conduct their own analyses, whether they are tribal members interested in their history, land managers responsible for public interpretation, students learning data manipulation and display, or social scientists grappling with the long-term questions about the human past. A Citizen Science component for registered volunteers will allow a bigger community to participate in transformative science.

[308] Discussant

Mills, Nikki [122] see Tipton, Katherine

Mills, Nikki (Colorado College)

[401] Archaeologist-Collector Collaborations in the San Luis Valley: A Case Study

This research project explores the ways in which the professional world of archaeology clashes with collectors, and how understanding both domains is vital to furthering knowledge of the past. By combining methods of collaboration as well as ethnohistory and field methodologies, professionals and other stewards of the past can retro-actively document sites through private collections and collection stories. This project serves as a case study for this type of collaboration working specifically in the San Luis Valley. In partnership with a private collector, four new sites on the Baca National Wildlife Refuge were recorded. When, as in this case, collectors are “responsible, responsive stewards”, according to the language and ethical standards set forth by the SAA Archaeologist-Collector Collaboration Interest Group, they prove to be integral partners in the discipline. By developing methodology and opening communication lines between professionals and other ethical stewards of the past, we can learn so much more about the past.

Mills, Rebekah (Barnard College, Columbia University)

[411] Conserving a Castle: The Connection between Archeology and Preservation in Making History Accessible

Nestled in the hidden heartlands of Roscommon, Ireland is Ballintober Castle. Ballintober Castle and its surrounding deserted village are the site of an archeological field school, Castles in Communities. As the field school progresses into its fifth year, castle conservation becomes more important for continuing archeological work and maintaining the cultural significance of Ballintober Castle. Both conservation and archeological work are important as the modern town of Ballintober views the castle as an essential site for tourism and local heritage. One goal of conservation for the local community is to connect Ballintober Castle with surrounding cultural sites along the Suck Valley Way. The Suck Valley Way Initiative has created hiking trails and canoeing for an active way to experience history. Conservation would allow visitors access to see inside Ballintober Castle instead of just walking past. Connecting Ballintober Castle to the Suck Valley Way would help paint the picture of the historical landscape, showing the importance of the current archeology and history of the site with modern day economic and community interests of tourism and historic preservation. This paper will demonstrate the importance of conservation for Ballintober Castle serving as a place of cultural heritage and connection to the past.

Miltimore, Derek (Arizona State University), Christopher Caseldine (Arizona State University/ Arizona Museum of Natura) and Sean Dolan (N3B Los Alamos)

[194] An Analysis of the Polvorón Phase Lithic Assemblage from the Mesa Grande Platform Mound in the Phoenix Basin

The Polvorón phase (ca. A.D. 1350–1500), which occurred after the Hohokam Classic Period, was a time of cultural paradigm shifts. There are cultural continuities with the preceding Civano phase, like the use of Salado Polychromes, but people during the Polvorón practiced different cultural traditions, most notably the construction of jacal-like pithouses through compound architecture, and the cessation of large-scale canal irrigation in favor of a mix of small-scale agricultural production and wild resource procurement. Recent excavations at Mesa Grande allow for a renewed effort to understand this understudied phase in the Hohokam cultural sequence. Here, we investigate if the Polvorón phase occupants migrated into the area when the platform mound at Mesa Grande fell into disuse. To assess where they came from, we performed formal and metrical analysis on the chipped stone assemblage, including an EDXRF analysis of the obsidian. Based on these data, we suggest that although the Polvorón phase occupants may have come from outside the region, the obsidian comes from sources that were previously used during the Civano phase like Sauceda Mountains and Los Vidrios. Therefore, while there is discontinuity in Hohokam material culture during the Polvorón, there was also continuity.

Milton, Emily [45] see Meinekat, Sarah

Milton, Emily (Michigan State University) and Joshua Schwartz (Northern Illinois University)**[116] Not Something to Grind Your Teeth Over: Experimental Mounting of Enamel for Stable Isotopic and Microscopic Analysis**

While preparing a set of zooarchaeological materials for microscopic and high-resolution stable isotopic studies, we found ourselves gritting our teeth to produce a set of mounts that met the standards for the intended lab analyses. Our target specimens were camelid teeth from the Terminal Pleistocene levels of Cuncaicha, a highland rockshelter in Southern Peru. These teeth are long and slender, making them difficult to fit into 2.5 centimeter epoxy rounds. As archaeological materials are rare and irreplaceable, it was essential to begin practicing with a set of modern samples to determine the best approaches. Here we present what we discovered which includes our framework of possible pre-destruction curation practices, such as imaging and modeling the specimens. We then explore various methods for preparing mounts to ultimately reveal minimalist techniques for maximum preservation. The intent of this poster is to help others forego nail-biting frustration by demonstrating how to bridge the gap between cutting-edge approaches and diligent conservation.

Min, Rui [130] see Cui, Jianfeng

Minc, Leah [355] see Bray, Tamara

Mink, Philip (University of Kentucky)**[393] Cooperation, Competition, or Taphonomy: Exploring Variegated Assemblages on Grand Canyon Formative Period Sites**

The vast majority of Formative Period archaeological sites recorded in Grand Canyon National Park can be assigned to one of the three distinct archaeological traditions that occur within the region, Ancestral Puebloan-Kayenta Branch, Ancestral Puebloan-Virgin Branch, or the Cohonina. However, a sizable number of sites, almost 20%, have mixed assemblages that blend traits from at least two of these traditions. In this paper I will explore some possible explanations for these variegated assemblages and discuss how these types of sites can influence our understanding of prehistoric settlement strategies.

[393] Chair

Minnis, Paul (University of Oklahoma) and Michael Whalen (University of Tulsa)**[36] Power Cooking...Or Not**

The Paquimé-centered tradition is one of the most influential communities in northwestern Chihuahua and U.S. Southwest (NW/SW). We have argued that food production and preparation was central to this polity. Some of best evidence of this are earthen ovens, one of which is likely the largest in the NW/SW. Based on previous research and data we have accumulated through survey and excavation, we consider how the use of these ovens related to community practices.

Minor, Elizabeth (Wellesley College)**[401] Digital Engagement Strategies Using Location-Based Gaming in Community-Based Participatory Archaeology**

Gamification offers participatory experiences for diverse communities to engage with archaeological research. In informal and formal learning situations, undergraduate students used the location-based mobile game platform ARIS Field Day to create narratives that play through the process of excavation, addressing questions of the ethics of collecting, and gathering community input on excavation strategies. For example, the Wellesley College Hall Archaeology Project incorporated digital engagement strategies to facilitate undergraduate participation in our community-based historical excavation. While building our research plan for exploring the site of a women's dormitory fire from 1914, community members were invited to share their perspectives through games built by students. This iterative process is meant to build inclusive conversations about how today's diverse community reflects on differences and continuities with a privileged past. As formal course assignments, undergraduates designed location-based games that explore ancient Egyptian and Sudanese archaeology and other cultural heritage issues, several with multi-lingual versions with the goal of connecting international audiences. These games and engagement strategies will be used to plan future community-based participatory research in the field in Sudan.

Mires, Ann Marie**[160] *Unearthing the Truth: Exhumation of a Catholic priest to establish paternity***

A niche is opening for Forensic Archaeologists to assist in establishing paternity to Catholic priests through exhumation. In June 2018, I was contacted by Jim Graham who for 25 years has tried to prove that he is the son of a deceased Catholic priest after being presented with an obituary and told the man could be his biological father. Although his quest may appear unique, Graham is one of thousands of people who claim they were fathered by Catholic priests. Despite compilation of extensive records indicating this priest was his father, the church refused to give confirmation. Early 2018, Graham obtained permission to exhume and extract the DNA samples to establish paternity. This is the first case of its kind and will set a precedence. FAR, Forensic Archaeology Recovery, was able to provide assistance. Families cannot conduct this type of testing or submit samples without being a lawyer or doctor to jury the case from the field to the laboratory. Following best practice for extraction and submission of DNA samples, we were successful in establishing paternity in this case. This case will provide an opportunity for Forensic Archaeologists to provide technical assistance and provide quality assurance for families.

[257] *Discussant***Miroff, Laurie and Nina Versaggi (Public Archaeology Facility)****[297] *Community Archaeology at the Trowel's Edge***

The Public Archaeology Facility's Community Archaeology Program (CAP) provides non-archaeologists with an opportunity to participate in archaeological field research projects. CAP participants experience the discovery of artifacts at the "trowel's edge" and follow the journey of an item through processing to interpretation of the people connected to these discoveries. Our goal is to educate individuals about the presence of a rich and fascinating past in their own communities and buried under their feet. Joining professionally supervised projects, even for a week, provides participants with the thrill of discovering objects used by everyday people hundreds and thousands of years ago. Making a connection to people through artifacts builds a deeper understanding of the past, but also an empathy for preservation through both local and national advocacy. CAP offers programs custom designed for the interests and abilities of adults, teens, and children. CAP operates under that principles that the heritage story embedded in an artifact is worthy of our respect and protection, and that an educated and engaged public is more likely to support the preservation of this heritage. This paper will illustrate the principles on which CAP is based with discussion of the successes and challenges of this program.

Miron, Rose (National Native American Boarding School Healing Coalition) and Christine McCleave (National Native American Boarding School Healing Coalition)**[294] *Data Sovereignty in Archaeological and Anthropological Research***

While collaboration has started to become an expected part of research with Native communities, prioritizing the needs and wants of Native communities has yet to be normalized within academic research. In this session, we will discuss how principles of "data sovereignty" might be applied to archaeological and anthropological research and how the National Native American Boarding School Healing Coalition (NABS) has implemented these principles in our research around repatriation and the location of the remains of children who died at U.S. Indian boarding schools. Data sovereignty means that indigenous nations have the right to determine how their "data" is collected, stored, shared, and interpreted. While we don't always think of material objects or the remains of ancestors as "data," these items carry knowledge, and Native nations should decide how this information is managed. Sometimes, the decisions indigenous nations make about data run contrary to what scholars expect or what is beneficial to their careers. For these situations in particular, it is crucial that academic fields adopt best practices where Native nations define their own wants and needs. We will discuss what the development of such principles might look like and how this has guided NABS research.

Miron Marvan, Esteban**[105] *Maya Archaeological Heritage: Ethical and Methodological Challenges from the Mexican Practice of the Discipline***

The practice of Mexican and Maya archaeology is yet to be affected by the postcolonial dialogues in the anglophone world that have discussed the terms of engagement between archaeologists and indigenous communities. Mexico is constitutionally conceived of as a multicultural nation, but the collective rights of indigenous communities are obscured under the predominance of individual rights and a single collective national identity. The contemporary Maya use languages that can be traced back to the Classic monument's hieroglyphs, and their presence as a descendant community is implied

in anthropological, national, and touristic discourses. Nonetheless, there is a serious lack of reflexivity about power relations and an ethic of responsibility for our own anthropological representations. In addition, there is a paradox created by the constitutional right that grants indigenous self-determination, and federal dominance in the managing of archaeological heritage, which is constituted by the indigenous material past. This paper will describe the relationship between archaeology and indigenous Maya communities in Mexico and, in particular, in the Palenque region. Possible paths to engage in dialog with native communities about the construction of their local histories will be discussed.

Mirro, Mike [254] see Potter, James

Misarti, Nicole (Water and Environmental Research Center), Ben Fitzhugh (University of Washington), Jason Addison (USGS), Kana Nagashima (JAMSTEC: Japan Agency for Marine-Earth Science) and PESAS (Paleoecology of the Subarctic and Arctic Seas Work)

[248] *Modeling Climate, Ocean Productivity and Human Population Dynamics on the North Pacific Rim*

We explore human population trends for several maritime regions around the North Pacific Rim over the last several thousand years. These data show correlated but oscillating patterns of populations from the eastern to the western Pacific. Two alternative models explain the patterns of population peaks and crashes over the past 2500 years. The first model considers possible "bottom-up" causes, assuming that population crashes followed subsistence failure tied to long-interval, climate derived ecological regime shifts. Proxy data on changes in climate, ocean productivity and Pacific salmon returns over the past 5,000 appear to correspond with changes in past human population size on adjacent coastlines, even when the populations in question are not focused on salmon as their major resource. The second model explores the role of expanding commodities markets in the destabilization of North Pacific populations.

Misarti, Nicole [269] see Funk, Caroline

Mistretta, Brittany (University of Florida) and Michelle LeFebvre (Florida Museum of Natural History)

[159] *Having Reservations: A Discussion on Recognizing the Dynamic Qualities of "Food" within Archaeological Contexts from the pre-Columbian Caribbean*

Food is a biological necessity, but it is also created and used through culturally defined practices and perceptions, including capture, cultivation, and/or collection, preparation, consumption, disposal, and even secondary deposition. This paper challenges us to think more critically about how we identify, categorize, and interpret the dynamic qualities of "food" within pre-Columbian archaeological contexts. Specifically, we discuss ongoing zooarchaeological analyses of faunal assemblages from MC-6 (Turks & Caicos Islands) and research from En Bas Saline (Haiti) to examine how animal-based food use and accessibility, at two later Ceramic Age sites, played roles in creating contexts of social practice and expression. We consider faunal patterns in terms of site layout (e.g., features, ceremonial architecture, and middens) and explore the ways in which animal-based food was important to ceremonial activities and community dynamics that transpired across diverse physical and culture landscapes. Moreover, we highlight zooarchaeological methodologies to study the archaeology of food, while acknowledging inherent difficulties.

Mitchell, Douglas [194] see Bostwick, Todd

Mitchell, Joseph [362] see Alvey, Jeffrey

Mitchell, Juliette (Miss)

[114] *Modeling Barrow Landscapes Using QGIS*

The visible commemoration of individuals in early medieval Scotland marks a big change in burial practice, with the shift to inhumation under burial mounds. The barrows, demonstrations of identity and power, are not just located in the landscape but interwoven and embedded within it. This poster presents recent research to recreate and understand the setting of the barrow cemeteries. Streams, rivers and areas of marshy ground are recreated using QGIS landscape modelling, historic mapping and digital terrain models (DTMs). These new projected landscapes give insight into the siting of the barrows and

signals of belief.

Mitchell, Mark [17] see Koons, Michele

Mitchell, Peter

[82] *Settling Madagascar: When Did People First Colonize the World's Largest Island?*

Madagascar constitutes a major anomaly in the history of human colonization: 400 km from the African mainland, but with a population whose culture, language, and genes derive substantially from Indonesia, more than 7000 km away. Recently, the argument has gained ground that the island was settled (perhaps from Africa) significantly earlier than the first widespread archaeologically visible traces of human presence in the late first millennium AD. If true, this has important implications for the antiquity of trans-Indian Ocean contacts, the navigational skills of late Holocene Africans, the timing and causation of megafaunal extinctions, and the overall impact of people on Madagascar's ecology. Building on work by Anderson et al. (2018), this paper assesses the published archaeological and palaeoenvironmental basis for this proposition. Applying well-established criteria for dating and evaluating claims of human activity in comparable situations (pre-Clovis sites in the Americas; Polynesian settlement of New Zealand and Remote Oceania), it concludes that there is no compelling evidence that people were present on Madagascar before the mid-first millennium AD. Such a 'short' chronology fits much better with the wider pattern of Indian Ocean contacts currently available.

Mitchell, Spencer [30] see Cortes-Rincon, Marisol

Mitchell, Spencer [114] see Mailer, Mary

Mitchem, Alexandria [168] see Kassabaum, Megan

Mixter, David (Binghamton University)

[371] *Building a Frontier? Preliminary Investigations into a Late Preclassic Maya Triadic Temple Group*

For the ancient Maya, the second century B.C. was a period of growth and consolidation; populations boomed, and a common set of cultural ideas spread across the Maya Lowlands. This expansion of ideas is evident in the widespread presence of chicanel ceramics, the spread of a unified Late Preclassic figural style found on mural and carved monuments, and in the construction of a common set of architectural forms. In the upper Belize River Valley, the adoption of these ideas is evident in the rapid construction of a major center at Actuncan, Belize that conforms to each of these cultural forms. This poster reports on preliminary investigations into the Triadic Temple group at Actuncan, Belize. Drawing on these data, I propose that Actuncan formed a cultural frontier, reflecting the furthest adoption of this full suite of ideas into the Belize River drainage. The broader implications of this frontier for Preclassic regional political processes will be discussed.

[165] *Discussant*

Mizoguchi, Koji (Kyushu University, Japan)

[74] *Collapse, or Drastic Socio-cultural Transformation?: Some Cases from Japanese Prehistory*

This paper proposes to redefine 'collapse' as a type of human responses to changes that happen to the (variously perceived, experienced and utilized) environment in which we live. It is argued that the phenomena commonly termed as 'collapses', such as the disintegration of settlement systems and the disappearance of monumental constructions, can be understood as the material consequences of changes in the way people organize their lives by spatio-temporally structuring their activities and communications. The argument is to be verified with some examples from Japanese prehistory which show that people actively responded to drastic environmental/social changes by utilizing material culture items (including their own body) in creatively different manners from before, that, on the surface, made the changes recognized in archaeological evidence 'look like' collapses.

Moates, Jeffrey [251] see Kangas, Rachael

Moe, Jeanne (Project Archaeology-BLM)

[184] *Kids and Excavations: Affordances and Constraints*

In 2016, fourth graders from an elementary school excavated four square meters of their playground over two days of school in anticipation of construction and complete replacement of the landscaping. The students had experienced some instruction with Project Archaeology: Investigating Shelter prior to the excavation. The excavation was supervised by two professional archaeologists and the students were assisted in the field by several other volunteer archaeologists. A short "lab" session allowed the students to examine the artifacts more closely and make some inferences about their origins and uses. Following the excavations, students completed a formative learning assessment probe about their experience. I interviewed some of the students, individually and in two focus groups, asking them to elaborate on their written responses. Results show that students certainly enjoyed the experience and will probably remember it for a very long time. Two full days of school is a lot of time taken away from other instruction and I question the value of excavations versus high-quality classroom instruction.

[184] *Chair*

Moe, Jeanne [184] see Reetz, Elizabeth

Moes, Emily [110] see O'Donnell, Alexis

Moholy-Nagy, Hattula

[255] *Discussant*

Moigne, Anne-Marie [415] see Morin, Eugene

Molinar, Marissa (University of Florida)

[43] *Seeing Is Believing: The Documentation of Rock Art*

This presentation examines traditional, contemporary, and experimental methods of illustration and photography in rock art recording. Addressed accordingly are the processes and problems unique to pictographs (painted) and petroglyphs (pecked) parietal imagery, superimposition and dating. As a rock art researcher, photographer, and artist, many examples will be drawn from my fieldwork; specifically contemporary methods utilizing panoramic photography and an experimental photographic technique employing solarization filters. The presentation concludes with a discussion of how the act of hand-drawing rock art images creates a powerful scenario to intimately connect with the acts of past agents, as well as the potential opportunity to envision more dynamic interpretive frameworks in rock art studies.

Mollenhauer, Jillian (Metropolitan State University of Denver)

[28] *Reconsidering the Feathered Serpent in Mesoamerica's Formative Period*

Studies of feathered serpent imagery during Mesoamerica's Formative Period range widely in their conclusions, with little agreement about the parameters of inquiry, associated iconographic conventions, or even what constitutes a "feathered" serpent. Images of serpentine creatures have been alternately described as Avian Serpents, Sky Serpents, Winged Serpents, and Plumed or Feathered Serpents. Some scholars would equate the feathered serpent with the crocodilian Olmec Dragon, while others view them as two separate entities. Confusion and disagreement regarding definitions and iconographic categories have resulted in a lack of consensus over whether feathered serpents appeared at all during the Formative period. Additionally, the presence or absence of feathered serpents during this period has been variously used to argue for greater or lesser continuities of political and religious ideology between Formative peoples and their Classic and Postclassic successors, as well as greater or lesser levels of cross-cultural connection between contemporaneous Formative societies. In light of these wide-ranging disparities, this paper will examine what we are truly asking (and

assuming) when we search for feathered serpents in Formative iconography. How might a reconsideration of the purpose, scope, and limitations of such inquiries bring the beliefs and practices of the Formative period into clearer focus?

Monaghan, William [45] see Donaldson, Tyler

Monaghan, William [205] see Krus, Anthony

Mongelluzzo, Ryan (San Diego Mesa College), Jose Garrido (Universidad de San Carlos de Guatemala) and Jean-Baptiste Le Moine (Université de Montréal)

[199] *Boundaries of the Past as Viewed through the Fences of Today: Shifting Methods of Archaeological Inquiry in the Southern Maya Lowlands*

An exploration of how modern borders of different kinds have influenced, and sometimes impeded, our understanding of ancient borders and territories. The Guatemala-Belize border has ramifications in terms of the ways in which scholars interact and how the archaeology is accomplished, including through differing rules and general philosophies of the governing bodies in the two areas. The modern border drawn around the archaeological site of Ucanal in Guatemala greatly impacts how we study it today in terms of remote sensing, including both LiDAR and photogrammetry, and how the place is considered within the larger ancient regional sphere. Official, protected areas are covered by jungle cover, while the farthest extents of the ancient site exist beyond this border and have been converted to grazing land. The two environments have what amounts to an arbitrary dividing line but necessitate vastly different approaches of inquiry.

Monnier, Gilliane (University of Minnesota)

[40] *Discussant*

Monnier, Gilliane [115] see Johnson, Kyra

Monroe, J. Cameron (University of California, Santa Cruz)

[347] *Demographic Change and the Trans-Atlantic Slave Trade in West Africa: An Example from the Abomey Plateau, Bénin*

Demographic historians have posited dramatic population decline across West Africa in the era of the slave trade, the cumulative effects of endemic warfare and the large scale population drain resulting from the export of enslaved peoples to the New World. At the same time, anthropological models for the organization of slavery within Africa have emphasized the quintessential value of captives within African political systems based on "wealth-in-people" rather than "wealth-in-goods". These two models are largely incompatible. Indeed, how do we explain the rapid rise in the export of human beings over the course of the 17th and 18th centuries, if political authority in this period depended fundamentally on absorbing such captives into extant polities? Recent archaeological survey on the Abomey Plateau, political heartland of the slave trading Kingdom of Dahomey, reveals a period of rapid population growth in the early years of the colonial encounter in the 16th and 17th centuries AD, followed by population decline and settlement nucleation in the 18th Century. This paper outlines this evidence in light of the demographic history of the Slave Coast, and considers an alternative hypothesis for the origins of the trans-Atlantic slave trade in West Africa.

Monson, Vanessa [394] see Brzezinski, Jeffrey

Montejano Esquivias, Marisol [349] see López Mestas Camberos, Martha Lorenza

Montenegro, Alvaro [314] see Callaghan, Richard

Montenegro, Alvaro**[378] Adding Navigating Capabilities to a Deterministic Computer Model of Ocean Voyaging**

Since pioneering efforts in the 1970's, computer models that simulate vessel displacement have contributed useful information to the debate around several historical and archaeological problems. Existing models can be separated into two categories. In stochastic models, wind and current values are based on a probabilistic description of these parameters. Deterministic models make direct use of observed or simulated winds and currents. Stochastic models have the advantage of allowing an infinite number of experiments but, in contrast to deterministic ones, ignore the fact that winds and currents are correlated in both space and time. Here I describe the first implementation of navigational capabilities in a frequently adopted deterministic model. Powered movement comes in two forms: 1) paddling/rowing, where vessel displacement is a function of drift due to currents and wind plus movement toward a target at a fixed speed; and 2) sailing, in which boats still move toward a target, but with speed determined by the wind and direction of movement restricted by limits on the vessel's ability to sail against the wind. The new capabilities are demonstrated on simulated trips aimed at evaluating the impacts of the El Niño-Southern Oscillation (ENSO) cycle on coastal trips between Mexico and Ecuador.

Montero, Gabriela (University of Kentucky)**[373] Postclassic Communities and Colonial Reconfigurations in the Eastern Lower Papaloapan Basin, Veracruz, Mexico**

Previous investigations in the region known as the Eastern Lower Papaloapan Basin, in the state of Veracruz, Mexico, have proposed the existence of a "Postclassic Paradox" in which Late Postclassic prehispanic communities identified in 16th century historic documents cannot be identified archaeologically. In this poster, I expand on this idea and propose that the Postclassic Paradox is rather a result of our partial interpretation of colonial documents together with recent and misleading changes in the names of local communities, and not a true lack of archaeological evidence. Through the analysis of maps and documents analyzed at the Archivo General de la Nación in Mexico City, I come up with new ideas for the location of possible Postclassic communities that were immersed in the new colonial political and economic landscapes.

Montero, Laurene [194] see Bostwick, Todd

Monterrosa Desruelles, Herve**[192] A Few Considerations Regarding Jade Circulation during the Aztec Period**

It is well a known fact among researchers that the only confirmed jade deposits in Mesoamerica are found in the middle Motagua Valley in Guatemala. This gem's brightest shades of green were the most appreciated among Mesoamerican people, yet, barely three hundred objects made with emerald green jadeite were recovered from the Great Temple of Tenochtitlan. Since it was the more important hegemonic center of the Mexican Highlands during the Late Postclassic (1350-1521 a. D.), the lack of this stone within the sacred enclosure of the Aztec capital is particularly striking. Previous technological studies established that almost the entirety of the objects were made in the Maya area, while only two were crafted according to imperial standards. This leads us to reconsider the origins of these jades, their possible trade routes and which groups had control of this precious goods. Did the Mexica obtained jade as raw material, were they elaborated by contemporaneous Maya groups or were they relics from ancient times?

Montgomery, Lindsay (University of Arizona)**[421] Contested Cartographies: Landscapes of Power, Adaptation, and Persistence on the Rosebud Reservation**

In 1878, the Rosebud agency moved to its contemporary location at the junction of Rosebud Creek and the south fork of the White River. Over the course of the next decade, members of the Sincangu (Brûlé) Sioux led by the charismatic headmen Spotted Tail came to settle within the reservation. While the reservation's boundaries were a product of American directives, indigenous perceptions of identity and practices of place making intimately shaped the formation of this landscape. Following the long-standing practice of aggregating along waterways, Sincangu leaders strategically placed their encampments near the creeks and river tributaries that flowed across the reservation. Drawing on historic photographs, ethnographic objects, and archival documents, this paper will discuss the various ways in which Sincangu encampments became strategic sites for the exercise of colonial power in the form of ration issue houses, day schools, and churches. These places and associated routes of travel also became important arenas of contestation and adaptation as well as sites for the persistence of indigenous social practices. Ultimately, this discussion challenges the static binary categories of

traditional-progressive and acculturation-survival which have often structured scholarly discussions of Native people during the late-nineteenth and twentieth centuries.

[294] *Chair*

Montgomery, Rebekah (Binghamton University)

[250] *Death in the City: Huari Urban Tombs*

After declaring tombs to be absent from the Patipampa archaeological record on the basis of our 2017 excavations, this presentation discusses two mortuary contexts discovered at the Middle Horizon (AD 600-1000) site of Patipampa in the capital city of Huari. Excavated during our 2018 field season, both tombs are severely looted, but each context displays important spatial and depositional features. This analysis focuses on understanding the relationship between mortuary practices and Huari urban residential space and social organization. I will describe each mortuary context, the associated materials, and relationship to architectural spaces within the Patipampa residential sector. I use these preliminary findings to explore similarities and differences between mortuary spaces elsewhere at Huari and other Middle Horizon Wari settlements in order to consider what Wari dead contributed to the world of the living.

Montgomery, Shane (Cornerstone Environmental)

[280] *The Treasure You Seek Will Not Be the Treasure You Find: Bushing the Path between Expected and Observed at Las Cuevas*

Over the past decade, aerial lidar (Light Detection and Ranging) technology has transformed understanding of prehistoric landscape modifications throughout the Maya Lowlands, including the Late Classic (A.D. 700—900) center of Las Cuevas. The site, situated on the southeastern edge of the Vaca Plateau in western Belize, is not immense, but is distinguished from others within the region by a cave system that runs directly below the main plaza. The peculiar nature of Las Cuevas suggests the site functioned in a ritually-focused manner compared to contemporaneous centers within the Vaca Plateau, such as the major polity of Caracol. This emphasis may have impacted the density, distribution, and layout of ancient Maya households in the surrounding area. The previous two seasons of the LCAR settlement and cave survey were conducted to determine the accuracy and precision of remotely-detected structures and karstic features. Through this research, we sought to understand the spatial relationship of these locales to the distinctive center built around the prominent cave system. This paper presents initial survey results from the 2017—2018 field seasons and discusses the capabilities and potential disadvantages of utilizing lidar-derived data for population and other settlement models within the Maya Lowlands.

Montgomery, Shane [373] see Walden, John

Montoya, Daniel (Pima Community College / University of Arizona), Helen O'Brien (Pima Community College) and Pearce Paul Creasmen (University of Arizona)

[125] *Challenges and Successes of Mapping Royal Tombs and a Newly Discovered Mound Feature Using a Total Station at Nuri, Sudan*

The University of Arizona and Pima Community College collaborated to initiate an archaeological expedition to Nuri, Sudan in January 2018. The site, looted in antiquity and excavated by George Reisner from 1916 through 1918, includes 56 mud brick pyramids and 72 known tombs. One focus of the 2018 expedition was to re-excavate two known tombs and re-map them using modern day technology. During the expedition an unmapped feature was discovered on the northeast corner of the site where test excavations were initiated. The northeast mound feature also became a mapping priority. This poster will discuss the methodologies of obtaining the mapping data in the field and transforming the data collected with the total station into a map using programs such as AutoCAD and ArcGIS and present the results of that transformation.

Montoya, Gabriel

[311] *Leadership*

Brief discussion on Pojoaque's place in the Tewa World

Montoya, Joaquin (New Mexico Highlands University), Warren Lail (New Mexico Highlands University) and Victoria Evans (New Mexico Highlands University)

[44] *Recent Research at El Pueblo, NM*

LA 1697 is a small site located on the Rio Pecos near the village of El Pueblo, New Mexico. Although the site was initially registered with the state's Archaeological Records Management Section (ARMS) in 1978, no other research was conducted on the site until 2016. Over the course of several field sessions during the 2016-2017 school year, a survey and limited excavation were conducted at the site for the purposes of trying to identify the period of occupation for the site and the cultural affiliation of its occupants. An analysis of the lithic and ceramic assemblages recorded at the site has yielded some preliminary results regarding potential trade interactions and the possible cultural affiliation for the site's occupants, while the location of the site itself provides information on Developmental-Coalition Period (1080-1300 A.D.) pueblo site locations along the Rio Pecos prior to the construction and occupation of Pecos Pueblo.

Montoya Mar, Francisco and Maby Medrano Enríquez (Universidad Autónoma de Zacatecas)

[367] *Santiago Apostol in the Conquest of Nueva Galicia and the Fiesta de los Tastoanes*

Festivals and religious beliefs in contemporary Mexico are the product of a cultural synthesis between the Mesoamerican religion and Christianity. In this presentation we expose the survival of a battle scene between Spaniards and indigenous tribes represented in a patronal feast known as Los Tastoanes, in which one of the main protagonists is Santiago Apostol, who is exalted as a warrior, paladin, leader and saint conqueror of Nueva Galicia. Currently, this festival is performed on July 25 in various towns in the metropolitan area of the city of Guadalajara in the state of Jalisco and in four municipal capitals of the state of Zacatecas (located in the Juchipila Canyon). The choreography, the costumes, the masks, the music, and the musicians are different in each of the places where the patronal feast is represented; nevertheless, in all of these the presence of Santo Santiago is protagonist during the staging. At first, the festival of Los Tastones was limited to the staging of a battle, but over the years and differently has accumulated a variety of elements such as the drama of the passion of Christ, of the pastorelas and the dances of Moors and Christians.

Moody, Adam [9] see Lieb, Brad

Mook, Margaret [404] see Scarry, C. Margaret

Mooney, Dawn Elise (Museum of Archaeology, University of Stavanger)

[91] *Imagined Forests: Woodlands and Wood Resources in Medieval Icelandic Literary, Documentary and Archaeological Sources*

Medieval literary sources describe the Icelandic landscape when the first settlers arrived as 'forested from the mountains to the shores'. It had previously been thought that the island was rapidly deforested after settlement, but recent research gives a much more nuanced picture of woodland history. It is becoming clear that while woodland declined in some regions, other woodland areas were preserved, especially for the production of charcoal for high-status farms. This poster compares archaeological, palaeoenvironmental, historical and literary sources to discuss how Icelandic wood resources were used and managed, both physically and in terms of their perception by the saga writers and their audiences. Data from analyses of wood charcoal and wooden artefacts are used to interrogate literary depictions of wood resources, which provide a view of the settlement-era Icelandic landscape as seen through the lens of the elites who produced them. Of particular interest are recurring tropes, such as the (imagined?) dense woodlands of Iceland at the time of settlement, and the import of timber from Norway. Through comparing saga descriptions of wood to archaeological data and to historical sources, this poster examines how the stories told by these diverse archives diverge from one another, and why this might be.

Mooney, Natalie

[295] *Magnolia Grove: A Comparative Study of Plantation Landscape and Architecture*

Magnolia Grove is a nineteenth-century town house property in Greensboro, Alabama. It functioned as a largely self-sufficient farming operation with around 25 acres of land and multiple slaves living and working on site. Because of these features, Magnolia Grove was used as a case study in comparison with other plantation landscapes. In short, this project is a comparative, regional study that looks at the built landscape through the comparison of possible landscape patterns of

plantations concentrated within the Deep South, particularly Alabama. Through the analysis of Magnolia Grove's built landscape, associated artifacts, and features such as swept yards, previously established regional artifact patterns were used to compare contemporary components at Magnolia Grove. This project argues that plantation landscapes were formed through a variety and synthesis of processes such as environmental and individual autonomy of both slave and master to form a unique plantation that is at once similar to other regions, but also different due to various factors that rely upon the individual population at that plantation.

Moonkham, Piyawit

[333] *Institutionalized a Sacred Place: Social Logic and Transformation of Space in an Early Northern Thai Cultural Landscape*

Early archaeological sites of Wiang Nong Lom and Chiang Saen in Northern Thailand appear to have a variety of their spatial pattern than the sites in the later periods (late 14th century). Although temples were constructed follow the state-sponsored Buddhist ideology, some building patterns in many early archaeological sites vary from location to location, illustrating different kinds of spatial orientations. The main hall of the temple is the primary space for monks and laypeople to hold activities together. Archaeological evidence indicates two types of the temples' main hall, one with walls and one without walls. The main hall that appears without walls also found a significant number of community's buildings associated with it, such as wells and kilns. This type of hall also appears to have more public engagement. This paper aims to examine how the spatial pattern differences and changes, between the halls without walls (open spaces) and ones with walls (closed spaces), reflect on the social patterns and relationships and impact on the transformation and communal notions of space. This paper wishes to offer another interpretation of how physical landscape plays a role in communal patterns of spaces, and vice versa, in both early and recent communities.

Moore, Briana [353] see Casserly, Anna-Marie

Moore, Christopher (SRARP-SCIAA), Mark J. Brooks (SRARP-SCIAA-retired), Albert C. Goodyear (SCIAA), Terry A. Ferguson (Department of Environmental Studies, Wofford Colle) and James Feathers (Department of Anthropology, University of Washington)

[122] *Geoarchaeological Investigations at White Pond, Elgin, SC*

The White Pond Human Paleoecology Project is a collaborative effort between multiple institutions and researchers to study the geology, archaeology, and paleoecology of White Pond in South Carolina. Building on the seminal work of Watts (1980), this research seeks to: 1) derive the broader geologic context of the age and origin of White Pond and its fringing sediments containing the archaeological record; 2) delineate and correlate the lacustrine paleoenvironmental and terrestrial archaeological records through integrated studies of litho- and biostratigraphy, geochronology, and archaeostratigraphy; and 3) conjoin the correlated paleoenvironmental and archaeological records in systemic, human behavioral terms (human paleoecology). Archaeological excavations at White Pond over two field seasons have revealed stratified sequences from Late Paleoindian Dalton to Woodland occupations buried within 1 meter of colluvial sand. Here we present preliminary field data, results of luminescence dating, granulometry, and sediment geochemistry. Implications for geochronology and site formation processes are discussed along with directions for future work.

Moore, Christopher (University of Indianapolis), Richard Jefferies (University of Kentucky) and Elizabeth Straub (University of Kentucky)

[145] *Shells and Sherds: Insights into the Historical Landscapes and Mission Period Site Distributions on Sapelo Island, Georgia*

Site 9Mc23, located at the north end of Sapelo Island, Georgia, is a multicomponent Late Archaic through Spanish Mission period site marked by numerous shell rings, piles, lenses, and pits. The adjacent marsh provided abundant shell, which the site's first inhabitants utilized to construct three monumental shell rings. These features continued to influence site organization throughout the Woodland and Late Precontact periods. Survey data indicate that the focus of settlement shifted during the 17th century Mission period, with a cluster of midden piles at Site 9Mc23 likely representing the Guale mission town of Sapala, while another cluster at Site 9Mc501 to the north may represent a refugee community. This paper examines the spatial patterning of shell at these sites and the changing use of the landscape over time.

Moore, Christopher [325] see Feathers, James

Moore, David [367] see Rodning, Christopher

Moore, Jerry (CSU Dominguez Hills)

[18] *Discussant*

Moore, Michael (Tennessee Division of Archaeology) and Aaron Deter-Wolf (Tennessee Division of Archaeology)

[97] *The Inglehame Farm Site (40WM342): A Preliminary Assessment of Mississippian Settlement in the Little Harpeth River Watershed, Tennessee*

Initial grading activity in 2003 for a proposed cul-de-sac within the Inglehame Farm subdivision in northern Williamson County uncovered several Mississippian period stone-box graves. Subsequent archaeological investigations in 2004 recorded structures, refuse-filled pits, and additional stone-box graves associated with an intact Mississippian period village. A reanalysis of the ceramic assemblage denoted two distinct Mississippian components. The first was an early occupation (estimated AD 1000-1100) defined by shell-tempered cordmarked ceramics. The vast majority of ceramics, however, supported a primary site occupation between the mid-13th and mid-15th centuries. An AMS date of 430 +/- 30 BP (AD 1440 to 1455 at one-sigma) raises the possibility that Inglehame Farm represents one of the last Mississippian sites to exist in the Harpeth River drainage, and likely the entire Middle Cumberland Region (Moore et al. 2006), prior to widespread depopulation of the study area.

Moore, Roger

[203] *The Sterling Site: A Preliminary Study of the Lithic Assemblage of a Bonito Phase Pueblo Community*

The Sterling Site is an Ancestral Puebloan structure with related features located in the San Juan River watershed near Farmington, New Mexico. The site was excavated in the early 1970's by the Archaeological Society of New Mexico under the direction of Dr. Cynthia Irwin-Williams. The focus of this paper is the lithic assemblage recovered from the excavated rooms and other features of the site. The general composition of the assemblage will be discussed in relation to lithic materials and their sources, technological characteristics of the assemblage and character of the tools present. Comparisons will be made with other nearby sites of the same general Classic Bonito phase in this part of the San Juan basin.

Moore, Savanna (Student Conservation Association - National Park Service)

[124] *Bonita Canyon: A Chronology of Prehistoric Occupation and Predictive Analysis of Archaic Sites*

One of the goals of the Student Conservation Association (SCA) is to develop the next generation of conservation leaders. While the focus is often on natural resources, cultural resources, as a nonrenewable resource, have, until recently, been neglected. Chiricahua NM has been partnering with the SCA to unravel these archaeological mysteries and develop a cultural resource management program for the park. One of those projects has been to analyze the prehistoric occupation within Bonita Canyon, the largest canyon within the Monument and the center of much archaeological research over the last 35 years. Such overviews of the archaeology in the area are lacking; as such, this synthesis will provide a strong grounding for future land management decisions. This poster focuses on the results of that synthesis, which included building an inductive predictive model with ArcGIS to predict additional high-likelihood areas on the Monument for prehistoric occupation.

Moore, Summer (College of William & Mary)

[354] *Contrast and Connection in a Colonial-Era Hawaiian Hinterland: A Study of Nineteenth-Century Households on the Nā Pali Coast, Kaua'i Island*

While researchers once considered the residents of hinterlands as the passive recipients of social and cultural influence, scholars have increasingly reframed these regions as dynamic zones of innovation and creative adaptation. Hinterlands

have often been mentioned in investigations of indigenous sites in the context of European colonialism. Still, little attention has been paid to the dynamics of social transformation in remote areas of colonial-era Polynesia, including Hawai'i. While the Nā Pali Coast of Kaua'i Island, Hawai'i, was nominally incorporated into the Kaua'i kingdom, in the period after European contact shifts in settlement patterns and modes of transportation rendered this region increasingly isolated. My research investigates how trajectories of household-level social and material transformation in this remote area differed from those more central areas of Hawai'i. Preliminary results suggest that residents of the Nā Pali Coast maintained many familiar domestic practices throughout the nineteenth century, perhaps intentionally choosing to situate themselves on the margins of Hawai'i's emerging market economy. These practices included pursuits such as small-scale farming and fishing and household-level craft production. Despite the persistence of such established routines, however, artifacts from residential contexts suggest that residents of the Nā Pali Coast maintained deep connections to Hawai'i as a whole.

[354] *Chair*

Moots, Hannah (Stanford University), Margaret Antonio (Stanford University), Ziyue Gao (Stanford University) and Jonathan Pritchard (Stanford University)

[253] *An Archaeogenetic Approach to Studying the Demographic History of Rome*

From shipwrecks to monuments, coins to mosaics, the Aeneid to the Satyricon, classicists, archeologists, and historians draw on a range of media to study ancient Rome. As a new media to study the past, ancient genomes provide direct insight into the demographic histories of Rome's inhabitants. This talk highlights our team's interdisciplinary approach to analyzing new genomic evidence in dialogue with existing archaeological and historical narratives of ancient Rome. We discuss cases in which ancient sources, such as contemporary histories, monumental inscriptions, and ancient Mediterranean trade routes, have been instrumental in understanding the genetic structure of the Roman population in our study. In collaboration with geneticists and archaeologists, we have worked to add a genetic dimension to this well-studied time period and region. As archaeogenetic approaches become increasingly common across disciplines, we present an integrative project that we hope will be a useful framework for studying demographic changes in historical populations.

Moral, Enrique (Universitat Pompeu Fabra)

[2] *The Seraglio of the Great Turk: Ethnosexual and Engendered Violences in the Mariana Islands*

After the arrival of a group of Hispanic Jesuits to the Mariana Islands in 1668, an ethnosexual conflict emerged between the colonists and the local communities (the Chamorros). After that conflict, Chamorro communities were relocated in new villages, the so-called reducciones, under the close surveillance of the Spanish colonial powers. This reduction brought about deep changes on natives' and colonists' gender and sexual standards during the first half of the 18th century. The new social order in the colony resulted in an increase of sexual violence exercised against Chamorro girls and women, who were enclosed in residential schools from childhood until they were married. In this presentation, I analyze the matrix of domination that emerged in the Marianas and the ways in which it shaped, and was shaped by, different spaces, such as the church, the school, and even the Governor's palace.

Morales, Anthony (California State University, Los Angeles)

[323] *Rose Valley Site (CA-INY-1799): Applying an Interdisciplinary Approach to a Western Great Basin Paleoindian Site*

In 2017, California State University, Los Angeles, began a multi-year investigation of the Rose Valley Site (CA-INY-1799). As an enhancement of our archaeological methodology, my study has emphasized an interdisciplinary approach that incorporates geological research and geospatial technologies. This includes the use of geostatistical analyses, extensive subsurface soil sampling, and the utilization of drones for topographical surveying and detailed mapping. Utilizing this approach, the resultant maps and datasets were used to identify statistically significant patterns amongst the spatial distribution of artifacts and aid in the reconstruction of the natural and cultural depositional processes at this highly significant site.

Morales, Carlos [181] see Tsurumi, Eisei

Morales, Jessica [323] see Lopez, Escee

Morales Contreras, Juan Julio [375] see Sanchez Guerrero, Andres Francisco

Morales-Arce, Ana (Center for Evolution and Medicine, Arizona State University)

[191] Greater Nicoya from an Ancient Molecular Perspective

Recent technological advances have allowed us to explore ancient molecules such as DNA. A successful recovery of ancient mitochondrial genomes from Greater Nicoya has showed the presence of the haplogroup B2d in a small group of samples (n=3) from the archaeological site named Jícaro, in the Bay of Culebra, Greater Nicoya. What does this mean? Besides representing the most complete ancient genetic data ever recovered in Central America, these results need to be contextualized in the Central American region. This study presents a deeper analysis exploring ancient and modern genetics data which is necessary for discussing potential connections and population movements in the Greater Nicoya area. Additionally, new data resulting from the analysis of ancient DNA from dental calculus of two Greater Nicoyan archeological sites, Jícaro and La Cascabel, will be presented. This second part will explore the ancient microbiome and possible health conditions of these Nicoyan ancient individuals which will enlighten the interactions between these past groups with their environment and complement genetics data with a more holistic view.

Moran, Kimberlee (Rutgers University - Camden)

[160] Standards for Crime Scene Investigation: An OSAC Update

The Organization of Scientific Area Committees (OSAC) is a federal effort coordinated by the National Institute of Standards and Technology (NIST) to create standards of best practice for all disciplines within forensic science. In 2015, NIST created an OSAC subcommittee to address the lack of standards within crime scene investigation. Included as inaugural members of the CSI subcommittee were two archaeologists, an important acknowledgement of the benefits of applying archaeological methodology to crime scene examination. Three years on, the subcommittee's efforts have begun to bear fruit. This presentation will provide an update on the progress of the CSI OSAC, the standards that have been created, and the implications for those that practice forensic archaeology.

[60] Discussant

[160] Chair

Moran, Kimberlee [131] see Leader, George

Mørch, Pivinnguaq [251] see Walls, Matthew

Mordechai, Lee [310] see Stahl, Alan

Morehart, Christopher (Arizona State University)

[56] Between Two Empires: Conflict and Community during the Epiclassic Period in the Northern Basin of Mexico

The Epiclassic period (ca. 650-900 CE) in the Basin of Mexico is considered a time of social, cultural, political, and economic transformation and re-organization. Most perspectives stress that, after the collapse of the major state system centered at Teotihuacan, regional population declined and new groups migrated into the region. The political landscape appears to have been de-centralized and largely unstable, marked by a constellation of competitive polities. In the northern Basin of Mexico and southern Mezquital Valley, archaeologists argue that these competitive relationships would eventually lead to the formation of the Toltec state during the Early Postclassic period (ca. 900-1200 CE), centered in Tula. This paper examines this trajectory through the lens of several seasons of intensive excavations at the hilltop center of Los Mogotes, located between the Basin of Mexico and the Mezquital Valley. This research provides important data on the interactions between household strategies, landscape modification, community formation, and regional political and economic relationships. We examine several lines of evidence that suggest that the inhabitants of Los Mogotes were embroiled in regional conflict. We consider how conflict both developed and changed as well as how such political and economic conditions influenced the nature of everyday life.

[56] Chair

Morehart, Christopher [373] see Villasenor Iribarne, Eunice

Morehart, Christopher [374] see Huster, Angela

Morehouse, Jana

[72] *The Science in Small Business: A Small Business's Process and Problems with Archeological Science Techniques*

Quality Services, Inc. is a small business in Rapid City, SD. Since 2013, we have added GPR, terrestrial LiDAR, 3D scanning and drone photography to our services, but have not had success in using them on a consistent basis. Three obstacles are present: skilled employee retention, convincing clients of the benefits and competition for low cost services that include these methods.

Recent projects for the City of Deadwood have shown the importance of using multiple types of archeological sciences to both preserve artifacts and add to the greater body of knowledge. While QSI has offered both GPR and LiDAR, the City has remained committed to what has worked in the past: construction monitoring.

To promote these techniques in our region, we encourage employee presentations and articles to showcase potential for clients. QSI also volunteers services for local non-profits, again to promote the capabilities of both the technology and our company.

Overall, CRM projects that incorporate archeological sciences should be shared and published more in order to highlight both the need and benefit to clients. However, until regulatory agencies begin to acknowledge the science as an integral part of the process it's unlikely to become commonplace.

Morell-Hart, Shanti [96] see Watson, Sarah

Morell-Hart, Shanti (McMaster University) and Éloi Bérubé (McMaster University)

[197] *Archaic Period MRG-6 and the Deep Culinary Roots of Oaxacan Cuisine*

The rich cuisine of contemporary Oaxaca sprouted from deep roots. Archaic Period plant remains recovered from the MRG-6 rockshelter enhance prior work at Guila Naquitz and grant us insight into some of the managed and wild food plants still used in contemporary Oaxacan dishes. Over 70 different botanical taxa were identified from samples excavated at this site. Residues of several food plants were recovered-- including guaje, cactus tuna, various agaves, squash, amaranth, and goosefoot— indicating the deep history of some of these present-day ingredients. However, other Archaic food ingredients, such as acorns, hackberry, and wild grasses, have since fallen out of favor in canonical Oaxacan cuisine, demonstrating the dynamic nature of food over time. Moreover, microbotanical residues extracted from lithic artifacts show the early uses of certain tools in food preparation that have since been replaced by metal analogues. The MRG-6 rockshelter represents a place where a number of early culinary activities took place, from cutting wild bean plants with chert scrapers to disposing hard cactus seeds after meals. Through these botanical and artefactual residues, we see an early version of Oaxacan cuisine that dynamically transformed over centuries into the UNESCO intangible heritage recognized today.

Morello Repetto, Flavia [33] see San Román, Manuel J.

Morello Repetto, Flavia (Instituto de la Patagonia, Universidad de Magallanes), Mauricio Massone (Centro de Estudios del Hombre Austral), Fabiana Martín (Centro de Estudios del Hombre Austral), Robert McCulloch (Centro de Investigación en Ecosistemas de la Patagonia) and Manuel J. San Román (Centro de Estudios del Hombre Austral)

[364] *Luis Alberto Borrero South-North Drift, Multiple Markers for the Archaeology of Tierra del Fuego and the Fueguian Archipelago (52°-56° S)*

The contributions and influence of Luis Borrero started with his early work at Tierra del Fuego and then surpassed multiple barriers –including the Strait of Magellan- as he developed an outstanding biogeographic perspective and the leading model for the peopling of Fuego-Patagonia. Thus all research programs for Tierra del Fuego have his mark in numerous ways; this influence has gone beyond several generations of archaeologists. We discuss some of these many contributions and select our favorites throughout more than 25 years of research collaboration with the Chilean archaeological teams of Tierra del Fuego and the Fueguian archipelago. The role of regional taphonomy, the assessment of continuities and discontinuities of the archaeological record, the analysis of technological and raw material procurement strategies, and different chronological scales from the Holocene to ethnohistoric and ethnographic records are discussed. Recent work conducted at Navarino and Capitan Aracena Islands and the Almirantazgo Fjord, taking Luis Borrero-mind and body-from the grasslands of the northern steppe of Tierra del Fuego to the hyper-humid forests of the southwestern channels are presented.

Moreno Guzmán, María Olvido [39] see Filloy, Laura

Morgan, Brooke (Illinois State Museum) and Brian Andrews (Rogers State University)

[186] *Architecture and Human Behavior at a Folsom Period Residential Camp*

The Mountaineer Folsom site, located in the Southern Rocky Mountains of Colorado, USA, contains evidence of at least four substantial habitation structures occupied over the course of at least one winter residence. The structures required significant energetic investment in their construction and were made of stacked stone foundations with an aspen-pole supported superstructure. Analysis of artifact assemblages and spatial patterning both inside and outside the structures suggests that different types of activities took place in the different structures, and that they were part of a functionally integrated, contemporaneously occupied community. This site offers a rare glimpse at social structure and behavior not seen in other more common types of sites in the Folsom archaeological record.

Morgan, Brooke [365] see Andrews, Brian

Morgan, Christopher (University of Nevada, Reno), Dallin Webb (Logan Simpson), Kari Sprengeler (University of Nevada Reno), Marielle Black (University of Nevada Reno) and Nicole George (University of Nevada Reno)

[186] *Experimental Construction of Hunter-Gatherer Residential Features, Mobility, and the Costs of Occupying "Persistent Places"*

Temporal and caloric costs associated with building common hunter-gatherer residential features – housefloors, housepits, storage pits, rock rings, and various types of wickiups – are presented based on experimental construction of these types of features. For subsurface features, excavation rates and associated labor costs are consistent regardless of feature type, soil type, or feature size. Labor costs for surface features are largely dependent on feature size, complexity, and availability of raw materials. In total, the per-family costs of building a single-family hunter-gatherer residential base are just under one eight-hour day and approximately 2500 kcal per person. Combined, these data indicate relatively low costs are associated with hunter-gatherer investments in persistent places and in residential facilities made from locally-available resources. Implied by the study is that initial use of a place might reduce the costs of and thus encourage subsequent reoccupations and that raw material availability may have played as much of a role in decisions about when to move as density and distribution of subsistence resources.

Morgan, Kelly (Lakota Consulting LLC)

[147] *The Significance of Stone Features on the Northern Plains: Criteria A-D and Other Issues*

The complex set of interrelated stone circles on the northern Great Plains and where literally hundreds of thousands of stone circles exist as marks on the ground left by those who came before us and our direct ancestors are a trifecta of multi-

component, multi-generational, multi-nation site complexes. These stone circles arise in singular patterns and large interrelated complexes. The contention of our traditional practitioners is that these sites are specific in use and application to the religious and cultural practices of those who placed them there so long ago. As they date to the late prehistoric, Late Archaic, and possibly into the Middle Archaic the oral traditions and religious practices of many nations tell of their use and application to our cultural life ways. There are some of these stone circles which were for the purpose of securing a tipi. Some stone circles can be associated with hearth features. Many more of the stone circles have an interconnected religious and spiritual use that is still known to the traditional practitioners of tribal groups. There are specific reasons why there are few artifacts associated with stone circles. These and other factors have impacted the protection and interpretation of stone circles.

[7] *Discussant*

Morgan, Linda (GRIC Cultural Resource Management Program), Chris Loendorf (GRIC Cultural Resource Management Program) and Barnaby Lewis (GRIC Tribal Historic Preservation Office)

[246] *Akimel O'Odham Traditional Knowledge Regarding Platform Mounds*

Platform mounds play a prominent role in the Akimel O'Odham creation story, but few archaeologists have considered the implications of this knowledge. The story names each of the mound leaders along the middle Gila River, and provides specific descriptions of the special abilities they possessed. The story also describes how Elder Brother, the primary deity of the O'Odham, attacked and defeated each of the mound leaders with the help of people who previously lived in the area. The close correspondences between this story and the archaeological record strongly suggest that the creation story can't be a myth or fiction that was invented by the O'Odham. For example, the conquest story does not include reference to the many other large prehistoric sites that are present along the middle Gila, and instead only references the late Classic period platform mound locations that are known by archaeologists today. We suggest that researchers will gain valuable insight into Platform Mound communities if they more fully consider the implications of the Akimel O'Odham understanding of these settlements.

Morgan, Michele (Peabody Museum, Harvard University)

[293] *Discussant*

Morgan, Robert (USDA Forest Service, Francis Marion National Forest), Matthew Taliaferro (USDA Forest Service, Francis Marion & Sumter National Forest) and Elizabeth Toney (USDA Forest Service, Francis Marion & Sumter National Forest)

[12] *Spatial Database to Spatial Knowledgebase: Predictive Modeling Challenges and Opportunities Across Time Space and Scale*

Geospatial modeling of landscapes for predictive scientific research and hypothesis testing in archaeology has become an important approach in cultural resource management. This poster demonstrates the challenges and opportunities with using predictive geospatial modeling in cultural resource management on Federal lands. The GIS-based analysis of natural and cultural resources within the boundaries of the Francis Marion and Sumter National Forests will allow for reflection on survey methodologies over the last 40 years, reconsider some of the standard approaches to the use of extant data sources, and expand on our current understanding of contemporary landscape modification through time. These studies contribute to the growing reliance on quantitative geospatial modeling in the social sciences and how these practices may better address future challenges of protecting cultural resources.

Morin, Eugene (Trent University), Jacqueline Meier (Trent University), Khalid El Guennouni (UMR 7194 CNRS, Musée de Préhistoire, 06690 Tourret), Anne-Marie Moigne (UMR 7194 CNRS, Department of Prehistory) and Loïc Lebreton (UMR 7194 CNRS, Department of Prehistory)

[415] *Dietary Change during the Middle and Late Pleistocene in the Northwestern Mediterranean: New Insights from the Analysis of Rabbit Assemblages*

In Europe, medium- to large-sized herbivores are widely considered to have formed the bulk of the human diet during the Lower and Middle Paleolithic. In contrast, small fast prey taxa were allegedly rarely exploited. Here, we report new data for a number of leporid assemblages from Southern France dated to the Middle and Late Pleistocene that challenge this view. Our results point to considerable dietary variation during the Middle and Late Pleistocene of Europe.

Morisaki, Kazuki [416] see Iizuka, Fumie

Moro Abadia, Oscar [15] see Nowell, April

Moro Abadia, Oscar [271] see Lewis-Sing, Emma

Morris, Adela [401] see Newland, Michael

Morris, Deianira (University of Arizona)

[258] Rock Art, Cognition, and Embodied Ontologies

In the past few decades, increasing attention toward the study of rock art in the archaeological community has resulted in new approaches to this sub-discipline. Through various research projects, a number of archaeologists have begun to consider what kinds of questions can be examined through the study of rock art and different methods of approaching rock art analysis which can contribute to the archaeological analysis of past societies. This paper seeks to explore another method of studying rock art by analyzing the spatial placement and co-occurrence of rock art motifs in relation to the ontologies of past societies, which no doubt differed from our own views of the world. The research examines the frequency of motif occurrence in rock art from two separate Hohokam sites, and compares possible patterns of motif re-occurrence and spatial co-occurrence based on quantitative analytical methods. Analysis of gathered data focuses on the spatial placement of artistic imagery in relation to embodiment of ontological categories. This paper incorporates theoretical models from cognitive archaeology, cognitive psychology, and neuroscience to provide a comprehensive discussion of how the Hohokam depicted their world, as they saw it, through their rock art.

Morris, Sarah (Department of Anthropology, Texas State University) and Britt Bousman (Department of Anthropology, Texas State University)

[338] Paleolandscape Reconstruction Using Geoproxy Evidence at Erfkroon, a Middle to Later Stone Age Occupation in South Africa's Continental Interior

Erfkroon is situated in South Africa's Modder River Valley and is known for its well-stratified fluvial landscape and archaeologically rich terrace systems. The Orangia terrace is the subject of ongoing investigations because it is characterized by abundant in situ alluvial deposits containing Middle and Later Stone Age artifact assemblages in context with Quaternary fauna. The formation's accessible geology and highly visible archaeology allows for the study of Quaternary environments associated with human occupations in the continental interior. Unraveling the depositional history responsible for terrace formation at Erfkroon the subject of ongoing debate. Two competing hypotheses, the Tooth and Lyons (2013) Accretionary Sedimentation Model and Bousman and Brink's (2015) Allostratigraphy Hypothesis, offer possible explanations but each with unique paleoenvironmental implications. The purpose of this study is to elucidate the validity of each hypothesis by combining geological profile description with high-resolution testing of bulk sediment samples. Methods include FTIR, magnetic susceptibility, grain-size, and micromorphological analysis of sediment thin sections to characterize weathering processes and sedimentation trends forming the Orangia terrace over time. Preliminary results corroborate the Allostratigraphy Hypothesis and provide detailed descriptions of soil formation events indicative of stable landscapes once supporting MSA and LSA occupations spanning 30,000 years.

Morris-Babb, Meredith

[164] Discussant

Morrison, Alex (International Archaeological Research Institute)**[29] A Synthesis of Windward Oahu Archaeology**

Steve Athens legacy has provided archaeologists working within a historic preservation context a reminder of the numerous opportunities available to conduct research within a cultural resource management setting. This paper argues that not only does historic preservation provide a plethora of funding but also offers a long-term regional perspective for those of us committed to compliance work in a single region. To illustrate these points a synthesis of windward Oahu archaeology is provided largely based on historic preservation reports and projects conducted in the region over the last three decades. The presentation concludes with a discussion of the benefits and pitfalls of undertaking applied research within a cultural resource management setting.

Morrison, Alex [29] see Rieth, Timothy

Morrison, Blythe (Northern Arizona University)**[419] Examining Turkey Husbandry in the Northern Southwest Using Legacy Museum Collections**

In this paper, I examine some of the details of turkey husbandry by analyzing avian remains and associated material culture, including feathers and cordage. The North American turkey (*Meleagris gallopavo* spp.) has had a significant and enduring presence in many of the ancient communities of North and Central America. In the literature of the American Southwest, turkeys are often relegated to subsistence categories without a great deal of contextual evidence. These assumptions have had a lasting influence on the understanding of turkeys in the ancient past. Although turkeys were present throughout the Puebloan occupation of the northern Southwest, they were not consistently utilized as food, except during periods of significant social change. Legacy materials housed in museum collections provide insight into turkey keeping methods and how they transformed as a result of environmental and cultural dynamics. Drawing from a sample of sites on the Colorado Plateau, I examine factors influencing the preservation of turkey remains and illustrate how these details may help guide our understandings to a more context-based discussion about subsistence and husbandry.

Morrison, Heather (Canyon de Chelly National Monument) and Victoria Ramirez**[88] Standardizing Condition Monitoring at Antelope House**

Located in Canyon de Chelly National Monument (CACH), Antelope House is one of the most recognized precontact architectural sites on the Navajo Nation, consisting of 93 rooms, 7 kivas, and 10 structures. Many of these rooms and their associated architectural features are noticeably deteriorating, made evident by masonry failures as well as significant mortar and plaster loss. Site monitoring procedures have varied significantly over the past two decades, resulting in inconsistencies in photography and documentation. In 2018, the National Park Service (NPS) updated the condition monitoring program from the Antelope House Monitoring Plan (2002). The updated plan maintains the same goals of the Antelope House Monitoring Plan (2002), but the format, terminology, and process of describing conditions have changed. The procedure includes photographing the walls, floor and fill of each room, assessing their condition, and ranking the most at-risk elements. This project allows the NPS to evaluate Antelope House's deterioration rates since 2002 and it standardizes long term monitoring procedures at the site. In addition, the documentation will help to inform a forthcoming first-order structural stability assessment by providing updated information on site elements that may be contributing to structural issues.

Morrison, Kathy [92] see Boles, Oliver

Morrow, Julie [325] see Smallwood, Ashley

Morrow, Juliet (Arkansas Archeological Survey), Randall Cox and Sarah Stuckey**[99] Paleoseismology at Old Town Ridge**

In the fall of 2018 personnel from the Arkansas Archeological Survey, University of Memphis, and the Natural and Cultural Resources Services conducted investigations at Old Town Ridge (3CG41) to determine if Mississippian period Native Americans abandoned the site circa A.D.1400 because of earthquake activity. Excavation of Trench A exposed four sediment deposits, a cultural deposit, and a plowzone. The sediment deposits include a pre-liquefaction alluvial deposit and

three separate sand dikes and associated sand blows. The cultural deposit consists of an anthropogenic refuse-rich soil that post-dates the alluvium and pre-dates the sand dikes. Sand venting caused vertical displacement of the cultural horizon across the vent zone. This presentation briefly describes the field methods, radiocarbon assays, and preliminary interpretations of cultural features and natural transforms in Trench A.

Morrow, Juliet [216] see Roades, Sean

Morse, Stanton, Marisol Cortes-Rincon (Humboldt State University) and Jeremy McFarland (Humboldt State University)

[113] *Digitizing Previously-Recorded Archaeological Survey Areas on a Budget: How Technical Illustrations in Inkscape Are Advancing the Field*

This research aims to examine nuances between site ranking, placement, and correlations to environmental zones in northwestern Belize. This study used a variety of technological tools such as Inkscape, a Scalable Vector Graphics (.svg) software and ArcGIS to provide in-depth analyses of the dynamic interactions of the ancient Maya at the household level. Scalable Vector Graphics configurations make the digitization processes in GIS seamless for modeling needs. The bulk of the maps and data were collected in the 1993 and 1994 field seasons by Dr. Hugh Robichaux at the Programme for Belize Archaeology Project (PfBAP) in preparation for his dissertation. Recently acquired light detection and ranging (LiDAR) data within the project area have provided a new window into the approach of digitization in archaeology. By utilizing Inkscape (.svg) and ArcGIS for technically illustrating his maps of excavations, settlement patterns, and ecological zones, we will be able to add this newly-enhanced data to a PfBAP GIS geodatabase which will stimulate collaboration, and data sharing among regional specialists.

Moseley, Michael, Susan deFrance (University of Florida), Patrick Ryan Williams (Field Museum of Natural History) and Donna Nash (University of North Carolina-Greensboro)

[306] *Cerros, Keros, Cuerpos, y Mas! 37 Years of Programa Contisuyo Research in Southern Peru*

In 1980 the Pritzker family, major shareholders in Southern Peru Copper Corporation (SPCC), contacted Michael Moseley then a Curator at the Field Museum of Natural History inquiring about establishing a research program in the Moquegua region of southern Peru. Rich in archaeological sites, little systematic research had been completed in Moquegua at that time. In 1981 with the help of Peruvian soldiers and archaeologists, including Garth Bawden, Chip Stanish, and Paul Goldstein, researchers began site survey and building the basic chronology of the region. From these early beginnings and with ongoing support from SPCC (now Southern Copper) developed Programa Contisuyo, one of the longest enduring research programs in the Andes, now in its 37th year. In addition to providing in-kind support for multiple research projects, Southern built and maintains an excellent museum with collections storage and research space. We highlight some of the transformative archaeology of the Programa including one of the largest historical archaeology projects in Peru, Inca and LIP research, the Middle Horizon Wari and Tiwanaku settlements as well as their local antecedents, and the cultures that flourished after their collapse, and the rich record of coastal settlement dating from the Late Pleistocene through the colonial period.

Moses, Sharon (Northern Arizona University)

[131] *Putting a Face on History: Using Forensic Facial Reconstructions and Imagery in the Arch Street Project*

This paper will discuss the application of forensic art and 3-D facial reconstruction (in clay) that was conducted on selected skull replicas made from the Arch Street salvage cemetery site. These reconstructions help to "put a face" on the people who lived in Philadelphia between the 18th to mid-19th century and humanize them. Historical archaeology often provides the historical context of a group of people, utilizing material artifacts as well as archival resources so that we can better understand the communities and their times. But too often the people who lived in the past remain amorphous, snapshots from distant times, and we find it difficult to relate to them in a meaningful way. Three dimensional reconstructions and imagery show us their humanity and enrich our appreciation for the story they provide. This presentation provides a view of four individuals whose faces can speak to us after their voices have been silenced for over 170 years.

Moss, Jeremy (National Park Service) and Colleen Fillipone (NPS Hydrologist)

[85] *Moisture Monitoring Studies of Adobe Walls at Pecos NHP, New Mexico*

In 2014 cultural resource staff at Pecos NHP began a moisture monitoring program to understand the movement of moisture within adobe walls and to study the effects of preservation treatments. The program uses moisture volume and soil moisture potential sensors in two adobe test walls and within a large original wall of the 18th century Spanish Colonial church to understand moisture infiltration and the effects of different preservation treatments, especially the use of amended adobe veneers as shelter coats protecting original 17th and 18th century adobe walls. Precipitation events are tied to the moisture data through the use of real-time weather stations and NOAA weather data on site. This presentation will discuss the last four years of data collection and how the results inform preservation decision making and monitoring.

Moss, Madonna (University of Oregon)

[34] *What Ancient DNA Can Reveal about the Ubiquitous Fish of the Northwest Coast: Salmon, Herring, and Rockfish*

Fisheries are of fundamental importance to Indigenous peoples of the Pacific Northwest of North America today and in the past. This presentation summarizes what ancient DNA has revealed/is revealing about Indigenous use of salmon, herring, and rockfish from different archaeological contexts along the Northwest Coast. In the case of salmon and rockfish, the main objective is species identification, with each species having different life histories and habitat preferences that shed light on human behavior and cultural practices. In the case of Pacific herring, the objective has been to document genetic diversity in a single species and compare ancient herring populations to those extant today. The larger goals of these projects are to understand the long-term historical ecologies of these fishes, and how archaeological data can illuminate pre-industrial patterns of fishing and fish processing. Understanding the genetics of pre-industrial fish may also inform management of the fish and fisheries to insure their survival into the future.

Moss, Madonna [34] see Wellman, Hannah

Motsinger, Thomas N. [254] see Thompson, Kevin

Moulin, Cléa (Sainsbury Research Unit, University of East Anglia)

[143] *Tambo Colorado before the Inca Administrative Center: Study of the Socio-political Developments of the Pisco Valley during the Late Intermediate Period and the Late Horizon*

Tambo Colorado is one of the most impressive Inca sites on the coast of Peru. Its mural paintings have drawn attention and yet, little is known about it, in particular about its pre-Inca occupation and its possible re-occupation after the Spanish invasion. Moreover, the Pisco Valley has been neglected by researchers and is believed to have known no independent socio-political development through its history. As in other regions of the Andes, the Late Intermediate Period and the transition into the Inca empire remains quite unclear. In this context, how is it possible to study the transition from one local polity to the Inca Empire? This paper will explore how to study transitions from one power to another with little information about material culture and the socio-political development of the local region. By understanding the role of Tambo Colorado in the Pisco valley and the regional context previous to the Inca conquest, it will be possible to apprehend the socio-political changes that occurred at a local and regional scale during the transitions from a local polity to the Inca empire and later during the early Spanish occupation.

[143] *Chair*

Mountjoy, Joseph (Universidad de Guadalajara, México) and Jill Rhodes (independent researcher)

[314] *The Curious Pacific Coast Distribution of Tightly Wrapped Bundle Burials in the Middle Formative*

Highly unusual tightly wrapped bundle burials of previously cleaned and carefully arranged disarticulated human bones dating to the Middle Formative have been discovered by archaeologists at three sites in western Jalisco, Mexico, one site on the Pacific coastal plain in far northern Sinaloa, Mexico and eroding out of the Pacific Coast in northwestern Costa Rica. We describe these discoveries and discuss some possible implications for the study of long-range Pre-Hispanic contacts along the Pacific coastal corridor of Mesoamerica.

Mouton, Alice [368] see Perri, Angela

Moyer, Teresa (National Park Service)

[139] *Discussant*

[3] *Chair*

Mrak, Daniel (University of Wyoming) and Jason Toohey (University of Wyoming)

[285] *Contextualizing a Middle Archaic Component at the Cajamarca Site of Callacpuma in the Northern Peruvian Andes*

The northern Peruvian Andes is a traditionally understudied region in terms of the Andean Archaic and foraging/hunting societies in general. Our knowledge of the lithic periods in the north comes from disparate project reports and a very limited number of previous academic projects. Recent fieldwork at the site of Callacpuma in the Cajamarca Basin recovered two examples of laurel leaf shaped projectile points. These point types have elsewhere been associated with the Middle Archaic Period (4200 – 6000 BC). At Callacpuma, they may represent at least the intermittent use of valley bottom resources by mobile groups whose archaeological evidence has often come from higher elevation puna/paramo zones outside the valley. Here we contextualize these finds within the 250 hectare site of Callacpuma, the northern Andes, and the broader laurel leaf point tradition in the Andes.

Mrozowski, Stephen (Fiske Center for Archaeological Research, University of Massachusetts Boston)

[13] *Discussant*

Mt. Joy, Kristen (Texas Army National Guard)

[282] *Moderator*

Mudar, Karen (National Park Service)

[27] *Old Bones, New Data: Pigs and Dogs from Prehistoric Non Pa Wai, Lopburi Province, Central Thailand in a Regional Context*

In the 1980s and 1990s, excavations by the Thailand Archaeometallurgy Project (TAP) at prehistoric Non Pa Wai in the Khao Wong Prachan Valley of central Thailand produced a large assemblage of animal bones. These include many pig and dog bones that provide evidence for management for food. Since their initial analysis, excavations at comparably-aged sites elsewhere including Man Bac and An Son, Vietnam, and Ban Non Wat, Thailand, have provided comparative contexts to examine dietary breadth and subsistence from a regional perspective across mainland Southeast Asia. DNA research into origins and relationships between domestic animals provide another source of data for amplifying understanding of human migrations in shaping regional history. These analytical opportunities enlarge our understanding of the variability in animal husbandry strategies as subsistence articulates with other facets of the domestic economy, such as agriculture and craft production. Representative assemblages from comparable sites elsewhere in mainland Southeast Asia allow us to examine animal husbandry on multiple scales.

Mueller, Natalie [82] see Goldstein, Steven

Mueller, Natalie (Cornell University)

[302] *Domestication and the Extended Evolutionary Synthesis*

In the past decade, a growing group of biologists, ecologists, and anthropologists have proposed a paradigm-shifting revision to the modern synthesis of evolutionary theory: the extended evolutionary synthesis (EES). The EES seeks to foreground developmental plasticity, epigenomics, and niche construction as evolutionary drivers. The EES is helping domestication theorists stop “talking past each other in a crowded room,” and has the potential to revolutionize our

understanding of the origins of agriculture by shifting our focus away from fixed traits and mechanical reactions and onto flexible responses – by both plants and people. The capacity of crop progenitors to immediately respond to cultivation may have been a key factor that determined which species were domesticated, and effected how that process unfolded. Culture, with its ability to encode complex bodies of ecological knowledge, can be fully integrated into evolutionary explanations of the origins of agriculture via the extended phenotype and ecological inheritance. Beyond anthropology, EES informed studies of domesticates and their progenitors are the best way to answer important unresolved questions in evolutionary biology about how and why genetic assimilation occurs. However, pursuing any of these lines of inquiry requires a revival and expansion of experimental and ethnoarchaeological approaches to domestication studies.

[302] Chair

Mueller, Raymond [307] see Hedgepeth Balkin, Jessica

Mukai, Taku [29] see Welch, David

Müller, Noémi [363] see Lis, Bartlomiej

Mullins, Cailey

[184] Archaeology for the People: Community-Based Research, Hands-On Education, and their Place in Archaeology

Archaeology has long captured the minds of the public, but it has not always been as open to community involvement as it could be. How could the field change if our research was run by, with, and for communities? How can archaeology shape the minds of young people through educational programs? When used in a hands-on educational manner, archaeology can help increase the STEAM (Science, Technology, Engineering, Arts, and Mathematics) literacy of both children and adults, opening up lifelong learning and career opportunities. Through the results of an online survey, this paper will explore how pre-college educational youth programs in archaeology can benefit both archaeology and the students involved.

Mullins, Patrick [54] see Billman, Brian

Mullins, Patrick [114] see Murray, Brendon

Mullins, Patrick (University of Pittsburgh)

[200] Legacies in the Landscape: Borderland Processes in the Upper Moche Valley of Peru

Frontier landscapes are complex and dynamic zones often comprising multiple cultural, economic, political, demographic, and geographic boundaries. Bradley J. Parker's (2006) Borderland Matrix model endeavors towards a systematic and process-focused study of frontier landscapes and the bundles of boundaries that compose them. The present work builds off of this model with data from a full-coverage pedestrian survey of the Upper Moche Valley of Peru. Beginning as a geographic and demographic boundary between the highlands and coast, this region served nearly a millennium-long tenure as the eastern political boundary of the southern Moche political tradition (AD 200-900) and subsequently the Chimú Empire (AD 900-1470). From a settlement perspective, findings suggest that coastal people and polities were often bound together in both time and space on this frontier. Traces of Chimú political authority frequently echo or co-opt the physical legacies—monuments and settlements alike—left in the landscape by the Moche. These data are explored in comparison to Parker's (2006) "Tigris Borderlands" case-study with a focus on process and differing trajectories of borderland creation and transformation.

[200] Chair

Mulvihill, Timothy [367] see Lockhart, Jami

Mundy, Barbara (Fordham University, New York)**[238] Paper Matters: Cultural Change in Post-Conquest Mexico**

Paper-making was an indigenous technology of great historical depth; on the eve of Conquest, thousands of reams of paper were brought into the imperial capital of Tenochtitlan, where it was used for a host of bureaucratic and ritual purposes. Yet a generation or two after the conquest, indigenous scribes were using costly imported European paper with frequency. European paper can be thought of as a disruptive agent, upsetting indigenous practices of paper production and use. Like many technologies, paper was one interlocked element of a larger technological bundle that included inks, pens, sizing, and practices of writing, drawing, and painting—the change in one element occasioned changes or modifications in all others. Despite its importance, paper has attracted little attention as in discussions of conquest and cultural change. In this talk, through a close examination of the bundled technology of which paper was a part, I will show how and when “conquest” and “invasion” registered in the material world, and when it did not, as a way of arriving at a better model of the impact of the marquee historical events of 1519-21 in the lives of things, and relatedly, on people.

Munga, Umazi [390] see Biddle, George

Muñiz, David (El Colegio de Michoacán), Kimberly Sumano Ortega (University of Texas at El Paso) and José Luis Punzo Díaz (CINAH Michoacán)**[307] Las unidades habitacionales de Chavinda y sus estrategias de apropiación del espacio**

Habitar un espacio es apropiarse del entorno mediante distintas estrategias que pueden interpretadas por el arqueólogo. Durante el epoclásico se desarrolló el sitio Chavinda en la Ciénega de Chapala, en este lugar se realizaron recorridos sistemáticos de superficie y excavaciones que permitieron identificar unidades habitacionales con estrategias de apropiación del entorno tales como la asociación con gráfica rupestre, ubicación, entierros, entre otras. Se analiza el concepto de unidad doméstica y la forma en que pudieron estar organizando su distribución espacial con base a las estrategias mencionadas. Aquí se muestra los indicios de como los habitantes de Chavinda marcaron su espacio doméstico en por lo menos dos sentidos: el simbólico y el físico, estos mediante elementos visibles como la gráfica rupestre, las construcciones o la ubicación, así como otros elementos no visibles como los entierros. En Chavinda hemos encontrado evidencias de un sistema complejos de apropiación del espacio que puede representar un patrón en la distribución de unidades habitacionales en una región que había carecido de trabajos arqueológicos por más de 50 años. Esperamos que este acercamiento permita abrir la discusión para comprender la arqueología de la Ciénega de Chapala en Michoacán, México

Munizzi, Jordon [419] see Manzano, Bruce

Munoz, Samuel [348] see Schroeder, Sissel

Munro, Kimberly (Louisiana State University)**[181] Tales from the Hearth: An Analysis of Formal versus Informal Burning Episodes at the Cosma Complex, Nepeña Valley, Peru**

Research at the Cosma Archaeological Complex since 2014 has revealed two multi-tiered mounds with architecture relating to the Kotosh-Mito tradition. Carbon dates from the earliest components in Cosma have dated several ritual structures to between 2900-2400 BCE, well into the early Late Preceramic Period. At least eight separate exclusive ritual structures were documented within the two mounds, one of these rooms exhibiting “traditional Mito features” such as the sunken floor, wall niches, and central fire feature. Additional hearths were also documented inside rooms and away from the customary centralized burning locale typical of Kotosh-Mito ritual. Paired with these hearths were activities taking place inside and outside of structures that produced large ash lenses. Materials recovered within these burning episodes include *Spondylus* and other marine remains, burnt camelid and deer bones, and lithic artifacts. This paper will discuss not only the location, characteristics, and elements associated with these hearths, but also touch upon the contrasting elements of the formalized central hearths versus informal hearths and ash lenses utilized during the Late Preceramic in Cosma.

[181] Chair

Munro, Natalie (University of Connecticut) and Elic Weitzel (University of Connecticut)**[35] The Ideal Free Distribution, Population Packing, and the Forager to Producer Transition in the Southern Levant**

Using predictions derived from the ideal free distribution, we test the hypothesis that the forager to farmer transition in the southern Levant emerged from a context of increased population packing. By constructing population size estimates derived from radiocarbon date frequencies and modeling changes in occupied site suitability through time, we estimate human population density in ecological zones of varying quality. We then compare the population densities in these zones with zooarchaeological relative taxonomic abundance data estimates of foraging efficiency. An inverse relationship between human population and foraging efficiency suggests that the adoption of agriculture was related to population packing rather than the motivation to settle down in "affluent habitats."

Munro-Harrison, Thomas (RMIT University)**[14] Indigeneity, Identity and Survivance through Ongoing Cultural Practices**

Through this project I aim to document the ways in which Indigenous artists exercise self-determination in expressing identity through creative means. A complex and significant issue is evident in the depiction of Indigenous Australians within the media which continue to stereotype or ignore Aboriginal perspectives requiring ongoing consideration and critique. I am interested in exploring the ways in which Indigenous artists 'speak back' to such destructive colonizing processes, I will explore these various forms of speaking back, and of resisting ongoing forms of colonization in contemporary everyday life in my work as a Wiradjuri Graphic Designer. Through the development of a graphic novel, I will continue to explore my own meaning-making and identity in ways that demonstrate the ongoing survivance, resurgence and modernity of my Wiradjuri culture. By exploring the works of and consulting with fellow Indigenous cultural practitioners, I seek to gain insights from legitimate primary sources of cultural practice, helping me to consider the ways in which Indigenous peoples draw from their own cultural foundations, whilst reflecting and building on the ways this occurs through my own practice.

Munson, Jessica (Lycoming College), Andrés Mejía Ramón (Penn State University) and Lorena Paíz Aragon (Altar de Sacrificios Archaeological Project)**[113] New Methods of Mound Detection in the Maya Lowlands: UAV Survey and Settlement Mapping at Altar de Sacrificios, Petén, Guatemala**

Over the last decade, the use of lidar has dramatically changed our understanding of the size and extent of ancient settlements in the Maya lowlands. This technology, however, has yielded equivocal results in secondary-forest growth and recently deforested environments. In these settings, unmanned aerial vehicle (UAV) surveys facilitate a more effective and efficient methodology for generating high-resolution imagery to identify archaeological and geomorphological features of interest as well as monitor site destruction. In this poster, we present the results of recent UAV surveys conducted in a 20 km² study area surrounding the site of Altar de Sacrificios in southwest Petén, Guatemala. Results from the survey and total station mapping have documented extensive low-density settlement dispersed along the Pasión Salinas, and Usumacinta rivers far beyond previous estimates of the city's size. The high-resolution digital elevation model generated from these images also captures geomorphological features that help us interpret the relationship between the ancient settlement and relic river courses. Lastly, we also use multitemporal images to quantify deforestation over the last five decades and mound erosion due to recent mechanized plowing. This presentation addresses the implications of these results and highlights the application of regional UAV survey methodology in the Maya lowlands.

[229] Discussant

Munson, Jessica [127] see Scholnick, Jonathan

Munson, Marit (Trent University)**[245] Pigments and Paints in the Ancestral Pueblo Southwest**

Archaeologists working in the Southwest have consistently recovered examples of prepared paints, and the pigments used to make them, during excavation. These materials are usually present in relatively small quantities, though, so they tend to get noted in field reports and then lost within the archaeological literature. In this paper, I consider the distribution of pigments and prepared paints in the Ancestral Pueblo Southwest, drawing on excavation and field reports from the late 1800s through the present day. Taken together, these records indicate that pigments and prepared paints were both ubiquitous and highly valued in the Southwest, occurring frequently in burial contexts from Basketmaker sites up to early

historic villages such as Hawikku and Awatovi. The literature also suggests that there is considerable continuity between ethnographically documented paint recipes, including a complicated copper resinate made from malachite and pinyon pitch, and paints prepared as much as a thousand years ago in Chaco Canyon.

Murakami, Tatsuya (Tulane University)

- [406] *Early Urbanism and Intermediate-Scale Social Interaction in Formative Central Mexico: Ritual Practice and Socio-spatial Organization at Tlalancaleca, Puebla*

Tlalancaleca was one of the largest settlements before the rise of Teotihuacan in Central Mexico. Our ongoing research indicates large-scale urban transformations in the transition from the Middle to Late Formative period. Tlalancaleca during the later Formative is characterized by a multi-centric spatial organization consisting of multiple monumental architectural complexes of different scales. This spatial configuration was not shared by contemporaneous Formative urban centers in Central Mexico, where a principal pyramid-plaza complex constituted the civic-ceremonial core. Our excavations at intermediate-scale complexes at Tlalancaleca have revealed possible feasting assemblages that show some similarities and differences in ritual practices between different complexes. In this paper, we will discuss the implications of varying ritual practices at intermediate-scale architectural complexes for understanding the nature of social integration and differentiation at Tlalancaleca during the Terminal Formative (ca. 100 BC-AD 250). We will contextualize Tlalancaleca's urban transformations in the broader sociopolitical processes in Central Mexico and discuss the significance of intermediate-scale social interaction for urban development.

- [230] *Discussant*

- [406] *Chair*

Murakami, Tatsuya [406] see Jurado, Alexander

Murgoitio, Jayson [88] see Halford, Fredrick

Murillo-Herrera, Mauricio (Universidad de Costa Rica)

- [191] *The Barranca Site: A Multiscalar Analysis*

The research project "Precolumbian social change in San Ramón de Alajuela, Costa Rica" deepens in the reconstruction of the trajectory of pre-Columbian social change in San Ramón de Alajuela and its surroundings. The research has been carried out in two stages, one regional (2007-2011) and the other on a settlement scale. In the present stage (2012-2017) the functional nature of the pre-Columbian settlement Barranca, San Ramón, Alajuela has been explored. Barranca, located in San Ramón, is a particularly interesting case in the region, first because of its complex architecture which, "presents features similar to those of Guayabo de Turrialba" and includes cobblestones and mounds of earth surrounded by rings of boulders; it is also located among the three villages that had the most use in ceremonial festive activities and, additionally, it is among the pre-Columbian villages that had greater material access to exchange with the north Pacific region of Greater Nicoya. All of the above led to the formulation of the following question: Why did a third-level village present a high investment of work in architectural features, together with a regional specialization in terms of festive and ritual activities and considerable interregional exchange?

Muro, Luis (Stanford University)

- [315] *Building a Huaca: Micro-chronological study of Huaca La Capilla-San José de Moro and Its Implications in the Late Moche Absolute Chronology (AD 700-850)*

In the past few decades, Moche huacas have been the object of intense archaeological excavations. The study of the formal characteristics of these constructions has produced relevant information about their appearance and function as well as their importance in the religious life of the ancient Moche. Nonetheless, little attention has been given to the study of the temporal dynamics of formation and transformation of these constructions. This paper presents radiometric data recently obtained from Huaca La Capilla, a monumental adobe construction located within the Moche cemetery of San José de Moro, in northern Peru. By using a micro-chronological approach, I reconstruct the multiple events that gave shape to this huaca, and discuss their relationships with the ever-changing deathscape of San José de Moro in Late Moche times. Inspired by John Rick's contributions to the Andean chronology, I argue that in order to better elucidate the dynamics that gave shape to the Moche phenomenon, we should move away from chrono-typological perspectives under which we equate ceramic styles to chronological phases. Instead, I suggest that the constant renovations in the Moche buildings can

be more effective temporal indicators to trace the transformations in the political and religious arenas of the Moche world.

[165] *Discussant*

Muros, Vanessa (UCLA/Getty Conservation Program)

[395] *Preservation, Education and Outreach: Conservation at the Corral Redondo Project*

The summer of 2018 marked the first season of the Corral Redondo Project, a multidisciplinary project that aims to identify the function of this site which seems to have had a ritual purpose for both the Wari and the Inca (AD 600-1550). Though the site had been previously excavated, and subsequently looted since its discovery in 1943, archaeologists and specialists employed various scientific techniques in order to understand the significance of Corral Redondo and its role in the broader context of the Churunga Valley (south coast area of Peru) where it is located. The project, which was run as a field school, incorporated three components: excavation, survey and conservation. In this paper, the work undertaken by the conservation team will be described, focusing on the treatment of objects in the Museo Escolar Miguel Grau, which houses material recovered from the area. The process for the preservation of these artifacts will be discussed with an emphasis on how these activities were incorporated into a conservation module within the field school. Community outreach was integral to the project's goals and implementation. Activities undertaken to engage with community members about the work undertaken and the development of the museum will also be presented.

Murphy, Liam (Cornell University)

[59] *Discussant*

Murphy, Luke John (University of Leicester) and Carly Ameen (University of Exeter)

[20] *Shifting Baselines of the British Hare Goddess(es)?*

Studies of past religions tend to fall into one of two camps: tightly-focused empirical examinations of a particular religious culture, or wide-ranging phenomenological studies divorced from any local context. Little scholarship engages with the middle ground of longue durée development in particular phenomena within the same geographic region or ecological niche. This interdisciplinary paper seeks to prove the value of just such an approach by examining the worship of female beings that negotiated the relationships between humans, animals, and their shared environment. Employing archaeological and textual evidence, it studies three female beings associated with hares in the British Isles: an anonymous Romano-British figure, the Anglo-Saxon goddess Eostre – whose name shares an etymological root with “Easter” and its lagomorph attendants – and the medieval Welsh St. Melangell. It proposes that these figures display different semantic centres but nonetheless show remarkable continuity in their secondary characteristics. This is used to argue that the temporally-local concerns of each society found expression in “the same” figure of the British Hare Goddess, whose origins and “meaning” is today frequently discussed on online internet fora – perhaps reflecting the Digital Age’s own anxieties regarding the flow and reliability of information.

Murphy, Melissa [285] see Garcia-Putnam, Alex

Murphy, Nell (American Museum of Natural History)

[178] *Moderator*

Murphy, Shayna (Anthropology at State University of New York at New Paltz), Kenneth Nystrom (State University of New York at New Paltz), Jennifer Geraghty (Hartgen Archaeology Associates) and Adam Luscier (Hartgen Archaeology Associates)

[11] *An Analysis of Fetal Remains Discovered in a New York Privy*

The remains of a thirty-six week old fetus were uncovered during the excavation of a privy on the Sargent Street site located in Cohoes, New York. Discovered in a 19th century town inhabited with textile mill workers and their families, the skeleton was fragmentary and consisted of only four long bones. The context of these remains are unique and represents one of only

three such cases in the United States, giving rise to inquiries of the circumstances that could have surrounded this abnormal burial. The recovery of these remains provides opportunity to explore 19th century attitudes towards this period of life. This archaeological context is thought to be a concealment of a fetus that resulted from illicit behavior or a burial of a miscarriage/premature birth, though possible explanations also include abortion and infanticide. Through previously published data on such themes, we will explore the different ideas of how children were valued at this point in history and analyze different explanations for the placement of these remains.

Murphy, Tracy**[21] From Grandma's Attic to Amnesty Programs: Adventures in Accessioning Archaeological Collections**

It is said that the best deaccession policy is a strong accession policy - never accession anything that is beyond your collection scope and institutional mission, and you will never need to deaccession. In a perfect museum world all incoming collections will meet institutional mission, scope of collection guidelines, and professional standards. In the real museum world, artifacts that technically meet your mission can still be problematic donations. This paper discusses challenges faced at the Bureau of Land Management - Canyons of the Ancients Visitor Center and Museum (formerly the Bureau of Land Management - Anasazi Heritage Center), a federal archaeological repository and museum. Applying Department of the Interior and Bureau of Land Management policy and guidance to unique, but not uncommon donation scenarios, methods for finding paths to public benefit are discussed.

Murray, Brendon (University of North Carolina at Chapel Hill) and Patrick Mullins (University of Pittsburgh)**[114] GIS Analysis of Domestic Structures at the Late Moche Site of Galindo**

The site of Galindo was a major center of the Southern Moche Region during the Late Moche Period (600–900 A.D.) During this period, the Moche Valley center appears to have undergone socio-political change, resulting in a new monumental style. In order to investigate possible changes in the domestic sectors, a series of spatial analyses were completed on the domestic sectors of the site using a three-dimensional aerial drone map. By looking at both the domestic and monumental architecture, it is possible to have a more complete understanding of how the marked transitions in monumental architecture may have been mirrored by domestic organization during the Middle Horizon of the Moche Valley.

Murray, John (Arizona State University)**[247] Chair**

Murray, John [247] see Benitez, Robert

Murray, John [390] see Butts, Clancey

Murrell, Monica, Phillip Leckman (Statistical Research, Inc.) and Michael Heilen (Statistical Research, Inc.)**[261] Camping and Hot-Rock Cooking: Hunter-Gatherer Land Use across the Southwest Pecos Slopes**

Understanding changes in mobility and subsistence practices among Jornada Mogollon hunter-gatherer groups remains a substantial research issue. Residents across the Permian Basin largely maintained a hunting-and-gathering cultural adaption throughout prehistoric times, although some segment of the local population practiced cultivation during the Late Formative period. The Southwest Pecos Slopes reflects transitional vegetation community that interfaces between succulent-rich uplands and mesquite-dominated lowlands. Available resources, such as lithic raw materials and edible plants, are scarce within this region; however, numerous small sites related to resource-processing and cooking activities persist across the area. The BLM Carlsbad Field Office requested an evaluation of existing site and feature typologies, to explore the potential for deriving more-meaningful behavioral interpretations regarding prehistoric use of region. This investigation aimed to better understand local patterns of lithic raw material sources, procurement, reduction, transport, use, and discard, in addition to examining temporal and spatial trends in the prehistoric occupation across the region in relation to mobility patterns. The combination of these detailed studies were used to elucidate the function and chronological placement of small sites, and enhance the BLM's ability to manage sites within the developing region, especially in regard

to understanding issues of site eligibility and research potential.

Murrieta, Rui [286] see Strauss, Andre

Murrin, Riley

[290] *The Dirt on Cultural Diversity: Examining Occupation Floor Surfaces in the Moquegua Valley*

The recent rise in the availability of literature on the topic soil chemical analysis has inspired growing interest in evaluating soils at archaeological sites to gain a more detailed picture of the lives and culture of the people that once lived there. Through soil analysis, we can better define areas once used for residential space activities like cooking, workshops and refuse disposal, and identify spaces used for ritual activities as well. The Moquegua Valley has been home to a variety of cultures, making it an ideal setting for exploring cultural development through time. This study examines its cultural diversity and change through the application of X-ray Fluorescence Spectroscopy by performing multi-element chemical analyses on soil samples from the occupation floor surfaces of both Middle Horizon and Late Intermediate Period Sites.

Musgrave, Maria [90] see Holtkamp, David

Musser-Lopez, Ruth (Applied Archaeology Graduate Student - CSUSB)

[274] *Trek Up the River: A Cobble Tool Technology as Clue to Interior California's Antiquity*

An early quartzite cobble lithic technology is evidenced by a multi-site pattern of datasets including waste cores and tools with highly patinated flake scars on remains deeply embedded in the natural desert pavement of the Pleistocene shorelines along the Lower Colorado River (LCR). Reduction technology is represented at Vista del Lago (CA-SBr-1456) located near Havasu Landing, California. The distribution pattern of multiple similar sites along the western shoreline of the LCR and Gulf of California (eastern shoreline of Baja California) was reported by Malcolm J. Rogers in 1939. These scattered sites are considered as a potential connecting link between interior California to a submerged ~ 12,700-year-old pre-Clovis paleo-coastal cobble tool dataset found off the Baja peninsula and reported by Matthew DesLauriers at Cedros Island in 2017. The presence or absence of a statistical typological, technological, and chronological correlation between the various cobble sites (with datasets available for study) is considered using Optically Stimulated Thermoluminescence (OST), XRF, and relative dating of pertinent Pleistocene shoreline benches. A corollary early technology along the inland shoreline would support the extension of a Paleocoastal peopling into interior regions via the Gulf of California and the Lower Colorado River channel.

Myers, Joshua (Indiana University-Purdue University Indianapolis) and Alex Badillo (Indiana State University)

[134] *Bethel Cemetery: Photogrammetric Field Methods in Burial Excavation*

During the summer of 2018, cultural resource management professionals, in collaboration with local universities, relocated a nineteenth-century cemetery from an urban setting, as a component of planned infrastructure expansion by the Indianapolis International Airport. Project managers chose to employ SFM photogrammetry to document excavated burials, which provided project researchers tools necessary for bioarchaeological study. Project directors devised a methodology for the digital mapping of human burials prior to fieldwork; however, team members faced unexpected challenges necessitating modification to established procedures and protocols. By the close of fieldwork, the photogrammetry team had digitally recorded and reconstructed 3D models of over three-hundred exhumations and developed a clear understanding of which practices were suitable to the variability in field settings, and those that revealed themselves to be impractical. This paper describes the problems encountered during the 3D mapping of excavations at Bethel cemetery, how the photogrammetry team adapted to variability in field environments for photocapture, and offers photogrammetric protocols recommended for adoption by practitioners and academics as standard practice in the archaeological excavation of human remains.

Myers, Nate [213] see Martinez, Daniel

Myrbo, Amy [37] see Beamer, Dawn

Nabity, Samantha (Utah State University), Jacob Freeman (Utah State University), Dave Byers (Utah State University) and Erick Robinson (University of Wyoming)

[209] *Hunter-Gatherer Intensification and Long-Term Demography: A SW Wyoming Case Study*

The intensification of production by human groups has occurred at various times around the globe. Intensification correlates with increases in population size, increased labor investment in food production, and decreased residential mobility; the opposite (de-intensification) correlates with decreases in population size, decreased labor investments in food production, and increased residential mobility. The exact causes that lead human groups to intensify/de-intensify are not always easily understood; potential factors include climate change, resource availability, and changes in social order. Using Southwest Wyoming as a case study, we construct datasets from archaeological sites dating to the Early to Mid-Holocene and use them to evaluate a model of intensification based on climate and investments in place-based infrastructure. The results of our analysis are important for developing a theory for better understanding the factors that lead human groups to intensify/de-intensify, which can be applied to other archaeological case studies.

Nachamie, Abel [113] see Shaw-Müller, Kyle

Nachamie, Abel (University of Pittsburgh), John Walden (University of Pittsburgh), Michael Biggie (Los Angeles Maritime Institute), Kyle Shaw-Müller (University of Toronto) and Rafael Guerra (University of New Mexico)

[371] *Reconstructing Shifting Patterns of Ritual Practices and Ceremonial Authority at the Emergent Late Classic Maya Polity of Lower Dover, Belize*

The Maya polity of Lower Dover arose in the Late Classic (AD 600-900) period in the Belize River Valley. During its rise, the center incorporated three small communities with autonomous local elites as neighborhoods with co-opted intermediate elite heads beneath an apical political regime. This situation provides archaeologists with a before-and-after perspective on how the emergence of a polity changed the rituals and ceremonial activities of a broader populace and speaks to intermediate elite agency and autonomy as they became subordinate to a new royal political system. Commoners were directed in the rapid creation of the civic-ceremonial center and subsequent large public gatherings in the centralized Lower Dover plazas. But how did this change pre-existing patterns of veneration at domestic and local elite venues? Traditional perspectives on Maya ruling strategies implicate ceremonial power as being central to the political power of kings, does this mean that the rise of an apical regime undercut or appropriated the pre-existing ceremonial role of hinterland elites? This poster examines the relationship between ceremonial practices and political control from a commoner and intermediate elite perspective. Data pertaining to ceremony comes from settlement survey and the excavation of elite and commoner contexts.

Nadel, Dani [402] see Seymore, Mason

Nadel, Samantha

[250] *A Microscopic Analysis of Inclusion Size in Middle Horizon 1 Ceramics from Huari*

Huari, the capital of an Andean conquest state during the Middle Horizon, contains ceramics of a multitude of local and foreign styles. While these styles have generally been defined by their outer appearances, it is still unclear whether they can also be distinguished according to their pastes. A group of 132 ceramics of five Middle Horizon styles- Huarpa, Nasca, Chakipampa, Ocros, and Nievería- were collected as part of the 2017 Prehistoria Urbana de Huari excavations for analysis. This research, building upon previous work by Andean archaeologist Luz Antonio, analyzes the pastes of these ceramics using a digital microscope and categorizes them based on inclusion size. It was determined that there are statistically significant differences in the distribution of inclusion sizes between Huarpa, Nasca, and Nievería (listed in order of descending size), while Ocros and Chakipampa could not be distinguished according to inclusion size. The overlap between the Huarpa and Nasca distributions, however, eliminates this characteristic as a predictive tool.

Nagaoka, Lisa (University of North Texas), Steve Wolverton (University of North Texas) and Patrick Elliott

[46] *Landscape Ecology, GIS and Faunal Abundances in Ancestral Puebloan Sites in the San Juan River Basin*

The abundance of faunal remains in archaeological sites is generally associated with the availability of those fauna on the

landscape. However, over time, the spatial variability in faunal abundances could change due to environmental or anthropogenic factors. In the American Southwest, the occurrence and abundance of artiodactyls and lagomorphs varies spatially, especially during the Pueblo periods. There are two competing hypotheses to explain these patterns. Either the landscape supported different types of fauna or the faunal composition is the result of anthropogenic harvest pressure. To evaluate the role of landscape in the distribution of fauna, we use methods developed in landscape ecology and biogeography to describe the realized niche of lagomorphs and artiodactyls in the San Juan River basin. We expect that if landscape is the driving factor in faunal abundances, we should see distinct landscapes associated with each species.

Nagashima, Kana [248] see Misarti, Nicole

Nakazawa, Yuichi (Hokkaido University)

- [392] *An Assessment of the Intrinsic Water Content to Understanding Obsidian Hydration: A Case Study of Paleolithic Obsidian from the Shirataki Region in Hokkaido, Japan*

Among the various factors that potentially affect the obsidian hydration rates, intrinsic water content of obsidian has been considered a significant factor. Despite this understanding, variation in water content even within the geochemically identical provenance of obsidian makes it difficult to evaluate the effect of water content on obsidian hydration rates. Given this problem, we attempt to measure the intrinsic water content of obsidian from the geochemically identical samples from an Upper Paleolithic assemblage of a single prehistoric site in the Shirataki region, known as the largest obsidian outcrop in Hokkaido, northern Japan. Because of the consistency in the other potential factors (burial conditions, date of the assemblage, obsidian provenance) among the samples, the measured difference in hydration bands can be explained by variation in the intrinsic water content. The results of this case study will provide implications to the relationship between intrinsic water content and hydration rates for prehistoric obsidian both in the Old and New Worlds.

- [392] *Chair*

Napolitano, Matthew [35] see DiNapoli, Robert J.

Napolitano, Matthew (University of Oregon), Geoffrey Clark (Australian National University), Robert J. DiNapoli (University of Oregon), Esther Mietes (D7 Archeologie) and Scott Fitzpatrick (University of Oregon)

- [212] *Geomorphological Development and Implications for Human Settlement of Southern Yap, Western Caroline Islands*

Human population dispersals across Remote Oceania were some of the most remarkable long-distance voyages in history. Recent collaborative research focused on the timing, drivers, and complexities of these voyages has led to an increased understanding of these movements, but many questions still remain unanswered. This is especially true for Yap, a group of four small islands in the northwest tropical Pacific. Multiple and conflicting lines of evidence provide a broad chronological range for when Yap was first colonized (sometime between ca. 3300-2000 BP), with the earliest dates essentially coeval with the other nearby archipelagoes. To address this issue, we present results from recent archaeological research from Gilman municipality in southern Yap. A suite of new archaeological and non-cultural radiocarbon dates has now extended the earliest date of human settlement by around 400 years and shed important new light on Late Holocene geomorphological development of southern Yap. Results from this study provide a guide to identifying where pre-2400 cal BP sites on Yap may be located.

Napora, Katharine (University of Georgia), Victor Thompson (University of Georgia), Robert Speakman (University of Georgia), Alexander Cherkinsky (University of Georgia) and Robert Horan (Georgia Department of Natural Resources)

- [94] *Environmental and Cultural Changes at the Late Archaic – Early Woodland Transition on the Georgia Coast, USA: A Dendrochronological and 14C-Based Approach*

We present a new multimillennial tree-ring chronology derived from subfossil bald cypress (*Taxodium distichum*) buried at the mouth of the Altamaha River on the Georgia Coast, USA, and discuss environmental and climatic changes indicated by tree-ring proxies, including ringwidth and chemical analyses. Finally, we examine modeled new and existing radiocarbon dates from terminal Late Archaic shell-bearing coastal sites in the area and contextualize these dates within the environmental framework.

Naranjo, Alden [244] see Atencio, Cassandra

Naranjo, Danny [254] see Chavarria, Benji

Narasimhan, Vagheesh (Harvard Medical School)

[253] *The Genomic Formation of Central and South Asia*

This paper serves as an example of how ancient DNA (aDNA) data can provide new insight into large-scale population transformations of archaeological cultures. The details of population transformation through time in Central and South Asia have been unclear due to the lack of aDNA. To address this gap, we generated genome-wide data from 500 ancient individuals and 200 new radiocarbon dates, from present day eastern Iran, Turan, Kazakhstan, and South Asia. We document population transformations from the Mesolithic that occurred on the Steppe, as well as in Turan, that ultimately give rise to large urban settlements in the Bronze Age, as part of the Sintashta and Bactria Margiana Archeological Complexes (BMAC). Sequencing of a large number of individuals from multiple archaeological sites in these locations shows that the inhabitants of these places were often genetically heterogeneous and included migrants from other locations. Of particular importance are outlier BMAC individuals that we believe to be from the Indus Valley Civilization, whose ancestry provides the single largest contribution to South Asia today. Finally, we show how Steppe ancestry linked Europe and South Asia in the Bronze Age, providing a mechanism for spreading Indo-European languages across much of Eurasia.

Nash, Brendan (University of Michigan)

[110] *Neural Nets for Style: A Method for the Examination of Material Culture Variation*

The cause of morphological variation in material culture has long been debated. This investigation into archaic projectile point variation from the Gault site in central Texas looks through the lens of social learning to suggest that different teaching and learning strategies represent the root cause of variation. These strategies may in turn reflect part of the social function of the items being made. Specifically, some of these objects may serve the purpose of signaling information to other people, while other forms may simply be utilitarian with no symbolic value. It is proposed that projectile point forms that show relatively less variation may represent objects with a symbolic purpose. The chronologically controlled forms are quantified into ideational units by training an artificial neural network to recognize patterns in the morphological data. These patterns can be compared to the data of each individual specimen in the groups to determine a level of intra-group variability for each group relative to each other group. It is hypothesized that the variation among these groups will display a bimodal distribution with one mode representing a group with a symbolic aspect, while the others is simply utilitarian.

Nash, Carole (Geographic Science, James Madison University)

[133] *Climate Change Impacts on Archaeological Sites of the Middle Atlantic Uplands (U.S.)*

At first glance, the archaeological resources of the uplands of the North American Middle Atlantic region are much less vulnerable to the impacts of climate change than are tidal or coastal sites. However, as the impacts of climate change become more pronounced, archaeological sites of the uplands -- including settings in the Appalachian Mountains, foothills and Piedmont plateau -- are subject to a different set of impacts associated with forest cover and slope: drought and high winds that create conditions for frequent wildfires; and extreme precipitation events that lead to severe erosion, flash flooding, or rapid mass wasting. This paper considers examples of such events in recent years and argues that the fragile stratigraphy of upland sites is further compromised by climate change-related extreme weather and fire occurrences. Soil deflation, in particular, creates lagged surfaces where once stratigraphically-separated cultural horizons collapse into each other. The limited amount of field work undertaken in the uplands relative to the lowlands magnifies the loss.

[133] *Chair*

Nash, Donna (UNCG)**[290] Getting to the Point: Wari Obsidian Distribution in Southern Peru**

Recent geochemical studies in the Andes have shown that obsidian was moved over long distances throughout prehistory. Yet as Burger et al. (2000) suggested, the mobilization of obsidian during the Middle Horizon was unparalleled in quantity and scope. In this poster, I consider the relationship between lithic source, reduction technique, and the nature of obsidian distribution to Wari-affiliated enclaves. I review the available data from several sites and use examples from Cerro Baúl and Cerro Mejía to illustrate the general reduction sequence of curated obsidian tools. I suggest that the classic Wari obsidian laurel leaf point is a diagnostic form because it is a product of the distribution of preforms, rather than the circulation of nodules, as well as a somewhat standardized process of obsidian reduction. I consider how the manner of distribution and reduction may have impacted the use of obsidian in Wari provinces and how it might be used to distinguish between communities receiving obsidian through imperial channels versus those engaging in direct procurement.

[290] Chair

Nash, Donna [290] see Henkin, Joshua

Nash, Robert (Desert West Environmental, LLC)**[57] Settlement-Subsistence Strategies and Economic Stress among the Sevier Desert Fremont**

Archaeological investigations at four Fremont sites in the Sevier Desert indicate settlement-subsistence strategies changed after AD 1000, shifting from short-term processing camps associated with logistical exploitation of resources to residential occupation and intensive processing of rabbits. These changes may have resulted from population growth and economic stress, which forced an expanding sedentary farming population into less desirable locations until final abandonment of the region around AD 1220. The findings presented in this paper are consistent with other research suggesting population growth and resource depression occurred during the Late Fremont period, and provides important insight to prehistoric adaptations in the Sevier Desert during this time.

Nash, Stephen (Denver Museum of Nature & Science), Michele Koons (Denver Museum of Nature & Science), Melissa Bechhoefer (Denver Museum of Nature & Science), Krista Barry (Denver Museum of Nature & Science) and Sarah Carlson (Denver Museum of Nature & Science)

[89] Enhancing Preservation and Access to Archaeological Collections at the Denver Museum of Nature & Science

The Denver Museum of Nature & Science (DMNS) Archaeology Collection represents an important, yet underutilized, cross-section of ancient material culture from around the world. The collection contains more than 72,000 objects, yet its contents are unknown to the vast majority of potentially interested people and communities. In 2014, DMNS opened a new state-of-the-art collections facility. In 2017, we obtained a National Endowment for the Humanities grant for \$300K to move, organize and rehouse the Archaeology Collection. We are currently constructing archival mounts for all objects, taking reference photos for the online Imu database, and reorganizing the collections by culture area in the new space. The reorganization effort will improve accessibility for scholars, students, source communities, and the general public that in turn will facilitate humanities projects and research, cultural resilience, and scientific discovery. This poster will highlight some of our most important collections, some of the research projects facilitated by the new collection space and workshop, and our process of rehousing.

Nash, Steve [122] see Baxter, Erin

Nathan, Smiti (Johns Hopkins University)**[232] Dugongs, Dromedaries, and Domesticates: Disentangling Diverse Diets in Bronze Age Southeast Arabia**

The Bronze Age (ca. 3100 – 1250 BCE) in southeast Arabia is a period of major social and economic changes. In general, several aspects of the southeastern Arabian Bronze Age diverge from patterns occurring in neighboring areas, making it an interesting focal point of study. In terms of subsistence strategies, agriculture arrived over a millennium later than in major Near East centers. While major Near Eastern urban centers did engage in other subsistence strategies (e.g., pastoralism), the diversity and intensity of the non-agrarian pursuits are often obscured. This paper disentangles the archaeological

evidence demonstrating diverse diets in Southeast Arabia that harnessed pastoralism, hunting, foraging, fishing, and agriculture.

Natker, Leon (Research Associate) and Ramson Lomatewama (Hopi Tribe)

[44] Katsinam, Clouds, and Kivas: Evidence for the Origins of the Katsina Culture

Katsinam are an iconic symbol of the Native American southwest, but the origin of the religion, sometimes referred to as the Katsina cult, has been elusive. In this paper I review earlier research on the origin of the Katsina culture and the conclusions these researchers came to, taking into account the theoretical constructs and assumptions these earlier researchers used. I review more recent research that explores imagery on ceramics, rock art, and kiva murals, and the movement of trade goods containing these images, coupled with research on Puebloan oral history. This includes current research on migrations and landscapes, and their association with aspects of the Katsina culture. Finally, I use this evidence to support the hypothesis that the Katsina culture is an indigenous creation of the Ancestral Puebloan Southwest which dates back at least as far as the Pueblo II period, and that our conception of the Puebloan world needs to be expanded northward to include the Fremont area in order to fully explore the ancestral beginnings of Katsinam and Puebloan ritual practices.

Naudinot, Nicolas (University Nice Sophia Antipolis/CNRS), Michel Le Goffic, Elena Man-Estier (SRA Bretagne/UMR 6566 CReAAH) and Patrick Paillet (Muséum national d'histoire naturelle)

[403] The Magdalenian-Azilian Transition: Contributions from the Rocher de l'Impératrice Rock-shelter (Brittany, France)

Succeeding the Magdalenian, the Azilian is one of the last techno-complexes of the Western Europe Upper Paleolithic. This period is characterized by major socio-cultural changes illustrated by techno-economic but also symbolic changes. One of the most famous elements of this process is the abandonment of naturalistic figurative art on portable pieces or on cave walls in the Magdalenian in favor of exclusive abstract expression on small pebbles. The development of these new concepts remains an important mystery of European Prehistory. The discovery of the Early Azilian site of Le Rocher de l'Impératrice (Plougastel-Daoulas, France) brings new essential evidence in order to investigate this key moment of European Prehistory. If the rich lithic assemblage collected in this small rock-shelter clearly shows the development of Azilian concepts, an exceptional artistic corpus suggests a clear iconographic continuity with the Magdalenian. This presentation develops new information about the "azilianization" process and its timing. We also argue that a culture is not a package and that whatever the origin of the change, various elements of a same cultural system do not necessarily react with the same timing.

Nauman, Alissa [70] see Goodale, Nathan

Navarro, Fernanda [375] see Méndez, Humberto

Navarro-Farr, Olivia [8] see Weyer, Simon

Navarro-Farr, Olivia [122] see Paredes, Hannah Julia

Navarro-Farr, Olivia (The College of Wooster)

[339] A Cosmopolitan Queen: Kaloomte' K'abel's Place on the Ancient Maya World Stage

Our session chairs rightfully encourage us to reconsider the complexity of ancient Mesoamerica and the worldliness of its inhabitants from all walks of life. We are tasked with examining the myriad ways in which these peoples understood themselves and their place(s) in these interconnected realms by seeking this information in the archaeological record. The funerary offerings associated with Waka's Late Classic Queen Kaloomte' K'abel reveal how she utilized her mortuary tableau to eloquently convey her cosmopolitanism. The assemblage, at first view, is striking for the similarity of certain key pieces to Calakmul's Tomb 4, believed to house the remains of Yuknoom Yich'ak K'ak. This is not surprising as she would have sought to identify herself unequivocally as a Kaanul regent. But her afterlife arrangement and the clues legible therein demonstrate she intended to do more than merely signal her kinship affiliation with Kaanul. She simultaneously established

herself as a politician with ties to a broad network of far-flung polities, even hearkening to Teotihuacan. She therefore promotes herself as a queen with a strong legacy of cosmopolitanism at Waka', which we believe was understood as such by generations of its citizens.

[165] *Discussant*

Navas, Ana (University of Texas, Austin)

[331] *Tales of Extinction: Natives in the Narratives of Early Colonial Panama, Historical Representations, and Archaeology*

Previous historical and archaeological narratives on colonial Panama emphasize the annihilation of indigenous communities after European conquest. Although the Spanish occupation in Panama had devastating consequences on the local population through epidemic diseases, war, and slavery, the documentary evidence provides insights on different ways local populations negotiated and adapted to their new situation. Inspired by postcolonial debates that introduced the notions of agency into archaeology, this paper explores indigenous responses to colonial occupation in Panama using sixteenth and seventeenth-century documents. This revision of documentary evidence brings forth different native strategies that have gone unnoticed both in historical and archaeological interpretations. In this paper, I will discuss the problem of historical representations and the impact of these narratives on the colonial Panamanian period archaeological research.

Navenma, Jeremy [85] see Navenma, Wendel

Navenma, Wendel (National Park Service), Lucas Hoedl (National Park Service) and Jeremy Navenma (National Park Service)

[85] *Integrated Approach to Ruins Stabilization at Tuzigoot National Monument*

In 1998, Tuzigoot National Monument, through the Vanishing Treasures Program, set forth on a program of complex ruins stabilization at Tuzigoot pueblo (AD 1125 – 1400) that endures to this day. While some of the original stabilization methodology has remained constant from its earliest iterations, there has been an evolution in the process in which the work is now accomplished. Much of this is due to the interdisciplinary and multi-cultural approach that the current NPS staff uses to stabilize Tuzigoot pueblo and the lessons that have been learned along the way. Working together, archeologists, Preservation Masons, and interns work in concert to stabilize the pueblo through their unique perspectives, beliefs, and abilities. The integrated use of accepted stabilization practices, experimental learning, and traditional knowledge has melded together to provide a comprehensive and successful effort in ruins stewardship and preservation at Tuzigoot National Monument.

Navenma, Wendel [117] see Hoedl, Lucas

Ndanga, Jean-Paul [82] see Schmitt, Dave

Ndiema, Emmanuel [82] see Goldstein, Steven

Neall, Vince [29] see White, Peter

Neely, James (University of Texas at Austin) and Don Lancaster (Synergetics)

[346] *The Bajada Canals of the Safford Basin, Southeastern Arizona: Excellence in Prehistoric Engineering*

Exceptionally well-engineered prehistoric canals have been disclosed near the city of Safford, Arizona. Within an area of roughly 450 square kilometers, 12 distinct canal systems, comprised of 41 canals, have been identified originating in the bajada (foothills) of the Pinaleño Mountains. Conveying water from mountain runoff and springs, the longest canal is about 13 kilometers, and the total length of all systems exceeds 125 kilometers. While a few canals may date as early as ca. A.D. 1100, the vast majority date between ca. A.D. 1250 and A.D. 1450 and appear to be the constructs of northern Kayenta migrants. These features represent the second largest assemblage of canal systems in the American Southwest, and, while

smaller in size and total length than the Phoenix area Hohokam canal systems, they exhibit engineering sophistication not found in the Hohokam systems. Unique engineering features include: canal portions being literally “hung” on mesa sides to render routes largely independent of local landscape; sophisticated inter-drainage watershed crossings; counter flowing canals to resolve terrain issues; and a significant 80 m long aqueduct. These canals have expanded the knowledge of prehistoric water management engineering and agricultural intensification in the American Southwest.

Neff, Hector (California State University-Long Beach)**[33] *Holocene Human Adaptations on the Pacific Coast of Central America***

Holocene human adaptations to the Pacific coast of southern Mesoamerica and Central America are documented at a number of locations from southern Mexico to Panama. Evidence comes from Archaic-Period shell mounds, Early Formative sites at the edge of dry land behind the mangrove forests, and cores that have sampled littoral zone sediments. Review of this evidence indicates that human activities played a key role in lower-coastal geomorphological evolution. First, anthropogenic deforestation of the interior coastal plain and uplands starting in the early Holocene accelerated sediment delivery to the lower coast, providing raw material for building barrier beaches that protected developing wetlands. By shortly after 2000 cal BC, these processes had created rich wetland zones that attracted colonization by early pottery-using people during the Initial Early Formative period. By the end of the Early Formative, around 1000 cal BC, exploitation of the estuarine zone in some locations had shifted to intensive use of mangrove wood to fuel salt production. Absence of pollen in levels corresponding to the Middle through Terminal Formative in some cores suggests that intensification of salt production led to deforestation and desiccation of mangrove forest sediments, as littoral zones focused more and more on specialized craft-production activities.

Neff, Hector [191] see Caro, Carlos

Neff, Linda, Ronald Krug and Peter Pilles (Coconino National Forest)**[21] *To Collect or Not to Collect: That Is the Question ...But Where Is the Point?***

Many land managing agencies have policies that forbid the collection of artifacts during archaeological survey and, even under controlled situations, as determined to be an “Adverse Effect” under Section 106 compliance interpretations. The main rationale is that removal destroys the contextual information of the artifact in relation to the rest of the site. This paper argues that such “non-collecting policies” are short-sighted and do not “protect” artifacts from unauthorized removal. In these days of technology, when sub-meter GPS instruments and other tools are available to pinpoint the location of artifacts, we submit that not collecting artifacts with important information potential is actually deleterious to the archaeological record. This point will be made by a case study from the Coconino National Forest in northern Arizona that illustrates the excuse “if I don’t pick it up, someone else will,” is a correct assumption, and that surface collections, properly documented, provide useful information that justifies their collection and curation for present and future research.

Neff, Louis (US Forest Service) and Samuel Connell (Foothill College)**[256] *From Las Brisas to the World: The Genesis of a Periphery-Core Perspective under the Tutelage of Pat Urban and Ed Schortman***

This paper explores the influences of Pat and Ed’s methods and theories on two friends who first met and worked together in 1990 at the archaeological site of Las Brisas in the Naco Valley, Honduras. Without the incredible opportunities, methodological grounding, and theoretical approach provided by Pat and Ed, our careers could have languished under core-periphery ideologies and structures. While doing archaeological research in far flung places like Belize, Ecuador, Ireland, and the North American Southwest, we almost always found ourselves in places with labels like peripheral, provincial, hinterland, and boundary. Yet the people that lived in these places clearly had sociocultural and socioeconomic complexity, as well as worthy interactions with their neighbors. These realities are diminished by the core-periphery perspective and accompanying terms. Not to worry though, the formative grounding we received from Pat and Ed came to the rescue. They gave us the theoretical space, critical eye, and creativity to articulate different and better interpretations of past lifeways where causality and orientation are not unidirectional from a core.

Negrino, Fabio [195] see Riel-Salvatore, Julien

Negrino, Fabio (University of Genoa), Stefano Bertola (Università di Ferrara) and Julien Riel-Salvatore (Université de Montréal)

[195] Strategies and Tools for Managing Change. What Lithic Artefacts Tell about Neandertals and First Anatomically Modern Humans in Liguria

Liguria is an arch of land overlooking the Mediterranean Sea, with mountain areas, very rare coastal planes and steeply sloping valleys. In spite of this peculiar orography this region represented an important passageway between France and central-northern Italy, allowing the diffusion of human groups, ideas, artefacts and raw materials through ridge routes. The presence in this area of important sites chronologically referable to the late Middle Palaeolithic (Mousterian) and to the early Upper Palaeolithic (Proto-Aurignacian) allows us to investigate some cultural and economic dynamics that have characterized this long and complex historical phase. The geological characteristics of this territory and of the surrounding areas are moreover very specific, with a large variety of lithotypes concentrated in a large territories, thus allowing a privileged glimpse into the movements and use of the different raw materials. Based on data gathered we will try to reconstruct the dynamics about AMH spreading in the Mediterranean area, underlying how Liguria represents a key territory for a correct understanding of the behavioural and migratory processes that have characterized Middle-to-Upper Palaeolithic transition in Europe.

[195] Discussant

Neils, Fred [313] see Arakawa, Fumi

Neiman, Fraser (Monticello)

[175] How Can Behavioral Ecology and the Analysis of Archaeological Spatial Structure Help Identify Inequality among Enslaved Households at Monticello?

For decades archaeologists have used optimization models to puzzle out how artifacts served the fitness interests of their makers and users. This paper offers a simple optimization model to clarify how selective pressures (e.g. household size and occupation span) shape the maintenance of space on domestic sites and archaeological spatial structure. It outlines an R-based workflow for the analysis of one aspect of spatial structure, artifact size sorting, including measurement and visualization of variation in size sorting within and among sites. The workflow facilitates the measurement of variation in size sorting among households occupied by enslaved agricultural laborers at Monticello Plantation (Virginia, USA). The model highlights selective pressures that might be responsible for this variation, and facilities the construction of alternative explanations and the search for independent evidence that can be used to evaluate them. The result is the identification of unanticipated inequality among households, driven by variation in the probability their members could count on residence at the site from one year to the next.

Neiman, Fraser [362] see Bollwerk, Elizabeth

Neitzel, Jill (University of Delaware) and David Witt (SUNY Buffalo)

[245] Sacred Colors and Materials: The Life Histories of Ancestral Pueblo Jewelry

The inextricable combination of color and raw material was the most fundamental characteristic of Ancestral Pueblo jewelry. For white and shell, blue-green and turquoise, and black and various types of stone, the color and the material each had diverse sets of sacred meanings that gave ornaments their value. Together, this symbolic content was abundant, repetitive, and more than representational. At the most profound level, a piece of jewelry was spiritually alive, whether it was worn or deposited intact, broken, or as production debris in ritual offerings. This paper examines the conjunction of Ancestral Pueblo jewelry colors, raw materials, symbolism, and animism from the perspective of artifact life history. Our purpose is to demonstrate that the sacred meanings and embodied spirits of different color/raw material combinations strengthened and expanded during each successive stage in an ornament's life cycle. Recognizing that not all jewelry passed through all stages, we begin with raw materials, then continue through craft production and bodily adornment, and end with ritual deposition.

Neller, Angela (Wanapum Heritage Center, Grant County PUD)

[178] *Discussant*

Neller, Angela [326] see Henebry-DeLeon, Lourdes

Nelson, Ben (Arizona State University)

[81] *Discussant*

Nelson, Ben [81] see Hundtoft, Brooke

Nelson, Ben [81] see Rodríguez Zariñán, Nora

Nelson, Chris [88] see Carlson Dietmeier, Jenna

Nelson, Erin (University of South Alabama) and Tamira K. Brennan (Center for Archaeological Investigations, SIUC)

[97] *Building, Burying, Tearing Down: The Role of Destruction in Mississippian Mound Building*

With their consistent themes of mantle construction, summit use, burning, and burial, earthen monuments of the Mississippi period conveyed shared meanings between people across wide geographical areas. Exceptions to these broader patterns, however, convey meanings that are steeped in local histories and the communities that create those histories. Drawing on archaeological data from the American Bottom, the Black Bottoms, and the Yazoo Basin, we explore the roles of truncation and subsumption in mound building, acts which can arguably be seen as destructive rather than generative. We suggest certain mound-altering practices represent the negotiations that took place between neighbors, kin, and figures of authority, and consider whether they are best understood as acts of erasure and forgetting or as expressions of community values related to new beginnings.

Nelson, Margaret (Arizona State University) and Thomas McGovern (CUNY)

[31] *Synthesis of Social-Ecological Change in the North Atlantic and US Southwest*

Anna Kerttula had the vision and commitment to support an experiment: two interdisciplinary research teams working in dramatically different settings, striving to find valuable insights from cross-region, cross-case studies. One team from the North Atlantic islands (NABO) and another from the US Southwest (LTVTP) combined to explore understandings from the study of the past to climate challenges, social inequality, transformations, and human experiences as they contribute to our understanding of the present and future.

[166] *Discussant*

Nelson, Matthew [147] see MacDonald, Douglas

Nelson, Peter [231] see Lightfoot, Kent

Nelson, Peter (Assistant Professor, American Indian Studies, San Diego State University)

[294] *The Desire to Know: Pathways to Social Justice in Archaeological Research with Indigenous Peoples*

When working with Native American and Indigenous peoples toward the goal of social justice in archaeology, scholars must remember that "research may not be the intervention that is needed" (Tuck and Yang 2014:236). In exploring this issue with

communities, it is crucial to decenter the position of scholars and refocus on the desires of communities to engage in research or other activities. This refocusing is important even in cases where scholars share ancestry with and belong to the communities with whom they are working. In embarking on collaborative ventures, it can be very beneficial to explore what constitutes Indigenous ways of knowing and what differentiates these ways of knowing from others. How and what knowledge can be produced, knowable, and valued? What are the intersections between the value systems, goals, and methods of these ways of knowing that allow for productive discourse, collaboration, and outcomes based in the desires of specific Indigenous communities? I will discuss how I, as an enrolled citizen of the Federated Indians of Graton Rancheria and a professional archaeologist, have approached engagement with my tribe that has materialized in archaeological and non-archaeological ways while contributing to the ongoing social justice work currently underway within my tribe.

Nelson, Ricky [286] see Black, Valda

Neme, Gustavo [248] see Gil, Adolfo

Neme, Gustavo, Adolfo Gil (CONICET; UTN FRSR & UNCuyo), Laura Salgan (CONICET; UTN FRSR-ICES.), Miguel Giardina (CONICET; UTN FRSR) and Clara Otaola (CONICET; UTN FRSR)

[364] A Biogeographic Approach to Hunter-Gatherer Dispersion Constraints in Northern Patagonia

The Northwest Patagonia late Holocene human occupation was almost a “barrier” against farmer dispersion, at least during the last 1500 years BP. The causes for this remain unclear and are still debated, but environment, human demography, and resource stress are among the most accepted explanations. In this presentation, we use a biogeographic approach to discuss different ideas about how demography, environment, human subsistence, mobility, and procurement strategies could explain the persistence of hunter-gatherer strategies in northwest Patagonia. We use different lines of evidence that include zooarchaeology, stable isotope on human bone, radiocarbon trends, obsidian provenience, and pottery from the Monte and Patagonia deserts. Contrary to our expectations, significant differences in the record show a discrete range that do not clearly overlap human occupation in both deserts.

Nesbitt, Jason [288] see Johnson, Rachel

Netherly, Patricia (Vanderbilt University)

[306] The Diverse Legacies of the Viru Project

In 1946 a group of North American archaeologists with Andean experience, undertook a program of research in the Viru Valley, designed to supplement Rafael Larco Hoyle's seriated sequence of ceramic styles based on vessels from graves and purchased collections. The Viru Project research program included systematic settlement survey, analysis of surface ceramic collections and stratigraphic excavation intended to create a cultural history from the advent of ceramics to the Inka occupation. Huaca Prieta, a large preceramic mound in the Chicama Valley was also excavated. The investigations of the Viru Project established the cultural and social background to Larco's ceramic seriation with few exceptions. The results set a benchmark for future research utilizing multiple archaeological strategies. The close congruence perceived between the Viru results and Larco's seriation for North Coast ceramics endured for the next 50 years. Revisions have come only in the past 15 years from site-specific investigations of chronology and sociopolitical complexity within the Viru Valley.

Neubauer, Fernanda (University of Wisconsin-Madison, Federal University of Rio Grande do Sul)

[318] Pottery and Fire-Cracked Rock Use-Alteration: Assessing the Impact of James M. Skibo

James M. Skibo's pioneering work developing the methods and theory of ceramic use-alteration analysis has allowed archaeologists to make new range of inferences from one of the most broadly available classes of artifacts, utilitarian ceramics. His ethnoarchaeological and experimental work has brought about a new appreciation for the performance characteristics of artifacts and how their interactions with humans left physical traces behind. Use-alteration analysis is now commonplace and while most studies tend to focus on ceramics, Skibo's use-alteration analysis is relevant to other classes of artifacts. We apply it to the investigation of rocks used as heating elements. In this paper, we describe a range of attributes with the goal of helping researchers identify use-alteration patterns on fire-cracked rocks from sites worldwide. Particularly, this paper discusses the impact of James Skibo in our own academic trajectory and how his pottery use-alteration studies have influenced our research of fire-cracked rocks from Late Archaic sites in the Great Lakes region,

pottery from Southern Brazil, and Peruvian cooking vessels.

[318] *Chair*

Neuhoff-Malorzo, Patricia [30] see Trein, Debora

Neusius, Sarah [34] see Styles, Bonnie

Neusius, Sarah (Indiana University of PA), Tanya Peres (Florida State University), Bonnie Styles (Illinois State Museum) and Renee Walker (SUNY-Oneonta)

[34] *Data, Digital Databases, and Teaching Students Zooarchaeology in the 21st Century*

As zooarchaeologists address digital data preservation, management, and access, and confront issues surrounding data standardization and integration, it is clear that most of our students have little understanding of the importance of digital data or of the issues surrounding its creation, preservation, and use. One outgrowth of the collaboration of the Eastern Archaic Faunal Working Group has been experimentation with using web resources and curricular modules to help students move from a focus on discovery and identification to a concern with how to record their observations and work with digital databases. This approach is part of training technologically savvy zooarchaeologists.

Neuzil, Anna (Flux Resources (Bonneville Power Administration))

[292] *Moderator*

Nevett, Lisa (The University of Michigan, Ann Arbor)

[384] *'Least Talked About Among Men?': The Verbal and Spatial Rhetoric of Women's Roles in Classical Athens (ca. 450-350 BCE)*

In this paper I argue that comparing views derived from texts and material culture highlights the conscious manipulation of both media by their creators in order to communicate specific messages. I suggest that an awareness of this kind of manipulation has a vital role to play, not only in the interpretation of textual sources (as is often recognised), but also of archaeological ones (which is more rarely acknowledged). As a demonstration of this point I focus on the debate concerning the roles played by women in Classical Athens, building on previous interpretations of both the textual and the archaeological evidence.

Newland, Michael, Alex DeGeorgey (Alta Archaeology), Lynne Englebert (Institute for Canine Forensics) and Adela Morris (Institute for Canine Forensics)

[401] *Finding Solace: Recovering Human Cremations from the Ashes of a Firestorm*

On October 9, 2017, a firestorm swept through northern California. Eventually reaching over 180,000-acres, the wildfire destroyed more than 8,400 buildings and killed 42 people. Thousands of families lost their homes and all their possessions. In many instances, the cremated remains of previously deceased family members were stored in urns within the home. A canine forensic team and volunteer crew of archaeologists banded together in an attempt to recover cremains lost during the firestorm. This paper tells the story of our recovery effort and describes how archaeology can be used to help those affected by natural disaster.

Newman, Sarah (University of Vermont)

[79] *Beheading Bugs and Spearing Stags: Depictions of Animal Sacrifice in Mesoamerica*

The practice of human sacrifice is one of the defining traits of ancient Mesoamerica, at least according to the modern imagination. But painted objects, carvings, and codices reveal that nonhuman animals often served as sacrificial victims as well. Were some classes or species of animals ritually killed more often than others? Were certain animals killed in

particular ways? In what social, symbolic, and/or spatial contexts did animal sacrifice take place? Are temporal and regional variations discernible? This paper attempts to answer these questions and to probe the meaning of animal sacrifice for relationships between humans and their nonhuman counterparts in ancient Mesoamerica.

Newsom, Bonnie [49] see Kelley, Alice R.

Newsom, Bonnie [136] see Wheeler, Ryan

Newsom, Lee [37] see LeFebvre, Michelle

Newsome, Seth (University of New Mexico)

- [174] *A Common Analytical Language: Compound-Specific Isotope Analysis as a Means for Collaboration between Archaeology and Ecology*

Archaeologists first embraced stable isotope analysis decades ago and have used this tool to study many aspects of human ecology, including diet, movement patterns, and the domestication of plants and animals (to name a few). In comparison to bulk tissue isotope analysis, technological advances in the analysis of individual compounds such as amino and fatty acids provide a relatively untouched analytical frontier for archaeologists interested in human ecology and nutrition. In addition, the flora and fauna present in archaeological sites offer a rich and unique source of information for historical ecologists interested in assessing how human activities have influenced energy flow in food webs and the prehistoric ecology of animals that now live in relict populations because of historic over-exploitation. This paper will review the basic biochemistry required to interpret compound-specific isotope data, the analytical methods used to produce such data, as well as some of the recent approaches that have been developed to study energy flow in food webs, trophic ecology, and human ecol-physiology and nutrition. This common analytical language creates ample opportunities for collaboration between archaeologists and ecologists to work on important questions in human history, plant and animal historical ecology, and conservation biology.

- [174] *Discussant*

Newsome, Seth [174] see Elliott Smith, Emma

Newton, Cody (SWCA Environmental Consultants) and Spencer Pelton (Transcon Environmental, Inc.)

- [80] *Plains and Mountain Settlement Systems Change During the Earliest Holocene at the Sisters Hill Paleoindian Site (48JO314)*

The Sisters Hill Paleoindian site is located between the Bighorn Mountains and the High Plains of the Powder River Basin in northern Wyoming, two regions with largely distinct ecologies and chipped stone raw material sources. Accordingly, the site is an ideal place to research the causes of settlement system shifts between the mountains and plains. Previously known for its Hell Gap component (ca. 11,000 cal BP), recent excavations at Sisters Hill discovered at least two later components, including one associated with the Cody complex (ca. 10,900 cal BP) and one slightly later (ca. 9,500 cal BP). In this study, we compare lithic raw material use and faunal constituents between the three Paleoindian components at Sisters Hill, situate them within a paleoenvironmental context, and discuss changes in Paleoindian plains and mountain settlement systems during the earliest Holocene. We find that the site's earliest inhabitants made greater use locally-procured resources from the foothills of the Bighorns, while later occupations made greater use of the Powder River Basin interior. The shift from a foothills-mountain to a plains-focused settlement system occurs after significant environmental reorganization between the Hell Gap and Cody occupations and coincides with landscape stabilization characterized by low energy alluvial aggradation.

Newton, Jennifer [317] see Halcrow, Sian

Ngandali, Yoli (University of Washington)

- [211] *Communities of Art Practices on the Lower Columbia River: Technical Photography Using Infrared, UV, and Visible Light*

Recovered from strata, stolen, sold off to feed their families, gifted, or commissioned for museum display Lower Columbia River or Chinookan carved stone effigies and artifacts are currently scattered across numerous collections and repositories. Previous analyses of Chinookan art styles have been limited to classifying motif attributes, but this research provides a diachronic analysis of the relationship between material culture and technology. Primarily focused on carved and painted groundstone pieces, I employed a chaîne opératoire approach and technical photographic techniques to examine the production process. I utilized a suite of digital, multispectral, and false-color imaging tools to detect evidence of use-wear, carving, and paint deterioration over time. By controlling and manipulating color-band distributions of the electromagnetic spectrum (ultraviolet 300-400nm, visible 400-750nm, and infrared 750nm-1mm), I observed a variation in absorbed, reflected, and re-emitted luminescence. My results indicate that light penetrates the object depending on the wavelength and absorbance of the material. Results also suggest that faint ochres and carving, not easily observable on basaltic stone, reveal diagnostic patterns of modification and technological style. These data concerning the production process contribute to the study of object biographies and shared technological knowledge among communities of practice along the Lower Columbia River.

Nicholas, George (Simon Fraser University)

- [244] *Converging or Contradictory Ways of Knowing: Assessing the Scientific Nature of Traditional Knowledge in Archaeological Contexts*

Traditional knowledge (TK) has become a familiar element of ethnobiology and anthropology but only recently has it gained the attention of the “harder” sciences (e.g., archaeology, biology, climatology). However, many archaeologists have an uneasy alliance with TK and Indigenous oral histories. On the one hand, these sources are valued when they support or supplement archaeological evidence, but when the situation is reversed and TK challenges scientific or historical “truths,” then its utility is questioned. I discuss examples of convergence and contradiction between archaeological and Indigenous Knowledge systems. I then argue that engagement with Indigenous knowledge can actually improve archaeological endeavors in two ways: 1) a commitment to objectivity requires that we increase diversity of ideas we explore; and 2) alternative explanations of observed phenomena can push us toward unanticipated insights.

- [177] *Discussant*

Nicholas, Joel [254] see Koyiyumpetwa, Stewart

Nicholas, Joel [258] see Terlep, Michael L.

Nicholas, Ramona [77] see Gupta, Neha

Nichols, Deborah (Dartmouth College)

- [38] *The Evolution of a Revolution: “The Basin of Mexico: Ecological Processes in the Evolution of a Civilization.”*

Before the 1960s, books about ancient urbanism and cities often included no references to the prehispanic Americas. V. Gordon Childe’s “urban revolution” was conceived as a phenomenon of the “Old World” as the “cradle of cradle of civilization.” Landmark projects in Central Mexico: the Basin of Mexico settlement pattern surveys, the Teotihuacan Mapping Project, and I.N.A.H.’s Special Project revolutionized understanding Teotihuacan and prehispanic Mesoamerica and how archaeologists study urbanism. The social context of the practice of archaeology also was important. I consider this “urban revolution” from two perspectives. What were the origins and development of prehispanic cities in the Basin of Mexico. How has modern scholarship, especially regional/landscape archaeology shaped understanding the urban transformation of the region.

- [40] *Discussant*

Nicholson, Christopher**[47] Changes to the Western Eurasian Hominin Climate Niche**

The climate niches that early modern humans and our earlier hominin ancestors inhabited have undergone major changes over time. This study documents climate niche expansions, contractions, and stationarity across four time periods (Last Interglacial, Last Glacial Maximum, Mid-Holocene, and 1950–2000) in western Eurasia. Using spatially gridded global climate model data and site locations for each time period, I track how groups shifted their climate niches by comparing climate data from archaeological sites across time and to current western Eurasian cities. I document each time periods' realized niche breadth, overlap, position, and variance with their overall fundamental niche. Results indicate that as global temperatures cooled from the Last Interglacial to Last Glacial Maximum, human populations expanded their climate niche breadth beyond that of earlier Neanderthal groups and shifted their niche toward regions that had less seasonal variation. Conversely, Mid-Holocene humans, who saw the proliferation of both agriculture and population, contracted their realized climate niche space. The changes to climate niche space illustrates how hominins have evolved the capacity to shift our niche through modifications to our subsistence strategy and adaptations to overall climatic conditions.

Nicolas, Richard (University of Wisconsin- Madison)**[115] The Ancient Lingling-O: Understanding Jade Stone Manufacture through Experimental Drilling and Scanning Electron Microscope Analysis**

The aim of this project is to understand the processes of jade stone manufacture of the Lingling-o, an ancient jade ornamental artifact found in Southeast Asia. As a favored body decoration in prehistoric societies, its distribution through a sea-based trade network in South China Sea, and the manufacture of jade stone materials influence the development of technological industries in Taiwan, China, Vietnam, and the Philippines during the Neolithic and Bronze-Iron Age. Considering the nature of jade artifacts from known archaeological sites, this experiment aims to reconstruct technological inventions by remanufacturing the circular disk blanks used in making lingling-o by way of experimental drilling and Scanning Electron Microscope (SEM) analysis in order to further understand behavioral processes and material resource procurement. Analyzing the stages of production allows characterization of craft specialization and the evolution of industries along with their socio-political strategies.

Nicolay, Scott (University of California, Merced)**[411] Cold Cases and Forgotten Caves: Reconstructing the Provenience of Unique Artifacts from the Greater Southwest**

Museum collections contain many unique objects from the Greater Southwest that lack complete provenience, especially items from caves and other shrines. These sites often served the region's inhabitants as both offertory locations and the terminal repositories for ceremonial objects, resulting in enormous and well-preserved assemblages, many composed primarily of perishable items otherwise rare in the archaeological record. Unfortunately, due to extensive looting that began in the nineteenth century, no archaeologist ever observed an intact cave shrine, and most researchers today believe the potential for such sites to yield new data has been exhausted by multiple cycles of looting, vandalism, and excavation. Artifacts without provenience, no matter how spectacular or appealing to museumgoers, rarely become the subjects of archaeological study. Conversely, other artifacts and even entire collections from identifiable sites have gone missing. Although most archaeologists consider these to be "lost causes," it is sometimes possible to extend or even complete the chain of provenience. This paper reports progress in multiple cases, and demonstrates how these efforts can enhance our knowledge of the archaeological record even when we cannot fully reestablish provenience. This knowledge may apply to other sites and hold special value for tribes working to preserve their cultural heritage.

Nielsen, Finn Ole [386] see Caretta, Nicolas

Nielsen, Michael (Ilisimatusarfik University of Greenland)**[91] New Interpretations of Medieval Norse Artifacts from the Tasikuluulik (Vatnahverfi) Area, South Greenland**

The goal in this Master's Thesis is to collect and systematize data from eight medieval Norse sites in the Tasikuluulik peninsula and use these data to compare with past interpretations regarding the use and purpose of these Norse sites. In past research projects, the eight sites under investigation have each been interpreted as representing different types of medieval Norse farms or shielings. Recently, different fields within the natural sciences have provided new knowledge on the use of the environment around, and consequently the function of, these sites. However, no one has been investigating the artifacts to try to establish building functions in these sites. Data for the thesis has been collected from catalogs,

publications, and from the collections in National Museums of Greenland and Denmark. Each artifact now has some level of information depending on who found the object and of the time of the excavation. An important part of this investigation was to improve information on individual objects' in order to improve 19th, 20th and 21st century recordings. The task was difficult and often the way from excavation to the Museum storage could have been a not so easy task.

Nielsen, Michael [251] see Harmsen, Hans

Nielsen, Poul Otto [386] see Caretta, Nicolas

Nielsen-Grimm, Glenna [420] see Matheny, Deanne

Nielsen-Grimm, Glenna

[420] *The Basketmaker Component of Cave Canyon Village, Montezuma Canyon, San Juan County, Utah*

Cave Canyon Village is a large, multi-component site investigated through survey and excavation by Brigham Young University Archaeology Field School in 1975-78. Two years of excavation in the Basketmaker component of the site uncovered 5 large pit structures, and associated small slab-lined cists that date to the beginnings of the Basketmaker III period. Data from the materials recovered from the excavations of the Basketmaker structures will be re-examined in light of recent studies from the area of Montezuma Canyon, San Juan County, Utah.

[420] Chair

Nigro, Lorenzo [321] see Zalloua, Pierre

Nihells, Angel (Purdue University), Melissa Torquato (Purdue University), John Rapes (Purdue University), Matthew E. Hill (University of Iowa) and Erik Otarola-Castillo (Purdue University)

[127] *Climate Change and the Foraging-Farming Transition on the Great Plains*

The foraging lifestyle persisted as the major human subsistence strategy worldwide for most of the human career. With notable exceptions, this way of life was eventually replaced by a subsistence base complemented and often dominated by cultivated foods. Archaeologists have proposed several hypotheses to explain this foraging-farming transition. One hypothesis is that climatically induced decreases in foraging risk might have functioned as a causal factor underlying this transition. However, the effects of climate change on the foraging risk of prehistoric populations are difficult to operationalize and evaluate. This study provides a methodology to test the hypothesis that climate change had an effect on increased foraging risk and was a causal factor of a foraging-farming transition. To evaluate this hypothesis, we use a sample of nearly 2,500 archaeological components from the North American Great Plains, where the widespread adoption of cultigens increased during the Plains Woodland period (2500-1150 BP). Using distribution models of prey-species, archaeological diet data, and paleoenvironmental proxies, this study reconstructs the paleoenvironment, assesses the availability of prehistoric resources, and compares expected to observed diets. Results of this research allow for a better understanding of the effects of climate change on the foraging strategies of Great Plains populations.

Nihells, Angel [365] see Otarola-Castillo, Erik

Niklasson, Elisabeth (Stanford University)

[283] *Discussant*

Nims, Reno (University of Auckland)**[212] Overcoming Variability in Zooarchaeological Data Quality**

Numerous paleoclimate proxies from Aotearoa New Zealand indicate the Little Ice Age (ca. 1450 – 1900 CE) caused marked changes in local conditions that could have affected the productivity of marine fisheries. Considering the critical relationships that have always existed between fisheries and Māori economic, social, and spiritual life, any changes in fisheries productivity would have had wide-ranging effects on people's lives. However, the variable data qualities of fishbone datasets from the northern North Island severely challenge any analysis of fisheries change in the past. Reported assemblages in this region show little consistency in identification methods, units of quantification, or recovery practices, while only a few report the necessary metadata for assessing sampling biases or processes of post-depositional destruction. In this poster, I explore an approach to meta-analysis of dissimilar assemblages by comparing like with like (i.e. assemblages with similar taphonomic histories), and then drawing conclusions from the similarities and differences that can be observed across each comparison in an attempt to address the question 'How did climate change affect Māori fisheries in northern Aotearoa New Zealand?'

Niquette, Richard**[45] Site Formation Processes at the Spring Valley Site (23CT389), Ozark National Scenic Riverways, Southeast Missouri**

The Spring Valley site (23CT389) is a stratified, multicomponent site associated with a co-alluvial fan in the Ozark National Scenic Riverways, southeast Missouri. Temporally diagnostic bifaces indicate components dating from the Middle Paleoindian to the Middle Archaic periods (ca. 10,800-5,500 14C yr BP). A detailed study of site formation process at 23CT389 included (1) description of soils and sediments, (2) particle-size analysis, (3) coefficient of linear extensibility, (4) radiocarbon dating, (5) limited refit analysis, (6) limited debitage analysis, and (7) three-dimensional spatial analysis of piece-plotted artifacts. Results indicate some mixing of artifacts, particularly translocation of smaller artifacts such as debitage under ½" in size. However, larger materials, such as bifaces, have maintained some vertical and horizontal integrity. Also, a Dalton and an Early Archaic occupation surface are well defined in the stratigraphic sequence.

Nissen, Zachary (Northwestern University)**[331] Community Archaeology and (Post)Colonial Identities in Northernmost Belize**

This paper investigates the "who/what" that constitutes "the local community" in engaged community archaeologies. It will do so by discussing community events organized by the Aventura Archaeology Project, as well as preliminary ethnographic and oral historical work I have conducted in the San Joaquin Village and Corozal Town areas of northernmost Belize. This paper seeks to further community archaeology's commitment to being self-reflexive in practice by offering a critical perspective on the desire to directly link the distant "Maya" past to local communities in the present. Due to long histories of colonialism and imperialism, the answer to the above question is and should be biologically, socially, and politically complicated, rather than easy and straightforward. I will show that "the local community" for whom engagement events are designed are not a single homogenous group of people with one shared history. I argue that an engaged archaeology in (post)colonial contexts must be aware and maintain a critical perspective on the long-term and often violent histories that brought into being contemporary communities. Finally, I will discuss how this awareness of variations in local community identities/histories provides new ground through which locals can collaborate in and engage with archaeological narratives of the distant past.

[331] Chair**Nivens, Joelle****[95] Early Aurignacian Symbolic Technologies: Assessing the Relationship between Personal Ornaments and Coloring Materials in SW France**

The Castel-Merle Valley (Dordogne, France) bears three of the most important Aurignacian (40-28 ka) sites: the Abris Blanchard, Castanet, and de la Souquette. Together, these sites offer strong evidence for the shifting social dynamics reflected in the period's characteristic innovations. The best explored of this evidence are their atypically large and diverse personal ornament collections that suggest they were shell 'markets' (Taborin, 1992) and specialized bead production centers (White, 1989; Heckel 2015). An overlooked feature of these sites, however, are their equally outsized coloring material assemblages. The few references engaging this record relegate them to bead production byproducts, stockpiles of polishing abrasives. Yet, despite extensive experimentation on iron oxides' other utilitarian properties, the polishing

hypothesis has not been rigorously investigated obscuring the relationship between the coloring materials and personal ornaments. This paper addresses these gaps by first reviewing experiments testing the local ferruginous materials polishing abilities. Combined with previous studies, this study models the properties that promote or preclude coloring materials' utilitarian roles. These properties are then compared to the results of spatial, colorimetric, and geochemical analyses of Castel-Merle's materials. The findings disrupt the *a priori* connection between polishing and coloring materials and instead implicate a wide range of activities.

Niwa, Takafumi, Yosuke Higuchi (Ashiyagamanosato) and Hidehiro Shingo (Ashiyagamanosato)**[299] Experimental Archaeological Research on Reconstructing Shang-Zhou Clay Molds**

This study reconstructed manufacturing technologies of Chinese bronze artifacts by performing a "contrastive manufacturing experiment." This approach called for creating identical casting figures using several manufacturing processes and conditions. One factor contributing to the appearance and development of Shang-Zhou Bronze artifacts is the existence of high quality mold soil in China. We conducted a contrastive casting experiment that was aimed at comparing the function of 'stripe-shaped' patterns found at the bottom of Shang-western Zhou bronze vessels by using a single layer structure mold with high temperature firing. The mold used differed from those in traditional Japanese casting. As a result of casting experiment, stripe-shaped engraved lines on mold resulted in "U-shaped" lines on casting bronze surface. In this presentation we discuss the reasons for this phenomenon.

Noack Myers, Kelsey**[385] Respecting the Past and Protecting the Future: Strategies for Implementing Digital Best Practices in Historical Archaeology Research on Military Installations**

In Cultural Resources Management, many archaeological survey projects are undertaken through contract services provided to regional federal clients with large-scale resource evaluation needs. In the case of military properties, each installation maintains SOPs and curatorial operations to serve the needs of their unique CRM department. While modern military and government security may exist at the forefront of on-the-ground practice at these locations, the historical research and archaeological data related to historic and precolonial communities and individuals that once resided on these properties should be handled with equal sensitivity. This paper examines practical digital strategies implemented at military installation sites in the southeastern United States to protect the legacy of those who lived in the past as well as those who are working to protect sites for the future, through the processes of resource evaluation, management, and interpretation for the public.

[344] Discussant

Nogué, Sandra [412] see Harvey, William

Nolan, Kevin (AAL, Ball State University), Michael Shott (University of Akron), Eric Olson (University of Akron) and Sidney Travis (AAL, Ball State University)**[88] The Risks and Benefits of Working with Private Collections: Lessons from the COADS Project**

Privately held collections are an endangered part of the archaeological record that the SAA's "Principles of Archaeological Ethics" directs us to preserve. The Central Ohio Archaeological Digitization Survey (COADS) is undertaking the documentation of dozens of private collections in central Ohio. By September 2018 it recorded over 15,000 artifacts and added over 300 new sites to the official records. Along the way, COADS staff have learned several lessons that can be generalized to other efforts to work with private collections of various documentary quality. Persistent issues include the vagaries of memory, disparities in artifact labels, and problems presented by purchased artifacts and their relation to personally collected materials. With these issues, we are still able to make valuable contributions to collective knowledge about the pattern and persistence of prehistoric activity in our region. Like the issues, these benefits are also generalizable to any other effort of similar aims and scope.

Noldner, Lara (University of Iowa Office of the State Archaeologist), Brennan Dolan (Iowa Department of Transportation) and Janee Becker (Indiana University of Pennsylvania)

[120] Cultural Resource Protection in Iowa Using Hand-Held LiDAR Technology

A primary focus of cultural resource protection in Iowa is on prehistorically constructed burial mounds and other earthworks that are important to Native communities, past and present. This involves monitoring the condition of these earthworks and considering all potential impacts given their location and landowner maintenance strategies. This poster summarizes an example of the application of hand-held light detecting and ranging (LiDAR) technology to our preservation efforts. The Iowa Department of Transportation's Office of Location and Environment and the University of Iowa Office of the State Archaeologist conducted a LiDAR survey of previously recorded site 13WA28, which consists of four Woodland-period conical mounds. The data showed subtleties in mound form resulting from construction and environmental impacts not readily visible to the naked eye. Mound size and shape can be more accurately quantified with three-dimensional data as opposed to the traditional method of measuring mound diameter and height. LiDAR survey data allows for evaluation of subtle changes over time with a high degree of accuracy, and can also detect more subtle mounds that would otherwise be missed using other traditional assessments. Future earthwork studies should use this technology to improve our understanding of change over time and our stewardship practices.

Noll, Christopher (Archaeological and Historical Services, EWU)

[328] A Perspective on Olcott from the Banks of the Elwha River, Clallam County, Washington

Olcott sites, representing human presence during the early-to-middle Holocene, have been defined throughout western Washington on the basis of a few key attributes: lanceolate projectile points, the use of relatively coarse-grained crystalline volcanic rock for the majority of the tools, and the position of artifacts within B-horizon soils. The focus on these attributes emphasizes the similarity of Olcott sites. The lack of abundant faunal remains, charcoal, and intact features is frequently invoked as limiting factors for refined understanding of this early period in the Puget Sound. Recent analysis of three sites (45CA727, 45CA774, and 45CA775) along the Elwha River on Washington's Olympic Peninsula presented the opportunity to explore sub-regional variation in Olcott occupations. This analysis yielded questions about human population movements, adaptive strategies, and technological stability over time. The artifact assemblages suggest that new approaches to Olcott analysis could provide new insights about a cultural tradition that appears relatively unchanged for thousands of years.

[328] Chair

Noll, Christopher [328] see Limberg, Caitlin

Nordby, Larry [85] see Guebard, Matthew

Nordby, Larry

[85] The Origins of the National Park Service's Vanishing Treasures Program

In the mid-1990s, the National Park Service sought to upgrade its architectural preservation programs at about 40 arid-lands parks, which were facing the loss of significant numbers of retiring preservation craftsmen who had been working to preserve resources since the 1960s and 1970s. In addition, the cultural resources of the Southwest were deteriorating at a rate that outstripped the traditional available funding allocation. The Vanishing Treasures (VT) program was designed to augment the existing level of stewardship resources by adding emergency project funding and training new personnel, mostly at the park/monument level. As the VT program took flight, staff selected from among the NPS parks viewed it as a bridge from reaction to proaction. Tactics included the hiring and training of new permanent preservation workers and developing standards and guidelines that also applied new technology and new skills in addition to making traditional brick-and-mortar repairs.

Nordine, Kelsey

- [168] *Preliminary Results from Paleoethnobotanical Analysis of Pit Features at the Morton Village Site (11F2), Central Illinois*

This paper presents the preliminary results of paleoethnobotanical analysis of flotation samples from 38 external pit features from the Morton Village Site (11F2), located in the Central Illinois River Valley (CIRV). Previous research at Morton Village provides strong evidence that the village was occupied contemporaneously by both Mississippian and Oneota groups living together as a multicultural community. Pit features analyzed were established as Oneota, Mississippian, or mixed use based on ceramic types present in the pits. Twelve Oneota, fourteen Mississippian (four of which may come from an earlier Mississippian occupation of the site, pending radiocarbon dating), and twelve mixed use pit features were analyzed. Plant macroremains are catalogued and quantified using standard paleoethnobotanical devices, such as density, ubiquity, and diversity measures of species present. Morphometric analysis of maize macroremains was also performed to attempt to examine diversity in maize farming at the site. This preliminary report presents data relevant to understanding foodways and diet at Morton Village.

Norman, Lauren (University of Kansas)

- [186] *Early Thule Inuit Architecture in the Arctic: An Anchor in Migration and Movement*

During and for a few hundred years after the Thule Inuit migration around AD 1200, early Thule groups in the North American Arctic established village sites in new locations where they maintained a similarity in ceremonial architecture, house form, and division of space, despite the variability of resources and vast distances between them. This form changed in many areas after the early Thule period, demonstrating that people did adapt their built environment to new regions, but chose to maintain the original house form for a while. This paper highlights the similarity in form across the Arctic using domestic and ceremonial plans from Alaska to Greenland. I also examine the use of space using faunal data from two houses, one from Alaska, near the start of the migration, and one from the central Canadian Arctic, near the middle of the migration. Despite differences in resources, faunal spatial patterning shows broad similarities across both houses, indicating that people used the house spaces in similar ways. This paper argues that people maintained ceremonial structures, dwelling form, and use of space during the early Thule Inuit period as an anchor to a broader culture in a period of major movement and change.

Norman, Neil (William and Mary)

- [347] *New Neighbors/Nearest Neighbors: Slavery, Displacement, and Belonging along the West African Coast*

During the Atlantic Period, Kingdoms along the West African Coast swelled as traders, emissaries, and famers moved to palatial capitals. As these groups freely poured into West African cities, African kings added war captives and enslaved individuals to the urban mix. Elite Africans were reliant on enslaved and attached labor for monumental construction efforts, agricultural efforts, and sustained regional warfare. This paper considers settlement data from the Hueda Kingdom (ca. 1650-1727 AD) that speaks to such a rapid urban expansion associated with the Trans-Atlantic Slave Trade. It uses ethnoarchaeological evidences to interpret the uneven and nonsequential nature of Hueda settlement system. It argues that some of the latest settlement in the kingdom was at the center of the settlement system and it considers this unusual settlement pattern in terms of the reliance on enslaved labor and belonging to a place.

Norman, Neil [391] see Bassett, Madeleine

Norman, Scotti (Vanderbilt University)

- [179] *The Gender(ed) Revolution: Female Priests and the Mary Magdalenas of the 16th Century Taki Onqoy Movement (Ayacucho, Peru)*

Interpretations of past identities have until recently often been considered in dichotomous binaries, in which individuals are either male or female, peasant or elite, ritual specialist or commoner. With the application of queer theory to archaeological analyses over the past decade, these "normative" understandings have been challenged, and scholars have recognized the fluidity and entanglement of identity. In the 1560s revitalization movement known as Taki Onqoy (quechua: "dancing sickness"), women were the majority of participants, making up nearly two-thirds of all named takiongos. Contrary to classical interpretations of men as the agentive actors in times of exaggerated cultural change, these female takiongos danced, preached, and intentionally took the names of Mary Magdalena and other Catholic saints in order to shift between

participants and spiritual leaders and promote religious revitalization. In this paper, I suggest that women played an integral role in challenging Catholic evangelization through their group participation in Taki Onqoy. Specifically, by taking on identities of female Catholic saints, women were able to both affirm the power of the Catholic Church, while simultaneously subverting this power through leading indigenous rituals and instructing followers to return to their pre-Hispanic worship practices and beliefs.

[179] *Chair*

Norris, James (Kent State University - The Eren Lab) and Metin Eren (Kent State University - The Eren Lab)

[51] *Early- and Middle-Stage Fluted Stone Tool Bases: Further Evidence They Are Not Diagnostic of Clovis*

Goodson Rockshelter in Oklahoma has provided strong chronometric evidence that early- and middle-stage fluted stone tool bases found there date to the Late Archaic. These results further indicate that such specimens are not necessarily diagnostic of the Clovis culture. Here, we present additional evidence that early- and middle-stage fluted bases do not automatically indicate a Clovis presence. The assemblage from the Fox Lake area in Northeast Ohio consists of 228 tools, including eight early- and middle-stage fluted bifaces. However, of the 20 diagnostic projectile points can all be assigned to Holocene (Early Archaic to the Late Prehistoric), and none to the Pleistocene. Until chronometric assessments of age can be conducted in the Fox Lake area, the most parsimonious explanation for this pattern is that these early- and middle-stage fluted bifaces are Holocene in age, and thus not affiliated with the Clovis culture.

North, Michelle [211] see Donnermeyer, Christopher

Norton, Brandy

[319] *Dietary and Environmental Implications of Animal Use in the Okeechobee Basin Area of Florida*

In order to gain a better understanding of the faunal diet composition of Native Americans in south-central Florida, an examination was conducted to determine which types of animals appeared most frequently within tree island assemblages. Of the faunal remains examined from a 2016 excavation, all were identified to at least an animal's taxonomic order, although identification to the species level was usually not possible due to the fragmentary nature of the sample. This information was compared with radiocarbon data to determine changes to diet through time as well as with oral histories from Seminole community members in order to compare stated dietary preferences with prehistoric evidence. This study determined the most prominent animal types present in the assemblage and identified whether there were fluctuations in animal composition present throughout time that could indicate a changing environment and differential resource availability and exploitation. Understanding the environmental changes through time and their impacts on subsistence patterns demonstrate the ways in which tree island inhabitants reacted to environmental changes.

[319] *Chair*

Norton, Holly (History Colorado)

[139] *Discussant*

Nosie Sr., Wendsler [294] see Grant, Vernelda

Notter, Olivier [195] see Rossoni-Notter, Elena

Novácek, Karel [298] see Hill, David

Novak, Shannon (Syracuse University)**[317] What Is It? Doing Bioarchaeology with Matter**

To know and to name bodies and their parts, bioarchaeologists rely on intimate encounters with material traces. At times, they closely examine the “same” objects, yet see quite different things. Understanding such difference is usually treated epistemologically. People have alternative vantage points on the same reality, and divergent interpretations are explained in terms of training, experience, or social position. Attending to difference using an epistemological approach tends to focus on the “knower” rather than the “known.” Alternatively, an ontological approach involves shifting our focus from the knower to the material traces themselves and the multiple forms they can take. Rather than simply bringing different perspectives to “an object,” these things are more active and in flux, enacted and altered in ecologies of people, objects, ideas, and practices. If the question “What entity?” is raised, then the ontological answer would be, in the words of Annemarie Mol (2002), “a slightly different one each time.” To consider these malleable matters, I follow the proliferation of “cancer” from the Spring Street Presbyterian Church vaults (ca. 1820-1850) in Manhattan. By exploring the struggles involved in making many things one, I trace this “disease” through historic landscapes, archival records, specialists’ laboratories, and the peer-review process.

Novotny, Anna [63] see Gallareta Cervera, Tomás

Novotny, Anna [81] see Wells, E. Christian

Novotny, Anna (Texas Tech University)**[353] Cooperation and Resilience at the Ancient Maya Site of Chan, Belize**

In ancient complex societies, unique social strata had differential access to food resources and likely relied on different food procurement strategies to meet their needs. This paper explores the extent to which cooperation was part of that strategy for the ancient Maya farmers of the Chan site, located in the Belize River Valley of west-central Belize, through possible changes in diet over 1800 years. In the Late Classic period (AD 750-900), the Maya lowlands were beginning to experience an intense and prolonged drought that contributed to significant sociopolitical reorganization. Artifacts recovered from the Chan site center dating to the Late Classic period originated far beyond the Belize Valley. The Chan farmers were reaching beyond their valley home to procure resources. To more fully understand the nature of these interactions, this study investigates diet at Chan over its 1800-year history through stable isotope analysis. Changes over long timespans illustrate the extent to which Chan successfully buffered its residents against sociopolitical and environmental fluctuations through economic cooperation with communities outside the Belize Valley. Results suggest remarkable stability in diet over Chan’s deep history, which has important implications for how small-scale stakeholders negotiate large-scale environmental and social change.

Novotny, Claire [81] see Wells, E. Christian

Novotny, Claire (Kenyon College), Anna Novotny (Texas Tech University) and Leigh Anne Ellison (Digital Antiquity, tDAR)**[256] Lessons That Can't Be Taught: Applying Anthropology in Honduras and Beyond**

After participating in the Kenyon-Honduras Program as a volunteer in the spring of 2004, I decided to apply to Master's programs in anthropology, and I used the word "applied" to describe my experience in Honduras. Pat gently pointed out that their research was not technically "applied archaeology," since that suggested public outreach and education. Though she was obviously correct, what I could not yet articulate was how living and working in a rural hamlet in northwestern Honduras had illustrated to me in sharp relief the social context of archaeological fieldwork. In Cofradia and Pueblo Nuevo, daily interactions with workmen, children, shopkeepers, bus drivers, and cooks taught students to treat people, regardless of background, with empathy and respect. For this honorary session, we will show more clearly how Pat and Ed's program instilled the principles of public engagement in their students, who have gone on to conduct applied work in archaeology, cultural anthropology, museum studies, public history, and in places beyond academia. By encouraging identity formation in their mentoring, Pat and Ed gave students the profound opportunity to develop a sense of their relationship to the world by living and working closely with people in Honduras.

Nowak, Jesse (University of Oklahoma)**[45] Testing the (Disappearing) Waters: A Preliminary Assessment of the Sedimentary Record of Lake Jackson, Florida**

Recent coring at the Lake Jackson Aquatic Preserve in Northwest Florida investigated the current sediment and stratigraphic integrity in order to assess the research potential of the area for exploring associated cultural events from the Mississippian Period (AD 1050 - 1500). The lake is a unique karst formation with sinkholes that cause dramatic drydown events, and on its southern shore rests the largest Mississippian mound site in the region—8Le1, or Okeehopee. Once collected, the cores were subject to various physical and chemical sediment measures including density, grain size, clay content and carbon to nitrogen ratios. We also obtained AMS radiocarbon dates to derive chronological control. We currently do not have any paleolimnological data from the lake and are unaware if modern anthropogenic impacts (e.g., dredging) have left any stratigraphic resources intact. This poster presents results from these exploratory studies and their implications for further research into the relationships between Lake Jackson, regional paleoenvironmental conditions, and associated human occupations.

Nowakowski, Joshua (California State University, Chico)**[66] Analysis of Obsidian Procurement from the Wurlitzer Site, Butte County, California**

This presentation will show the results of XRF testing of obsidian artifacts from the Wurlitzer site in Butte County, California. The purpose of this testing is to create a better context from which to understand the site. Previous research has focused primarily on creating a chronology of the site using radiocarbon dating, point typologies, and comparison to other sites in the region. Radiocarbon dates from lower levels at the site were dated to 2480 BC, while upper levels were dated to 1416 AD (Johnson 2005). While a general chronology of the site is understood, little is known about settlement patterns. As a result, x-ray fluorescence spectrometry (XRF) was run on 1,130 artifacts (207 points, 53 bifaces, 3 cores, and 867 flakes) to determine the raw material sources. This sample represents all obsidian artifacts cataloged in the digital database that could be located in the collection. Metrics were also taken on each artifact tested to attempt to find a relationship between flake or tool type and obsidian procurement. Combining previously studied chronological markers with interpretations regarding mobility creates a more dynamic cultural pattern that more accurately reflects the ever-shifting cultural boundaries of the region.

Nowell, April (Univ of Victoria-Dept of Anth)**[15] From Trinkets to Privileged Artifacts: The Transition in Our Understanding of Paleolithic Personal Ornaments**

Among Paleolithic archaeologists, there is general consensus that body adornments are important for exploring the origins of cognitive, artistic and symbolic behavior from an evolutionary perspective. This view contrasts with how Palaeolithic ornaments were perceived during most of the twentieth century when they were rarely considered in debates concerning human evolution, art and symbolism. In this paper, we explore this shift in the understanding of beads, pendants and other similar artifacts and discuss epistemological challenges posed by the current revalorization of personal ornaments.

[15] Chair

Nowell, April [15] see Collins, Benjamin

Nowell, Sarah (University of Georgia)**[211] Feature Content Analysis: Comparing Trends in Tool Use and Storage Strategies at Bridge River (EeRI-4), British Columbia**

Analysis of household storage strategies at the Bridge River Village in the British Columbia interior during the late prehistoric period has shown that there is potential to gain a better understanding of the accumulation of social capital at the household level. This poster incorporates feature content analysis of tools and raw materials from a series of household occupational surfaces at Housepit 54. Analysis of the use-lives household tools can serve to better define ambiguities in spatial analyses that have attempted to determine the presence and nature of activities reflective of efforts at accumulating social capital. Lithic raw material analysis demonstrates variation in access and household production of tools over time. While demographic, ecological, and dietary trends are better understood, a more focused examination of both lithic and faunal tools found in features will provide a better understanding of lifeways in this household as well as a strong proxy for

household cooperation that can be applicable to larger scale studies aimed at understanding collective action and other regional phenomena.

Nowlin, Jessica [387] see Gosner, Linda

Nuckols-Wilde, Catherine (University of Texas at Austin)

[270] Emerging Perspectives: A New Cross-Contextual Analysis of the Niche Monument Corpus

Preclassic niche monuments, found from Guatemala to Chiapas to Veracruz, portray anthropomorphic figures emerging from a high-relief cavity. Presently there is no extant study of niche monuments that assembles the entire corpus and situates them within a broader matrix of exchange via trade, interaction and linguistics. In this paper, I will present my analysis of the corpus of niche monuments and their context, as well as their geographic and chronological qualities (when available), in order to interpret the ways in which these monuments functioned within the larger matrix of sociopolitical exchange during the Preclassic period. Once I have gathered the corpus I will perform an iconographic analysis of the monuments within the corpus. These analyses will hopefully provide greater insight into the Middle Preclassic-Late Preclassic transition.

Nuevo Delaunay, Amalia [33] see Méndez, César

Nuevo Delaunay, Amalia (Centro de Investigación en Ecosistemas de la Patagonia), César Méndez (Centro de Investigación en Ecosistemas de la Patagonia) and Omar Reyes (Universidad de Magallanes)

[364] Living in/Visiting Andean Dead Ends: Measuring the Intensity of Human Land Use at the Fringes of the Northern Ice Field

Luis Borrero's conception of the occupation of Andean dead ends is a pivotal framework for the study of western valleys of Patagonia. Main circulation routes, most likely located at the east of this region, made western valleys to be marginally occupied, possibly in a seasonal basis and a complementary fashion, hence less intensely visited. Yet, these areas are highly sensitive to changes in mobility and land use, and thus are informative of human processes on broader spatial scales. The human occupation of the Andes of Patagonia is still understudied. When considering such areas, the sector bounded by the General Carrera and Cochrane lakes and the Northern Ice field stands as a remarkable example of dead end. Our main goal is to study human occupation and environmental interactions by addressing large temporal and spatial scales and focusing on the assessment of occupational redundancy, variability in technology and subsistence, and the changes in mobility strategies. This research project seeks an understanding of human-environmental dynamics to unveil the occupation of this "dead end" in the context of the broader region. FONDECYT 1180306.

Núñez-Cortés, Yajaira (University at Albany-SUNY)

[330] Exploring the Social and Political Dynamics of Power Centers in Central Pacific Costa Rica

The Central Pacific region is one of the least explored areas of Costa Rican archaeology. Recent research conducted at Lomas Entierros and Sardinal sites allow us to contribute to the understanding of the history of occupation in the area, but also to consider the emergence, occupation and abandonment of prominent political centers inhabited during AD 300-1500. While Lomas Entierros, in the lower Tárcoles basin, had a long and permanent occupation for over a millennium, Sardinal was only occupied for 500 years, after which another complex site, Pozo Azul, became the primary center of the Parrita river basin. Both rivers were main entrances to the chiefdoms located in the Central Valley of Costa Rica and were the communication and trading routes during this time. It is not clear yet which factors may have shifted the social and economic dynamics in the region, but we consider the interest in foreign objects, warfare over territory and resources, changes on economic or subsistence activities, etc. We present preliminary results based on household data from both sites to study the result of political and economic fluctuations on household economies as well as the possible variables that boosted social change in these important political centers.

[330] Chair

Nuvamsa, Benjamin**[341] Discussant****Nycz, Christine (National Park Service)****[151] An Historic Summary of Parashant National Monument, Arizona**

The land that now comprises Grand Canyon - Parashant National Monument has a long, unique history stretching back to the early years of exploration and discovery in the American Southwest. This paper summarizes the history of the area that became Parashant NM and introduces several methods that the National Park Service uses to restore and maintain the historic landscape throughout the monument.

Nystrom, Kenneth [11] see Fant, Carly

O'Neale, Dion [316] see McCoy, Mark

Oas, Sarah (Arizona State University) and Christopher Schwartz (Arizona State University)**[34] "A feast of meat, a day of sociability": Examining Patterns in Turkey Management in the Cibola Region, AD 1150-1400**

Recent genetic and isotopic studies highlight important variations in the nature, timing, and intensity of domesticated turkey (*Meleagris gallopavo*) management practices across the northern U.S. Southwest. While a degree of intensification in turkey production has been associated with widespread settlement aggregation in the 13th and 14th centuries, recent work suggests not all of these turkeys were primarily maize-fed. This paper presents results of the stable isotopic analysis of 40 turkey and lagomorph specimens from Pueblo III and IV period (AD 1150-1400) settlements in the Cibola region of west-central New Mexico. There have been no previous studies of turkey paleodiets in the Cibola region, despite having measures of relative turkey abundance that are comparable to the northern San Juan. The results of our study indicate a widespread practice of keeping captive turkeys that were fed large quantities of maize, even in areas where abundant wild turkey populations might be expected. In contrast with patterns of turkey intensification reported from other areas of the northern Southwest, increased turkey production in the Cibola region—perhaps in association with communal feasting—fits into a larger pattern of simultaneous increases in artiodactyl and turkey procurement, production, and use in the late 13th century.

Oas, Sarah [188] see Schachner, Gregson

Obie, Michael (Trent University)**[108] Lost Landscapes of the Kawarthas: Investigating Inundated Archaeological Sites Using Integrated Methods**

The Kawartha lakes region of south-central Ontario is a region dominated by water bodies and rivers, where humans are known to have lived at least since 12,000 years ago (only shortly after the retreat of glaciers from the region). Since this time, water levels within the region have changed dramatically as a result of various geophysical, climatological, and human induced phenomena, leaving modern water level at a maximum high-stand. While it is acknowledged within the local archaeological community that these hydrological dynamics would have resulted in the inundation of much of the region's past terrestrial and culturally active landscapes, cultural research into the region's lakes and waterbodies have to date been very few and limited in scale. The subject of this presentation is a master's-level research project assessing the cultural significance of the inundated landscapes around an island within Pigeon Lake of the Kawartha Lakes region, known as Jacob Island. Using a series of integrated methods including bathymetric modeling, shoreline/ecological reconstruction, and in-water-visual artefact survey, the goals of this research relate to illuminating the nature of the Kawartha Lakes Region's underwater archaeological record and associating specific cultural occupations and land-use strategies with various regions of Jacob island's inundated landscapes.

Obregón, Mauricio [407] see López, Eos

O'Briant, Kevin (University of Montana School of Extended & Lifelong Learning)

[369] Reimagining Non-representational Rock Art through Proto-Historical Indigenous Cartographic Traditions

When confronted with apparently non-representational forms at prehistoric rock art sites, North American researchers tend to categorize such imagery as abstract symbols, shamanic art, or entoptic phenomena. Drawing on research in the field of historical geography and utilizing a direct-historical, ethnoarchaeological approach linking historical ledger art, the Plains "biographic" and other rock art traditions, as well as proto-historical maps drawn by native informants for Euro-American colonists and traders, many of these "abstractions" may be effectively re-interpreted as cartographic elements symbolizing topographic, political, or sacred geographies.

O'Brien, Haley [327] see Kaviani, Kelsi

O'Brien, Haley (University of Montana), Anna Prentiss (University of Montana), Ethan Ryan (University of Montana) and Emma Vance (University of Montana)

[327] Re-examining Site 48PA551 in Sunlight Basin, Northwest Wyoming: The Faunal Remains from the 2018 Field Season

Site 48PA551, located in the Sunlight Basin of Northwest Wyoming, is widely accepted as a winter camp dated to the Middle Archaic period. In the original excavation, researchers initially identified one consistent occupation layer, dated to ca. 3800-4400 radiocarbon years B.P and associated with the McKean Complex. New research, however, indicates that there are actually two periods of McKean occupation. Consequently, we now recognize site wide temporal and spatial variability in subsistence behavior as measured using faunal remains. This poster focuses specifically on variation in hunting, butchery, and transport of ungulates drawing on multiple data sets including taxonomic diversity, element representation, and taphonomic patterns. Results offer implications regarding relationships between subsistence strategies and occupational stability.

O'Brien, Helen (Pima Community College) and Cristin Lucas (Pima Community College)

[125] 100 Years Later: Georeferencing Early Maps and Present Day Field Work at the Site of Nuri, Sudan

Nuri, a UNESCO World Heritage site, in northern Sudan is the primary burial site for the Nubian Pharaohs beginning with Taharqa of the 25th Dynasty. Thoroughly looted in antiquity, the site was excavated by George Reisner, Director of the Harvard University-Boston Museum of Fine Arts Egyptian Expedition, during the years 1916-1918, with final mapping and back-filling taking place in 1920. A detailed map of the locations and plan views of 56 pyramids and an additional 16 tombs, along with detailed plan views and sections of all of the features, were published by Dows Dunham in 1955. The University of Arizona Egyptian Expedition in collaboration with Pima Community College initiated field work at Nuri in 2018 to assess what remains of the site - excavated and unexcavated - and to bring modern excavation and mapping methods to bear. In this poster we will discuss our assessment of the accuracy of the early plan maps, our attempts to georeference the early maps, the establishment of mapping points for use during the 2018 season and beyond, the overall results of our mapping objectives, and our future goals for the site.

O'Brien, Helen [125] see Prasciunas, Mary

O'Brien, Matthew, Todd Surovell (University of Wyoming) and Randy Haas (University of California, Davis)

[186] Five Seasons with the Dukha: House Structure among Nomadic Herders

Houses are common structures, and the importance and distinction of domestic space has been researched a great detail through ethnography. Yet, how these common structures shape the spatial behavior of residents is often not clearly articulated. This is a particular concern for ephemeral structures that are all too common in hunter-gatherer archaeology. In the absence of clear demarcations of interior space, discard patterns associated with hearths have provided a means of identifying the presence of a house, but what else can be said about this built environment? Our five-year study of Dukha

reindeer herders of northern Mongolia provides quantitative observations of how house structures influence human spatial behavior. In total, we have nearly 5,000 internal observations of individuals documenting identity, activity, and objects used. This dataset demonstrates the structured nature of spatial behavior within the household. We explore both physical and social factors influencing where people situate themselves within the context of the house design and layout. The loci of activities observed provide a new archaeological tool to investigate the influences of the built environment on human behavior.

O'Brien, Matthew [368] see Mackie, Madeline

O'Brien, Michael (Texas A&M–San Antonio)

[247] Genes, Culture, and the Archaeological Record

As archaeology increasingly turns to explanatory models of cultural evolution based on a Darwinian perspective, three processes—dual inheritance, cultural transmission, and, more recently, niche construction—have assumed prominent positions. Until the early 1980s, the behavioral sciences tended to draw a sharp distinction between biologically based behavioral traits and cultural traits, the former being a reflection of one's genotype and the latter the result of learning. Things began to change in the 1970s and early 1980s, beginning with the mathematical-modeling work of Cavalli-Sforza and Feldman, who not only modeled the differential transmission of genes between generations but also incorporated cultural information into the analysis, which allowed the evolution of the two systems to be mutually dependent. Their work was followed by that of Boyd and Richerson, who laid a foundation for what they labeled "dual-inheritance theory," one important component of which was their emphasis on kinds of learning. Niche construction theory added a third dimension. It views niche construction as an evolutionary process—an initiator of evolutionary change rather than merely the end product of earlier selection. Understanding the interplay between genes and culture and their role in shaping and reshaping human behavior is the ultimate goal of archaeology.

O'Brien, Helen [125] see Montoya, Daniel

O'Carroll, Finola [310] see Scott, Rachel

Ochatoma Cabrera, Jose Antonio [396] see Ochatoma Paravicino, Jose

Ochatoma Paravicino, Jose (Universidad Nacional de San Cristobal de Huamanga), Martha Cabrera Romero (Universidad Nacional de San Cristóbal de Huamanga) and Jose Antonio Ochatoma Cabrera (Pontificia Universidad Católica del Perú)

[396] Memory and Resilience after the Collapse of the Wari Empire: Analysis from the Remains of Home and Funerary Contexts

During the last 5 years a team of researchers from the National University of San Cristobal de Huamanga has been carrying out archaeological research in the sectors of Vegachayuq Moqo, Capillapata, Chupapata, and Cerro San Cristobal in the capital of the Wari Empire. The results obtained show an occupation sequence from the Huarpa period (emergence of the empire) to the collapse of the Wari civilization, unveiling different types of architecture associated with cultural materials that has allowed definition of the functionality and abandonment processes. The finding of collective burials inside funeral chambers, in graves dug at a shallow depth, as well as within architectural spaces of the Wari era (mausoleums) have been increasing during the last field seasons. These burials do not correspond to the Wari era, but to a later period linked to the cultural manifestations of the Late Intermediate period that in the region of the southern highlands, are known as the Chankas.

Ochoa Castillo, Patricia**[349] The Context of Tlatilco Figurines**

Analysis around anthropomorphic figurines found in prehispanic sites have been diverse, nevertheless the intrigue and confusion among their interpretations are still remaining. Fortunately figurines typologies for the Mesoamerican Formative are useful to locate them chronologically, likewise spatially, although there is still the need to study them in relation to their context. In the Formative site of Tlatilco, located in Central Mexico, many clay figurines have been obtained through four season excavations. In those around 500 burials were explored, with their associated offering, bell-shaped pits, among other elements, and in which it is very common to find figurines. To understand the use and significance of the figurines among their society, it is essential to focus this study especially on those pieces that come from safe archaeological contexts, using the field information, as well as the archaeological material available.

[230] Discussant

Ochoa-Winemiller, Virginia (New Jersey City University), Terance Winemiller (Auburn University Montgomery), William J. Folan (Universidad Autonoma de Campeche) and Lynda Florey Folan (Universidad Autonoma de Campeche)

[219] Crafting, Sharing, and Representing: The Molds and Figurines of Calakmul, Mexico

Three-dimensional multi-line laser scanning reproduces highly accurate models that preserve measurable characteristics of portable artifacts such as figurines, whistles, stamps, and molds. Metrological analyses are revealing valuable information about manufacturing techniques, the crafter's tool kit, the function of these artifacts, and the extent of interaction and cultural borrowing that existed in the Northern Maya Lowlands during the Classic Period. Analyses of a sample of mold-made and modeled artifacts recovered from the site of Calakmul, Mexico are discussed to infer function, craftsmanship, tools used in the manufacturing process, as well as the extent of shared representations and ideas circulating through long distance networks.

O'Connell, James (University of Utah) and Jim Allen (La Trobe University)

[35] Why So Low So Long? Constraints on Human Population Growth in Late Pleistocene Sahul

Human populations in Sahul (Pleistocene Australia-New Guinea) probably numbered in the tens of thousands, two orders of magnitude below the 3-4 million estimated at time of European contact. They were also more patchily distributed than simple hypotheses grounded in an ideal free distribution model would lead one to expect. This situation persisted until the Middle Holocene, 40,000 years post-arrival, when sharp population growth and dispersal to previously uninhabited areas suddenly ensued. Factors potentially responsible for this history are identified and discussed.

O'Connor, John (University of Oregon)

[354] Recent Investigations at Western Raiatea

The island of Raiatea in the Leeward Society Islands of French Polynesia is viewed as a central place for the initial colonization of East Polynesia and the dispersal of pre-contact voyaging populations to distantly located islands of the Pacific Ocean. This history is embedded in the oral traditions of Pacific Island peoples and supported by archaeological research throughout the region. Archaeological investigation at the megalithic Marae Tainuu on the west coast of Raiatea furthers regional knowledge related to concepts of centrality in settlement patterns and regional networks of human interaction. Subsurface testing at Marae Tainuu has revealed faunal and artifactual evidence of circumscribed behavioral patterns consistent with expectations of hierarchical social structures. The relation of Marae Tainuu to the surrounding anthropological landscape supports the marae as a sociopolitical center for western Raiatea, and the marae still serves in this capacity today. However, the regional prominence of Marae Tainuu may be compared to the political centers at Opoa that held a position of central importance for inter-island political alliances and regional voyaging. Continuing work at Raiatea will contribute to understandings of local human-environmental interactions and the greater role of local cultural trajectories in regional social networks.

Odegaard, Nancy [41] see Bisulca, Christina

Odegaard, Nancy and Kelsey Hanson (School of Anthropology, University of Arizona)**[245] The Technology of Capturing Color: Complementary Analyses of Pigment Cakes and Chalks**

The brilliant range of colors seen on painted media in the U.S. Southwest represents only one stage in an intricate sequence required to make paint. Capturing color from the natural world, harnessing it into a palette, and incorporating it into the material cultural repertoire represents a skillset with deep roots. The ability to make a good paint requires knowledge of geologic sources, processing, and application techniques that is severely understudied. While much attention is afforded to painted objects, less has been done to consider the pigment cakes or chalks that are prepared in advance of painting objects. Pigment specimens reflect the initial stages of combining pigments with binders and a liquid vehicle. Few have ventured to investigate the diversity of semi-prepared materials needed for a paint recipe. Despite their perceived rarity, decades of archaeological recovery have resulted in a large assemblage. This paper summarizes the results of the analysis of over 400 specimens recovered from across the U.S. Southwest. A combination of analytical techniques including microscopy, XRF, FTIR, Raman spectroscopy were employed to investigate the colors represented in semi-processed pigment specimens, the results of which shed light on the spatial, temporal, and technological diversity of approaches to capturing color.

Odess, Daniel (National Park Service)**[135] Rethinking Site Significance to Improve Preservation and Protection**

The archaeological record is under attack. Whether from willful destruction at the hands of religious extremists, vandalism aimed at destroying the heritage of minority populations, looting for fun and profit, development in the name of progress, ill-considered agency actions, or climate-driven fire and erosion, the tangible remains of our collective history are suffering death by a thousand cuts. The problem is global: despite our efforts, these cuts occur every day and in every nation. In many areas, efforts to address this problem are plagued by a lack of priority-driven focus that leads to an inability to participate effectively in planning processes. Simply put, we have difficulty setting priorities for protection and preservation because we cannot agree upon and articulate what is most important. As a result, project proponents and resource managers are unable to avoid damaging resources efficiently within their broader planning efforts. Until we can agree upon and effectively communicate significance-based priorities for preservation, effective resource stewardship will remain an elusive goal. This paper discusses how we might begin to rethink our approach to significance to incorporate archaeological resources into landscape-scale (big picture) conservation planning and design.

Odess, Daniel [187] see Bustos, David

Odling-Smee, John [352] see Altman, Arie

ODonnabhain, Barra (University College Cork, Ireland)**[157] Plus ça Change: Archaeology and Incarceration**

The Spike Island Male Convict Depot opened in 1847 at the height of the Great Famine in Ireland as part of the colonial government's response to the rise in 'criminality' that accompanied mass starvation. The site has a global reach, not just because it was an embarkation point in the transportation of convicts around the world but also because of its critical role in the emergence of the 'Irish System' that was to influence the development of modern prison systems internationally. Archaeology has shed light on the quotidian in the Victorian Convict Depot that closed in 1883: from artefactual evidence of coping strategies adopted by convicts to bioarchaeological evidence of the impact of institutionalisation on their bodies. The island became a prison again in 1985 and has become a heritage destination since the closure of this institution in 2004. Heritage tourism narratives contrast the two regimes, highlighting the injustice that lay at the heart of the Victorian regime but shying away from discussion of the roles that social exclusion, inequality and race continue to play in determining who is imprisoned today. The archaeology of 19th century incarceration begs uncomfortable questions about the carceral regimes of the present.

[340] Discussant

O'Donnell, Alexis (University of New Mexico), Emily Moes (Department of Anthropology, University of New Mexico), Ethan C. Hill (Department of Anthropology, University of New Mexico), Douglas J. Kennett (Department of Anthropology, Pennsylvania State) and Keith M. Prufer (Department of Anthropology, University of New Mexico)

[110] *Indicators of Skeletal Stress in a Small Skeletal Sample Spanning the Holocene in the Maya Mountains of Belize*

The Bladen Paleoindian and Archaic archaeological Project (BPAAP) is an ongoing research endeavor focused on excavations from two rock shelters in the Maya Mountains of southern Belize: Maya Hak Cab Pek, and Saki Tzul. Continued use of these rock shelters from the Late Pleistocene to the collapse of Mayan civilization has resulted in a unique perspective on biological variation in Mesoamerica during this time. This study examines differential stress experiences in a small sample ($n=16$) of human skeletal remains dating between 8270–2265 years B.P. Here, we examine prevalence of non-specific indicators of stress (cribra orbitalia(CO) and porotic hyperostosis(PH)) in conjunction with aDNA to better understand stress differentials between individuals from different migratory waves and with different subsistence strategies. Of these, 9.09% have CO and 50% have PH; this higher incidence of PH is a result in keeping with other studies. Overall, few individuals exhibit stress indicators despite reflecting ~6000 years of ecological and social change. Despite the small sample size, these remains represent an important avenue for the exploration of differences in stress and diet in members of various haplogroups throughout the Holocene.

[226] *Moderator*

[226] *Discussant*

O'Donnell, Alexis [189] see Price, Karen

O'Donnell, Sarah

[293] *Discussant*

Oelze, Vicky [55] see Washburn, Eden

Offenbecker, Adrienne [185] see Rakita, Gordon

Offenbecker, Adrienne (University of Calgary), Kyle Waller (University of Missouri), Gordon Rakita (University of North Florida) and M. Anne Katzenberg (University of Calgary)

[296] *Patterns of Migration at Paquimé: Insights from Isotopic and Demographic Data*

Interregional interaction has factored prominently in debates about the origin and cultural trajectory of Paquimé since the site was first excavated six decades ago. In this paper, we use a bioarchaeological approach to reconstruct the structure and scale of migration at Paquimé to better understand who migrated to the site, their motivations for doing so, and the impacts that interregional interaction had on this prehistoric community. Strontium and oxygen isotope results indicate that ~68% of non-local individuals moved to Paquimé from within the Casas Grandes region, while ~32% migrated from neighboring regions. The immigrants consisted of men, women, and children, which suggests that migration likely occurred within social or kin-based units. Our multi-tissue sampling strategy revealed that most immigrants from outside the Casas Grandes region moved multiple times during life, particularly those from the American Southwest. There is also compelling evidence for the practice of captive taking. We conclude by discussing potential push and pull factors, as well as how place of origin may have impacted power, status, and authority structures at Paquimé.

Ogaz, Andrea (California State University, Los Angeles)

[323] *Revisiting the Archaeology of Dry Lake Cave, California (CA-INY-1898)*

In 1950, University of California, Los Angeles (UCLA) graduate student Georgiana Guthrie excavated Dry Lake Cave (CA-INY-1898). Located in Inyo County, California, the rock shelter is near Little Lake, the Stahl site, the Rose Spring site, and the Borden site. Dry Lake Cave is an east-facing basalt rock shelter that overlooks Rose Valley, providing occupants with a broad view of the valley floor. Guthrie led excavations at Dry Lake Cave while also investigating the Stahl Site, but did not

complete analysis of the artifacts recovered from the rock shelter. Her original field notes have been preserved at UCLA along with the unanalyzed collection. The assemblage includes projectile points and other chipped stone tools, ground stone, shell beads, faunal remains, basketry fragments, and other perishables. Diagnostic artifacts suggest Rose Spring and Late Prehistoric occupations. This poster will serve as a preliminary report on Guthrie's investigation and will address functional use of the site and its possible relationship to other sites in the valley with similar chronology.

Ogburn, Dennis (University of North Carolina at Charlotte), Bill Sillar (University College London) and Rob Ixer (University College London)

[233] Inca Stone Sources, Quarrying, and Transport

Stone was fundamental to building Cuzco and there was significant variability in the sources and sizes of stones employed. To understand the history of construction, we must take into account relationships with the people and resources of the wider region, which impacted where the stones originated and how they were worked, transported, and used. Changes in the choice of stone depended partly on how the properties of the material relate to building techniques, but perhaps more important were the socio-politics of Inca access to labor and resources and the political and religious significance attached to specific sources. We discuss research into identifying the geological sources of Cuzco building stones via pXRF and petrography, which involved characterizing stone from multiple quarry sites in the region and matching that to the geochemistry of Cuzco's building stones. We argue there were several phases of development that can be distinguished by the choice of stone and the sizes of building blocks. These changes in stone use tie the development of Cuzco into that of the Inca royal estates and the expansion of Inca political dominance in the region, giving us significant insights into the chronology of the construction of Cuzco.

Ogburn, Dennis [233] see Sillar, Bill

Ogola, Christine [82] see Goldstein, Steven

O'Grady, Patrick, Scott Thomas (Bureau of Land Management), Thomas W. Stafford Jr. (Stafford Research), Daniel Stueber (Thunderstones Consulting) and Margaret Helzer (Lane Community College)

[249] The View from the Trenches: Tying Paleoenvironment to Archaeology at Rimrock Draw Rockshelter (35HA3855)

The 2018 fieldwork emphasized trench excavation across the relict stream channel directly in front of the rockshelter. Sedimentary deposits comprise a well-stratified, five-part sequence of bedrock basalt overlain by a gravel bed of rounded cobbles and boulders; dark gray blocky to massive ciénega (marsh) clays covered by a layer of primary Mazama tephra overlain by reworked Mazama; and finally, two meters of eolian sediments. Four obsidian flakes were collected in the basal gravels and one in ciénega clays during stratigraphic profiling. Bison tooth enamel was found at the contact between bedrock and the basal gravels. Four samples were AMS 14C dated, including bison enamel (bioapatite carbonate) from the basal gravels and humate samples from the top, middle, and bottom of the ciénega deposit. In the rockshelter, bison and camelid tooth enamel were AMS 14C dated for comparison with enamel from the trench. Archaeobotanical and lithic artifact data are summarized to highlight the paleoenvironmental relationship between the channel and rockshelter. Collectively, these data indicate strong stream discharge at 13,000 CAL BP, when WST human occupations occurred at the site before and after what is defined as Clovis elsewhere in the United States.

Okumura, Mercedes [268] see Araujo, Astolfo

Okumura, Mercedes (University of São Paulo, Brazil)

[268] On the Role of Bifacial Points in the Construction of Past Identities and Boundaries in Southeastern and Southern Brazil during the Holocene

Archaeological sites presenting bifacial points dated from the Holocene are common in southern and southeastern Brazil. Our studies have pointed out that the morphological and technological diversity of these bifacial points was much greater than it had been postulated in the past, indicating the presence of potential past boundaries and territories. However, no tests of the relationship between raw materials and point shapes have been performed so far. We aim to explore the relationship between raw material and the shape of bifacial points from southern and southeastern Brazil to better understand whether the morphological variation observed among points from different regions could be a consequence of

the differential availability of raw material or of different cultural norms. According to the theoretical expectations and heuristic models of style and function proposed by Dunnell (1978), our hypotheses is that stem morphology indicates choices made by the human groups and, ultimately, is a reflection of possible past cultural boundaries and group identities. The analysis of 1492 bifacial points from southern and southeastern Brazil shows that points from different regions present a predominant stem morphology, regardless of raw material type, supporting our initial hypothesis.

[268] *Chair*

Oland, Maxine (University of Massachusetts- Amherst)

[198] *Shifting Colonial Narratives at the Edge of the Spanish Colony: 15th-17th Century Maya Archaeology at Progresso Lagoon, Belize*

There is no question that colonialism in the Americas brought huge and unanticipated changes for both European and Indigenous peoples. Yet Indigenous people often contextualized colonial efforts within their own worldview, or ontology, even as they interacted with European people, things, and colonial structures. This was perhaps most true at the edges of colonies, where European supervision was minimal, and Indigenous lifeways were allowed to continue. This paper draws on colonial period research at Progresso Lagoon, Belize, to suggest that Maya and Spanish actors along the Belize frontier had fundamentally different understandings of colonial events. I argue that we can use archaeology and ethnohistory to deconstruct Eurocentric narratives of colonialism, and to re-envision the colonial experience through a Mayacentric worldview.

[13] *Discussant*

Oldenburg, Thomas [278] see Inwood, Jamie

O'Leary, Owen [129] see Esh, Kelley

Olesch, Dana, Guido Pezzarossi (Syracuse University) and Philip Millhouse (Red Gates Archaeology LLC)

[336] *Literacy, Toys, and Social Roles: Childrearing and Subject Making on the 19th Century Wisconsin Frontier*

The "lead rush" initiated a mass migration of Euro-American miners, military officers, and government agents to the southwestern Wisconsin territory during the first half of the nineteenth century. Likely implementing prospecting methods developed by indigenous Meskwaki and Ho-Chunk peoples, multiethnic mining communities emerged in areas such as Gratiots Grove. Several of these populations included Euro-American women and children. These women were often responsible for instructing and enforcing what was viewed as proper behaviors and performance in their children, a task often employed through guided practice with appropriate forms of material culture. This paper will specifically explore educational materials associated with Sarah and Henry Gratiot and their affluent Euro-American family who were commissioned by the United States government as agents to the Ho-Chunk nation from 1825 to 1836. Presence of educational materials and toys suggests that the Gratiot children were taught culturally appropriate forms of play and social engagement that were used to invoke and maintain familial, communal, and national bonds through shared communicative and habitual practices. These objects also visually separated the Gratiot family from the larger mining and indigenous communities of the surrounding area and associated the family with emerging conceptions of whiteness and prosperity in the United States.

[336] *Chair*

Olesilau, Lucas [2] see Lee, Patrick

Olin, Susan [357] see Schnitzer, Laura Kate

Oliver, Jose**[159] Food for the Soul & Well-being: Ruminations about the Other Face of Ancient Plant Remains**

This paper makes the case for a greater concerted effort in archaeobotany to give equal standing to the domain of 'food' for the soul and spirit, that is, useful/edible plants for the well-being of the individual and the community in the past. All too often, the emphasis falls into concerns of staple food as a nutrient requirement and as part of agricultural and landscape studies. The presentation presents examples of the centrality of 'food for the soul' among contemporary groups (Orinoco Basin & Caribbean), followed by a review of the archaeobotanical evidence for the Caribbean, concluding with some suggestions for future avenues of research.

Oliver, Jose [404] see Garay-Vazquez, Jose

O'Loughlin, Colleen [123] see Huftalen, Cameron

Olsen, Nancy, Ann Brierty (Pueblo of Laguna) and John Fryer (Pueblo of Acoma)**[252] A Walk Around Tsankawi Mesa: Applying Written in Rock Preservation Principles to the Pajarito Plateau Rock Art**

SAA is comprised of many educators and a special interest group that conducts research on rock art. The emphasis now is to raise awareness regarding cultural sensitivity of rock art panels, including protection and preservation. That Pueblo people think of rock art panels as part of their cultural heritage, is not a new concept. What may not be obvious to mainstream researchers is how to maintain respect for that sensitivity and preservation. In the project Written in Rock conducted by the National Museum of American Indian in 2012-13, participants practiced sharing cultural heritage of rock art panels with partners from Azerbaijan who shared their cultural heritage with Pueblo participants. The experience of sharing cultural heritage between two international groups gave Pueblo participants insights into how they might share it with interested groups of people in the United States. This presentation shares with current researchers and educators some of our most important lessons learned.

Olsen, Sandra and Khan**[252] Depictions of Human Trophies in Arabian Rock Art**

The ritualistic use of various detached human body parts is a circumglobal phenomenon that has been documented for cultures extending backward through time for millennia. Its symbolic purposes are diverse, but war trophies and ancestor worship are two of the most common. Artists' depictions of displays of human body parts occur in numerous media, including stone sculptures and bas relief, ceramic vessels, carved shells, Plains Indian ledger art and more. Here we document decapitated heads and detached arms illustrated in Arabian petroglyphs on boulders. The images of human heads uncharacteristically incorporate facial features, and it is possible to determine that the removal of the arms left the scapula attached to the forelimbs. A possible weapon is shown in one grouping. A Neolithic figure of a man waving a severed arm over his head on a rock art panel at the Shuwaimis locality sheds light on an ancient activity incorporating human limbs. The man is accompanied by three dogs and faces a bezoar goat.

Olsen, Sandra [391] see Taylor, William

Olson, Dalton [258] see Solometo, Julie

Olson, Elizabeth J. [290] see deFrance, Susan

Olson, Eric [88] see Nolan, Kevin

Olson, Kyle [411] see Reamer, Justin

Olszewski, Deborah (University of Pennsylvania), Brenda Baker (Arizona State University) and Sidney Rempel (Independent Scholar)

[32] *The Middle Stone Age Record in Egypt and Sudan: Implications for Out of Africa 2*

Africa is the continent of origin for *Homo sapiens* and thus is the source for human colonization of the Old (and eventually New) World. Out of Africa 2 (anatomically, then behaviorally, modern humans) is supported archaeologically by African stone artifact industries found outside of Africa. Two routes widely acknowledged are along the Nile Valley corridor into the Levant and the Southern Route across the Bab al-Mandeb Strait from Eritrea/Djibouti to Yemen. What, however, is the on-the-ground data within Africa along these probable routes out of Africa? This talk discusses the Middle Stone Age stone artifact record from two northeastern African regions—high desert middle Egypt near Abydos and low desert northern Sudan in the upper 4th Cataract region. The Abydos Survey for Paleolithic Sites (Egypt) and the Bioarchaeology of Nubia Expedition (Sudan) survey datasets are used to examine the diversity of the record along the Nile Valley corridor route, including Middle Stone Age technologies, stone raw materials, and spatial distributions of materials. Assessed are the potential implications of this “trace evidence” for moving out of Africa during the MSA, and whether such “trace evidence” is sufficient to address the questions we ask about prehistoric out of Africa migrations.

[366] *Discussant*

Olver, Peter [57] see Yezzi-Woodley, Katrina

O'Mansky, Matt (Youngstown State University), Thomas Delvaux (Youngstown State University), David Parker (Youngstown State University) and Ronald Madeline (Youngstown State University)

[37] *The Continuing Archaeological Investigations on the Northeast Coast of San Salvador Island, Bahamas*

Youngstown State University archaeologists have conducted research on San Salvador Island since 1995, initially under the direction of Gary Fry and, later, of Thomas Delvaux and Matt O'Mansky. This research has focused on three sites on the east side of the island: the North Storr's Lake site (SS-4), the Fresh Lake site (SS-7), and the Dim Bay site (SS-5). Extensive excavations have been conducted at both SS-4 and SS-7 while work at SS-5 is in the early stages. Despite the relative proximity of these three sites to one another, each is distinct in function. SS-4, the only one of the sites for which radiocarbon dates have been obtained, was clearly a habitation site. Preliminary research at SS-5 indicates that that site was likely a temporary campsite, based on its exposed location and paucity of artifacts. The nature of SS-7 is more ambiguous with abundant shell beads and other artifacts recovered but no clear evidence of long-term occupation. In this presentation, we describe the settings of these three sites and compare the distribution of artifacts as we continue to refine our understanding of the pre-contact occupation of San Salvador.

O'Meara, Sean

[62] *Discussant*

O'Neil, Megan (Assistant Professor of Art History and Faculty Curator, Emory University), Nawa Sugiyama (Assistant Professor, Department of Sociology and A), Gilberto Pérez Roldán (Profesor Investigador de Tiempo Completo, Facultad), Laura Maccarelli (Assistant Conservation Scientist, LACMA) and Yosi Pozeilov (Senior Conservation Photographer, LACMA)

[39] *Tools Fit for a Queen: Interdisciplinary Study of a Set of Ancient Maya Weaving Implements*

This paper reviews our interdisciplinary study examining a set of carved deer bones comprising what appears to be a weaving or sewing kit for an ancient Maya royal woman bearing the *Sa'* emblem glyph associated with Naranjo. This set, acquired by a private collector and donated to the Los Angeles County Museum of Art (LACMA), includes small bone needles and longer tools with carved finials and incised texts; some are identified as *puitz'* (weaving or sewing needle) for a royal woman. Although they form a unique set, their forms, images, and inscriptions share features with other carved bones - including weaving tools-- from other ancient Maya and broader Mesoamerican contexts, and they have analogues with contemporary weaving implements. Our preliminary research combines art historical and epigraphic study with faunal analysis and analytical methods (such as portable X-Ray Fluorescence [pXRF], digital microscopy, InfraRed imaging, and

Scanning Electron Microscopy [SEM] of molds from the surface of the bones). These techniques are used to identify materials and look for evidence of production methods (e.g. tool marks) and use wear. Comparing these objects to artifacts excavated by archaeologists can help in reconstructing crucial information about these and other pieces in museum collections without archaeological context.

Opack, Emily [89] see Crews, Christopher

Opitz, Rachel (Archaeology, University of Glasgow)

[77] Not Going There: Seeing, Depicting and Interpreting Archaeological Topography through Digital Media

This paper explores a tension in field practice and interpretation in landscape archaeology. Digital 3D topographic data have proliferated, and the increasing availability of lidar DTMs are transforming the practice of archaeological topographic interpretation. As a toolkit for interpretation tailored to this digital medium is being developed, powerful ways of looking at digital topography have emerged, drawing on scientific data visualization and enhancement techniques. However, these advances do not directly translate to new approaches to interpretation and communication, for example by delimiting inter-related features. In contrast, archaeological survey of earthworks, particularly in the British tradition, draws on over 100 years of practice. This approach has archaeological experience, field observation and visual representation at its core. There are clear synergies between traditional field-based approaches to earthworks and the analytical tools and visualisations afforded by digital 3D environments. How then can we adapt our practices to develop 'digital fieldwork skills' for topographic interpretation and communication in a digital environment? This paper explores connections between our visual engagement with the landscape through traditional archaeological earthwork surveys in the field and entirely digital engagements through visualizing remotely sensed 3D data, and proposes a new methodology for digital fieldwork practice in archaeological topographic interpretation.

Oporta Fonseca, Deyvis [412] see Torreggiani, Irene

Oppenheim, Georgia (Wellesley College), Amanda Stricklan (University of Georgia), Rahab Kinyanjui (National Museums of Kenya), Sarah Hlubik (Rutgers University) and David Braun (George Washington University)

[115] Phytolith Analysis of Experimental Fires: Insights into the Prehistory of Fire

The Cooking Hypothesis suggests the morphological changes in the Homo lineage, including larger brains, were due to incorporating controlled combustion to cook food. Most archaeological evidence for fire comes from cave sites, which are less likely to be exposed to post-depositional processes (e.g. wind and water) that can destroy combustion evidence. Yet the majority of Early Pleistocene archaeological sites are in open-air contexts. Multi-proxy evidence is necessary for studying fire in open air contexts because of the equifinality between multiple types of combustion. Phytolith and chemical analyses are particularly useful proxies for studying controlled fire. To develop inferences of behavior from phytolith data requires extensive experimentation to provide expectations regarding the frequency and distribution of phytoliths in high intensity localized fires. We look at evidence left by modern experimental fires in a floodplain environment, similar to the environment at FxJ20 AB, a potential locality of hominin fire use in the Okote Mbr (~1.5 Ma) of the Koobi Fora Fm (northern Kenya). Preliminary results confirm that sediment inside the fire contains the highest concentration of burnt phytoliths versus outside the fire and prevailing wind direction may explain the presence of burnt phytoliths outside the fire.

Oppenheim, Georgia [390] see Stricklan, Amanda

Oppitz, Gabriela (Gabriela Oppitz)

[335] Community Ways and Historical Paths in Brazilian Southern Coast (5000–600 BP)

By presenting isotopic ($^{87}\text{Sr}/^{86}\text{Sr}$, $d^{15}\text{N}$, and $d^{13}\text{C}$) data from human bones buried in shell-matrix sites (sambaquis) in Southern Brazil, this paper discusses how different ways of community coordination and organization can lead to alternative historical paths.

Orcosupa, Boris [182] see Tantaleán, Henry

Orchard, Trevor [110] see Royle, Thomas

Orchard, Trevor [169] see Guiry, Eric

O'Reilly, Dougald [27] see Tayles, Nancy

Orengo, Héctor A. [154] see García, Arnau

Orlando, Ludovic [352] see Outram, Alan

O'Rourke, Dennis H. [323] see Sykora, Lydia

Orozco Ortíz, Ignacio [71] see Zetina-Gutierrez, María De Guadalupe

Orozco-Orozco, Lorena [253] see Flores Huacuja, Marlen

Orr, Caley [195] see Hodgkins, Jamie

Orsini, Carolina (Museo delle Culture)

[306] *Italian Contributions to Andean Archaeology (1962-2018): An Unknown History*

Unlike other European countries, Italian archaeological research in the Americas started only after the Second World War. Nevertheless, links between Italy and Latin America are much older: in the mid-nineteenth century individual scholars of the caliber of Antonio Raimondi (1826-1890) had carried out important expeditions in the Andes mapping numerous archaeological sites. But historically, Italian institutions have focused on the large national archaeological heritage, paying little attention to foreign archaeology, except with a few exceptions. The insignificant Italian colonial history has not fomented research abroad, and the period of fascism has contributed even more to the isolation of the "bel paese". Since the post-war period, the situation has changed. Thanks to the research funded, albeit in a limited way, by public institutions often supported by the Italian Ministry of Foreign Affairs, some long-lasting missions have taken place (mainly in Peru and Bolivia). This presentation will highlight the distinctive features of the Italian archaeological research methodology applied to Andean cases, starting from the Italian Archaeological Mission in Cajamarquilla (1962-1971) up to current investigation programmes.

Ort, Katherine (Manejo Cultural A.C.) and Lilia Lizama Aranda (Manejo Cultural A.C.)

[71] *Un caso de estudio sostenible en Puerto Morelos: Recursos arqueológicos y naturales en tierras bajas mayas del norte La Riviera Maya*

La ciudad de Puerto Morelos, Quintana Roo se ha convertido recientemente en un municipio y se esfuerza por promover el turismo sostenible en función de sus activos naturales y culturales y evitar el turismo de masas que ha afectado a otras partes de la Riviera Maya. Como municipio nuevo, tiene la posibilidad de configurar la política desde un lienzo relativamente vacío. Recientemente realizamos un estudio que incluyó la recopilación de datos sobre las diferentes perspectivas de las partes interesadas clave a través de entrevistas y encuestas cualitativas para comprender si los puntos de vista de los diseñadores de políticas, las ONG, los turistas, etc., estaban alineados entre sí, así como con un marco de gestión sostenible. Nuestros hallazgos indican que existe una desconexión significativa entre los legisladores y otras

instituciones federales y los que típicamente administran sitios culturales. Nuestros hallazgos también indican que los turistas valoran mucho el turismo social y ecológicamente responsable. Con un plan de gestión de recursos eficaz el turismo puede ser más sostenible y, al mismo tiempo, comercializable para los usuarios.

Ortega, Ethan [367] see Barbour, Matthew

Ortega, Karla [360] see Alaniz, Guillermo Gerardo De

Ortega, Verónica [110] see Soler, Manuel

Ortiz, Liz (University of Alaska Anchorage)

[10] *Marine Foragers at the Top of the World: Zooarchaeological Analysis of a Thule Period Small Site at Uivvaq, Alaska*

The Thule period is significant as a predecessor to modern Iñupiat culture, and yet understanding Thule life remains partial to the selectiveness of archaeological investigations. Much of the Alaskan Thule period research has focused on large settlements along the northwest coast (e.g. Point Hope, Walakpa, and Utqiagvik). Smaller sites, such as the Uivvaq village site have not been extensively explored and provide deeper insights into the lifeways of early Alaskans. The predominant focus of research on Thule period sites is whaling technology, which minimizes the importance of other terrestrial and marine resources. However, initial interpretations of subsistence at the Uivvaq site indicate that seals, birds, and caribou were economically important. The tendency of arctic faunal assemblages to contain predominantly seal bones is interesting, given that subsistence research has focused on the Thule practice of whale hunting. The results of this analysis provide data to assess whether variation existed between large sites and the small, satellite settlements as well as further understanding the use of animal resources by Thule period communities. The Uivvaq site will demonstrate that the smaller, year-round Thule sites have the same types of activities and similar faunal assemblages as the larger communities.

Ortiz, Ricardo

[178] *Discussant*

Ortiz A la triste, Gabriel [58] see Zimmermann, Mario

Ortiz Brito, Alberto (University of Kentucky)

[405] *Reutilization of Olmec Monuments during the Classic Period in the Gulf Coast of México*

After excavating Gulf Coast archaeological sites, Alfonso Medellin Zenil affirmed that Olmec monuments were carved during the Late Classic period (600-900 AD). He made this statement two decades after the second round table of the Mexican anthropology society, in which scholars agreed on placing the Olmec culture in the Preclassic period, based on stratigraphical excavations. The archaeological data recovered to date from Gulf Coast sites strongly support the placement of the Olmec culture between the years 1400 and 400 BC. Of course, Medellin Zenil was aware of these facts; however, he continued claiming that the Olmecs were a Classic culture. The evidence he used to defend his hypothesis was the association of many Olmec monuments with classic period materials in sites such as Laguna de los Cerros and San Martín Pajapan. Despite scholars rejected Medellin Zenil's hypothesis, nobody has made the effort of explaining the association of Olmec moments with Classic ceramic materials. In this paper, I will address this issue through an analysis of Medellin Zenil excavations and the depositional context of other Olmec monuments. I will argue that the evidence provided by Medellin Zenil suggests the reutilization of Olmec monuments during the Classic period.

Ortiz-Aguilú, J.J. [409] see Winemiller, Terance

Ortman, Scott [259] see Mills, Barbara

Ortman, Scott (CU-Boulder)**[311] Cuyamungue and Partnership**

The papers in this session illustrate the many benefits that follow from archaeologists and community members working together in partnership. In this paper, I explain why the concept of partnership better-captures the approach we are taking than the related concepts of indigenous and collaborative archaeology. I also describe how we have implemented this approach in our investigation of Cuyamungue, an ancestral Pojoaque (and Tesuque) site, and provide a few examples of ways traditional knowledge and archaeology have influenced each other through our work.

[86] Discussant**[311] Chair**

Osborn, Jo [182] see Weinberg, Camille

Osborn, Jo (University of Michigan), Brittany Hundman (Direct AMS), Camille Weinberg (University of Texas at Austin) and Kelita Pérez (Pontificia Universidad Católica del Perú)

[182] Chincha-Inka Mortuary Traditions at Jahuay, Quebrada de Topará

The site of Jahuay, located 20 km north of the Chincha Valley, was first occupied during the Early Horizon as a commoner fishing community. In later eras, it was reoccupied by the Chincha and Inka, possibly as a tambo. During the 2017 and 2018 field seasons, the Proyecto de Investigación Arqueológica de Jahuay excavated burials from multiple contexts at the sites, both disturbed and intact, and spanning from the Early Horizon to the early colonial period. Among our findings, we observe that the unique mortuary patterns previously documented by our colleagues in Chincha reached beyond the valley proper during the Late Intermediate Period and Late Horizon, demonstrating the persistence of the social and political ties between Jahuay and the Chincha Valley.

Osborn, Jo [287] see Penfil, Rachael

O'Shea, John [267] see Parditka, Györgyi

Osores, Carlos**[200] Contributions and Perspectives about Household Archaeology in the Andes: A Homage to Bradley J. Parker**

The goal of this paper is to review the influence of Bradley J. Parker on household archaeology in the Andes--with an emphasis on the North Coast of Peru--based on papers, hundreds of conversations, and future ideas. Parker and I started to work on common projects together in 2014. From my point of view, Parker's work included relevant new ideas and perspectives for the Andes even though he was in an early period of his contributions. This paper will discuss the use of microarchaeological sampling on house floors and associated surfaces, in order to make conclusions on the functional use of space inside the household, and present relevant methodologies to apply to future archaeological projects in the Andes. Parker's works at sites such as Huanchaco (Moche Valley) and Cerro la Guitarra (Zaña Valley) will serve as case studies to highlight the importance of Parker's approach for household archaeology in the Andes.

Osorio, Jose [113] see Stanton, Travis

Ostahowski, Brian (Louisiana Archaeological Society), Jayur Mehta (Florida State University) and Theodore Marks (New Orleans Center for Creative Arts)

[97] *Coastal Louisiana's Vanishing Archaeological Record: The Last Investigations at the Adams Bay Mounds Site (16PL8)*

Sea level rise coupled with coastal erosion and subsidence has created an unprecedented land loss crisis for coastal Louisiana. This presentation provides an overview of the effects of land loss to coastal Louisiana's archaeological record observed at different scales (coast-wide, regional, and the individual archaeological site) and highlights the 2018 summer fieldwork at the Adams Bay Site (16PL8). This site is a Plaquemines mound complex (1200-1500 AD) located in Plaquemines Parish, Louisiana, which will be fully destroyed by coastal erosion and subsidence in just under eight years.

Ostapkowicz, Joanna [37] see Snoeck, Christophe

Ostapkowicz, Joanna (University of Oxford)

[37] *Lucayan Stone Celts: A Preliminary Overview of Style and Typology*

Exotic hard stone materials (e.g., jadeites, cherts, basalts) and artefacts were imported into the entirely limestone Lucayan archipelago (The Bahamas/Turks and Caicos Islands) post-AD 700, to fulfil both functional and ceremonial needs. Many of these pieces were removed from their original contexts during the 19th/early 20th centuries, when commercial guano mining and early amateur and archaeological investigations brought artefacts to light; some of these eventually entered museum collections. Project SIBA (Stone Interchanges in the Bahama Archipelago) provides a comprehensive overview of Lucayan materials in international museum collections, spanning both seemingly functional artefacts (celts) to stone pendants and carvings that defy simple classification. This paper highlights some of the stylistically unique artefacts to emerge as part of this research, alongside a preliminary overview of the range of celts, adzes and chisels, charting their shape and size, and exploring their varied purposes.

Osterholtz, Anna (Mississippi State University/Cobb Institute of Archaeology)

[366] *Becoming Cypriot: Identity Formation, Negotiation and Renegotiation on Bronze Age Cyprus*

Work on Cypriot identity has a long history, beginning with the identification of the first Cypriots during the Neolithic. This presentation continues on in the direction begun by Alan Simmons at Ais Giorkis of examining physical remains to understand what it meant to become Cypriot; here I examine the role of interaction and trade in developing, negotiating and renegotiating Cypriot identity in the Bronze Age. Multiple lines of evidence are examined, including mortuary locations, particularly near administrative or storage areas and the analysis of human remains from six sites throughout the island spanning from the Early through Late Bronze Age. By examining these remains from a model of migration and integration as opposed to colonization with enforced social change, we begin to see the creation of a third-space. Cypriot identity can be seen as a product of integration of newcomers and local populations, a blending of traditions and cultures to create a vibrant and resilient Cypriot identity.

Osterholtz, Anna [387] see Paige, Julianne

Otaola, Clara [364] see Neme, Gustavo

Otarola-Castillo, Erik [127] see Gonzalez, Carolina

Otarola-Castillo, Erik [127] see May, Alejandra

Otarola-Castillo, Erik (Purdue University)

- [365] *Managing the Effects of Climate Change and Foraging Risk through Dietary Portfolio Diversity, an Example from 13,000 years of Human-Environment Interactions on the Great Plains of North America*

Food security and risk management are prominent contemporary global challenges, with ~795 million people undernourished worldwide. Climate change is projected to affect the availability, accessibility and stability of food sources, further exacerbating global malnutrition, but this is not a novel human challenge. Food security risk management in the face of climate change was crucial to the survival of ancestral foragers and farmers throughout human evolution. Though fundamental to human survival, little is known about the effects of climate change on foraging-risk management strategies of small-scale societies. To this end, we introduce the concept of "Dietary Portfolios", an optimization technique to model the use of resource diversity as a bet-hedging strategy to manage foraging-risk. As a case study, we investigated the effect of climate change and foraging risk on dietary portfolios of ~2,500 components from the North American Great Plains and adjacent regions. Prehistorically, this area saw heavy reliance on big-game hunting, and delayed horticulture adoption, compared to other North American regions. Results of observed to expected portfolio comparisons across space and time, track variations in foraging and resource risk, providing insight into climate change-related impacts on human-animal-plant interactions over the last 13,000 years.

- [127] *Chair*

Otis Charlton, Cynthia [38] see Fournier, Patricia

Otis Charlton, Cynthia and Patricia Fournier (Escuela Nacional de Antropología e Historia-México)

- [198] *Mirrors of Time: Figurines in the New World Order*

Small ceramic figurines are ubiquitous in the preconquest central highlands of Mexico and are seemingly tied to household ritual. The arrival of the Spanish caused immense change at some levels, some reflected in these small objects. Archaeological evidence shows figurines briefly transitioning, but their reappearance is as decorative objects reflecting consumption of new, sometimes hybrid style. We examine this transformation through collections of excavated figurines from Mexico City, Otumba, and Patzcuaro (Michoacan), among others, with comparisons to such sources as Christoph Weiditz's *Trachtenbuch* (1529) to present some reflections of new order in the post-conquest sixteenth and seventeenth centuries.

Ott, Aaron (University of Central Florida)

- [406] *Aztec Twin-Temple Pyramids as Evidence for State Religion through Shared Architecture and Symbology*

Twin-temple pyramids of the Late Postclassic in Central Mexico became a distinct symbol of Aztec ideology. Nowhere is this demonstrated more than with Templo Mayor, the Great Temple of Tenochtitlán, the capital city of the Aztec empire. The deities worshiped and rituals conducted at Templo Mayor made it a beacon of ideological identity for the Mexica-Aztec, both in religious belief and national dominance. The very aspects that made it so symbolically significant would also carry over to the other temples of similar construction outside the capital city. This paper identifies aspects of state religion, invokes ethnographic analogy from Medieval Catholicism, and demonstrates those same traits in Postclassic Central Mexico. By examining the shared architectural features between Templo Mayor and nearby pyramids in cities under Aztec control, such as twin-temple design, shared sculpture and orientation, their contribution to the state religion in place at the time becomes clear. This then offers a method for showing state religion in new areas under investigation.

Otto Mejía, Raquel (Universidad Nacional Autónoma de Honduras), Luke Stroth (University of California, San Diego), Geoffrey Braswell (University of California, San Diego), Markus Riendl (German Archaeological Institute) and Franziska Fecher (University of Zurich)

- [103] *Reconsideración de Las Fuentes de Aprovisionamiento de Obsidiana en el Oriente y Suroriente de Honduras*

A la luz de los nuevos datos sobre el uso y distribución de fuentes de obsidiana en el territorio hondureño, particularmente la evidencia relacionada con la explotación de la cantera de Güinope, en el departamento de El Paraíso en la región oriental del país. Se analiza y expone un debate sobre el abordaje de los estudios líticos en Honduras, particularmente en la transición de los períodos Clásico al Posclásico. Esto apunta a reflexionar sobre la naturaleza y la extensión de las relaciones comerciales entre el Sureste y Noreste de Honduras. Esta nueva evidencia nos obliga a reconsiderar la

importancia y calidad de la obsidiana proveniente de esta importante fuente de materia prima.

Outram, Alan (University of Exeter) and Ludovic Orlando (CNRS)

[352] *The Archaeology and Ancient Genomics of Early Horse Domestication: Not as Simple as Once Thought!*

The earliest unambiguous evidence for equine husbandry relates to the Eneolithic Botai Culture of Northern Kazakhstan, circa. 5,500 years ago. However, whilst recent archaeological investigations and ancient genomics have added further weight to the case for domesticity and husbandry, it is now apparent that Botai horses are not the principal ancestor of modern domestic horses, but instead are the direct ancestors of the Przewalski's horse. This paper presents both the archaeological and genomic lines of evidence for this finding and investigates its implications for the story of horse domestication. A key lesson for domestication studies in general is the recognition that many lineages, once important in the past, can largely be replaced. Simplistic assumptions cannot be made about past domestication events by merely projecting back from the present.

Overholtzer, Lisa (McGill University)

[238] *Copper Buckles and Comal Battens: Clothing Indigenous Conquerors at 16th Century Coyotepetl, Tepeticpac, Tlaxcala*

In October of 1519, the fiercely independent Tlaxcallan state first sent Indigenous warriors to aid Hernán Cortés in his conquest efforts. Such military aid, common for more than a decade, established a community of people who identified as Indigenous conquerors and Spanish allies. Documents such as the cabildo records demonstrate that by the mid-16th century, Indigenous peoples in Tlaxcala had forged a thriving community, though they remained subjects of the Spanish crown. This presentation explores the process of creative appropriation and invention as Indigenous Tlaxcalans negotiated their roles within this entangled social context. I draw on recent excavations of a 16th century house in the Coyotepetl neighborhood of Tepeticpac, one of four señoríos that formed the capital of Tlaxcallan in the late pre-Hispanic period. I focus on archaeological evidence for the production and consumption of textiles and clothing, including not only the mundane and omnipresent spindle whorl, but also the more striking finds of a copper buckle that likely formed part of a sword belt and weaving battens worked out of ceramic comals or griddles. Together, these objects reveal both predictable and surprising colonial practices and shed light on the complexity of Indigenous attire and identity in 16th century Tlaxcala.

[59] *Discussant*

Owen, Ross (Indiana University of Pennsylvania)

[235] *Moderator*

Ownby, Mary (Desert Archaeology Inc.)

[72] *Ceramic Petrography as a Service for CRM Firms and Beyond*

Ceramic petrography is best known as a highly specialized skill employed by certain ceramic researchers within academic institutions. The results of this method are utilized to understand the broader culture that produced the pottery studied. However, both the technique and the holistic interpretation of the data are also used for cultural resource management projects. For the past eight years such an approach has been employed at Desert Archaeology, Inc., which builds on over 30 years of advanced petrographic analysis of pottery and sands by this company in the US Southwest. The ability to hire a specialist petrographer on a project by project basis has been beneficial to other CRM firms, non-profit research groups, and academics. This is because of the time and study required to become a proficient ceramic petrographer so that training a new person for each research program is not always feasible. The result has been analysis of ceramic material throughout the greater Southwest leading to cross-cultural perceptions of pottery production and distribution. This combines the typically academic emphasis on broad pattern identification with CRM's greater access to material benefiting both while highlighting the importance of scientific methods within archaeology.

[298] *Chair*

Ownby, Mary [298] see Lack, Andrew

Oxenham, Marc [379] see Adams, Alisha

Ozbun, Terry (AINW)

[235] *Moderator*

[235] *Discussant*

Özcan, Asu Selen [321] see Martin, Samuel

Pacheco-Cobos, Luis (Universidad Veracruzana), Amy Thompson (Department of Anthropology, University of New Mexico), Carmen Cortez (Community Agroecology Network (CAN), Santa Cruz), Bruce Winterhalder (Department of Anthropology, University of California) and Keith M. Prufer (Center for Stable Isotopes, University of New Mexico)

[146] *The Effects of Households and Labor Requirements on Intracommunity Boundary Formation, Settlement Choices, and Neighborhood Functions in Modern and Prehistoric Communities*

Cooperation is essential to labor networks in low-density agricultural societies. Household or neighborhood heads must learn to identify, select, and monitor raw materials, and estimate harvest times and transport costs. In addition, kin related groups must nurture allegiances to attract and reciprocate for labor to build houses, farm, and for other communal duties. In this paper we explore how households and other collective groups maintain intracommunity boundaries by drawing on four data sets: Geospatial distributions of households and multihousehold labor-sharing clusters from Santa Cruz (SC), a modern, Maya speaking community; full-year ethnographic time allocation data relating to labor activities and networks in SC; energy calculations on costs, derived from GPS-tracks associated with the management of forest products in SC; geospatial and archaeological studies of ancient households, neighborhoods, districts, and natural resources near the Classic Maya center Uxbenka. We develop analogies between modern and prehistoric communities to illustrate mechanisms for forming and maintaining boundaries. We expect that observed modern and inferred ancient labor networks would be distributed similarly across the landscape, with positive spatial correlations relative to access to water, farmland, transportation routes, minerals, plants and animals.

Pacheco-Forés, Sofía (Arizona State University)

[81] *Contextualizing Ritual Violence: Kinship, Ethnicity, and Human Sacrifice in Epiclassic Central Mexico*

Ritual violence has a long time-depth within Mesoamerica. While archaeologists and ethnohistorians have studied the political and cosmological significance of this practice extensively, less is understood about how or why particular individuals were targeted for sacrifice. This study investigates how the perception of social difference contributed to the selection of sacrificial victims at the central Mexican shrine site of Non-Grid 4, where 173 individuals were interred. The site dates to the Epiclassic (600-900 CE) period, a time of dramatic political upheaval and social reorganization. In such a volatile geopolitical climate, aspects of individuals' social identities—including their biological kinship affiliations and ethnicities—could have acted as powerful indicators of social difference that culminated in violence. Multi-scalar biodistance analyses are used to reconstruct patterns of biological relatedness among sacrificial victims, as well as between sacrificial victims and pre-extant populations within greater Mesoamerica, including central, northern, and western Mexico. This research not only improves understandings of ritual violence within ancient Mesoamerica, but also contributes more broadly to anthropological knowledge about the social context of violence by examining the interaction between specific social identities such as biological kinship and ethnicity, complex social processes like migration and demographic change, and instances of mass violence.

Pacheco-Forés, Sofía [91] see Pinta, Elie

Pacifico, David (University of Wisconsin - Milwaukee)

[236] *Periurbanism in the Casma State: Preliminary Observations from the Olivar Archaeological Complex*

The Casma State played a major role in north-central coastal social and political developments in the Middle Horizon and Late Intermediate Period, circa AD 1000-1400. El Purgatorio served as the capital for much of that time, providing a central

location for a dense population, intensive production activities, and collective rituals at a variety of scales. But El Purgatorio was no isolated urban center, it was the primary among many settlements lining virtually all segments of the rocky Andean foothills of both branches of the Casma Valley. So, what was the relationship of El Purgatorio to surrounding settlements? This paper provides preliminary observations and interpretations of site layout, architecture, and surface artifacts as seen from satellite imagery and informal, non-invasive pedestrian observation of the El Olivar Archaeological Complex. The Complex includes the sites of Tucushuaman, Cahuacucho, Templo Olivar, and Cerro Olivar. Drawing upon baseline models developed at El Purgatorio, the architecture, function, and probable occupation histories of these sites are hypothesized. The significance of these hypothetical conclusions for understanding Casma State formation, administration, and social life is proposed. And future methods for evaluating these hypotheses are presented.

[236] Chair

Padgett, Brian [70] see Sanger, Matthew

Padon, Beth (Discovery Works, Inc.)

[122] Partners for Archaeological Site Stewardship

Prehistorical and historical resources are irreplaceable. When they are damaged or destroyed, we lose the information and connections that they offer about past cultures. Increased development and recreational activities have increased the public exposure to sites. These population pressures also present opportunities for preservation efforts through public participation in site stewardship programs. Across the country, public agencies sponsor volunteer site stewardship programs to help protect known sites. In these programs, volunteers regularly visit and report on conditions at assigned sites, which alerts organizations about vandalism, erosion, or other problems before more damage is done. In 2018, the Partners for Archaeological Site Stewardship surveyed site stewardship programs in all parts of the country. By sharing information, tools, and resources, site stewardship programs help each other become more effective and efficient. By collaborating, they can better compete at the national level for financial support. This poster reports some of the challenges and successes of different site stewardship programs, describes the variety of ways that the public helps protect cultural resources in different communities, and presents initiatives that will help make preservation of sites more successful in the future.

Pageau, Hanna Marie (University at Albany)

[376] Discussant

Paige, Jonathan [197] see Carpenter, Lacey

Paige, Jonathan (Arizona State University, School of Human Evolution and Social Change), Deanna Dytchkowskyj (Institute of Human Origins, School of Human Evolution) and Charles Perreault (Institute of Human Origins, School of Human Evolution)

[247] Measuring Lithic Complexity from the Lower Paleolithic through the Late Holocene

The extended evolutionary synthesis emphasizes the importance of understanding how the interaction of biological and cultural inheritance systems have shaped human evolution. Within the animal kingdom, modern humans possess a unique ability to transmit and maintain complex cultural traditions (Tennie et al. 2009). When this capacity for cumulative culture appears in the hominin lineage remains unclear. Previous research suggests the complexity of stone tool traditions increased exponentially from the Oldowan onwards (Perreault et al. 2013; Stout 2011), with a marked increase during the Middle Paleolithic. But these studies focus on a small sample of sites and tool-making techniques, and do not include Holocene material. Here, we measure the complexity of a large sample of stone tool traditions spanning the entire archaeological record from the lower Paleolithic through the Holocene. We use two methods to measure cultural complexity: a coarse measure of complexity (applied to 217 assemblages), and a second more fine grained measure (applied to 27 assemblages). Preliminary results suggest a gradual increase in complexity from the Oldowan through the Late Holocene, with far more complex technologies arising in the past ~300 thousand years.

Paige, Julianne, Kara Larson (Mississippi State University), Anna Osterholtz (Mississippi State University, Cobb Institute) and Lujana Paraman (Muzej grada Trogira)

[387] *Feasting with the Dead: Preliminary Analysis of Faunal Remains at the Put Dragulina Roman Cemetery*

Put Dragulina, a Roman cemetery site dating between 100 AD and 300 AD, was excavated as part of rescue projects during 2011 and 2017 in Trogir, Croatia. At least 84 individual graves were excavated with associated burial goods. Along with the recovery of human remains, over 250 fragments of animal bone were recovered. This poster presents the identification and analysis of ovicapropines, cattle, and equid remains as possible remnants of feasting activities associated with mortuary practices based on postmortem alterations. The presence of cut marks on the distal and proximal portion of the bones suggest that the remains were processed and consumed. In association with the human burials, it is suggested that the postmortem alterations, alongside the presence of fragmented burned bone, are indicators that mortuary feasting processes were occurring at this Roman cemetery site.

Pailles, Matthew (University of Oklahoma), John Carpenter (Instituto Nacional de Antropología e Historia (Cen) and Guadalupe Sánchez (Estación del Noroeste, Universidad Nacional Autónoma)

[296] *Casas Grandes Culture in the Sierra Madre of Sonora*

This presentation will summarize results from ongoing research on the late prehistoric period of the Sonoran Sierra Madre. Thus far, investigations focused on the Sahuaripa and Fronteras valleys. These valleys are approximately equidistant from Paquimé at 185 and 165 km, respectively. In the Fronteras valley, there is substantial ceramic and architectural evidence that several sites maintained strong connections to the Casas Grandes system. In the Sahuaripa valley, there is evidence of periodic exchange in the form of rare Casas Grandes ceramics. The presence of appreciable amounts of marine shell indicates the Sahuaripa area potentially participated in the Casas Grandes economic system. Similar to previous research in the Sierra Madre, both valleys present substantial local variation. We argue the differential viability of economic connections—established trade routes—and variability in the saliency of Casas Grandes ideological content contributed to the resulting uneven patchwork of Casas Grandes influence in the Sonoran Sierra Madre. This spatially discontinuous pattern suggests high local autonomy in which local communities, or their leaders, selected the domains and strength of interaction with Casas Grandes institutions.

Paillet, Patrick [403] see Naudinot, Nicolas

Paine, Richard (University of Utah) and Richard Hansen (University of Utah)

[409] *Hidden Structures, Ground Penetrating RADAR, and the Demography of El Mirador*

The Preclassic El Mirador polity collapsed around 150 C.E. One focus of explanations of El Mirador's collapse is anthropogenic changes to Basin ecology, centered on 1) population growth and agricultural overexploitation; and 2) conspicuous consumption of stucco for elite construction. Reliable estimates of population are essential for evaluating these hypotheses. LiDAR revolutionized our ability to identify and count surface structures, but questions concerning 'hidden structures' remain. A variety of hidden structures exists at El Mirador. They are a common feature of Late Classic patios, and have been encountered in several open contexts. Some include formal cut-stone foundations. Others are less regular concentrations of unworked stones. We tested the efficacy of Ground Penetrating RADAR for identifying hidden structures at El Mirador in 2018. The area covered by GPR, approximately 40x50m, was equivalent to 125 4x4m test units. Twelve anomalies were identified as possible hidden structures. Eight were ground truthed using 1x2m excavations. Three of eight yielded evidence of hidden structures. Additionally, two 4x4m control excavations as failed to yield evidence of hidden structures. Though remote techniques like GPR are imperfect, they represent our only practical means of estimating the prevalence of hidden structure at El Mirador and other Maya sites.

Painter, Autumn (Michigan State University) and Jeffrey Painter (Michigan State University)

[291] *Walk with Me: Reflections on Almost a Lifetime with Dr. James Skibo*

During this paper, we will reflect on the impacts that Dr. James Skibo has had on our lives and careers. From childhood to graduate school, Dr. Skibo has been a major influence on how we think about and approach archaeological research. Thanks to his Yooper wisdom, he has also taught us many life lessons, such as the value of duct tape and a proper

appreciation for a good axe. While we have both graduated from Illinois State University and are now working on our Ph.D.'s at Michigan State University, Dr. Skibo continues to influence our research and thinking, and we will always be thankful for the mentorship that he has, and continues to, provide.

Painter, Jeffrey [291] see Painter, Autumn

Paíz Aragon, Lorena [113] see Munson, Jessica

Paja, László [126] see Duffy, Paul R.

Palace, Michael, Meghan Howey (Department of Anthropology, UNH) and Franklin Sullivan (Earth System Research Center, UNH)

[77] Geospatial "Big Data" in Archaeology and the Enduring Challenge of Anthropological Significance

Archaeology has always been in the realm of "Big Data". Every site, feature and artifact holds a myriad of attributes that can be qualitatively and quantitatively recorded. While a near endless amount can be measured, the challenge has been identifying data that are actually connected to past human behavior that is of anthropological significance. This challenge remains in today's new geospatial digital horizon of "Big Data". While the ever-expanding suite of geospatial technologies provide a plethora of data on potential past human landscape use, we still must ask if we are using these data to bring about new, anthropologically salient, insights into past human behavior. Here, we explore our own advances and shortcomings in terms of navigating this challenge in our work on precontact food storage features. We critically examine our use of unmanned aerial vehicles (UAS) with lidar to characterize microtopography of precontact storage pits in the Great Lakes. We explore how such remote sensing can best integrated with theoretically-grounded geospatial analyses to examine environmental impacts of past societies on existing forests. Finally, we examine graph theory as a means to advance insights into not just current spatial distributions of past sites but actual past socioeconomic developments and connections.

Palacios, Horvey (University of Miami) and Traci Ardren (University of Miami)

[94] Green Stone Pendants of the Florida Middle Archaic: Trade and Lithic Ornament Construction as Evidence for Early Social Difference

Little Salt Spring mortuary pond is located in south central Sarasota County, Florida. It has been the subject of numerous significant discoveries that have challenged our understanding of the earliest occupations of the Americas. Two green stone pendants recovered from the basin, and dated to the Middle Archaic period (700-500 BP) also test current models of trade and lithic use for the time period. Provenance analysis conducted previously have sourced the stones to the southern Appalachian Piedmont of the United States nearly 650km away from the Little Salt Spring sinkhole. This paper will review evidence of trade routes and lithic ornament construction to argue that these two pendants may represent the earliest form of jewelry associated with emergent social stratification in the Middle Archaic period. New trade and crafting practices signal cultural innovation in this region and suggest that the reification of individuals could now be expressed through trade items and technological complexity.

Palet, Josep M. [154] see Garcia, Arnau

Paling, Jason (Plymouth State University)

[412] Chair

Palmiotto, Andrea [129] see Magoon, Dane

Palomo Mijangos, Juan Manuel (University of Arizona)**[309] Diet, Migration and Social Changes: The Preclassic Burials of Ceibal**

The Ceibal-Petexbatún Archaeological Project uncovered 43 burials with a minimum number of 58 individuals that date from the Middle Preclassic to the Protoclassic period (ca. 700 BC-AD 200). These remains have the potential to provide valuable insight into the processes of political centralization and social inequalities in the Maya lowlands. By analyzing stable isotopes contained in ancient human remains, two specific questions will be explored: 1) How were social inequality and political centralization reflected in dietary practice? 2) How were changes in social inequality and political centralization associated with migrants and external relations during the Preclassic period? To address these questions, this presentation will discuss the preliminary results of a multi-isotopic analysis made on 43 burials from Ceibal. Carbon and nitrogen isotopic data will be used to examine whether changes in social inequality and political centralization were accompanied by those in the diet during the Preclassic period. Oxygen, strontium, and lead data will be analyzed to test whether Ceibal attracted more migrants or there were more hostile external relations during the periods of growing political centralization and social inequality.

Palonka, Radosław, Vincent MacMillan (Canyons of the Ancients National Monument), Katarzyna Ciomek (Jagiellonian University in Kraków) and Magdalena Lewandowska (Jagiellonian University in Kraków)**[190] Cultural Landscapes and Migrations in Sandstone Canyon, Southwestern Colorado through Pueblo and Ute Rock Art**

Sandstone Canyon, located within the Canyons of the Ancients National Monument in southwestern Colorado, is one of the biggest canyons of the area. Since 2014 four sites with large rock art panels, previously unknown, have been found in the area. Depictions of rock art at these sites have been initially dated from around the third/fifth century A.D. to the thirteenth century A.D. (Pueblo and possibly Fremont cultures) and to the appearance of the ancestors of the Ute Indians in this area. The petroglyphs depict mostly single geometric motifs and other symbols like the bear paw, individual figures of people and animals, and extended scenes that include fighting and also hunting of large animals, mostly deer, bison, and bighorn sheep.

This paper will answer questions of the chronology and cultural affiliations of particular rock art panels, and shed new light on settlement continuity and change, including migrations from one region to another by farming Pueblo societies, as well as hunter-gatherer Ute societies and later Euro-American explorers, settlers, and cowboys passing through the canyon with cattle at the turn of nineteenth and twentieth century and who left their initials, names, and dates on almost every panel of rock art.

Palus, Emily (Bureau of Land Management)**[237] Yes! You Can Still Dig, but, Please Plan Ahead. NAGPRA Section 3 New Discoveries in Land Management**

Vast, but not vacant, the 256 million acres of public lands managed by the Bureau of Land Management offer an incredible laboratory for archaeological research with 400+ academic and CRM permittees annually conducting thousands of surveys and hundreds of excavation projects. BLM manages these lands for multiple-uses to benefit the American people, so cultural resource projects are often for land-use compliance, but also academic research. Archaeologists have recorded 390,000 sites on just 10 percent of these lands; most are associated with Native American cultures. With high frequencies of cultural sites and increasing land-use, discoveries of Native American human remains and cultural items are inevitable, and often foreseeable. Section 3 of NAGPRA affirms tribal rights to inform land management and to custody of their ancestors and cultural property, prescribing to land managers specific planning and response procedures, and emphasizing tribal consultation. This paper demystifies "Section 3" responsibilities, identifying critical steps for archaeologists in planning projects, including coordinating—but not entangling—NHPA "Section 106" compliance and ARPA requirements, what do to upon discovery, and how to avoid suspending a project. By respectfully navigating the legal processes, there is opportunity to 'balance' or rather support archaeological research goals and uphold tribal rights.

[237] Chair**Panczak, Taylor (Michigan State University) and Kurt Rademaker (Michigan State University)****[268] Exploring Inter-zonal Connections through a Constructed Projectile Point Typology from Cuncaicha Rockshelter**

Cuncaicha rockshelter, Carぶn-Ruan, and Pampa Colorada are parts of an early inter-zonal settlement system located in southern Peru. Cuncaicha and Carぶn-Ruan are multi-component highland rockshelters, with initial occupations dating respectively to the Terminal Pleistocene and Early Holocene. Early to Late Holocene sites at Pampa Colorada on the

Pacific coast contain projectile points made of highland Alca obsidian. Highland and coastal sites share common usage of additional raw-material resources from intermediate elevations. In addition, these sites have similar projectile point styles but have yet to be tested for relatedness. Because Cuncaicha is one of the best dated highland sites in South America and excavations have yielded over 1000 projectile points, I was able to construct a lithic typology to examine the nature of this shared inter-zonal material culture. Types were assigned and tested using morphological characteristics, metric data, and geometric morphometrics. Photogrammetric techniques were then used to create 3D models of over 200 projectile points from the highland and coastal sites. The 3D models were digitally archived to be easily accessible to other researchers. This digital archive and typology, which includes fishtail projectile points, will be useful for other archaeologists working in the Andes and along the coast of Peru.

Panelli, Chiara [195] see Rossi, Stefano

Panich, Lee (Santa Clara University)

[19] *Documenting Persistence: The Archaeological Paper Trail of Indigenous Residence in Marin County, California, 1579-1934*

As part of our broader efforts to document patterns of Native American residence in the nineteenth century, we examined the documentary record associated with nearly 900 archaeological sites in Marin County, California. This paper trail begins with the first regional surveys conducted during the early 1900s, which focused exclusively on detailing the area's precontact deposits. Archaeologists' attention to more recent materials and sites grew slowly over the course of the twentieth century, along with the increasing temporal classification of sites into prehistoric, protohistoric, and historic periods. Our findings reveal the shortcomings of this traditional site recording system. In many records, mass produced consumer goods were simply dismissed or assumed to have been deposited by white settlers. In other cases, items typically viewed by archaeologists as evidence of postcontact indigenous occupation were absent, but continued site use is indicated by radiocarbon or obsidian hydration dates. In assessing sites occupied by indigenous people from the late sixteenth through the mid-twentieth centuries, we discuss how the use of multiple lines of evidence—including temporally diagnostic artifacts, chronometric dating techniques, and historical documentation—may help illuminate subtle but widespread patterns of native residence that have been obscured by essentialist assumptions about indigenous culture change.

[229] *Discussant*

[19] *Chair*

Pantoja, Luis

[71] *Arqueología Preventiva en México: experiencias, alcances, limitaciones y propuestas*

Son muchos son los riesgos en los que el Patrimonio Arqueológico en México se encuentra expuesto: el crecimiento de asentamientos humanos, las industrias que usan, transforman y reutilizan el territorio, así como el vandalismo, el saqueo y colecciónismo. Desde el ámbito nacional las empresas y particulares que construyen, necesitan cumplir la legislación vigente en materia de patrimonio con trámites ante el órgano competente (INAH) con antelación a la ejecución de obras que involucren la modificación y alteración del subsuelo en territorio nacional, lo que conlleva a un largo proceso de gestión. La Arqueología Preventiva, como alternativa de intervención para la protección, y estudio de del patrimonio arqueológico, está basada en la legislación y normatividad vigente, la cual cobija acciones previas a cualquier diseño de obra y permite tanto la planeación de proyectos de infraestructura como la prevención de afectaciones al patrimonio, logrando la conciliación de intereses tanto de investigación y protección, como de avance, diseño y gestión de obras; de manera que ambas partes alcancen sus objetivos de manera óptima. La presente ponencia muestra una propuesta viable de ejecución de arqueología que permite la coadyuvancia de instituciones y empresas, mostrando algunos ejemplos de actuación.

[71] *Chair*

Pape, W. Kevin (Gray & Pape, Inc.)

[400] *Electrical Generation and Cultural Heritage Stewardship on the Banks of the Ohio River: An NHPA Success Story!*

The Dayton Power and Light Company (DP&L) has invested in a long-term commitment to cultural heritage stewardship, through their role as applicant under Section 106 of the National Historic Preservation Act, at their JM Stuart Generating

Station, in Adams County, Ohio. For almost 25 years, DP&L has worked closely with state and federal permitting agencies to advance cultural resources studies, formulate innovative treatment and mitigation plans, develop productive engagement with tribes, and broadly share the results of these studies with the public. In addition to the traditional range of CRM studies, DP&L has supported geoarchaeological and landscape reconstruction analyses, historic cemetery restoration, dedication of easement covenants to protect ancestral remains in perpetuity, publication of synthetic research, funding commitments for tribal cultural sensitivity training, and public outreach. Through their leadership, remarkable advancements in archaeological research have been carefully integrated into the environmental review process.

[292] *Discussant*

Paquin, Simon, Samuel Seuru (Université de Montréal), Ariane Burke (Université de Montréal) and François Girard (Université de Montréal)

[128] *How Precise Are My Survey Data? GNSS Receivers Test and Comparison*

Archaeological surveys using GNSS receivers (Global Navigation Satellite System) to register artefact location generally state the accuracy of used devices, but rarely discuss the precision of resulting data. In other words, we have an idea of how "true" individual points are, but not as much regarding the statistical variability of groups of points. Yet, the later information is critical in assessing how confidently artefact clusters can be interpreted on surveyed archaeological sites. With this question in mind, we designed an experiment using four different GNSS receivers with various price ranges and advertised accuracy. This experiment was carried out in a way to (1) compare these devices in field-like conditions and (2) document how their precision holds up at different spatial and temporal scales of data collection. Is the variability stable through time while retaking the same group of points hour after hour and how does this variability affects spatial relation between points? This poster will set out how the experiment was implemented as well as showing the visual and statistical results of our comparison.

Paraman, Lujana [387] see Paige, Julianne

Parbus, Brett (University of Central Florida)

[47] *Determining the Impact of Major Storm Events on Ancient Peoples of Coastal Florida*

For this project, I assess the potential effects that periods of increased storm frequency and intensity may have had on the lives and behaviors of ancient coastal Florida populations. Using sediment grain size analysis, storm periods were retrodicted and organized into regional storm chronologies for 5 lake bed sediment cores within the East and Central, Northwest, and North Peninsular Gulf Coast archaeological regions of the Florida coast. The storm periods were identified by signatures of increased particle size and platykurtic particle size distribution. The storm periods were then dated using a linear regression of radiocarbon dates taken at varying depths of the sediment core. The storm period chronology generated for each sediment core was compared alongside radiocarbon dates taken from across coastal Florida archaeological sites, which were used to infer periods of occupation for the individual sites, and for the archaeological region as a whole. Initial investigations show correlations between periods of increased storminess and periods of settlement abandonment. These correlations may aid in explaining the causes of settlement abandonment at these sites and reinforces the utility of particle grain size analysis for retrodicting ancient climate.

Parditka, Györgyi (University of Michigan)

[267] *New Identities and Changing Funerary Practices in the Mid–Late 2nd Millennium BC in the Carpathian Basin*

The transition from Middle to Late Bronze Age (ca. 1600 – 1300 BC) in the Carpathian Basin encompassed a broad range of changes in material culture, settlement, and societal organization. While the narratives have somewhat shifted from the traditional model that primarily associated these changes with the arrival of the Tumulus culture population, and described them as rather abrupt events, several aspects of the underlying processes and the transition itself are still unclear. This paper addresses questions about the trajectory of changes in social practices and social identities at the dawn of a new era in a specific cultural context. As a case study, it focuses on the changes that happened in the Tisza-Maros confluence area from about 1700 to 1300 BC. More specifically, it is evaluating some of the changes that the Early-Middle Bronze Age Maros polity's mortuary traditions went through and the changes that appeared shortly after the Maros era, using a Late Bronze Age cemetery, Tápé, as a point of reference. This study evaluates whether the observed patterns indicate a gradual or abrupt change at the end of the Middle Bronze Age, and the kind of social transformations that the observed changes

may imply.

[126] *Chair*

Parditka, Györgyi [126] see Duffy, Paul R.

Paredes, Hannah Julia, Olivia Navarro-Farr (The College of Wooster) and Mary Kate Kelly (Tulane University)

[122] *Community Engagement in Archaeology through Photogrammetry*

Photogrammetry is a rapidly-evolving technology that is applicable to a wide array of archaeological contexts and reconstructions. Researchers affiliated with the Proyecto Arqueológico Waka' (PAW) at the site of El Perú-Waka', Petén, Guatemala, initiated a program of photogrammetric recording of stelae during the 2018 season. In this process, a series of photos of an object are entered into Agisoft PhotoScan software to create 3D models. The process can create models of not only small, portable objects but also entire buildings. These models are used to create drawings of the monuments and may be used to produce replicas. Photogrammetry has the potential to advance discovery and make information more accessible to both the academic community and the modern Maya populations who live in or near areas of excavation. This presentation focuses on El Perú's Stela 44 which dates to AD 564 and was found in the site's primary civic-ceremonial structure, M13-1. In this poster we review the application of photogrammetry to this monument, consider preliminary results of investigation, and possibilities for future developments including community engagement through creation of signage and stelae replication.

Parfitt, Anne (Southern Methodist University) and Kathryn Cross (Southern Methodist University)

[187] *Archaeological Investigations at the Double Flute Folsom site (LA178142), New Mexico*

In May 2017, the QUEST Archaeological Research Program (SMU) investigated the Double Flute Folsom site (LA178142) in Socorro County, New Mexico. Intensive surface survey and excavations were performed to determine the nature and extent of Folsom activities, the stratigraphic integrity of archaeological deposits, and their paleoenvironmental context. The site exhibits a sparse lithic scatter and little stratigraphic integrity. Double Flute is a small, ephemeral Folsom locality.

Pargeter, Justin (Emory University/University of Johannesburg), Hayley Cawthra (African Centre for Coastal Palaeoscience), Irene Esteban (University of the Witwatersrand), Erich Fisher (Arizona State University) and Rosaria Sakutra (University of Wollongong)

[32] *The Msikaba Red Sand Dunes: Middle Pleistocene Lithic Technological Variability in Pondoland, South Africa*

The Msikaba Red Sand Dunes along South Africa's Pondoland coast are a recently discovered open-air site complex that documents Middle Pleistocene lithic technological and morphological change. The deposit comprises ancient dune surfaces stacked over time with repeated sea-level highstand events. Initial excavations and surface collections document in situ lithics comprising large bifaces, prepared cores, large blade production as well as a novel small bladelet and flake component. We also document a large groundstone and anvil assemblage in the same horizon as the site's other lithic components. OSL dating provides minimum ages for the deposits making this one of the few well-dated open-air coastal Middle Pleistocene archaeological sites in Africa. Here, we provide the results of ongoing lithic analyses and further details on the assemblage's structure and taphonomy that will be the focus of future fine-scale archaeological analyses at the site. This study highlights the significance of the early Middle Pleistocene in Africa for understanding behavioral variability and the evolution of our genus.

Pargeter, Justin [32] see Fisher, Erich

Paris, Elizabeth [407] see Meanwell, Jennifer

Parish, Ryan (University of Memphis), Nora Franco (University of Buenos Aires) and Dagmara Werra (The Institute of Archaeology and Ethnology, Polish)

[110] *Characterizing Argentinian Quartzite and Polish 'Chocolate' Flint for Sourcing Studies*

The application of reflectance spectroscopy in sourcing studies of quartzite and flint illustrates the broad potential that the technique has in helping us explain human behavior using lithic provenance data. An ongoing line of research is to characterize tool stone used by prehistoric peoples in order to source artifacts back to known deposits. The large amount of visual, mineral, and chemical variability present in chert, flint, and quartzite is often problematic when identifying source. Geologic samples from multiple quartzite quarries in Argentina and 'chocolate' flint quarries in Poland are characterized using their atomic and molecular bond composition. Both examples demonstrate the future application of reflectance spectroscopy in provenance research where artifacts are sourced back to individual quarry sites or deposits on the landscape. The data will directly lead to a greater understanding of hunter-gatherer groups in South America and Mesolithic/Neolithic groups in Eastern Europe.

[235] *Discussant*

Parish, Ryan [176] see Giles, Bretton

Park, Gayoung (University of Washington) and Ben Marwick (University of Washington)

[389] *Change in Mobility and Site Occupation during the Late Pleistocene in Korea*

Stone artifact assemblages can be an important source of information about hunter-gatherer mobility and subsistence, according to behavioral ecological theory that links technological changes to environmental adaptation. We examined stone artifacts from 28 sites in South Korea to investigate technological innovations during the Late Pleistocene and their relationship to environmental changes. We hypothesized that hunter-gatherers should move more frequently and further in order to adapt to the changed environment, so their tools became more portable and efficient, as indicated by decreases in the size of both individual tools and toolkit, and increases in function and utility. We use optimality models, especially the central place model and the patch choice model, to interpret changes in stone artifact attributes such as size, cortex ratio, retouch intensity, retouched edge ratio, and ratio of retouched pieces to discarded artifacts. We also calculate the Minimum Number of Artifacts (MNA) and Lithic Volumetric Densities (LVD) values to investigate toolkit size, diversity, and complexity for insights into patterns of mobility and site occupation. We discuss the implications of our results for understanding technological innovation as a means of risk reduction strategy for environmental change.

Park, Geun Tae (Jeju Archaeological Institute), Chang Hwa Kang (Jeju Archaeological Institute) and Jae Won Ko (Jeju Cultural Heritage Institute)

[156] *Subsistence Economy and Paleoenvironment of Neolithic Islanders in Jeju, Korea*

The subsistence economy of the Neolithic Period in Korea mainly consisted of hunting, fishing, gathering, and farming. However, there are also regional and chronological variations, which can be understood through the detailed study of lithic and bone tools and the analysis of archaeological sites' landscape and their paleoenvironment. This study analyzes patterns of change in the lithic and bone tool assemblages and the physical landscapes of the Neolithic archaeological sites in Jeju Island, Korea. Recent geological data are also included for analysis of Jeju's paleoenvironment. The study discusses implications for the subsistence economy of the prehistoric Neolithic people in Jeju, who lived in a unique island setting with the challenges posed by the paleoenvironment and its changes.

Park, Jiyoung

[361] *The Three Settlement Patterns of the Southern Korean Peninsula in the Proto-Three Kingdoms Period*

Settlement sites have been regarded as important data reflecting social and political complexities and organization. Consequently, settlement archaeology of the Proto-Three Kingdoms period in the Southern Korean peninsula has focused on the typological classification of settlements according to a typical hierarchical model to explain the boundaries and the socio-political organization of small polities. Difficulties in establishing chronology, however, have made previous studies focused on a single-region scale for examining each local polity. Despite the importance of the results of the previous

research, there have been some limitations to investigating the time of profound socio-political transformation when over 50 small states interacted each other through wars, population movements, trades in the southern Korean Peninsula. To explain this dynamic situation, a broad-scale spatial analysis of settlement patterns and inter-regional comparisons with new methodology are clearly necessary. According to recent analyses of settlement and population distribution, three regions of the Southern Korean peninsula in the Proto-Three Kingdoms period clearly showed different site and population distributions, and they imply quite different social, political, and economic situations. There is a need to diversify the model to explain settlement patterns and their social organizations.

Park Boush, Lisa [37] see Beamer, Dawn

Parker, Ashley (Far Western Anthropological Research Group), Kate Magargal (University of Utah) and Brian Codding (University of Utah)

[8] *Tend or Travel? Examining Constraints of Traditional Pinus monophylla Harvest in Western Nevada*

Pine nuts from the single leaf pinyon (*Pinus monophylla*) were a critical resource for prehistoric populations across the Great Basin, and they maintain significant economic and social value for many who continue traditional collecting practices today. However, with limited access to and control over ancestral lands, contemporary populations are unable to carry out traditional land management practices such as coppicing, burning, and irrigating, which limits the productivity of local groves and requires long distance travel to locate patches that are worth collecting. Here we report quantitative ethnographic data on pine nut harvesting returns collected in collaboration with Northern Paiute communities in Nevada. The results illustrate that the reliable exploitation of pine nuts requires either investing in local groves or extensive travel and transport. This research has direct implications for archaeological interpretations of pine nut collecting, and for collaborative management between Tribal communities and federal land managers.

Parker, David [37] see O'Mansky, Matt

Parker, Evan (Tulane University)

[219] *The Tzimin Jades of Paso del Macho: Description and Analysis of a Middle Preclassic Maya Plaza Offering*

Jade tadpole spoons and clamshell pendants represent some of the most symbolically charged items of wealth and power in formative Mesoamerica. The Tzimin jades are a newly discovered cache of these items from the Middle Preclassic (900 BC—350 BC) Maya village of Paso del Macho that offer additional context for assessing the function and significance of jade adornments during this time. Based on material characteristics, the timing of the deposition, and their location, these items are associated with cosmogenesis, the Middle Preclassic fertility complex, and the formation of early cooperative social compacts for the agricultural pioneers of the Puuc region.

[165] *Discussant*

[219] *Chair*

Parker, Megan [56] see Morehart, Christopher

Parris, Caroline (Tulane University)

[370] *Nuancing the Maya Feast: A Reexamination of the Function of Ceramic Feasting Assemblages*

Feasting is a commonly cited interpretation across the Maya area for middens which include large quantities of ceramics and animal bones. This poster takes a closer look at previously published Maya feasting contexts by further examining the functional make up of their ceramic assemblages. By moving beyond the standard open/closed or serving/storage functional terms, it is possible to attain a finer grained interpretation of the activities that lead to the composition of each feasting assemblage. Comparison with recently excavated feasting middens and elite household middens from the site of La Corona, Petén, Guatemala provides greater nuance to the current understanding of Maya feasts and facilitates breaking the broad heading of 'feast' into smaller more socially meaningful categories.

Parrish, Julia [312] see Bovy, Kristine

Parsons, Jeffrey (University of Michigan)

[306] *The Junin Surveys, 1975-1981*

Inspired by previous systematic regional surveys in the Valley of Mexico, the Junin surveys were undertaken as a collaborative effort by the Universidad Nacional Mayor de San Marcos and the University of Michigan during several long field seasons between 1975-1981. This presentation highlights some of the major contributions of these surveys and specifies a number of key follow-up studies that should be undertaken in this still under-studied region in the Peruvian Sierra Central.

[38] *Discussant*

Parsons, Ted (University of Alaska Anchorage)

[120] *New Alternatives to Terrestrial Laser Scanning: The Case of Poorly-Lit Features and Sites*

3D modeling is an integral part of many archaeology projects. Photo-based 3D modeling using Structure from Motion and Multiview Stereo (SfM/MVS) algorithms is widely used. SfM/MVS requires minimal field gear and can produce very high-quality output: Agisoft's PhotoScan Professional® is the most popular commercial implementation of SfM/MVS. Adequate illumination is a major consideration for SfM/MVS, however, especially in remote or rugged field settings where it is impractical to provide supplemental lighting. Such locales include poorly-lit caves and semi-subterranean rock shelters. Terrestrial Laser Scanning (TLS) is a proven alternative to SfM/MVS in these settings, but TLS units are bulky, heavy, and very expensive. Prior work includes infrared cave imaging using Microsoft's Kinect® video game controller as a depth-mapping sensor. While smaller, lighter, and far cheaper than TLS, a Kinect-based system nonetheless requires a laptop computer for the scanning software, and 115v AC electrical power. New lightweight, self-powered, alternatives to TLS (and the Kinect) including Google and Sony's smartphone-based systems, Scanse Sweep®, and the moderately expensive DotProduct DPI-8X® compact handheld scanner are evaluated as possible alternatives.

Pascual Soto, Arturo

[405] *El universo de los guerreros: Tumbas y gobernantes en El Tajín del período Epiclásico*

El período Epiclásico en El Tajín, Veracruz, como en buena parte del litoral norte del Golfo de México, se encuentra marcado por una profunda transformación ideológica y por el surgimiento de una clase gobernante que habrá de exaltar los atributos propios de los guerreros. El Complejo Arquitectónico del Edificio de las Columnas, construido en el punto más alto del asentamiento, es la obra emblemática de un grupo de soberanos pertenecientes al linaje de 13 Conejo. Aunque debieron sucederse a todo lo largo del Epiclásico, hay dos de ellos –los últimos- cuyos actos de gobierno fueron celebrados en las columnas historiadas de los imponentes pórticos del Edificio de las Columnas. La ponencia explora la época en la que vivieron y se detiene para examinar con todo cuidado un ejemplo magnífico de arquitectura funeraria, el único que conocemos hasta ahora, que se relaciona directamente con estos tardíos señores de El Tajín y cuya excavación hemos concluido en fecha reciente.

[405] *Chair*

Pasqual, Kimberly [254] see Garcia, Damian

Pasqual, Theresa (University of New Mexico/Pueblo of Acoma)

[342] *Discussant*

Passalacqua, Nicholas [317] see Pilloud, Marin

Pasternak, Igor [31] see Yamin-Pasternak, Sveta

Pastrana, Alejandro (INAH)

[255] *¿Siluetas o excéntricos?*

A partir del estudio del proceso de elaboración de siluetas o excéntricos bifaciales y monofaciales teotihuacanos de las fases Tlamimilolpa y Xolalpan, elaborados en el yacimiento de obsidiana verde de La Sierra de Las Navajas, Hidalgo, se propone una clasificación preliminar morfológica y tecnológica de las siluetas o excéntricos. También se presentan los resultados de la reproducción experimental de las siluetas teotihuacanas.

Patch, Shawn [348] see Meeks, Scott

Patel, Sneh

[232] *Cuisine on the Harappan Frontier: Regional Cooking Vessels in Harappan Gujarat*

During the 3rd and 2nd millennium BCE, the western Indian state of Gujarat was home to a regional expression of Harappan culture known as the Sorath Harappans. This cultural group was composed of a network of farmers, herders, and craftsmen that subsisted on an economy based on cattle herding and the farming of summer crops. Unlike the core regions of the Harappan culture that relied on the cultivation of winter crops such as barley and wheat, archaeobotanical evidence from several Sorath Harappan sites in Gujarat revealed a preference for small seed cereals, primarily millets. Additionally, these settlements produced a distinctive corpus of ceramic vessels. This paper explores one subset of the Sorath ceramic assemblage: cooking and storage vessels. While there are parallels between classical Indus vessel forms and those of the Sorath Harappans, this class of vessels are wholly Sorath in character. This paper analyzes the macrostructural and microstructural aspects of these Sorath Harappan vessels in order to understand how two intertwined industries, agricultural and ceramic production, contributed to the local food culture.

[232] *Chair*

Pateman, Michael (Turks and Caicos National Museum) and William Keegan (Florida Museum of Natural History)

[37] *Lucayan Burials in the Bahama Archipelago*

The first archaeological evidence for the native peoples of the Bahama archipelago was found in dry caves, many of which were excavated for cave earth to fertilize agricultural fields. Human remains were found in some of these caves, but in such small numbers it was thought this could not have been the only location in which the Lucayans interred their dead. The use of SCUBA for pleasure and scientific purposes has led to a dramatic increase in the investigations of underwater caves, caverns and sink holes. As a result, human remains have increasingly been found throughout the archipelago leading to the assumption that the Lucayans buried their dead only in the caves (dry and submerged) throughout the Bahama Archipelago. However, recent discoveries in Long Island along with previous discoveries in Abaco and Middle Caicos have revealed burials in open-air environments. This presentation is an overview of all known burial sites in the Bahama Archipelago and gives an update on the analysis of these remains. We will also discuss the similarities and differences between dry cave, submerged and open-air burials. We conclude with some thoughts on the cultural significance on the various types of burials.

Pateman, Michael [37] see Snoeck, Christophe

Patrick, Shelby [188] see Ingram, Scott

Patterson, David [390] see Porter, Joshua

Patton, Katherine [87] see Blair, Susan

Patton, Katherine (University of Toronto)

[284] *Discussant*

Patton, Natalie [117] see Laurich, Megan

Pauketat, Timothy [348] see Hedman, Kristin

Pawlowicz, Leszek

[134] *3D or 2-1/2D? Comparing 3D Photogrammetry and Reflectance Transformation Imaging*

3D photogrammetry, creating digital 3D models using multiple photographs, has become a popular tool for documenting, analyzing and sharing archaeological artifacts and sites. In some cases, though, Reflectance Transformation Imaging (RTI) can be a useful complementary documentation/analysis technique, perhaps even superior for some artifacts and uses. RTI generates digital virtual lighting models of surfaces using multiple photographs taken at different lighting angles, which can be thought of as "2-1/2D" information. Examples of optimal use cases for each technique will be discussed and compared.

Paxton, Merideth

[304] *The New Year Pages of the Dresden Codex and the Concept of Co-essence*

The Dresden Codex is a Postclassic Maya document that is thought to have originated in the Yucatán Peninsula. The opossum figures in the panels at the tops of its section on the New Year (pages 25-28) are associated with the uayeb, the five nameless, unlucky days that mark the ends of the 365-day haabs. A glyph in the accompanying text, T572, was first read as the logograph WAY, a reference to the uayeb. Then, it became linked with T539 through study of such Classic period Southern Lowland monuments as Lintel 14 at Yaxchilán. This established that T539 is another logograph read as WAY (or UAY), with the meaning of co-essence. Thus, T572 came to be regarded as the codical variant of T539. Subsequent scholarly attention has focused on the latter sense, although the anthropomorphic opossums are now also described as naguals. The present research reexamines the symbolism underlying these invented creatures in the New Year pages and analyzes the use of T572 in that passage and in the general corpus of Maya hieroglyphic writing. I argue that co-essence is indeed the best classificatory term for the opossums and that the connection of T572 with the uayeb merits greater emphasis.

Payntar, Nicole [54] see Billman, Brian

Payntar, Nicole (University of Texas at Austin), Patrick Mullins (University of Pittsburgh and MOCHE, Inc.) and Brian Billman (UNC Chapel Hill and MOCHE, Inc.)

[271] *Moche Valley Ancient Settlement Survey (MVASS): Assessing Archaeological Heritage Destruction and Land-Use in Peru's Lower Moche Valley*

"I'm sure it's all gone by now...", these were the words of Dr. Michael Moseley, director of the Chan Chan-Moche Valley Project (CCMVP) from 1969-1974, in reference to the 420 archaeological sites that were originally registered in the lower portion of the Moche Valley. This statement highlights the need for a comprehensive regional study of archaeological heritage landscapes and land-use in Peru's Lower Moche Valley. The Moche Valley is unique in terms of the visual intersectionality of past and present landscapes, and the overlapping presence of nearly 2,000 years of urbanism and agricultural intensification represented by the Moche, Chimú, Inca, Spanish colonial, and modern built environments. However, the existence of these various heritage sites, and the knowledge gleaned from them, has been slowly undercut. Globalization, environmental disasters, urbanization, and a push to modernize Peru throughout the 20th century have resulted in today's contemporary land-use patterns and practices, as well as the destruction of (and damage to) thousands of archaeological sites. As part of the Moche Valley Ancient Settlement Survey (MVASS) project, a selection of CCMVP sites were systematically ground-truthed to assess archaeological heritage destruction on the landscape. This paper

presents the preliminary results of research conducted during the summer 2018 field season.

Paz, Dalia [71] see Lizama Aranda, Lilia

Pazmino, Audrey (Utah State University)

[209] *Technological Investment and Subsistence Strategy Flexibility within the Uinta Basin Fremont*

The Cub Creek area of Dinosaur National Monument has a Fremont occupation spanning from AD 300-1350 that shows variable reliance on maize agriculture depending on environmental conditions. Settlement data indicate a stable upland occupation throughout the sequence characterized by ~120 roasting features, but an intensive lowland pithouse occupation that lasted for only 300 years. Groundstone technology in these two settings is primary evidence of changing investments in maize agriculture. Upland occupations indicate maize stone boiling and expedient groundstone technology. In contrast, the lowland pithouse occupation yields formalized groundstone technology and ceramics. The shift in technological artifact suites during this period of intensification leads to the question: does increasing maize reliance drive investment in higher up-front-cost technologies with greater processing efficiency? I investigate these technological transitions by comparing the relative grinding surface areas of groundstone artifacts from the upland and lowland occupations within Cub Creek. I will determine whether there are discrete statistical differences in the processing efficiencies between the two technological suites and whether this transition corresponds with the local intensification pattern. Discrete technological transitions can illustrate changing reliance on wild and agricultural resources through time to formulate a broader picture of subsistence strategy flexibility practiced by the Fremont inhabitants.

Pazmiño, Estanislao [320] see Velasco Alban, Janny

Pazmiño, Estanislao

[350] *El Secuestro del "Tesoro de Huataviro": Cuando la Comunidad Manda*

En las últimas décadas se ha incrementado el interés de los arqueólogos por estrechar los vínculos con las comunidades locales. La participación de la comunidad adquiere cada vez más fuerza, y su voz empieza a tener un mayor espacio crítico sobre el rol que la arqueología juega en la sociedad. A pesar de ello, cabe también resaltar que, en los discursos que se manejan a nivel académico, generalmente, se visualiza a los arqueólogos como las personas que marcan los ejes de interacción con la comunidad. No obstante, en un hecho inusual ocurrido a mediados de 2009 podemos analizar un caso distinto. El descubrimiento de un rico ajuar funerario durante la apertura de una vía en la parroquia San Antonio de Ibarra, en el norte del Ecuador; propició un proceso de diálogo y negociaciones entre la comunidad del barrio Moras y el Instituto Nacional de Patrimonio Cultural. El presente trabajo expone un caso muy singular, en el cuál la comunidad local estableció mecanismos de presión a las entidades gubernamentales para propiciar una investigación arqueológica bajo sus propias condiciones.

Peacock, Evan [97] see Renson, Virginie

Pearson, John (Pima Community College) and Ashley D'Elia (Tierra Right Of Way Services, Ltd)

[125] *A Look at the Artifact Assemblage from the Dairy Site Marana, Arizona*

Pima Community College recently partnered with local cultural resource management firm, Tierra Right of Way Services, Ltd. to aid in a data recovery project involving the Dairy Site (AZ AA:12:285[ASM]). The Dairy Site is a prominent multi-component site in Marana, Arizona dating from the Agua Caliente Phase (A.D. 50-450) into the Canada del Oro Phase (A.D. 750-850). It was first recorded by the Arizona State Museum in 1982 and has since been the location for various data recovery and testing projects. Students assisted with the cleaning, analysis, and curation preparation of a wide variety of artifacts from the 5-month long excavation project. The professional laboratory work was an opportunity for Pima Community College students to process over 40,000 artifacts from an important archaeological site in the Tucson Basin. Artifacts include, but are not limited to, sherds, whole vessels and reconstructable vessels, ceramic figurines, lithic flakes and debitage, projectile points, ground stone effigies, manos, metates, censers, palettes, turquoise, shell, basketry remains, and charred organic remains. This poster will discuss the various artifacts, their relation to the Dairy Site, and their greater

importance in Southwest archaeology in the United States.

Peart, Daniel (The Ohio State University), Deanna Grimstead (The Ohio State University) and Catherine Mendel**[419] *There and Back Again: A Foragers-Farmers Model of Turkey Domestication (Part I)***

The human-domesticate relationship has long been a focus of archaeologists, and advances in archaeological science have revealed the dynamics of husbandry practices. But why domesticate? Evolutionary ecology suggests expanding human populations, depressed habitats, and the need to produce more food are potential reasons for adoption, but the timing, nature, and decision-making processes of this transition remain unclear. Focusing on the turkey (*Meleagris gallopavo*) we ask: why fodder, if hunting wild turkeys provides a comparable source of meat? Drawing on the central place foraging model, we hypothesize that distance of wild turkey procurement is an important factor in transitioning to domesticates. Results demonstrate that turkey hunting remains energetically profitable, even when round trip travel distances are ~100km, but the energetic cost required to provision domesticated turkeys are high. In order for the domesticated bird to produce net caloric gains that outweigh returns from hunting, only ~15% maize-foddering costs can be expended prior to slaughter at full body weight. This comparison suggests that domesticates should only be adopted when local and non-local habitats are extremely depleted, and/or non-caloric currencies are optimized. Ethnohistorical and ecological data are used to explore several currencies optimized during domestication.

Pechenkina, Kate [379] see Miller, Melanie

Peck, Katherine (University of New Mexico) and Michael W. Graves (University of New Mexico)**[408] *Soil and Water Management in the South Kohala Field System, Hawai'i Island***

The South Kohala Field System (SKFS), Hawai'i Island, is a network of contoured and sloping field borders first constructed in the prehistoric period but utilized into the 19th century. Many features are located below the 750 mm rainfall isohyet, the lower boundary for rainfed agriculture in Hawai'i. In order to sustain agriculture in this environment, Hawaiians built 'auwai (irrigation ditches) and modified existing drainages to make water accessible throughout the field system. This paper focuses on the portion of the SKFS located in the ahupua'a of Kawaihae 1 and 2, which contain a dense network of dryland features. Using geospatial and geoarchaeological methods, I analyze the distribution of features in, chronology of, and nutrient variability across the field system. These data are used to assess the sustainability of the SKFS from its initial phases of building through later periods of expansion. Additionally, we are partnering with the Kailapa Community Association, which includes members of the descendant community of Kawaihae 1. The KCA is currently planning for the restoration of agriculture into the dryland terraces. These historical data will assist the KCA in targeting areas of the field system that could be sustainably restored as rainfed or irrigated plots today.

Peck, Katherine [408] see West, Stephen

Pedersen-Guzman, Jeannine and Jason LaBelle (Colorado State University)**[89] *The Archaeological Repository of Colorado State University: Expanding Opportunities for Accessibility and Research***

Colorado State University is one of many universities and museums with extensive collections of archaeological material. Each institution has unique and noteworthy collections with material specific to the region and to the research interests of faculty and curators. The opportunities for research are abundant, as many collections remain untouched since original investigation. However, most researchers and students are unaware of the treasures that lie within our repositories. How do we increase the visibility and accessibility of these collections? How do we encourage future research? The Department of Anthropology at CSU recently began to address this issue. First, the Department hired an Archaeological Collections Coordinator to manage the organization, preservation, access, and outreach of their collections. Organization is key to accessibility and having a person dedicated to this task is crucial. The other piece to the puzzle is having a champion for the collection. Ideally, this champion (professor and/or curator) will have in-depth knowledge of the material, work in the region, and encourage others to use the collections. CSU is beginning to test this model and we will share our challenges and successes to date and highlight several of the research opportunities within our own collection.

Peebles, Giovanna

[297] *Discussant*

Peeples, Matthew [31] see Hegmon, Michelle

Peeples, Matthew (Arizona State University)

[188] *Chair*

Peixotto, Becca (American University)

[140] *Discussant*

Pelton, Spencer [80] see Newton, Cody

Pelton, Spencer (University of Wyoming) and Brigid Grund (University of Wyoming)

[329] *Hell Gap Versus High Plains: A Comparison of Site-Specific and Regional Paleoindian Chronologies*

In the 1960s, the Hell Gap site in eastern Wyoming produced at least eight archaeological cultural complexes that spanned almost the entire Paleoindian period, becoming the key chronological site for Plains Paleoindian archaeology and beyond. High resolution spatial and chronological data spanning this occupational sequence were collected over more than a decade of field investigations. Recent analysis of these data by Pelton resulted in the publication of an updated Paleoindian chronology for Hell Gap. In 2016-2018, using distinct methods, Grund independently produced a High Plains Paleoindian chronology by compiling, vetting, and synthesizing radiocarbon dates from the region. This poster reports the results of our joint effort to compare, contrast, and synthesize these two projects' results in terms of age, precision, age range, and other factors. We discuss the benefits and challenges of comparing site-specific and regional chronologies.

Peña, Jose L. [222] see Singletary, Jennifer

Peña, Jose L.

[236] *Los Casma del Sur: Interpreting Domestic Activities at the Southern border of the Casma Polity.*

The archaeological research conducted at the El Campanario site, located in Peru's Huarmey Valley, is oriented towards understanding Casma household production and consumption, which has resulted in the identification of various activities linked to pottery production, spinning, and food preparation. While El Campanario was occupied over different periods, absolute dating place the domestic areas between AD 1151 and 1280, which indicates the site's occupation during the Late Intermediate Period. Possible episodes of rainfall associated with El Niño could have caused the abandonment of these domestic areas at the site. The analysis of pottery sherds shows that the production of ceramic vessels occurred at the household level, whereby potters relied on local raw materials. The most common material in the manufacture of textile was cotton, which was locally produced; however, the presence of cotton-wool and wool textiles indicates the use of alternative materials and a possible long distant exchange with highland communities. Although, it is been argued that the Casma was a centralized state, data from El Campanario suggest that the inhabitants maintained their independence and probably created a separate cultural identity.

[236] *Chair*

Peña Rodríguez, Alberto [346] see Kita, Yuko

Penders, Thomas (Archaeologists for Autism)

- [119] *Archaeologists for Autism: 5 Years and Counting of Bringing Archaeology to Children and Young Adults on the Autism Spectrum*

The Archaeologists for Autism mission is to unlock the potential of children and young adults with autism spectrum disorders, and at the same time, we aim to provide children on the spectrum and their families with a chance to experience archaeology (as well as paleontology, history and Native American heritage) in a fun, low stress environment. We present the activities in a low stress/low stimuli environment specifically designed for children and young adults on the spectrum. The concept is to hold the events at known archaeological sites that are open to the public that have exhibits, museums or other features that can be incorporated into the activities. Across the site are stations consisting of activities, exhibits and/or vendors. In the past 5 years we have exposed 2095 individuals to archaeology who would not otherwise be afforded that opportunity.

Penfil, Rachael (University of Illinois at Chicago), Jo Osborn (University of Michigan) and Jacob Bongers (University of California Los Angeles)

- [287] *The Effect of Imperial Conquest on Regional Settlement Patterns: A Case Study from the Peruvian South Coast between ca. 1000–1532 CE*

Archaeological research clearly demonstrates that imperial expansions have significant effects on regional settlement patterns. One region where imperial conquests affected social life is the Peruvian south coast. During the Late Intermediate Period (LIP, ca. 1000–1450 CE), the region was controlled by localized polities such as the Chincha and Huarco. With the expansion of the Inka empire and the beginning of the Late Horizon (LH, ca. 1450–1532 CE), these local polities either submitted to Inka hegemony or were otherwise incorporated into the empire. This shift in power should be reflected in settlement patterns across the south coast as people dispersed, aggregated, or moved to adapt to life under Inka rule. While previous archaeological research in the region has traditionally focused on a single site or valley, this analysis casts a wider net in order to explore macro-regional patterns by synthesizing decades of survey data concerning the LIP and LH in the Cañete, Topará, Chincha, and Pisco Valleys. This exploration forms the foundation of a developing geospatial analysis that examines how and why settlement patterns on the south coast shifted after Inka expansion.

Penman, Shawn and Kari Schleher (Crow Canyon Archaeological Center)

- [257] *Theory and Anecdotes: A Student Retrospective of Ann F. Ramenofsky's New Mexico Research*

Ann F. Ramenofsky arrived in New Mexico in 1990 and in the following decades has influenced many careers. Beginning with her archaeological projects in the Upper Chama to her final archaeological research project at the Pueblo of San Marcos her insistence on methodological and intellectual rigor has contributed to undergraduate Honors Thesis, PhD dissertations and published works. While Dr. Ramenofsky's influence is obvious in these projects, what is not as well known is her light-hearted relationship with her students. This paper explores some of these unknown stories and events.

Perales, Manuel

- [18] *Where Are the Cinchecona? Mortuary Architecture and Socio-political Organization in Jauja, Peru, during the Late Intermediate Period*

The Late Intermediate period constitutes a time of important changes in the life of pre-colonial Andean societies, including new mechanisms for the construction of power and authority. In the case of the Yanamarca valley in Jauja, central highlands of Peru, previous investigations have indicated that its inhabitants organized themselves in weakly institutionalized and politically unstable chiefdoms, in spite of having large human agglomerations. In this sense, following recent approaches, this paper proposes that these human groups experienced alternative forms of complexity, of a corporate and stable nature, in which local leaders known in the written sources as cinchecona stood out. For this purpose, a study of the mortuary architecture present in sites of the region is developed, which usually has not been considered in the studies developed by other researchers.

Perdikaris, Sophia (University of Nebraska, Lincoln)**[159] Saladoid Dog Burials from the West Indies**

Across the Caribbean, there are numerous dog burials from the Saladoid period and they warrant a closer look as to their purpose and function. Dog remains have been found both as burials associated with human graves but also in refuse middens along with other archaeofauna from prehistoric meals. This paper will examine the dog remains from the French Antilles and Barbuda, West Indies focusing on the multifaceted place of dogs in the Saladoid society from a zooarchaeological perspective.

[31] Discussant

Perdikaris, Sophia [159] see Grouard, Sandrine

Pereira, Grégory [81] see Elliott, Michelle

Pereira, Telmo [403] see Zinsious, Brandon

Pereira Furquim, Laura [404] see Shock, Myrtle

Peres, Tanya [34] see Neusius, Sarah

Peres, Tanya (Florida State University)**[415] Making Archaic Snaileries out of Shell Heaps: Human Behaviors and Ecological Niches**

Global evidence for human consumption and management of gastropods predates the Neolithic Revolution - the period noted for independent experimentation and domestication of terrestrial plants and animals. Archaeological data indicates that gastropods, terrestrial and aquatic, were vital resources for Holocene human communities. This phenomenon is not limited to one region. The consumption of aquatic snails is documented from archaeological sites in Mesoamerica, Japan, and China, while the consumption of land snails is well-documented in the Iberian Peninsula, circum-Mediterranean area, Africa, and North and South America. These studies show the temporal depth and spatial breadth of humans' knowledge of, and interaction with, different species of snails. Along interior rivers of the American Southeast, evidence for the exploitation of freshwater gastropods (small game) appear in archaeological sites dating from approximately 7000 to 1000 cal BC. We bring together multiple lines of data to test the hypothesis that the freshwater gastropod deposits (snaileries) along the Cumberland River in the American Southeast were the outcome of human behaviors that ultimately resulted in the construction of ecological niches favorable for humans and snails.

[171] Chair**Perez, Daniel (University of Nevada, Las Vegas)****[151] Substance and Subsistence: A Use-Wear Analysis on Ground Stone from the Virgin Branch Puebloan Region**

Archaeological investigations pertaining to the upland zone of the Virgin Branch Puebloan region—namely, the Colorado Plateaus—have historically been limited in both number and scope. Recent expeditions to various sites on the Grand Canyon-Parashant National Monument, however, have helped expand the archaeological record of the area—contributing a greater depth of knowledge concerning Virgin Branch Puebloan culture occupation of the area in late prehistory. The framework for the present study comprises excavation data from recent expeditions to several sites on the Shivwits Plateau of northern Arizona, conducted by the University of Nevada, Las Vegas from 2012 to 2014. This paper presents a use-wear analysis on ground stone recovered from four Pueblo-period habitation sites (To'tsa, Bart, Lava Ridge, and Coyote). Both use-wear analysis results and provenience information frame a discussion on implications of this study on Virgin Branch Puebloan subsistence, economy, and potential exchange relationships during the Pueblo II-III periods.

[151] Chair

Perez, Douglas [113] see Cooper, Zachary

Perez, Griselda [339] see Navarro-Farr, Olivia

Perez, Henry [219] see Clarke, Mary

Pérez, Juan Carlos [410] see Eppich, Keith

Pérez, Juan Carlos [410] see Marken, Damien

Pérez, Kelita [182] see Osborn, Jo

Pérez, Kelita [182] see Weinberg, Camille

Perez, Liliana [128] see Seuru, Samuel

Pérez, Francisco [146] see Ponce, Jocelyne

Pérez, Lourdes [159] see Valcárcel Rojas, Roberto

Pérez, Ventura (University of Massachusetts Amherst)**[317] Toward a Bioarchaeology of Social Change: Moving Beyond the Myth of Scientific Neutrality**

In his article, *Bioarchaeology as Anthropology* (2003:27), George Armelagos noted that, “scientists’ perceptions of their discipline clearly influence how they frame their research agenda.” This paper will illustrate how all such agendas are politicized. To engage with violence in the past from the safety of your labs and computer screens is nothing more than to tell a fable with the hopes that it might be true and heard by others in their labs in front of their screens. Violence is visceral and real. Why should a mother who wails about her child’s brains being sprayed across her body care about the abstraction of our discipline? We must confront the myth that the science of bioarchaeology can be apolitical. We must move beyond being engaged intellectuals in the public sphere. We must recognize that, until our work affects policy, we are, at best, intellectual distractions and, at worst, self-serving academic elites. Doing this work requires confidence in our possibilities. Enough self-preoccupation. The possibilities for bioarchaeology are greater than what we are doing. This paper explores the current and future possibilities of a bioarchaeology that can affect social change.

Perez Calderon, Ismael [250] see Isbell, William

Pérez Castellano, Nora A. [68] see Rodas, Diana

Perez Rodriguez, Veronica (University at Albany, SUNY)

[58] *Sustainable Urbanism in the Mixteca Alta: Was There Ever Such a Thing?*

Researchers that study pre-Hispanic urbanism in the Mixteca Alta often remark that the region today is eroded and sparsely populated. Places that in the past supported urban populations in the tens of thousands today seem to struggle to sustain a few hundred. Some have called this the Mixtec paradox. Research on the early city of Cerro Jazmín has reconstructed the settlement's history of occupation (300 BC-AD 300), depopulation (AD 300-1300), and later reoccupation (AD 1300-1500). A geomorphic survey of the area surrounding Cerro Jazmín identified a well-developed soil horizon dating to AD 1100 and we initially thought that it was the result of successful land management from the city's Classic and Early Postclassic-period population (AD 300-1100). Recent excavations have revealed that the population of Cerro Jazmín decreased after AD 300 and it remained that way until AD 1300, thus suggesting that the soil horizon was perhaps the result of the area's depopulation. Was Cerro Jazmín ever a sustainable settlement? As we work to identify successful, ancient land use practices that might provide current Mixtec communities with ideas on how their lands can again sustain thousands, we use a localized approach to make our research relevant.

[197] *Discussant*

[197] *Chair*

Perez Rodriguez, Veronica [197] see Gonzales, Alicia

Perez Rodriguez, Veronica [307] see Martínez Tuñón, Antonio

Pérez Roldán, Gilberto [39] see O'Neil, Megan

Perkins, Jeremiah (Wichita State University), Cambria Haley (Wichita State University) and David Klamann (Wichita State University)

[112] *The Cooperative Future of Archaeology and 3D Terrestrial Scanning*

Over the past two summers at the archaeological excavation of Etzanoa we used a Leica P40 scanner to create 3-D models of the excavation units. The accuracy of the measurements is + 1 mm. It is possible to take measurements of features and object from the model. The scanner has some limitations for recording deep excavations, and a novel method for overcoming them is discussed.

Perreault, Charles [247] see Paige, Jonathan

Perreault, Charles (Arizona State University)

[247] *A Macroarchaeology Approach: How Can Archaeology Make Novel and Useful Contributions to Evolutionary Theory?*

The quality of the archaeological record limits the range of evolutionary research questions archaeologists can ask. The Extended Evolutionary Synthesis mostly describes micro-scale phenomena that unfold at the hierarchical level of the individual and over very short time scales. This means that most of these processes are underdetermined by the archaeological record, with its resolution and sampling intervals that are typically in the order of 10²-10³ years. Archaeologists can overcome these limitations and make novel and useful contributions to evolutionary theory and behavioral sciences in general by replacing the search for micro-scale phenomena with a search for macro-scale patterns in the global archaeological record. Macro-scale processes operate at a hierarchical level well above that of the individual. They cannot be seen within the span of a human lifetime but become visible when looked from an observation window thousands of years long and thousands of kilometers wide. The archaeological record has the scope necessary to detect macro-scale phenomena because it can provide samples that are large enough to cancel out the noise generated by micro-scale examples. Here I lay out what a macroarchaeology program looks like and provide examples of the approach.

Perri, Angela (Durham University)**[368] Stark Variation: New Insights into Dire Wolves and Their Interactions with Humans**

Dire wolves are an iconic extinct Pleistocene species in the Americas and their interactions with humans at Paleoindian sites has been largely unknown. Here we explore potential interactions between dire wolves and Paleoindians at sites in the San Pedro Valley, Arizona. We also present new radiocarbon dates and the results of our ancient DNA analysis, which reveals a surprising phylogeny for dire wolves. We discuss what this taxonomy may mean for dire wolf paleoecology in the Americas and their interactions with newly-arrived human hunters.

[368] Chair

Perri, Angela [397] see Beasley, Melanie

Perrone, Alyssa and Metin Eren (Kent State University)**[67] How Much Force Does It Take to Break a Flaked Stone Tool?**

Endscrapers are a common flaked stone tool found at Late Pleistocene sites around the world. Microwear evidence has demonstrated that these implements are predominantly used for hide-scraping. However, these small, round, often bullet-like specimens are also found broken. Here, using controlled and actualistic experiments we explore the forces necessary to break hafted and un-hafted endscrapers. These results will have implications for endscraper use, curation, and discard.

Perry, David [262] see Maki, David

Perry, Jennifer (CSU Channel Islands) and Mikael Fauvelle (University of California, San Diego)**[70] Inter-island Material Conveyance and Exchange on California's Channel Islands**

Most discussions of exchange relating to California's eight Channel Islands have been framed in terms of island-mainland interactions, of which the Chumash people of the four northern islands have been the primary focus. Less consideration has been given to the Tongva of the four southern islands as well as inter-island and intra-island networks throughout the archipelago. Inter-island and intra-island studies of material conveyance allow us to evaluate this topic more holistically, by being inclusive of both the Chumash and Tongva as well as the roles that smaller islands, such as Santa Barbara Island, and more marginal environments have played in supporting permanent populations on the larger islands. We consider the inter-island distribution of major lithic materials and artifact types throughout the Channel Islands because of their durability, desirability through time, and sourcing possibilities, with emphasis placed on evidence of material conveyance between the southern islands. The distribution and type of non-local objects, which includes ceremonial ones such as stone effigies and pipes, also allows for a fuller consideration of ritual and value-added items as facilitators, products, and archaeological evidence of inter-island and intra-island interaction.

Perry, Megan [9] see Long, Madison

Perry, Megan (East Carolina University)**[317] Uniting the Archaeological Body: The Bioarchaeological Investigation of Human Remains and Mortuary Behaviors**

Bioarchaeology has the unique power to deeply investigate mortuary space not only to identify lived experiences from human remains but also to illuminate elements of mortuary ritual. However, these two aspects of bioarchaeology still remain conceptually separated: one is biological and the other socio-cultural, one is scientific and the other theoretical, one is lab-based, the other is field-based. To move the discipline forward, scholars need to unite these two halves of the archaeological body through recognizing their dual role as arenas for expressing social identity, economic status, commemoration, and the reality of death. This paper explores how the human body and the mortuary context share biological, representational, and material foundations (Sofaer 2006) and how an integrated investigation of the material

nature of the corpse and behaviors associated with its treatment generate a multifaceted, nuanced view of ancient communities and their social and cultural processes.

Perry, Megan [391] see Edwards, Emily

Perry, Richard

[395] *Public Archaeology as a Gateway towards a Revisionist History*

Government archeologists work in geographic areas that are associated with their agency's mission and projects. By law, the government agency's archeologist is required to consider all cultural entities that may be adversely affected by the project. This permits a more objective approach to the use of archeology as a tool that provides information that can correct the historical record and identify the cultural identity and contributions of ethnic groups that are often overlooked or are dismissed as being irrelevant. Such use of archaeological data can then facilitate the formulation of historical justice on behalf of the disenfranchised. Two examples of historical justice being addressed as a result of federal construction projects are the focus of this paper. The examples are the well-publicized colonial era African burial ground that was excavated during earth-moving activities for a General Services Administration government building in Manhattan, and the Mexican Potters of the Rincon Townsite in Riverside County, California that was excavated for the expansion of Prado Dam on the Santa Ana River.

Person, Dylan (University of Nevada, Las Vegas)

[346] *The Flow of Lithic Production: Debitage Analysis in the Mogollon Highlands, AD550-1000*

The Late Pithouse Period (AD550-1000) was a time of significant material development and social change in the Mogollon region of southwestern New Mexico. Intensive research has been devoted to explaining these changes. These approaches have resulted in a wealth of data concerning architecture, site layout, ceramic design, and incipient hierarchical social structures. What has not been examined in detail are lithic debitage assemblages. This is due to the difficulties inherent in applying non-functionalist theoretical lenses to lithic technologies as well as the minimal stylistic expression commonly seen in expedient lithic artifacts. In this paper I present analysis results from two Mogollon pithouse sites, the Harris Village (LA1867) and the La Gila Encantada site (LA113467). I synthesize this data taking into account regional stone sources, production methods, and differential material use in lithic technological systems. These lines of inquiry provide behavioral inferences about Mogollon debitage patterns and their implications for regional technological identity.

Perteet, Brenna [360] see Brady, James

PESAS, [248] see Misarti, Nicole

Pestle, William J. [55] see Pinder, Danielle

Peter, Duane (DP Heritage Consulting)

[139] *Discussant*

Péter, Réka [126] see Cruz, Heleinna

Peters, Ann (University of Pennsylvania Museum)

[76] *Tools Present and Tools Absent in Textile-Intensive Mortuary Contexts: The Paracas Case*

In most of the world ancient fabrics are not preserved, though much can be learned about garment systems, surface design and production techniques through tools, accessories and contemporary imagery. The Andean desert coast and mortuary traditions provide extraordinary conditions for textile preservation, but we have much to learn about how they were made. Women's burials from Inka and other late prehistoric contexts frequently include baskets of spindles and llama bone picks,

but loom parts and tools for non-loomed techniques are seldom preserved. Some 1500 years earlier, distinct mortuary traditions from Ocuaje and the Paracas site (c. 250 BCE – 150 CE) include and exclude different types of textile tools, reminding us that mortuary ritual is a locus of norms and choices quite distinct from the practices of daily life. The textiles included in each mortuary tradition provide a different sphere of information, as their forms imply the presence of tools that are yet to be recovered or identified, as well as a complex chain of materials, practices and relationships of production. Replication studies open paths for further research on the techniques and processes that create both textiles and social networks.

Peterson, Kateea [121] see Blatt, Samantha

Peterson, Marcia [297] see Pierce, Greg

Peterson, Ryan, Alex Badillo (Indiana State University), Joshua Meyers (IUPUI) and Jeremy Wilson (IUPUI)

[72] *The Bethel Cemetery Relocation Project: Academic Collaboration, Archaeological Science, and CRM*

The Bethel Cemetery project combined the best of what the CRM and University communities have to offer, while documenting, exhuming, and relocating over 500 graves from a 19th century cemetery in Indianapolis, IN on an aggressive schedule. Over 30 professionals from the University of Indianapolis and IUPUI were employed by Cardno to execute the field work given faculty and students' expertise in photogrammetry, bioarchaeology, and human osteology. Structure from motion (SfM) photogrammetry was utilized to document a majority of the burials once exposed via standard excavation practices, resulting in highly accurate documentation, improved efficiency over traditional field mapping techniques, and research-quality, three-dimensional models. Subsequently, the two universities collaborated to complete the osteological analysis of the human remains. Beyond the report that is in preparation, at least four master's theses will be produced, and the compiled photogrammetry and osteological databases will allow for further research for years to come. The protocols developed have allowed for more in-depth research and technological benefit than is the norm for CRM projects. Meanwhile, the relationships established and techniques developed will last well beyond the current project and provide a multitude of benefits for all stakeholders moving forward.

Peterson, Staffan [155] see Strezewski, Michael

Petraglia, Michael

[368] *Interactions between Hominins and Mammalian Faunas in Southern Asia*

As early humans and Homo sapiens migrated out of Africa, they encountered diverse communities of mammalian faunas in Asia. Here we document hominin migrations out of Africa over the last 500,000 years, discussing the degree to which humans interacted with faunas in Arabia and South Asia. Climate change seems to be the primary reason for the demise of mammalian faunas in Arabia, while in South Asia, there is broad continuity of faunas over the last 200,000 years, despite sophisticated hunting abilities and increases in human population sizes. The implications of these findings are discussed relative to mammalian species expansions, contractions and extinctions.

Petrík, Jan [298] see Hill, David

Petrou, Eleni [312] see Kopperl, Robert

Pevny, Charlotte [325] see Smallwood, Ashley

Pezzarossi, Guido [336] see Olesch, Dana

Pezzuti, Florencia (Colorado State University), Naomi Brandenfels (Colorado State University-CEMML/USACE) and Austin Pratt (Student Conservation Association)

[211] Willamette Valley Project: Recreating the Landscape of the Willamette Valley through GIS Mapping of Historic Documents

The Willamette Valley Projects (WVP) has been partnering with Colorado State University Center for Environmental Management of Military Lands (CEMML) to create a GIS database of historic properties on the WVP lands, which include the Willamette River Basin 13 dams and their associated lakes or reservoirs. Existing USACE documentation exists from all phases of dam construction through design drawings, dam construction photos, historic aerial imagery, real estate transactions, relocation contracts, and microfiche documents. This data was provided to CSU for georeferencing and digitizing to create a GIS database of historic properties in the WVP. While the individual files can be helpful, compiling them in GIS allows for greater analysis and a further understanding of their relevance to other data, such as LiDAR and elevation to assess impacts to historic resources. As the information is digitized, field visits check the accuracy of the GIS data and confirm the presence of additional historic sites. The most helpful data were pre-dam aerial imagery, engineered drawings of road and railroad relocations, and proposed reservoir clearing maps. In addition to discovering historic features, the GIS data identifies areas that have been heavily disturbed, which assists with environmental and cultural consultations for future projects.

Phelps, Danielle (University of Arizona)

[52] The Spatial Distribution of Late Eighteenth Dynasty Tombs in the Valley of the Kings, Egypt

The Valley of the Kings was the royal necropolis of the New Kingdom in ancient Egypt. The types of tombs found in the Valley include the larger royal tombs, small-chambered tombs, and pit tombs. It is suggested that the location of the small-chambered tombs in the Valley followed the tradition set forth during the Old and Middle Kingdoms when smaller tombs were located next to larger more substantial royal tombs. Evidence also suggests that the early kings of the Eighteenth Dynasty created their own family necropolis inside of the Valley of the Kings. Tutankhamun, the antepenultimate ruler of the Eighteenth Dynasty (c. 1550-1290 BCE), was buried in a repurposed small-chambered tomb (KV 62). KV 62 is also part of collection of small-chambered tombs that all date to the post-Amarna Period. Through the application of Geographic Information Systems, this paper will investigate the spatial distribution of the post-Amarna Period tombs to determine if they follow the earlier precedence of creating a family necropolis within the Valley of the Kings and if one larger royal tomb may have joined the others together. This paper will provide insight into the mortuary ritual landscape of the late Eighteenth Dynasty.

[52] Chair

Phillips, David (Maxwell Museum of Anthropology), Karen Armstrong (Maxwell Museum of Anthropology) and Karen Price (Maxwell Museum of Anthropology)

[25] Rescuing Collections from Us: The Tijeras Pueblo Story

Most of the archaeological collections from Tijeras Pueblo were submitted to the Maxwell Museum of Anthropology, University of New Mexico. As was typical at the time, the collections were stored in a warehouse, using non-archival materials, with only minimal records about what was stored where. Beginning in 2004 a massive effort, driven mostly by volunteer labor, led to the complete reorganization of the Tijeras Pueblo collections at the museum, and storage in a vastly improved space. This effort resulted in renewed research on Tijeras Pueblo, along with other public benefits. The history of the Tijeras Pueblo collections is a reminder that the project isn't completed until the collections are actively cared for and ready for use.

[296] Discussant

Phillips, Emily (University of Cincinnati)

[261] Investigating the Spatial and Behavioral Factors that Influence Regional Lithic Assemblage Variability

Lithic scatters are commonly the most abundant site type recorded in regional archaeological surveys. Paradoxically, lithic scatters are widely considered typologically homogeneous and are typically classified as limited-activity sites. These practices have contributed to the view that lithic scatters are of limited research value in understanding the origins and formation histories of regional archaeological records. To illustrate their unappreciated interpretive potential, I report the results of recent lithic-scatter investigations in the Upper Basin of northern Arizona, which have revealed significant inter-

site differences in assemblage composition (ratios of debitage, tools, and cores), formal variability of debitage assemblages (measured by maximum flake area), and artifact density. In addition, I explore the hypothesis that masonry-structure proximity influenced lithic-scatter variability. By analyzing differences in the aforementioned variables between lithic scatters and masonry structures, I anticipate, for example, that higher proportions of unifacially retouched pieces will occur at masonry structures, whereas assemblage-level values of maximum flake area will decrease in lithic scatters that are located at increasingly greater distances from the nearest masonry structure. Overall, the goal of this project is to showcase an unbiased approach that incorporates the lithic scatter in regional models of technological production and assemblage formation.

Phillips, Laura and Erin Younger**[312] Making Voices Heard: Archaeology as Community Engagement**

In the Pacific Northwest today, the professional expectation is that archaeology and community are, or at least should be, intertwined. While collaboration and cooperation are not always easy, past projects spearheaded by Dr. Julie Stein, curator and now executive director, at the Burke Museum of Natural History and Culture in Seattle, highlight the importance of establishing long-term relationships. For over 25 years, these projects provide examples of commitment to public outreach, tribal oversight and collaborative exhibitions to connect archaeological insights with community knowledge.

Phillips, Lori (Washington State University), Erin Thornton (Washington State University) and Eleanor Harrison-Buck (University of New Hampshire)**[370] Testing the Efficacy of Sulfur Isotopes from the Maya Site of Chulub**

Stable isotope analysis of carbon ($^{13}\text{C}/^{12}\text{C}$) and nitrogen ($^{15}\text{N}/^{14}\text{N}$) are often used to reconstruct ancient Maya diets. While these two isotopes provide us with a broad understanding of past subsistence practices, carbon and nitrogen are limited in their ability to differentiate freshwater and terrestrial based diets. Similar problems exist in other areas of the world and sulfur ($^{34}\text{S}/^{32}\text{S}$) stable isotopes have shown promise in separating the two. To determine the feasibility of this isotope's use in the Maya region, we tested the carbon, nitrogen, and sulfur composition of terrestrial and freshwater animal remains from the Classic to Postclassic (AD 800-1200) transitional site of Chulub, Belize. This site provides the ideal setting for testing sulfur's utility because of its location within the Western Lagoon Wetlands, which provides a wide assortment of terrestrial and freshwater species that were available to the ancient Maya.

Phillips, Lori [419] see Fladeboe, Randee

Phillips, Susan (Pitzer College)**[157] Radical Stratigraphy: A Century of Los Angeles Graffiti**

For the past 100 years, an alternative written record has been tied to the underbelly of Los Angeles' built environment. The urban infrastructure of railroads, bridges, storm drain tunnels, harbors, and paved rivers houses a vernacular history inscribed mostly on concrete with rocks, chalk, charcoal, pencil, and sometimes railroad tar. Combining elements of ethnography and archaeology, my work examines several phenomenological aspects of graffiti: its deeply sited nature, its radical condensation, and its indexical tie to absent authors. As Los Angeles' urban landscapes developed over the course of a century, groups as diverse as hobos, children, gay men, and blue collar workers have used graffiti to craft a radical stratigraphy that upends conventional ways of writing history. As illicit material representations, graffiti marks cement ties between landscape, cultural memory, and social life. A new point of theoretical transfer between archaeology and cultural anthropology, the analysis of graffiti provides new fodder for the archaeological turn within anthropology (Dawdy 2010), and for continued attention to the excavation of the present and recent past (González-Ruibal 2008). Graffiti creates alternative narratives about chronology and categorization, and about how people create knowledge in place.

Phipps, Elena, Lucy Commoner (Cooper Hewitt Smithsonian National Design Museum) and Nobuko Shibayama (Metropolitan Museum of Art)

[39] *Viscacha or Rabbit, Peru or Mexico: Fiber Identification and Cultural Clarification in the Investigation of a 16th C. Colonial Latin American Textile*

Long distance trade of precious materials such as *Spondylus* shell or turquoise took place in the Precolumbian world. However, at the same time, the associations between particularly local materials and their long-term cultural significance formed the material foundations of early cultures. In the present study, understanding the cultural patterns of use, the environmental preconditions for species identification, dye analysis and fiber morphology though microscopy enabled the attribution of the origin of a rare early colonial textile from the Americas through collaborative efforts of curators, conservators and museum scientists.

Phon, Kaseka [27] see Kealhofer, Lisa

Picard, Taylor [41] see Roldan, Jonathan

Picard, Taylor (Humboldt State University) and Marisol Cortes-Rincon (Humboldt State University)

[115] *Prehistoric Weapon Perimortem Damage Documentation*

In the 2016 – 2017 academic year a Humboldt State University Anthropology Graduate Student recreated a macuahuitl, a wooden club with obsidian blades, and used it on two pig heads for a use-wear analysis of the obsidian. The pig heads were partially de-fleshed and frozen to be added to the university's zooarchaeology collection. This allowed for the opportunity for documentation of damage by a prehistoric weapon in a controlled environment. To date, there is not a comparative database that catalogs the damage to bone of ancient remains caused by prehistoric weapons. This prevents archaeologists from determining with certainty the weapon that was used at, or near, the time of death from ancient remains. By using the damaged remains of experiments that involved reconstructions of prehistoric weapons, this project examines the possibility of creating a database of perimortem damage by prehistoric weapons based on region and culture.

Picas, Mathieu (University of Barcelona) and Margarita Diaz-Andreu (ICREA/University of Barcelona)

[105] *Local Interpretations about Maya Pre-Hispanic Heritage: The Case of Tulum*

Cultural heritage is a social construction that allows groups of different character to appropriate culturally or politically ancient sites by attaching symbolism to them. In Mexico, the use by the state of archaeological remains for the construction of a homogeneous national identity has been marked by the management of many sites since the late 1930s. The official discourse on these sites emphasizes scientific research and promotes cultural tourism on the basis of historic and aesthetic values. This discourse contrasts with the local uses of the archaeological remains, a use that is underscored by social and sacred values. This presentation will focus on Pre-Hispanic structures, locally known as *múulo'ob* or mounds. The *múulo'ob* are considered by the local Maya to be the dwelling places of supernatural entities such as guardians and ancestors whom are considerate to the owners of the land. The Maya's territoriality includes, therefore, a particular connection to the remains which is reflected in the agricultural cycle, social practices, and oral tradition. We will explore different ways of local communities' interaction with archaeological sites in central Quintana Roo paying particular attention to the alternative values that they raise, especially in the case of the archaeological site of Tulum.

Pickering, Evelyn [8] see Soza, Danielle

Pickering, Robert [185] see King, Jason

Pickering, Robyn [32] see Wilkins, Jayne

Pierce, Daniel [152] see Gilstrap, William

Pierce, Daniel (University of Missouri Research Reactor)

[407] An Empirical Analysis of Highland-Lowland Interaction in the Aztatlán Tradition

The Aztatlán tradition constituted the primary economic and cultural development during the Early/Middle Postclassic (AD 900-1350) in west Mexico. Though politically decentralized, this culture was rooted on the Pacific coastal plain and featured vast trade networks. Located 100 km inland, the Etzatlán Basin is the westernmost lake basin in the Jalisco altiplano. This area likely played a critical role in the movement of goods throughout the Aztatlán network, despite being peripheral to the cultural core. Through these mercantile relationships, the transmission of Aztatlán cultural concepts likely overlapped with existing local traditions, thus creating cultural affinity while retaining a measure of sociopolitical and economic autonomy. Most Aztatlán scholarship has focused on the characterization of Aztatlán culture, yet the specifics of regional interactions have rarely been empirically addressed. In this study, geochemical analyses reveal that Etzatlán-area obsidian was a key lithic resource in coastal economies. Geospatial analyses also indicate that the most cost efficient pathways from the coast to central Mexico align with multiple Etzatlán sites. Even within the Etzatlán Basin, differential access to these networks is evident in obsidian production and usage patterns between sites. These results demonstrate the importance of obsidian networks in the expansion of the Aztatlán culture.

Pierce, Greg (Office of the Wyoming State Archaeologist), Marieka Arksey (Office of the Wyoming State Archaeologist) and Marcia Peterson (Office of the Wyoming State Archaeologist)

[297] Outreach, Education, and Archaeological Collections: Public Archaeology at the Office of the Wyoming State Archaeologist

The Office of the Wyoming State Archaeologist (OWSA) has become increasingly focused on implementing public outreach initiatives to more effectively engage Wyoming's citizenry in archaeological investigations and collections care. Our office manages the University of Wyoming Archaeological Repository, and the incorporation of our educational collection in our outreach efforts have had a demonstrable impact on our ability to more effectively engage with interested publics.

Archaeological investigations benefit from the inclusion of a wide range of stakeholders in the identification, investigation, interpretation, and preservation of these resources. As a public agency conducting archaeology, it is incumbent upon us to include interested individuals in the archaeological process; more effectively connecting participants to their local history and shared cultural heritage. The active inclusion of a wide range of individuals in the archaeological process serves to make our office, the work we do, and the archaeological record more relevant in today's world. This paper will highlight recent public outreach initiatives undertaken by OWSA including archaeology fairs, a program involving high school students in archaeological digs, and a new Avocational Archaeology Training Program, and discuss the challenges and benefits of each.

Pierce, Greg [411] see Arksey, Marieka

Pierson, Arielle [168] see Kassabaum, Megan

Pietruszewsky, Michael [29] see Ikebara-Quebral, Rona

Piezonka, Henny (Christian Albrechts University Kiel, Germany), Olga Poshekhanova (Tyumen Scientific Center, Russia), Vladimir Adaev (Tyumen Scientific Center, Russia) and Aleksey Rud (Ekaterinburg)

[154] Earth House, Chum and Reindeer Shed: Ethnoarchaeological Research on Household and Settlement Organization of Mobile Hunter-Fisher-Reindeer Herders in Western Siberia

The Taz Selkup are a Siberian indigenous group of hunters, fishers and reindeer herders in the northern taiga between Ob' and Yenisei. In the 17th and 18th centuries they have migrated north from Tomsk region, and in the new territory have preserved their nomadic ways until today. The adaptation to the new environment and its effects on material and immaterial

culture, language and self-perception are of great interest from an anthropological point of view. Ethnoarchaeological research of a Russian-German team among the Taz Selkup investigates the effects of that migration into the new environment on material and immaterial, and the archaeological visibility of these processes, with special attention to the effects of the uptake of reindeer husbandry into the lifeways. Fieldwork focuses on temporary settlements, shedding light on patterns of site location, dwelling types and the interconnections with the requirements of a subsistence economy including the seasonal cycle of reindeer keeping. By comparing ethnographic information and excavation results from winter earth houses, conical tents (chums) and lighter rectangular tent structure, detailed insights into household organization, material patters and their archaeological foot print are gained. Special systematic attention is paid to what cannot be seen with archaeological methods.

Pigott, Michelle (Tulane University) and Christopher Rodning (Tulane University)

[239] *Archaeology of Ritual in Cherokee Towns of the Southern Appalachians*

Ritual and ceremonialism were important domains of practice through which Cherokee peoples of the southern Appalachians maintained cultural identities during the aftermath of European contact in the Americas, and through which Cherokee towns responded to the opportunities and challenges associated with European exploration, colonization, trade, diplomacy, and violence. Written accounts and maps associated with Spanish exploration and English trading activities offer clues about Cherokee town locations, and basic characteristics of Cherokee economy, political organization, social dynamics, and religion. Written accounts of Cherokee oral tradition, as recorded in the 1700s and 1800s, also lend insight into Cherokee religion and ritual. This paper relates these forms of ethnohistoric evidence to archaeological evidence about earthen mounds, public architecture and cycles of building and rebuilding public structures known as townhouses, production and circulation of marine shell beads and pendants with engraved iconography, mortuary practices, and smoking, including smoking associated with calumet ceremonialism.

Pigott, Michelle [414] see Brewer, Katherine

Pigott, Vincent C. (University of Pennsylvania Museum)

[27] *The Technology of Metallurgy and Evolving Views of Its Development in Prehistoric Thailand*

In the archaeology of prehistoric Thailand, the sub-field of archaeometallurgy has undergone numerous changes in established perceptions, both anthropologically and technologically. This paper introduces the Symposium and overviews recent shifts that characterize how metallurgy in Thailand has come to be understood today. These shifts include evidence that copper-based metallurgy appeared in the late 2nd millennium BCE and that large-scale copper mining and massive production proceeded over subsequent centuries at the community level at a cluster of settlements centered in the ore-rich Khao Wong Prachan Valley, in sites excavated by the Thailand Archaeometallurgy Project(TAP). Smelting may have been carried out by kin-related groups that practiced their craft aggregated closely with other such groups. At these sites there are few markers of an elite-focused control of the local industry that, it is argued, developed within a heterarchical, socio-political context with only sparse evidence of emerging social complexity until later prehistory. Analytical evidence supports the premise that Valley products, copper ingots, and other goods (e.g. shell bangles) were being distributed widely along established exchange networks. Thus, this production center offers an example of how metallurgical developments can be understood elsewhere in MSEA.

[27] *Chair*

Pike, Matthew [205] see Krus, Anthony

Pilaar Birch, Suzanne [48] see Veres, Matthew

Pilaar Birch, Suzanne (University of Georgia)

[365] *Spatial and Temporal Diversity in Stable Isotope Studies of Archaeological Material*

While identifying and defining diversity in material culture studies, bioarchaeological assemblages, and site distribution has long been de rigueur, the advent and development of stable isotope analysis in archaeology since the publication of

Leonard & Jones' seminal 1989 volume provides yet another layer of complexity in archaeological interpretation. This paper reviews some of the primary developments in stable isotope analysis in archaeology over the last 30 years, and considers the role of this technique in advancing our understanding of variability both across space and through time in coupled human-natural systems, whether the context be the Old World Paleolithic or North American Paleoindian.

Pilaar Birch, Suzanne [368] see Madrigal, T. Cregg

Pilides, Despo [387] see Herrmann, Nicholas

Pilkington, Dusty [66] see Walton, Lauren

Pilles, Peter [21] see Neff, Linda

Pilles, Peter

[36] Roasting Pit Mounds of the Verde Valley, Central Arizona: New Implications for Yavapai/Apache Archaeology

Excavations in the Verde Valley of central Arizona have documented the use of roasting pits for food processing from Archaic to modern times. The most obvious evidence for this can be seen in the large mounds of burned earth and fire-cracked rocks that dot the Valley. Over 90 such mounds have been recorded, but only a few have been excavated. These large mounds are attributed to the Yavapai and Apache, primarily for the processing of agave, and indicate a different technology and associated social behavior than that of the Valley's earlier inhabitants, the Sinagua. Sinagua roasting pits are much smaller, and indicate limited use by a small number of people. Yavapai /Apache roasting pits are much larger and represent industrial-size processing by larger social groups over much longer time spans. C-14 dates from recent excavations challenge current interpretations of when the Yavapai/Apache are recognized in the Valley and their relationship with the Sinagua. This paper will summarize the results of these excavations and implications for understanding the late prehistoric period in the Verde Valley.

Pilloud, Marin [142] see Schwitalla, Al

Pilloud, Marin and Nicholas Passalacqua (Western Carolina University)

[317] Ethics, Professionalism, and Qualifications in Bioarchaeology and Forensic Anthropology

Bioarchaeology and forensic anthropology both primarily deal with the analysis of human skeletal remains and employ similar methods for osteological analysis. However, over the past several decades, both subfields have become increasingly specialized with unique procedural and analytical goals. This divergence means that training in one subfield does not translate to competency in the other. Bioarchaeology requires a thorough understanding of both biocultural adaptation and archaeological theory, in addition to archaeological methods and data. Forensic anthropology on the other hand, requires extensive knowledge of laboratory procedures, accreditation, proper case documentation, legal standards (e.g., Daubert), expert witness testimony, and how to navigate within the medicolegal system.

We have argued elsewhere (Passalacqua and Pilloud 2018) that working outside one's expertise is unprofessional and can extend to a breach of ethics. It is therefore important to identify qualifications of both subfields to ensure that practitioners are working as ethical professionals; yet currently, there is little guidance on what qualifies someone to practice bioarchaeology or forensic anthropology. This presentation will outline the current qualifications for forensic anthropology, and suggest future directions for both fields in order to establish a set of qualifications for the professional practice of each discipline.

Pillsbury, Joanne [363] see Boswell, Alicia

Piña Calva, Maribel [71] see Sanchez, Pedro

Pinder, Danielle (Department of Anthropology, University of Miami), Francisco Gallardo (Pontificia Universidad Católica de Chile), Gloria Cabello (Pontificia Universidad Católica de Chile), Christina Torres-Rouff (University of California, Merced) and William J. Pestle (Department of Anthropology, University of Miami)

[55] *An Isotopic Study of Dietary Diversity in Formative Period Ancachi, Atacama Desert, Northern Chile*

Stable isotope analysis has been used to reconstruct the dietary patterns of individuals recovered from archaeological sites. Given the centrality of food to human social interaction, dietary insights provide a window into the inner-workings of past societies. In the present instance, stable isotope analysis, when coupled with multi-source mixture modeling, permits an enhanced understanding of the economic and social relationships that bound together Formative Period (1000 BC - AD 400) populations and individuals in northern Chile's Atacama Desert. This work specifically focuses on 29 individuals recovered near the modern town of Quillagua at the cemetery of Ancachi (02QU175). This cemetery is associated with a logistical settlement on the Loa River at a frontier between coastal and inland/highland populations during the Formative Period. We present here a reconstruction of the dietary variation in the Ancachi individuals obtained by isotopic composition analysis of bone collagen and hydroxyapatite. These data were compared with a robust database of available foods, contemporary individuals from throughout the region, and the exceptional preservation of the hyper arid Atacama. Ultimately, the results speak to the ways in which economic exchange promoted the development of new diets and lifeways during a time of burgeoning economic, social, and cultural change.

Pinhasi, Ron [253] see Sirak, Kendra

Pino, Mariela [315] see Hayashida, Frances

Pino, Paul

[62] *Discussant*

Pinson, Ariane (U.S. Army Corps of Engineers)

[257] *What Unit Is a Degree?*

Upon receiving your doctorate, you are expected to become a contributing member of your field, as an academic or as a professional. But what kind of unit is a "field" and what use is a degree in a particular field if you never participate in that field? In this paper I explore the ways in which studying and working with Dr. Ann Ramenofsky and others at UNM in pursuit of my doctorate in Archaeology has contributed to my professional success in diverse fields outside of Archaeology. Along the way I explore the value of a holistic degree as a complement to focused technical degrees in project planning and execution, and highlight the importance of the doctoral degree as a "knowledge creation license".

Pinta, Elie (Université Paris 1 Panthéon-Sorbonne / UMR 8096)

[91] *Norse Exploitation of Wooden Resources in North America: Determining Wood Provenance Using Isotopic Analysis*

From historic sources we know the inhabitants of the North Atlantic islands relied on importations of timber from Northern Europe in order to supplement their resource deficit. In the case of the Greenland Settlements, we know Norse Greenlanders organized expeditions to North American shores where they acquired timber and other items. It is likely that a certain amount of wooden materials used in the Greenland Settlements came from the forested areas of Markland and Vinland. Isotopic analysis has proven useful in archaeology for sourcing materials such as bones, textiles, or metal objects. The success of isotopic studies depends on the principle that variation in environmental conditions (i.e., the proportions of elemental isotopes present in the soil, air, and water) becomes engrained in the composition of natural resources that humans either ingest or harvest for use. Previous studies have illustrated that strontium (Sr) isotopes can be used to determine the provenance of wooden materials. The potential for assigning provenance to wooden artifacts using isotopic analysis, therefore, is high and can provide us with the data necessary to differentiate among artifacts crafted in similar environments or production areas, and to establish their provenance based on modern reference samples of known origin.

[138] *Moderator*

[91] *Chair*

Pinta, Elie [251] see Harmsen, Hans

Pinto, Samuel [103] see Diaz Garcia, Mauricio

Piscitelli, Matthew (The Field Museum)

[181] *No Hearth, No Problem: A Multidisciplinary Exploration of Ceremonial Architecture at Two Late Preceramic Sites in the Norte Chico Region*

Multi-elemental analytical techniques like X-Ray Fluorescence have been employed to determine the use of space through residues left behind from human activities. In addition, methodologies primarily used in other disciplines such as pollen analysis or micromorphology can illuminate the archaeological record in ways that traditional methods cannot. This paper presents the results of innovative analytical techniques used to identify and analyze small-scale ceremonial architecture at the Late Preceramic sites of Huaricanga and Caballete in the Fortaleza Valley of Peru. The results of this project allow us to reconstruct the ritual practices that took place within these ancient structures and shed light on an early form of South American religion.

Pitblado, Bonnie (University of Oklahoma)

[80] *24 Years Down & 24 to Go: Lessons Learned and New Research Directions for the Gunnison Basin (CO)-based Rocky Mountain Paleoindian Research Program*

From 1999 to 2013, members of the Rocky Mountain Paleoindian Research Program (RMPRP) conducted extensive survey and numerous test excavations of very ancient sites in the Gunnison Basin, southwestern Colorado. During that period, researchers learned much about the timing of initial human use of the Basin and how land-use changed between the first human forays into the region ca. 11,000 rcybp and the onset of the Archaic era ca. 8,000 rcybp. After a several-year hiatus to tie up research loose ends and to synthesize what the team learned in its initial two-dozen years of research, RMPRP personnel are preparing now to return to the field in summer 2019. This paper summarizes archaeological questions answered in its first two dozen years of work, then pivots to outline the many new questions that have arisen in that same time period—questions that will drive RMPRP field research going forward.

[343] *Moderator*

[1] *Discussant*

Pitezel, Todd [84] see Searcy, Michael

Pitezel, Todd (University of Arizona) and Michael Searcy (Brigham Young University)

[296] *An Evaluation of Type Definitions for Viejo Period Red-on-brown Pottery*

We recently began a long-term research program focused on identifying and excavating Viejo Period settlements in the near vicinity of the massive, latter Medio Period settlement known as Paquimé (ca. A.D. 12-1450) in Chihuahua, Mexico. We have located previously unrecorded Viejo sites and completed limited excavation at one of them. A persistent difficulty during this early endeavor has been identification of red-on-brown painted sherds to typological definitions as described by Charles Di Peso and his colleagues. We contend that the published type descriptions are not effective for identifying sherds at the type level. At this time, we have simply categorized Viejo painted sherds as "red-on-brown." Moreover, as we and others have discussed, the Viejo period phase designations are flawed. Researchers should be cognizant of these deficiencies when contemplating the roots of Paquimé.

Piven, Alix (Utah State University) and Elizabeth Lynch (University of Wyoming)

[329] *Hell Gap in 3D: Visualizing the Past on the Great Plains*

Research at Hell Gap has incorporated a number of technological innovations since investigations began at the site in the early 1960s. Recent advances in digital techniques have spurred the rise of digital documentation and analysis in the field. Low-cost yet high-quality photogrammetric softwares such as Agisoft Photoscan have become powerful, non-invasive tools for data collection and presentation. This poster presents the rise of digital data collection at Hell Gap and the methodology used to create 3D models based on in situ artifacts and faunal remains. The scope of digital documentation at Hell Gap aims to explore the ways photogrammetric modeling and 3D imaging can be integrated into analytical techniques and in fostering public engagement.

Plank, Shannon [100] see Hutson, Scott

Platt, Sarah [34] see Reitz, Elizabeth

Platt, Sarah (Syracuse University)

[362] *Artifact Boxes and Cans of Worms; Navigating the 87 Church Street Legacy Collections*

The collections excavated in the 1970s at 87 Church Street in downtown Charleston, South Carolina play a crucial role as part of a repertoire of sites deployed to understand Charleston as a critical urban center and waypoint in the eighteenth-century American southeast. However, a full site report does not exist for these early excavations, and research remains unfinished nearly fifty years later. Although archaeologist Elaine Herold and her volunteers carefully counted and meticulously labeled each artifact with provenience information, they then cataloged and curated the collection by class and type. Along with its sheer size, this classification decision renders the collection exceedingly difficult to use in modern context-based systems of analysis. Through her dissertation the author has returned to these collections with new research questions. In the process of opening long sealed artifact boxes and revisiting old catalog cards new strategies and quick, often unexpected, pivots in approach were required to make sense of this large and frequently unwieldy collection. The result was a process not unlike the challenges of any field excavation. This paper considers these challenges, and demonstrates that with the right sets of strategies and questions old collections can produce exceedingly valuable new insights.

Plattner, Paige and Meradeth Snow (University of Montana)

[253] *Ancient DNA Analysis of Orton Quarry*

The Orton Quarry site is a Late Prehistoric ossuary along the coast of Lake Erie in Pennsylvania. In March 1991, heavy-equipment operators accidentally destroyed a majority of the site before archeologists arrived. Since the excavation very little had been published on the Orton Quarry site, its importance or its original inhabitants. One of the primary objectives of this project is to change that. By extracting and analyzing the mtDNA using the Dabney et al. (2013) protocol and standard aDNA contamination avoidance protocol, we have obtained valuable data on the site's genetic ancestry. Ancient DNA from the seven samples were isolated and amplified for the hypervariable region of the mtDNA mitogenome. Following this, the whole mitogenome for the individuals ($n=7$). Haplogroups were assigned and the resulting sequences were compared to a relevant dataset from the surrounding region to gauge population relatedness and shared derived mutations. Despite the small sample size, comparing the data from these individuals through haplogroup and haplotype data from the Great Lakes region, this research has expanded our knowledge of the Orton Quarry Ossuary, the genetic data for the Great Lakes region as well as grown our genetic understanding of ancient mitochondrial DNA in North America.

Platz, Lorelei [191] see Dennett, Carrie

Platz, Lorelei and Carrie Dennett

[298] *Pre-Columbian Pottery Production in Greater Nicoya: A Cross-Regional Analysis*

Spanning northwest Costa Rica and the Isthmus of Rivas in Pacific Nicaragua, the Greater Nicoya archaeological region has been historically interpreted as a cohesive language and culture area ('primordially' Chibchan but shifting to

Mesoamerican post-AD 800). Since the 1980s, however, researchers have begun to increasingly challenge this long-presumed 'cultural cohesion.' Ongoing analytical reconstruction and refinement of pre-Columbian ceramic economy in Greater Nicoya continues to validate this challenge, suggesting instead that Pacific Nicaraguan potters participated in a sphere of cultural practices and traditions distinct from potting communities in neighbouring Costa Rica. Through the lens of ceramic petrography, we seek to demonstrate the different sociocultural attitudes and normative strategies related to resource procurement, paste preparation techniques, technological innovation, and the transmission of technology and tradition across time and space. Two temporally distinct case studies are reviewed that highlight cross-regional differences in Greater Nicoya including the import, manufacture, distribution and consumption of Usulután-style negative resist wares from approximately AD 1 to 500 and later white-slipped 'Nicoya Polychrome' styles from roughly AD 800-1300. These case studies show the power of ceramic petrography to refine complementary analytical techniques (INAA), articulate pre-Columbian potting practices, and inform archaeologists on socioculturally charged aspects of the broader ceramic economy.

Plavsic, Senka [42] see Dakovic, Gligor

Plekhanov, Daniel (Brown University) and Evan Levine (Brown University)

[35] *Defining Suitability in Mixed Pastoral-Agricultural Societies: A Case Study from Bactria in Northern Afghanistan*

This paper explores the concept of suitability as a guiding parameter for applications of the Ideal Free/Despotic Distribution (IFD/IDD) in cases of mixed pastoral and agricultural economies. We briefly review recent archaeological survey data and research from Central Asia to contextualize how pastoral societies intersect and complement agricultural societies and discuss how suitability can be generally defined for a region and time period given the different requirements and environmental constraints of these different subsistence strategies. While pastoralism is inherently a more mobile and less archaeological visible lifestyle, recent research has demonstrated the interdependencies between pastoralist and agricultural societies, such that suitability parameters of agricultural settlements may be influenced by parameters necessary for pastoral strategies. Drawing on legacy diachronic survey data from ancient Bactria, located in Central Asia, we consider the efficacy of a singular definition of suitability for explaining shifts in settlement pattern occurring across various periods of sociopolitical control and organization. We conclude that agriculturally-relevant parameters alone fail to sufficiently model changes in settlement pattern, as predicted by the IFD/IDD, and proxies of suitability must take into consideration parameters relevant to pastoralism as well.

Plekhanov, Daniel [387] see Gosner, Linda

Plew, Mark (Boise State University) and Louisa Daggers (University of Guyana)

[26] *Moving Beyond: Using Methods of Assessing Holocene Environmental Change in Northwestern Guyana*

To assess Holocene dietary changes we conducted isotopic analysis of human and faunal remains from seven shell mounds in Northwestern Guyana. We used stable carbon 13C and oxygen 18O isotope compositions data to assess the degree of dietary constancy as a proxy for determining the likelihood of there being any significant changes in the Archaic/Holocene environment that would have influenced resources in the Northwest. Using 13C and 18O data, we have demonstrated some degree of constancy in the availability of C3 plants during the past several thousand years—though we note an increasing reliance on such plants beginning in the Early Holocene. We also document warming intervals during the Early Holocene which appear to correlate with dry periods known elsewhere in the central Amazon during this period. While our data support long-term perpetuation of what may be thought of as relatively modern forest conditions, we conclude that in at least the Early Holocene there may have been more open canopy—a condition that may well have seen prehistoric peoples moving to a range of seasonally available resources.

Plog, Stephen [153] see George, Richard

Pluckhahn, Thomas (University South Florida), Victor Thompson (University of Georgia), Isabelle Lulewicz (University of Georgia), Trevor Duke (University of Florida) and Matthew Compton (Georgia Southern University)

[70] *Selfish for Shellfish, or Magnanimous about Mollusks? The Transformation of Cooperation across the First Millennium CE at Crystal River and Roberts Island, Florida, USA*

Blanton and Fargher (2016) critique evolutionary theorists for the assumption that cooperation was a single evolutionary hurdle; even if our species overcame such an obstacle in our distant evolutionary development, it is simplistic to assume that cooperation and collective action have been unchanged around the world over the last 100,000 or more years. Too little attention has been devoted to how cooperation and collective action may change under particular ecological and historical circumstances. Recent research at the Crystal River and Roberts Island sites, on the Gulf Coast of peninsular Florida, suggests changes in the scale and intensity of cooperation in subsistence production over the first millennium CE, as reflected in faunal remains (including oxygen isotope studies of shellfish) and subsistence technology. Specifically, in early phases, the scale of cooperation may have been broad in terms of the number of people or productive groups integrated, but the intensity of cooperation in subsistence endeavors was probably relatively limited. Later, there appears to have been a reduction in the social scale of cooperation, but productive groups began cooperating more intensively.

Plumer-Moodie, Hannah (University of Sheffield) and Katherine Miller Wolf (Indiana University East)

[30] *Bioarchaeology in the Northern Three Rivers Region of Belize: Teaching and Research Trajectories in a Bioarchaeological Field School*

As archaeologists have long recognized, the research on human skeletal remains by bioarchaeologists and physical anthropologists provides invaluable information on individual and population histories. The sample of 250 human skeletal remains, currently curated at the Maya Research Program (MRP) facilities in Northern Belize, is a font of data about life in the Three Rivers Region from 250-1000 CE. A collection of this size allows for various research questions to be asked on a larger scale than is typical in much of the Maya Lowlands. This paper will showcase the MRP collection and data derived from it by the authors and students enrolled in the MRP annual bioarchaeological field school. Projects include paleodemography, health and disease, biological affinity within single and multiple mortuary contexts, metric analyses, social status, migration, social organization, and conservation. Special attention will be paid to current and future research trajectories in relationship to the ethics and practice of teaching a field school on extant prehistoric remains.

Plumer-Moodie, Hannah [398] see Leonard, Jessica

Pluskowski, Aleks (Department of Archaeology, University of Reading, UK), Guillermo García-Contreras Ruiz (Departamento de Historia Medieval y Ciencias y Téc), Michelle Alexander (Department of Archaeology, University of York), Rowena Banerjea (Department of Archaeology, University of Reading) and Marcos García-García (Departamento de Historia Medieval y Ciencias y Téc)

[310] *(Re)Conquests: Creating New Societies at the Frontiers of the Medieval Western Mediterranean*

This paper introduces the key questions of the “Landscapes of (Re)Conquest” research programme which is investigating the character of frontier societies in the medieval SW Mediterranean in the context of multiple conquests and regime changes. How did conquering authorities deal with the creation of multicultural societies in these frontiers, how did they relate to central authorities and how did conquered communities respond to the imposition of new political and social norms? Our approach is multi-disciplinary and multi-scalar, focusing on the dynamics of biocultural landscapes.

Pniewski, Joseph [269] see Knudsen, Garrett

Pohl, John [28] see Longman, Darren

Pohl, John (UCLA) and Michael Mathiowetz (Independent Scholar)

[314] *Pacific Coastal Exchange in Postclassic Mexico: Wealth, Rituals, Feasts, and Marriages*

The pioneering fieldwork of Seler, Lumholtz, Saville, Sauer, Vaillant and Elkholm, the Sociedad Mexicana de Antropología to officially recognize “Mixteca-Puebla” as the fourth and last major cultural horizon of the ancient Mexican World in 1945.

By 1960 however, H.B. Nicholson had reduced Mixteca-Puebla to a provincial artistic phenomena spread through Aztec imperial domination. Attractive as this proposal has been to "big" society theorists in Mesoamerica, it has in reality always created more problems than it solved by grossly simplifying the critical role played by the peoples of the Pacific Coast in building the transregional economy on which the Aztec empire was ultimately predicated. We will focus upon a number of significant organizational characteristics including decentralized political systems, the introduction of a new wealth finance economy, and religious ritualism that were shared between the Eastern Nahua, Mixtec, Zapotec, Aztec, and the Casas Grandes traditions.

Pohl, Mary (Florida State University), J. M. Adovasio (Senator John Heinz History Center Pittsburgh, PA) and Christopher von Nagy (University of Nevada-Reno)

[222] A Fabric-Impressed Potsherd from San Andrés, Tabasco, Mexico

Despite over a century of intense research, little has been published on the non-durable technology of the Olmecs. This is due to the "tyranny" of preservation, which strongly biases the archaeological record in most areas toward durable artifacts. Recent analysis of a probably accidentally impressed potsherd from San Andrés, within the urban polity of La Venta, indicates the production of at least one type of finely woven textile/basketry and suggests the existence of a highly sophisticated Olmec textile/basketry industry, based in part on the cultivation of cotton. The technology of the impressed specimen is presented, and the possible implications of this analysis are elaborated.

Poirier, Marcella (Purdue University)

[223] Decolonizing the Past & Education: Expanding the Classroom and Using Archaeology to Transform the Way History Is Taught. Chavín De Huántar – Perú: A Case Example

Representations of the past outside of academia are based--to a certain degree--on archaeological or historical investigations; however, they are often outdated and/or manipulated. This has the worrisome ability to disenfranchise Indigenous peoples from their history. As public archaeologists that critique and study knowledge production and consumption from archaeological work, it is our responsibility to create and ensure responsible education outreach. My research explores different ways archaeologists can effectively engage in decolonized educational projects in communities living near archaeological sites. During my 12-month research in Perú, I collaborated with archaeologists, educators, and community members to co-teach a Summer Camp for elementary school children in Chavín de Huántar. We expanded the classroom by taking them to the archaeological site and museum, engaging with these locations in different ways, as well as exploring different archaeological artifacts such as ceramics, bones, and musical instruments. We also provided children with lessons from the past--not typically addressed--such as the environment and humans' impact on it, gender, oral histories, and folk stories. In this paper I will discuss this Summer Camp and the lessons learned. In addition, I will provide suggestions for engaging with local communities in archaeological and historical education efforts.

Poister, Nick [381] see McCrackan, Jennifer

Polacek, Lumir [386] see Veleminská, Jana

Polk, Harding (Bureau of Indian Affairs)

[264] Dendrochronology of Historic Structures Associated with the Acequia de San Jose de la Cienega in San Fidel, NM

A grant was secured from the New Mexico Archaeological Council to conduct dendrochronological studies of a number of structures near the village of San Fidel, New Mexico. Dendrochronological samples were obtained from a breeched and abandoned reservoir dam, a partially standing abandoned adobe residence, and an occupied adobe residence. Cut dates were determined from the samples from the dam and the occupied residence. The data from this research is being used to help support precedence dates in the adjudication of water rights for the Acequia de San Jose de la Cienega, the agricultural irrigation ditch that serves the San Fidel community.

Polkowski, Paweł (Poznan Archaeological Museum)**[52] Rock Art Research in Dakhleh Oasis, Egypt: Content, Methods, and Interpretations**

Situated some 350 km from the Nile Valley, Dakhleh Oasis is considered one of the largest rock art complexes in Egypt. The petroglyphs found there were executed in various periods, beginning from the Early Holocene, through Pharaonic times, towards modernity. Often being located in the same areas, they constitute large palimpsests witnessing a long history of the Oasis. In shaping its landscape rock art production has always played an important role. In this paper I describe some of the research questions raised by the ongoing scientific project of the Petroglyph Unit. Basing on fieldwork conducted in the central part of the Oasis, distribution of various rock art traditions and categories will be presented and analyzed with respect to the ancient routes crossing the area, their landscape setting, and their potential functions and significance. I also touch upon the problem of palimpsestic nature of Dakhleh rock art which can be manifested in frequent superimpositions. In this respect, particularly important are these panels which contain prehistoric depictions covered by or juxtaposed with Pharaonic imagery. Appropriation of older petroglyphs and their re-interpretation may indicate an idea of intentional transformation of landscape in post-prehistoric era.

Pollack, David [419] see Manzano, Bruce

Pollock, Susan**[200] The House Next Door**

The attention devoted to households and houses in archaeology over the last few decades has brought with it a welcome emphasis on small-scale domestic practices and the rhythms of daily life. But houses are not only constructed and lived in – they are also abandoned and reused in various ways. I will focus on these latter aspects, drawing on recent excavations at the small, early Chalcolithic site of Monjukli Depe in southern Turkmenistan. The site is characterized by a dense sequence of domestic architecture that reveals remarkable similarities in plan and layout but also an array of abandonment and post-occupation uses of houses that speak to the practices of those still living “next door.”

Polonio, Tania [154] see Garcia, Arnau

Pompei, Maria de la Paz [248] see Gil, Adolfo

Ponce, Jocelyne (Tulane University) and Francisco Pérez (Universidad del Valle de Guatemala)**[146] El Jobillo Settlement Cluster: A Classic Maya Neighborhood?**

Some significant social and spatial units of organization and analysis include neighborhoods, wards and zones. These intermediate scale units are important to understand Maya social organization and integration, especially in dispersed or sparsely populated regions such as La Corona's in northwest Petén, Guatemala. This paper assesses criteria regarding the identification of such units in the archaeological record. Results of spatial analysis, testing and excavations of architecture are used to determine the role of the settlement cluster of El Jobillo, located 3 km from La Corona. Its role as a potential neighborhood and its social significance within a broader regional context are assessed and considered significant to contribute to understanding the varied degrees of social integration within Classic Maya society and the relationship that populations had with political authority.

Ponomarenko, Elena [320] see Vyazov, Leonid

Pontbriand, Kate [49] see Kelley, Alice R.

Pontieri, Kyle [390] see Egeland, Charles P.

Ponton, Nydia (Temple University)**[418] The Use of Primary Sources in Plantation Archaeology: The Case Study of Hacienda La Esperanza**

Research at Hacienda La Esperanza, a nineteenth century sugar plantation in the municipality of Manatí, Puerto Rico, was conducted to study the material culture of its enslaved population and document their unwritten experiences. The use of primary sources proved indispensable during the early research design stages of the project. First, 19th century property maps and court proceedings were used to select loci within the property that were later surveyed using ground penetrating radar. Results of the GPR study were crucial in the identification of a trash midden that served as the basis for the material culture analysis. Furthermore, population census and court proceedings also provided valuable information that aided in the interpretation of the artifacts and the experiences of the enslaved.

Pool, Christopher (University of Kentucky)**[230] Discussant**

Pool, Marilen [41] see Bisulca, Christina

Pool, Michael (Austin Community College)**[260] Fauna at the HO Bar Site: A Mogollon Early Pithouse Period Site**

At the HO-Bar Site, identifiable faunal bones are very low given the almost 30 cubic meters excavated in 1979. Indeed, most of the faunal remains are fragments (ratio of 3.0 grams of fragments to 1.0 gram NISP). The species and NISP will be presented, and there will be discussion of why there are so many fragments.

Pop, Cornel (Max Planck Institute for Evolutionary Anthropology; Columbia College)**[92] Lithics3D: An R Package for Lithic Analysis**

An increasing number of studies are demonstrating the advantages and potential of 3D data acquisition and analysis techniques for documenting and understanding drivers of morphological variability in lithic assemblages. Applications of 3D geometric morphometrics, for instance, are challenging and refining traditional classifications and promise to open new windows into artifact life histories. More broadly, 3D scans document the full geometry of artifacts and allow for potentially automated (and hence fully replicable) quantification of important aspects of variability that have heretofore been impractical or impossible to measure or document manually with meaningful precision and/or low inter-observer error. Notwithstanding the advantages of 3D techniques, however, they come at the cost of substantially increased complexity and added expense, and there is a distinct lack of publicly available software designed specifically to work with 3D lithic data, limiting applications. This presentation introduces Lithics3D, an open-source R package for automatic and semi-automatic processing and analysis of 3D lithic scans, highlighting its potential applications and future development directions. The package is the result of an ongoing effort that has already been successfully applied in a series of publications. The main high-level features include automatic surface segmentation, artifact orientation, edge angle measurements, thickness mapping, and more.

Pope, Carly**[407] A Ceramic Analysis of Coconut Walk Unslipped and Its Implications for Late Classic Maya Salt Production in Coastal Belize**

During the Late Classic period, ca. 600-900 AD, there is evidence for industrial-scale salt production and export of salt from small coastal sites in Belize to the larger inland Maya centers. The mechanisms and processes involved in this brief but intense period of production are yet poorly understood, particularly with regard to ancient technologies at work. Coconut Walk unslipped ceramics, a pottery type with a wide distribution and far-flung analogous types along the coast, are thought to have been used in this salt production. Geochemical and petrographic analyses of 58 Coconut Walk unslipped sherds from three sites – Marco Gonzalez and Santa Cruz on Ambergris Cay, and Watson's Island at Colson Point, in the Stann Creek district – have provided new data concerning the provenance and technology of this complex process. This study

indicates that this pottery is the result of an expedient, locally-produced technology. In defining both this ceramic category and delineating petrographic groups, quartz has been integral. Mono- and polycrystalline quartz from different geological sources has been identified within CWU pastes, and can provide data concerning the production, function, and technology of these vessels.

Pope, Melody

[136] *Glenn A. Black and the Lessons of Big Site/Big Science Archaeology*

Large-scale excavations in the first half of the 20th century, like those conducted by Glenn Black at Angel Mounds, were a means to deliver archaeology from its antiquarian roots to legitimate scientific practice. Though this transformation led to innovative methods, amassed collections of unprecedented size and scale, and created foundational knowledge, the past and peoples who occupied it became increasingly objectified, sins we struggle with today in arenas of NAGPRA, curation, and archaeological practice. How does archaeology on such an expansive scale remove from history the very people whose past lives and places it interrogated and memorialized in a national historic landmark? Were other social inequities set in motion through labor relations and institutional politics by early large-scale archaeology projects and their legacies? Would discourse and archaeological practice today be different had this big site/big science approach been more inclusive and sensitive to tribal concerns? Through correspondence, institutional papers, and field records, this paper explores these questions in order to offer solutions to ways archaeologists and tribal groups can come to terms with the unintended consequences of past archaeologies and mediate present challenges.

Porcic, Marko [363] see Radivojevic, Miljana

Porter, Douglas [85] see Guebard, Matthew

Porter, Douglas [380] see Williams, Katharine

Porter, Douglas (University of Vermont), Angelyn Bass (University of New Mexico), Michael Spiide (University of New Mexico), Katharine Williams (University of New Mexico) and Noreen Fritz (National Park Service)

[380] *Cedar Mesa Architecture: Analysis of Earthen Mortars, Decorated Plasters, and an Intact Wood Roof at Bare Ladder Ruin, Natural Bridges National Monument, Utah*

People of the southwestern United States traditionally used earthen materials for building and architectural embellishment. Examples include pointing stone and earthen unit masonry; layering floors and roofs; fabricating architectural features such as mealng bins, fire hearths, and nichos, and; plastering surfaces to protect them from weather and as a ground for painted and incised designs. Though these mortars and plasters differ in terms of material components and the contexts in which they were used, they share characteristics that provide evidence about how materials were selected, processed, and applied. This presentation focuses on the characterization of ancient earthen plasters and mortars in Structure 14 at Bare Ladder Ruin, which was constructed and used between c.1142 -1216. Our analysis, conducted through the University of New Mexico's Department of Anthropology, the Institute for Meteoritics, and the Colorado Plateau Cooperative Ecosystems Study Unit, clearly supports the idea that materials for earthen construction were specifically selected and then modified to suit the unique site conditions and physical properties required for specific architectural uses. In addition, we will discuss the construction and structural analysis of the intact wood-framed roof on the Mesa Verde-style kiva, and how the analysis informed our recommendations for its long-term preservation.

Porter, Joshua (The George Washington University), Maryse Biernat (School of Human Evolution and Social Change, Arizo), W. Andrew Barr (Center for the Advanced Study of Human Paleobiology), David Patterson (Center for the Advanced Study of Human Paleobiology) and David Braun (Center for the Advanced Study of Human Paleobiology)

[390] *Carbon Enamel Isotopes as Proxy for Dietary Changes in the Omo-Turkana Basin between 2 and 1.4 Ma*

Despite the numerous hominin fossils found in the Omo-Turkana Basin dating to between 2.0 and 1.4 Ma., a resolved understanding of their dietary ecology has been challenging due to limited research on similar patterns in contemporaneous large mammals. In this study, we use a sample (n = 390) of enamel $\delta^{13}\text{C}$ values of six Bovidae, Suidae, and Equidae taxa as proxies of their diets. We focused on hyper-grazing taxa due to the highly specific dietary niche. These samples were

assigned locational classifications based on their relationship to the reconstructed depositional center of the basin during this period. Based on their spatial relationship with the center of the Basin, fossils from Ileret, Koobi Fora, and West Turkana were designated as axial, while those from Karari are referred to as marginal. Between 1.87 and 1.56 Ma, Alcelaphine bovids and Metridiochoerus in the margin have more depleted $\delta^{13}\text{C}$ values compared to the axis. These depleted values indicate that margin was likely less conducive towards C4 vegetation despite the elevated indicators of C4 plants in the axial regions of our analyses. Further $\delta^{13}\text{C}$ studies of the basin would provide a more nuanced understanding of the relationship between paleogeography and heterogeneity within the broader paleoecosystem.

Porter, Samantha [114] see Rodriguez Osorio, Daniel

Portman, Katherine and Kelsey Reese (University of Notre Dame)

[259] First Impressions of the Mesa Verde North Escarpment

The Mesa Verde region in southwestern Colorado has been intensively surveyed and excavated over the past century, resulting in the identification of over 4,000 archaeological sites on the Mesa Verde cuesta and over 5,000 sites in the Great Sage Plain to its north. Directly abutting the northern cliff face of the Mesa Verde cuesta lays the Mesa Verde North Escarpment, a series of talus slopes that extend from the cuesta down into the valley below. Despite the thorough research history of this area's surrounding regions and its location in what was the most densely populated portion of the prehistoric northern Southwest, the Mesa Verde North Escarpment itself has been relatively ignored. In the summer of 2018, we began a systematic study of the extent of Ancestral Pueblo occupation on the escarpment using drone imaging and pedestrian survey in conjunction with the BLM Tres Rios Field Office. This poster presents the results of that fieldwork effort, offers preliminary occupation estimates through time, and considers the implications of these results for future fieldwork efforts.

Poshekhanova, Olga [154] see Piezonka, Henny

Poss, Jane [350] see Cossin, Zev

Post, Stephen

[367] Reappraisal of Evidence for the Pueblo Revolt Village Located in the Villa of Santa Fe, 1680 to 1697

For one hundred years archaeologists and historians have speculated about the location, size, and layout of the Pueblo Revolt village built on top of the Palace of the Governors following the expulsion of Spanish colonists and priests from New Mexico in August 1680. Few researchers have integrated archaeological data into their hypothetical models. This omission has resulted in a lack of concordance between their models and what is known about Puebloan building conventions from that time. The approach in my presentation integrates excavation data from the Palace of the Governors, historical accounts by Spanish observers, Puebloan scholar interpretations of Spanish accounts, and excavation data from Puebloan villages in the Galisteo Basin where Spanish missions were established prior to the Pueblo Revolt. Using these cross-cultural and cross-disciplinary data sources, I evaluate previous hypothetical models for the Pueblo Revolt village, and then present two alternative models. Finally, I consider the level of coordinated effort and organization required to build and populate the village in light of the Pan-Pueblo phenomena that exemplified that seventeen-year period.

Poston, Victoria and Maria Belen Mendez Bauer (UNAM)

[309] Excavations at Tiradero

The site of Tiradero is located next to the San Pedro River, a distributary of the Usumacinta River, in Tabasco, Mexico and contains evidence of occupation during the Late Preclassic and Terminal Classic periods. At the site, a Middle Formative Chiapas E-Group pattern is consistent with those found in Chiapas de Corzo, Ceibal, and other Maya sites, but differs from the pattern of the earlier Preclassic site of Aguada Fénix only a short distance away. During the past two seasons, the Middle Usumacinta Archaeological Project has conducted excavations in the E-Group plaza to discern temporality, as well as mapping to distinguish the boundaries of the site. The ceramic sequence and construction episodes have revealed a Late Preclassic occupation followed by possible abandonment and subsequent reoccupation during the Terminal Classic as Heinrich Berlin reported in 1953. This paper will outline the work done at Tiradero and how continuing seasons seek to elucidate social changes and human-environment interactions along the Usumacinta River especially during the Preclassic

period.

Pothier Bouchard, Genevieve (Université de Montréal), Julien Riel-Salvatore (Département d'Anthropologie, Université de Montréal), Fabio Negrino (Dipartimento di Antichità, Filosofia, Storia, Geog) and Michael Buckley (Manchester Institute of Biotechnology)

[195] First Insights on Proto-Aurignacian Subsistence Behaviors at Riparo Bombrini (Liguria, Italy)

Located in the Balzi Rossi Paleolithic site complex, Riparo Bombrini documents the oldest Proto-Aurignacian occupations in Liguria, Italy along with the neighboring site of Riparo Mochi. Bombrini itself is the sole site to have been entirely excavated and documented with modern archaeological methods. This makes it a key site to document subsistence behaviors characterizing the arrival of modern humans in western Europe. Unfortunately, the faunal remains have been badly fragmented by diverse taphonomic agents at Riparo Bombrini, the most damaging being the use of dynamite during the construction of the Genova-Marseille railway bisecting the site during the mid-nineteenth century. Given the extensive fragmentation and the near absence of morphologically identifiable bones (<1% identifiable), the ZooMS (Zooarchaeology by Mass Spectrometry) has emerged as an essential tool to supplement traditional zooarchaeological analysis when bones are mass sampled (hundreds of bone fragments). We present results of the first complete faunal analysis conducted on both Proto-Aurignacian layers at Bombrini (A1 and A2), which integrate taphonomy, zooarchaeology and ZooMS. Subsistence behaviors are then compared between both layers and confronted to the environmental and climatic contexts in which they unfolded. Finally, the results are integrated within behavioral reconstructions from the archaeological material already available, notably lithics.

Potter, James (PaleoWest Archaeology)

[254] Recent Investigations of the Los Rayos – Red Willow Chacoan Landscape

The Los Rayos-Red Willow Chacoan landscape, east of Tohatchi, New Mexico, consists of the Los Rayos great kiva and at least seven surrounding small-house sites, the Red Willow Chacoan great house and associated great kiva and at least seven surrounding small-house sites, and a Chacoan road connecting the Los Rayos great kiva and the Red Willow great house. The Navajo-Gallup Water Supply project right-of-way extends through the Los Rayos road, about halfway between the great house and the great kiva. As a result, PaleoWest conducted excavations and a geomorphological study in the affected portion of the road and non-destructive investigations at both the great house and great kiva, including mapping, surface pottery analysis, and drone-based imaging. This paper presents the results of those analyses and investigations, including an expansion and reconfiguration of site maps, a refinement of the chronology of site and landscape components, aerial imaging of the sites and surrounding landscape, and 3D models of standing architecture.

[254] Chair

Pouley, Cheryl [401] see Curteman, Jessica

Poulin, Mairead

[369] Making the Walls Talk: Rock Art and Memory in the American Southwest

Over the past few decades, memory has become a topic of prominence in archaeological research. While iconography has long been seen as revealing social practices of the past, rock art has typically been neglected in memory-related literature, a gap in scholarship that is particularly notable in the American Southwest, where hundreds of thousands of rock art images have been recorded. In this paper, I synthesize iconographic, geospatial, and ethnographic evidence to understand the ways that memory is visible in rock art at Baird's Chevelon Steps, an Ancestral Puebloan site in northeastern Arizona documented by the Arizona Archaeological Society and the Rock Art Ranch Field School. I argue that the rock art practices performed at this site, particularly those related to engagement with and manipulation of ancestral imagery, offer insights into how the sites' residents incorporated the past into their ongoing process of identity formation. By integrating multiple lines of evidence, archaeologists can productively interpret the ways that memory is embedded in and facilitated by rock art and advance our understandings of the relationship between memory and identity in the Southwest.

[293] Discussant

Pouncett, John (University of Oxford), Emma Slayton (Carnegie Mellon University), Gareth Davies (Vrije Universiteit Amsterdam), Antonio García Casco (Universidad de Granada) and Joanna Ostapkowicz (University of Oxford)

[37] *SIBA: Stone Interchanges within the Bahama Archipelago*

This paper presents results from Project SIBA, an Arts and Humanities Research Council funded project that aims to: 1) characterise the regional social networks that bound the Lucayan archipelago to the wider Caribbean region, and; 2) provide an understanding of the creation and maintenance of indigenous exchange networks. The development of the pre-colonial socio-political networks of the Bahama archipelago is reconstructed through the geochemical, isotopic, stylistic and iconographic analysis of 300 stone artefacts now held in museum collections. Identification of the provenance of the raw materials exploited by source region is combined with a reappraisal of the distinctive canon of Lucayan material culture in order to explore the relationships between people and the stone they worked, exchanged and valued. These relationships are embedded in a complex network of times and places that can be explored through relative chronologies established for the archipelago and geographic models of seafaring voyages.

Powell, Lindsay and Zachary Hruby

[103] *The Obsidian of Postclassic Rio Amarillo: A Shift in Population or Technology?*

The rather diminutive site of Rio Amarillo, located to the north of the Copan city center, is well known as a subsidiary site that was somehow involved in the movement of goods between the Motagua and Copan Valleys. After the collapse of the Copan Dynasty, large civic-ceremonial structures were abandoned and the people that remained, or perhaps moved to Rio Amarillo, formed new living areas in defensible hilltop positions. After examining the obsidian from Platform 9 at Site 5, the northern portion of Rio Amarillo, we discovered that there was a difference in technology from the Late Classic sites in the area. There was little evidence of prismatic blade production, but a great increase in bifacial point manufacture. There were also a relatively large number of obsidians imported from Mexican sources, such as Pachuca, Ucareo, and Otumba. We explore the possibility that there may have been a non-Maya group occupying Postclassic Rio Amarillo, as well as the economic impacts of dynastic collapse and diaspora.

Power, Mitchell [247] see Braun, David

Powis, Terry [113] see Cartagena, Nicaela

Powis, Terry [199] see Micheletti, George J.

Powis, Terry (Kennesaw State University)

[284] *Discussant*

Pozeilov, Yosi [39] see O'Neil, Megan

Pozorski, Shelia and Thomas Pozorski (University of Texas Rio Grande Valley)

[181] *Early Ritual and Public Hearths in the Casma Valley, Peru*

Around 1500 BC, the complex society of the Sechin Alto polity of the Casma Valley, Peru produced a wide variety of architectural forms ranging from large platform mounds to small single room dwellings. Hearths used for public or ritual purposes are frequently associated with some of these architectural forms. These hearths range from ventilated hearths set within small roofed buildings that could hold very few people, to open-air hearths set within large open plazas that served as the foci of public activities for hundreds of people. Clearly, these special hearths played an important role in a variety of social settings that reflect the complex nature of the society that built and used these features.

Pozorski, Thomas [181] see Pozorski, Shelia

Prasciunas, Mary (Pima Community College)

- [125] *Community Matters: Enhancing Student Learning Opportunities through the Development of Community Partnerships*

Undergraduate archaeology students traditionally have few opportunities to gain meaningful archaeological field and/or research experience while pursuing academic goals such as degrees or certificates. This lack of opportunity can negatively impact students' success in the next stage of their careers. To support student success, Pima Community College's (PCC's) Centre for Archaeological Field Training actively develops community partnerships which provide additional opportunities to enhance student learning. Through community partnerships, students can participate in a wide variety of local and international projects which provide unique educational opportunities and invaluable field and research experience. Partnerships are also mutually beneficial. Our community partners benefit by gaining access to the resources of PCC's Archaeology Centre; by drawing from a student labor pool to assist them in completing projects on-time and on-budget; and by helping to develop the local student workforce for future archaeological employment opportunities within the community.

- [125] *Chair*

Pratt, Austin [211] see Pezzutti, Florencia

Pratt, Darrin (University Press of Colorado)

- [164] *Moderator*

Pratt, Jordan (Texas A&M University)

- [249] *Exploring Open-Air Western Stemmed Sites in the Harney Basin, Oregon: A Technological and Chronological Analysis*

Western Stemmed Tradition (WST) studies in the Great Basin often emphasize results from cave or rockshelter sites; however, these sites present a very specific occupation type. Studying open-air sites provides a different line of evidence used to expand interpretations of WST lithic technology and subsistence. Several Paleoindian open-air sites with buried WST components have been discovered in the Harney Basin, Oregon, including Weed Lake Ditch, Nials, and Biting Fly; however, initial efforts by the University of Nevada Reno (UNR) in the late 1990s and early 2000s to precisely date these sites were unsuccessful. Since 2017, the Center for the Study of the First Americans has begun efforts to reinvestigate these sites with the goal of establishing their ages, as well as describing and interpreting the geoarchaeological and lithic materials. The research presented here focuses on Weed Lake Ditch (35HA341/35HA342), from which seven Haskett points, six crescents, a bone needle, a stone pendant, a bone bead preform, over forty bifaces and other non-diagnostic tools, and thousands of pieces of debitage and bone were recovered from buried deposits. New radiocarbon dates and lithic technological analysis will be presented as a way to further explore the WST in Oregon.

- [249] *Chair*

Pratt, Lauren and Kurt Rademaker (Michigan State University)

- [268] *An Application of Surovell's Behavioral Ecology Models of Site Occupation Length in the Peruvian Andes*

In his monograph, *Toward a Behavioral Ecology of Lithic Technology* (2009), Todd Surovell models mathematically the economics of prehistoric hunter-gatherers' production, use, and discard of lithic technologies. Although we see great potential in these models to extend our understanding of hunter-gatherer mobility patterns and landscape use, they have received little empirical testing in the decade since publication. Here, we apply one subset of his models—those that use proportions of the lithic assemblage to estimate site occupation length—in a diachronic study of two stratified, multi-component prehistoric rockshelters of the Peruvian highlands, Cuncaicha and Carbur Ruán. In an extension of Surovell's work, we propose new ways of operationalizing some variables, such as "lithic surplus," outlined in the original text and discuss the role that post-depositional processes might play in complicating these measurements. An extremely high-altitude site (4480 masl) with a Terminal Pleistocene fishtail component, Cuncaicha rockshelter is uniquely placed to benefit

from an evaluation of occupation length, adding another line of evidence to ongoing debates regarding residential vs. logistical use of high-altitude environments during the initial phases of human colonization of South America.

Pratt, William (Texas State University)**[320] Materials Preparation and Procurement at Cochasquí as Indicators of Social Organization**

Excavations at earthen pyramid sites in northern Ecuador have documented the presence of unique circular baked-earth floors atop the pyramids which have been interpreted to be a marker of the especially sacred nature of the structure. Yet little is known about the process by which these floors are produced and fired or the societies that built them. Recent excavations at the archaeological site of Cochasquí have revealed that, in addition to these baked floors, a number of earthen materials composing the pyramids were manipulated in a variety of ways. Rather than being the product of least-cost procurement, many of the materials were brought from various locations at some distances across the landscape. The way in which these materials appear to have been processed and incorporated into the construction can ultimately provide clues to the technical and symbolic reasons that the architects included them in construction of the pyramids. Understanding the vagaries of material procurement and processing may help explain the organization of the society that built these massive structures and how their unique makeup affects the composition of the surrounding landscape seen at Cochasquí and other pyramid sites across the north.

Prebble, Matthew (The Australian National University), Seth Quintus (The University of Hawaii at Manoa) and Ethan Cochrane (The University of Auckland)**[408] Applications of Geospatial Technologies in Known Archaeological Landscapes: Re-examining the Archaeological Settlement Pattern of Falefa Valley**

The development and present nature of landscape archaeology in the Pacific owes much to the pioneering work of Janet Davidson and Roger Green in Falefa Valley, Upolu, Sāmoa. This research, completed in the absence of modern geospatial technology, not only demonstrated the potential of landscape-scale investigations in Polynesia but also laid the foundation for Sāmoan archaeology more generally by constructing an initial chronology and documenting the variation of the archaeological record in the region. This paper builds on the work of Davidson and Green by presenting results of renewed research in Falefa Valley that has taken advantage of modern geospatial technology. Access to a commercial lidar dataset has allowed a re-imagination of the Falefa landscape, identifying large-scale spatial patterns of land use and informing the use of pedestrian survey techniques. We describe and illustrate patterns of food production not previously documented and discuss the implications that these patterns might have on our understanding of Sāmoan settlement and subsistence.

Prendergast, Mary [82] see Janzen, Anneke

Prentiss, Anna [70] see Goodale, Nathan

Prentiss, Anna (University of Montana)**[239] Scrambles, Potlatches, and Feasts: the Archaeology of Public Rituals amongst the St'át'imc People of Interior British Columbia**

Public sharing of food and gifts remains important to St'át'imc communities of interior British Columbia today despite decades of prohibition by Canadian authorities. The archaeological record offers evidence that public events involving large scale food preparation and sharing were commonly practiced at least since ca. 1300 years ago. Yet, we have little understanding of variation in how such events were developed and operated. We know even less about the social dimensions of public rituals involving sharing of food and goods. This paper explores the archaeology of food-related public ritual (feasting) and related activities (e.g. potlatching) in the Middle Fraser Canyon of British Columbia. Drawing data from the Bell, Bridge River, and Keatley Creek sites, we assess (1) variation in time and space in the nature of such rituals; (2) potential socio-economic and political explanations for variation; and (3) relationships between historical and contemporary practice.

[163] Discussant

Presnall, Aaron [31] see Anderson, Shelby

Preston, David [203] see Lorenz, Carol

Preucel, Robert (Haffenreffer Museum, Brown University)

[311] *Discussant*

Prezzano, Susan (Clarion University)

[22] *Archaeology as a Public Good: the Summer Field School Program at Clarion University of Pennsylvania*

During the past twenty years, the anthropology program at Clarion University, a small public university in rural western Pennsylvania, participated in a partnership with the Heritage Program of the Allegheny National Forest focused on the excavation of archaeological sites within the boundaries of the National Forest. This partnership linked undergraduates participating in summer archaeological field schools to high school students enrolled in an outreach program. It formed a collaboration of these students with county, state, and federal officials in a shared project to retrieve and preserve knowledge of past lives. Besides learning basic excavation techniques, undergraduates, many of whom were first generation in college, learned leadership skills, techniques for public outreach, mentoring practices, and a variety of critical thinking skills. Paired with extensive laboratory experience, graduates pursued careers in CRM, museum studies, and heritage programs with state and federal governments. The project exposed landowners to the field of archaeology and created an avenue for them to claim the heritage of their communities. It provided the federal government with knowledge of its cultural resources and a means to connect to both the university and surrounding communities.

Price, Karen [25] see Phillips, David

Price, Karen (Maxwell Museum of Anthropology, UNM), Alexis O'Donnell (Dept. of Anthropology, University of New Mexico), William Marquardt (Dept. of Anthropology, University of New Mexico) and Heather Edgar (Dept. of Anthropology, University of New Mexico)

[189] *Four Down, 6,000 to Go: Processing and Researching the (not) St. Joseph's Cemetery Site Legacy Collection*

Archaeological legacy collections found in museums and repositories across the nation continue to present challenging and intriguing research opportunities. Basic processing of artifacts and field notes within these older collections can itself feel like an excavation and the slow process of addressing an institution's backlog can be daunting. The University of New Mexico's Maxwell Museum of Anthropology's (MMA) backlog remains in over 6,000 boxes and although thousands have been processed, the smaller historic collections are often given a backseat to larger prehistoric collections. This case study looks at a recently processed historical archaeological collection, LA 49791, housed at MMA in Albuquerque, New Mexico. In a combined effort by staff, graduate students, and volunteers, this holistic study combines artifact analysis and archival research, in concert with bioarchaeological techniques to reclaim contextual integrity for eleven nineteenth century burials and their artifacts. While the sample is small, the individuals buried at this cemetery can give biohistorical insight into others who might remain interred there as well as highlight the research potential that hides within legacy collections.

Price, Max [127] see Rapes, John

Price, Michael Holton [247] see Ready, Elspeth

Price, Seth (University of Arkansas) and Benjamin Vining (University of Arkansas)

[64] *An Agent-Based Disaster Model: Marginality, Decision-Making, and Novel Resource Exploitation during ENSO Flooding Events in Chicama, Peru*

Ecological disasters are often argued to be forces of large-scale societal change, including the primary causes of major cultural collapses. This concept is reevaluated in light of the recent 2016-2017 El Niño Southern Oscillation (ENSO), which

provides an opportunity to examine the ways in which this event affects the landscape. Through integration of remote sensing, historical, and archaeological survey data in the Chicama Valley of northern Peru, we investigate a first iteration agent-based agroecosystem simulation as a method of testing how social actors managed resources during disasters associated with warm (El Niño) ENSO phases. Of particular interest are inland water sources and ephemeral vegetation, resources that may be less important during times of plenty but act as invaluable buffers during environmental disasters and also serve as proxies for crop cycles. ABM techniques allow us to define ecological constraints and decision-making criteria of agents, to explore how past communities would have adapted to unforeseen scenarios such as flooding of rivers and canals. Using these methods, we suggest survival strategies that may have allowed social groups to exploit diverse resources and develop novel subsistence strategies, adapt to new circumstances, and avoid destruction.

Price, Seth [64] see Vining, Benjamin

Price, Seth [387] see Gosner, Linda

Price Steinbrecher, Barry (Anthropological Research, LLC) and Maren Hopkins (Anthropological Research, LLC)

[84] Place as Reference: Metonymy in Pueblo Landscapes

For contemporary Pueblo people in the American Southwest, land, history, and religion are inextricably entwined. Historical events and religious beliefs manifest on the land at different physical and conceptual scales. Over time, places come to represent larger landscapes or philosophical concepts, effectively becoming metonyms for such spaces and ideas. We suggest that metonymy provides a compelling theoretical framework for understanding complex relationships between people, places, and beliefs over time. Drawing on examples that represent both built environments and natural landmarks, we examine how history, religious beliefs, and identity are metonymized at places important to members of the Hopi Tribe and Pueblo of Jemez. This form of recalling and reproducing knowledge adds to the many forms of traditional history that sustain Pueblo identity and culture.

Prieto, Gabriel [55] see Sutter, Richard

Prieto, Gabriel and Feren Castillo

[200] Becoming Moche in Huanchaco: The Impact of Moche Politics, Economy and Religion in the Fishermen Households at Pampa la Cruz, AD 500-650

The archaeological research at Pampa la Cruz, a residential fishing settlement occupied between 350 cal. BC and 650 cal AD and located on the shoreline at the mouth of the Moche valley, is providing new insights on the impact made by Moche political organization at the household level. The investigations are revealing the impact of the material culture produced by specialists at the site of Moche as well as the effect of that material culture on the private lives of the fishermen residents at Pampa la Cruz. Current evidence suggest that domestic rituals changed from the intimacy of fishermen families to incorporate new rituals using Moche-like paraphernalia. On the other hand, there seems to be a more restricted capacity of the households to accumulate surplus based on a comparison of storage facilities during the Moche presence of the site and previous occupations. These and other variables are explored at a broader level to measure how political, economic, and religious power had an impact at the household level and explore how local families dealt with these changes and the maintenance of their own identities and social trajectories.

Prieto, Gabriel [286] see Torres Morales, Genesis

Primeau, Kristy (NYS DEC)

[114] Methodological Improvements in Landscape Archaeoacoustics: Exploring the Effects of Vegetation and Ground Cover

Recent development in the field of landscape archaeoacoustics has resulted in improved GIS-based soundshed modeling solutions, however, it has also led to the identification of several limitations of these tools. Foremost among these limitations

is the lack of reliable modeling capability to explore the effects of vegetation attenuation or variable ground cover types on audibility. While these limitations do not impact the study of archaeoacoustics in fairly homogenous landscapes, use of these tools in a landscape of ecotones can result in the production of audibility maps and models which do not reflect the ecological and anthropogenic variation in sonorous environments. This study describes the current state of soundshed modeling; provides a detailed examination of the challenges and tools available to model vegetation attenuation, variable ground cover types, and other impacts to acoustic transmission paths; and explores solutions to these obstacles. The results of this analysis will be discussed in relation to the "Soundshed Analysis Toolbox" (presented in Primeau and Witt 2018), written in Python script for use in ArcGIS. Ultimately, this research will be used to improve the toolbox allowing landscape scale soundshed modeling to be applied to a vast array of site locations.

[167] *Discussant*

Pritchard, Jonathan [253] see Moots, Hannah

Prociuk, Nadya (University of Texas at Austin)

[407] *By the Sea Shore: Examining the Prehistoric Shell Industry of the Rio Grande Delta*

In North America the archaeologically defined prehistoric culture of the Rio Grande Delta is essentially unknown outside of the state of Texas. Even within Texas the culture of the Rio Grande Delta is poorly understood. Adding to this obscurity is the lack of cross-border communication or collaboration between researchers regarding the material culture of the area. This absence of awareness is unfortunate considering the potential for new understanding the area offers. Though the Rio Grande Delta is a marginal environment, the people of the area exploited the rich marine resources available to them in economically and socially significant ways. The Delta peoples maintained a thriving shell industry, creating a wide assortment of tools and ornaments that dominate the material record. This shell industry enabled the Delta inhabitants to maintain ties with surrounding groups, including the Huasteca farther south along the Gulf Coast. Based on an analysis of the A. E. Anderson Collection housed at the Texas Archeological Research Laboratory, in this paper I will examine the central role of the shell industry to gain a greater understanding of the lifeways and cultural dynamics of the prehistoric Rio Grande Delta.

[407] *Chair*

Proctor, Lucas (University of Connecticut)

[404] *Fanning the Flames of Complexity: Archaeobotanical Approaches to the Study of Fuel Economies at Late Chalcolithic Sites in Northern Mesopotamia*

The burning of fuel resources for the heating and lighting homes, preparing food and craft goods, and eliminating waste is an essential daily domestic practice on par with the acquisition of food and shelter. With the emergence of socioeconomically complex societies in Northern Mesopotamia during the Late Chalcolithic, ever greater resources would have been necessary to fuel expanding craft production and support growing populations in increasingly urban settlements. People living in these societies would have had to balance increasing pressure on their access to fuel resources with adequately provisioning their hearths with fuel on a daily basis. Here, we combine archaeobotanical, anthracological, and dung spherulite analyses of two Late Chalcolithic sites, Surezha (Iraqi Kurdistan) and Tell Zeidan (Syria), in order to investigate the social, economic, and environmental factors underpinning fuel use choices at the onset of socioeconomic complexity. The identification and relative contribution of fuel resources within hearths and refuse deposits speak to both local resource availability and the economic and social organization of domestic activities and craft production in the Late Chalcolithic. Results from these sites document different fuel choices for ovens, hearths, and pyrotechnic features, suggesting a preference for specific fuels based on the activities being performed.

[137] *Discussant*

Proctor, Terren (Vanderbilt University)

[206] *Quicksilver and Cruelty: Violence at the Santa Bárbara Mining Encampment in Huancavelica, Peru*

The colonization of the Americas by the Spanish presents a unique context for exploring structural violence. The rapacious extractivism practiced by the colonizers led to the immeasurable destruction of indigenous communities, particularly those working as tributary labor. At the nexus of the colonial mining industry were the mercury mines of Santa Bárbara in Huancavelica, Peru, which operated from the 16th to the 18th century. From these veins, the Spanish extracted mercury for

the refinement of silver for export; this metal was collected by Andean laborers in deplorable conditions for little pay. Bioarchaeological analysis of human remains excavated in 2018 has yielded evidence of extensive violence perpetrated and experienced by the indigenous laborers of the colonial mining economy. Individuals recovered at the site were interred in communal pits after exhumation. These individuals (n=148) show high levels of cranial trauma resulting from interpersonal violence among the community of laborers. I argue that this is indicative of the quotidian experience of the structural violence of the empire. The lifeways of the Santa Bárbara miners and their families were not only lives of labor and hardship, but also of violence, resulting from oppressive institutional policies, and manifesting in everyday interactions.

Proebsting, Eric (Thomas Jefferson's Poplar Forest)**[58] Exploring Sustainability and the Realities of Plantation Agriculture at Thomas Jefferson's Poplar Forest**

Over the past thirty years, landscape archaeology has been used to study Thomas Jefferson's retreat home and plantation located in Bedford County, Virginia. A goal of this work has been to cultivate a deeper understanding of the individuals who lived and labored on Poplar Forest plantation as well as how their households were connected with the broader world in which they lived. Among other things, this interdisciplinary work has developed detailed understandings of the property's environmental history, extending from the Native American occupation of the property through the 20th century. This includes a special focus on details related to the lives of the enslaved African Americans who lived on the property from colonial settlement through emancipation. While the destructive nature of plantation agriculture and the harsh system that supported it were clearly unsustainable; the historical archaeology and ecology of Poplar Forest and the surrounding community also reveals instances of continuity and resiliency amidst the steady flow of change overtime. These and other topics pertinent to the concept of sustainability may be discussed in the future along a new parkway entrance road at Poplar Forest, designed to bring visitors through historic plantation fields, woodlands, and wetlands before arriving at Jefferson's retreat.

Prout, Michael [360] see Iglesias, Christina

Prowse, Tracy [109] see Glencross, Bonnie

Prufer, Keith M. [110] see O'Donnell, Alexis

Prufer, Keith M. (University of New Mexico)**[174] Discussant**

Pruitt, Elizabeth [184] see Reetz, Elizabeth

Pruitt, Elizabeth**[184] Discussant****Pryor, John and Galen Lee (North Fork Mono)****[8] Toward a Nim (Mono) Archeology**

This poster is a collaboration in an attempt to create a new archeology rooted in a Native American tradition of the people who created the archeological deposits, based in a Nim sense of time, space and values. Archeologists must get away from the artificial concept of sites, which divides rather than looks for interconnections. We must show respect for artifacts not as objects, but imbued with the spirit of those that made them. We need to look at landscapes and land uses. Our chronologies must be rooted in Native American time rather than Western European categories. Lastly we need to create an archeology that embraces Native values. Their past can never fully be understood outside of their frameworks.

Pryor, John [400] see Gaskell, Sandra

Przelomska, Natalia (Smithsonian Institution), Adrienne Kaeppler (Smithsonian Institution), Jim Groombridge (University of Kent, UK), Logan Kistler (Smithsonian Institution) and Rob Fleischer (Smithsonian Institution)

[153] Ethnoornithological and Genomic Perspectives on Royal Hawaiian Featherwork

Hawaiian featherwork constitutes a treasured element of Hawaiian cultural heritage. Feather artefacts curated in museums today were acquired between the late 18th and the early 20th centuries and it is clear that their production required thousands of feathers sourced from Hawaiian forest birds. Many of these bird species are currently either in decline or extinct, but the extent to which featherwork manufacture contributed to this remains uncertain. We hypothesize that the sacred status of Hawaiian forest birds allowed for feather harvesting to occur in a sustainable manner. We are investigating this using a non-invasive, museum collection-based approach (counts of feathers, extrapolation to total birds exploited). Furthermore, we are employing genomic methods (target DNA capture, high-throughput sequencing) to learn more about the histories of these artefacts. For the genomic work, we make use of contemporary samples for the extant species, museum specimens from the 19th and 20th centuries, as well as the unique source of DNA that are loose feathers from the artefacts themselves. We create a population genomic framework within which data from cape feathers can be placed – to provide clues regarding provenances of feathers used in 'ahu'ula as well as to confirm species identities of the birds used.

Przystupa, Paulina (University of New Mexico)

[14] Archaeology and Comics: Cons, Concerns, and Creativity

Popular culture is important for gauging how archaeology is understood by the public. It allows us to evaluate what aspects of our discipline the public finds interesting and what the public misunderstands, despite a wealth of academic and scientific knowledge. This paper will focus on how archaeology as a discipline, and as a source of information or inspiration, is explored in comic books written by non-archaeologists. It will draw from comics as source materials themselves, reviews of comics by archaeologists, and personal experiences doing outreach at comic conventions, in the form of panels which combine laypeople with professionals, to discuss topics of anthropological and historical significance. These are an important way that archaeologists can both explain more about the discipline, illustrate the past, and correct misconceptions about the field, as a science, and about our knowledge of what the past was like. Additionally, the work will demonstrate the importance of collaborations between creators and archaeologists that can work to create accurate and fun pieces of entertainment. Establishing a good balance of fact to fiction is difficult but can create a rewarding and worthwhile product that works to promote modern ideas about archaeology and an accurate knowledge of the past.

[226] Moderator

[226] Discussant

Puckett, Taylor [370] see McKenzie, Emily

Pugh, Timothy (Queens College and The Graduate Center), Evelyn Chan (CUDEP) and Katherine Miller Wolf (Indiana University East)

[198] The Peal of Domination at San Bernabé, Petén, Guatemala

In 1718, Bishop Juan Gómez de Pareda, the 20th bishop of Yucatan, consecrated a number of bells destined for churches in what is now Petén, Guatemala. At least two of these bells swung in the San Bernabé mission church. The mission was established on the western end of the Tayasal peninsula in Petén, Guatemala a little over a decade after the conquest of Nojpeten, the Itza capital in 1697. Bells herald important rites, daily cycles, and other events but they were also instruments of *policía cristiana*—of Christian practice. Of course, they were not the only instruments of conversion in colonial period churches. Churches were literal road maps toward salvation and heavenly Jerusalem. However, bells were certainly the loudest and the most penetrating. The current paper considers how bells and other symbols acted as objects of discipline in the context of colonial Petén.

[234] Discussant

Pugh, Timothy [199] see Harrison-Buck, Eleanor

Punzo Díaz, José Luis [39] see Valdes Herrera, Alejandro

Punzo Díaz, José Luis (Instituto Nacional de Antropología e Historia) and Ben Nelson (Arizona State University)

[296] Revisiting the Mesoamerican Materials from Paquimé

Beginning with the first investigations in Paquimé, one of the most important issues that archaeologists have identified was the site's apparently intimate relationship with Mesoamerica. This idea is supported by relatively abundant copper objects, as well as ceramic remains from southern sites and other items such as parrots, macaws, and possibly cacao. In this paper we will present the materials found in Paquimé with a southern provenience, analyzing and contextualizing them as to possible places of origin and time frames, in order to better quantify and orientate the Mesoamerican presence in Paquimé.

[375] Chair

Purcell, David (Museum of Northern Arizona)

[259] Timelapse Photographic Documentation of Archaeoastronomical Sites

Horseshoe Mesa (WS834) in the Ancestral Puebloan Crack-in-Rock Community of Wupatki National Monument, Arizona, has three petroglyph panels that mark important solar events. Timelapse cameras documented the daily patterns of these interactions from September 2016 to March 2018 at two of the panels. Panel 39 uses carefully placed petroglyph elements to interact with a winter solstice shadow and a summer solstice sunray. Ethnographic sources, design layout, and association with other panels are considered in evaluating how the panel was created, the information that it would have conveyed to contemporary viewers, and its contribution to archaeoastronomical research in the Southwest.

Purdon, Donald (Eastern New Mexico University)

[261] Projectile Point Variation at Fresnal Rock Shelter

Typological classifications of stone projectile points are often used as diagnostic indicators of cultural occupations and chronological sequences at archaeological sites across North America. However, many of these typological traditions are only applicable to a particular region where they were first discovered and were commonly based on nothing more than on-site visual comparisons of shape—diminishing their value as cultural and chronological indicators. Moreover, many published typological sequences do not consider the range of variation that a “type” may actually encompass resulting from raw material constraints as well as resharpening and reworking procedures. A primary goal of this research is to contribute to this ongoing discussion and document morphometric variation within the projectile point assemblage from Fresnal Rock Shelter, New Mexico. Multivariate analysis of variance was used to examine whether patterns in morphology generated from traditional metric and geometric morphometric attributes support the typological organization that has historically been used to describe the cultural sequences at Fresnal.

Purdy, Barbara (University of Florida) and David S. Leigh

[274] The Search for Paleo Dog and the Recognition of Ancient Art

During archaeological field schools in 1976–1978, unfamiliar chert objects and tools were recovered from a sandy/clay deposit at the Container Corporation of America site (CCA 8MR154), Marion County, Florida. This deposit, the Alachua Clays, was traditionally considered “culturally sterile.” The specimens from the sandy/clay deposit did not resemble in any way chert artifacts from the overlying sand layers that ranged from Middle Archaic to Paleoindian. Significantly, a gigantic chert boulder, jokingly designated “Paleo Dog,” was exposed in Area 3, Square 3, and numerous chert specimens were recovered around and below it from the Alachua Clays. Field schools terminated, excavation units were backfilled, and Paleo Dog did not see the light of day again until March 28, 2017. Renewed interest in the CCA site led to the exposure and study of its stratigraphy in several backhoe trenches, and to the excavation in 2017–2018 of nine new units in Area 3, seven of which confirmed the existence of cultural material in the Alachua Clays, including animal figures of chert. Paleo Dog’s resurrection, chert animal figures, the Alachua Clays, and exciting recent discoveries are the subjects of this presentation.

Puseman, Kathryn [197] see Levine, Marc

Putt, Shelby S. J. [390] see Holden, Chloe

Pyburn, Anne (Indiana University)

[377] *Discussant*

Pye, Jeremy (Cultural Resource Analysts, Inc.)

[208] *The Dreaded Pox: Agent-Based Simulation of the 1870 Smallpox Epidemic in Tucson, Arizona*

In October of 1869 a smallpox outbreak developed in Tucson, Arizona, which lasted until late April of 1870. Historical documents do not agree on the number of deaths resulting from the epidemic, and no concrete information is given about the extent of the illness spread through the Tucson community or the surrounding region. Bioarchaeological evidence of smallpox is also scant. Therefore, in order to estimate the total number of deaths and impact of the epidemic, an agent-based computer simulation was constructed using AgentSheets® 3.0 simulation software. Census figures from the 1870 federal census were used to populate the simulated Tucson environment. This initial simulation tests a "virgin" environment where no previous immunity is assumed and agents progress through all levels of smallpox infection (susceptible, pre-eruptive, pre-symptomatic, symptomatic, immune or dead) based on agreed upon disease epidemiological parameters. Ten simulations were run and the averages of the simulation resulted in 779 deaths, 1721 infected individuals who recovered, and a 311-day long epidemic. These results are similar to what would be expected in a virgin population of this size based on disease parameters. This suggests that further simulation specification could yield results which more clearly approximate the unknown historical truth.

Pye, Mary E. [39] see Gutiérrez, Gerardo

Qi, Justin K. [42] see Dakovic, Gligor

Qian, Yaopeng (China Northwest University)

[214] *A Functional Study of 'jiandiping' (Pointed base) Amphorae*

There have been many debates on the function of jiandiping (or pointed base) amphorae of the Yangshao Culture in the Wei River valley. Although analyses of plant residue suggested that the amphorae might have been used as wine vessels, their function and the usage are still in doubt. Based on the observations of typological characteristics and the production technology, this paper investigates the functional significance of the morphological structure of the jiandiping amphorae from the perspective of design. The main function of the pointed bottom is to separate by precipitation, but the narrow mouth is not suitable for the fermentation of cereals, contrasting with the wine brewing process in which fermentation and precipitation taking place simultaneously. In addition, the specific functions and usage of the large and medium-sized amphorae are different, while the double handles on amphorae of different sizes also show variation. The large amphorae were inconvenient for transportation, but suitable for long-term storage in an environment with consistent humidity and temperature. The smaller ones were used at feasting or sacrificing events, usually forming a set with the similarly shaped flat-bottomed bottles. Once the more convenient precipitation technique emerged, the inconvenient pointed-bottom structure was replaced.

Qian, Yaopeng [361] see Li, Yue

Qin, Zhen (Henan University)

[78] *Pluvial and Fluvial: Investigating the Environmental Resistance and Driving Force of Wheat Cropping in the Central Plain of China*

Recent archaeological evidence suggests that wheat, one of the most important grain crops originating in the Near East, was introduced into the Central Plain of China as early as approximately 4,000 BP. However, it is not until around 2,000 BP or even later that wheat was widely cultivated and consumed. Why was there a two-thousand-year gap between the earliest emergence and widespread cultivation? And why was wheat eventually accepted by the Central Plain inhabitants? These questions have attracted but also puzzled archaeologists for a long time. Although cultural and culinary traditions may play a significant role in resistance and acceptance, this research mainly focuses on environmental factors. We first compare the pluvial patterns of the Mediterranean climatic zone with the East Asia Monsoon zone, and investigate variance in rain fall pattern as a factor in the resistance of wheat cropping in the Central Plain of China. The study then reconstructs the fluvial sequence in the lower reaches of the Yellow River and investigates the increasingly frequent Yellow River floods as the driving force of wheat cropping in the China's Central Plain.

Qiu, Yijia (University of Pittsburgh), John Walden (University of Pittsburgh), Anais Levin (Grinnell University), Kyle Shaw-Müller (University of Toronto) and Rafael A. Guerra (University of New Mexico Albuquerque)

[280] *Examining the Ramifications of the Formation of a Late Classic Maya Polity on Local Exchange Systems at Lower Dover, Belize*

Traditionally scholars envisaged Classic Maya economic centralization and commercialization as being poorly developed. However, the discovery of markets at several Maya political centers has begun to shift these perspectives. One important question which remains was how much did centralized markets affect the redistribution of items within hinterland households? The Late Classic (AD 600-900) Maya polity of Lower Dover, Belize arose in a densely populated landscape dominated by autonomous communities with long-established local elite leaders. The recent discovery of market facilities at the civic-ceremonial center indicate the possibility that the rise of the political center was accompanied by centralized marketing of certain commodities. This paper provides a settlement-based perspective grounded in the distributional approach to test the hypothesis that differences existed between the exchange items among high and low status commoner and intermediate elite residences in the hinterlands of the polity. Our investigation applies ANOVA (analysis of variance) to the proportions of imported ceramics and obsidian diachronically before and after the emergence of Lower Dover. Based on preliminary data we hypothesize an increase in commercialization following the rise of Lower Dover, most probably associated with the centralized markets.

Quade, Jay [32] see Rogers, Michael

Quave, Kylie (The George Washington University)

[355] *Factional Ceramic Economies in the Inka Imperial Heartland*

Inka ceramic workshops have been identified in many Inka provinces, but the process of making and disseminating Inka pottery in the imperial heartland of Cuzco has been largely unknown until recently. Previously, scholars assumed Inka pottery was made in state-sponsored workshops near the urban capital. However, excavations at a royal estate site 30 km northwest of Cuzco (Cheqoq, Maras) revealed a small-scale imperial-style ceramic workshop operating in the late decades of Tawantinsuyu. This paper examines the archaeological and ethnohistoric context at Cheqoq, an Inka village where forcibly migrated retainer laborers from nearby and distant ethnic groups were resettled in the late imperial period. Cheqoq was one of the largest Inka domestic sites in the Cuzco region, with dozens of large imperial storehouses, a corral complex, heterogeneous domestic terraces, and the first securely-identified imperial pottery production locus in Inka Cuzco. The site was likely one of many where imperial pottery was produced; however, household excavations there indicate that the pottery was not destined to be used at the same site. Retainer laborers at Cheqoq produced imperial-style goods for the benefit of a particular royal faction, and contributed to the formation of a decentralized ceramic economy in the imperial heartland.

Quave, Kylie [404] see Hoover, Corey

Querenet Onfroy De Breville, Iris (Barnard College of Columbia University)**[213] Analyzing Archaic Rock Art in Northern New Mexico through Landscape Survey**

My paper will be centered around an archaeology of the ancient indigenous rock art analysis through the landscapes of northern New Mexico. This project utilizes two primary lines of evidence. First, it examines the plant and animal ecology of the Rio Grande Gorge, particularly the so-called natural signs or traces of mammals such as the modern distribution of tracks, game trails, and scat. Second, it examines the ancient human-made signs of the hunt, particularly the hundreds of animal tracks that were pecked on rocks in the Rio Grande Gorge over the past 12,000 years -- by re-visiting rock art sites to study their relation to surrounding features of the landscape. This project, then, will bring together iconography, ecology, and Native American traditions to understand how early hunters "read" the landscape of the Rio Grande Gorge in their pursuit of game. I will re-contextualize the art, facilitating its interpretation and hopefully bringing it to life.

Quilter, Jeffrey [253] see Fehren-Schmitz, Lars

Quinlan, Liz (University of Massachusetts - Boston)**[136] "... and his wife Sally": The Binford Legacy and Uncredited Work in Archaeology**

Often mentioned as an afterthought in sentences about her more famous husband, Sally R. Binford has long been a topic of discussion for those interested in 20th century female archaeologists. Her foundational work in the early endeavors of the 'New Archaeology' set the stage for an academic revolution, however, much of her work went uncredited. The legacy of stolen work affects a broad demographic, with graduate students, post-doctoral, and early career researchers often suffering the same insult. Through discussion of Sally R. Binford's contributions to, and omissions from, the field of archaeology, this paper will examine solutions for the threat of lost attribution, and how we might successfully navigate hostile academic environments. Sally's position as a queer Jewish feminist academic working in the 1950s to 1970s, and the actions she took, serve as both a warning and a model for those who may be facing similar problems today.

Quinn, Colin [58] see Dorr, Lana

Quinn, Colin (Hamilton College)**[183] A Bioarchaeological Approach to Contested Mountain Landscapes in Transylvania's Golden Quadrangle**

In this paper, we introduce the agenda for the session Living and Dying in Mountain and Highland Landscapes. Mountains and high altitude areas are ideal spaces where archaeologists can examine the relationship between social action and the environment. As this session will show, the study of human remains must be situated with a holistic bioarchaeological approach to life and death in order to understand the dynamic relationships between people and mountain and highland landscapes. We highlight one such approach through a case study of mortuary archaeology and bioarchaeology in the Apuseni Mountains of Transylvania (Romania). The Apuseni Mountains are home to the richest gold and copper deposits in Europe; key resources that fueled the development of social complexity during the Bronze Age. In this heterogeneous landscape, we document and discuss changes in upland use throughout the Bronze Age. We introduce the results of recent bioarchaeological research to discuss the biocultural consequences of living in upland environments. We argue that the Apuseni mountain topography channelized mobility through mountains, heightened competition for access to metal trade routes, and provided relief that Bronze Age peoples used to create monumental reminders of ancestral connections on daily and decadal temporal scales.

[183] Chair

Quinn, Rhonda [47] see Quirin, Carley

Quinn, Rhonda (Seton Hall University), Volney Friedrich (University of Pennsylvania), Francisco Estrada-Belli (Tulane University), Alexandre Tokovinine (University of Alabama) and Linda Godfrey (Rutgers University)

[410] *Lead Isotopic Evidence for Foreign-Born Burials in the Classic Maya City of Holmul, Petén, Guatemala*

La Sufricaya, a Classic Period Maya civic-ceremonial complex in the city of Holmul, Petén, Guatemala, has several epigraphic elements that potentially link it to the Maya city of Tikal and the central Mexican metropolis of Teotihuacan. The La Sufricaya area boasts elaborate elite residential buildings, plazas, a ball court, and carved stelae; rulers from Holmul trace their dynasties back to a Teotihuacan-linked founder. La Sufricaya also shows epigraphic and architectural similarities to Copan, and both sites share a foundation narrative of a ruler embarking on a pilgrimage to a distant place, possibly Teotihuacan. In an effort to test if cultural connections at La Sufricaya included foreign-born individuals, we analyze lead isotopes of dental enamel samples and report new AMS dates of six burials. Framed within established lead isoscapes, five of the six individuals suggest geographic origins in the Northern Highlands, a region that includes Copan. We cannot rule out that the Maya Mountains region, which includes Caracol, was also a possible source. One individual, who died during late infancy, was likely born in the Northern Lowlands. We interpret an interchange of people between the Holmul area and other Maya geopolitical regions within the Yucatan Peninsula and discuss possible political connections.

Quiñonez, Patricia

[356] *Estudios de las especies de moluscos en Quilcapampa La Antigua*

El sitio arqueológico de Quilcapampa se ubica en la margen derecha del valle medio del río Sihuas al sur de Perú. Los datos recuperados durante dos temporadas de campo lo ubican cronológicamente en el Horizonte Medio, asociándolo directamente a la cultura Wari, evidenciando actividades específicas, entre las que destacan aquellas relacionadas con la alimentación, identificando una dieta variada que combina productos agrícolas y productos marinos. La inclusión de estos alimentos marinos en los grupos humanos asentados en las partes media y altas de los valles andinos nos pone en manifiesto 5 aspectos a tener en cuenta: El acceso al mar para la actividad de recolección de moluscos (distancia desde la entrada/salida del valle medio hasta el litoral), la especialización de las personas para la obtención de los moluscos en diversos fondos marinos, la selección de individuos aptos para el consumo, la identificación de la presencia o ausencia de un fenómeno ENSO, y el traslado de los moluscos al interior del valle, cuya inversión de esfuerzo sería una variable importante según el lugar de intercambio del producto, pudiendo ser en el valle bajo o valle adentro.

Quintana Ortiz, Luis (University of Puerto Rico, Río Piedras Campus)

[418] *Analysis of Households in Calle de Isabel II, San Juan, Puerto Rico, 1910*

Calle de Isabel II was the main street of La Puntilla, a neighborhood located in a small peninsula outside the San Juan city walls. Throughout the 19th century a series of construction projects were undertaken in this area, including dwellings, schools and colonial government buildings. Unfortunately, a large part of this neighborhood was demolished in the mid-20th century to give way to new residential units, but the proposed plan was not completed and the land was converted into a parking lot. This presentation focuses on an analysis of households located in Calle de Isabel II, to identify information related to family units, trades and professions, in addition to building characteristics. Documentary resources like maps, blueprints, photographs, commercial directories and newspaper advertisements were used to recreate the stories of the people who lived on this street.

Quintela, Daniel

[180] *Petroglyph Panels in Isolation: Differences in Cultural Expression through Rock Art Placement in the Landscape of Petrified Forest National Park*

Across Petrified Forest National Park, ancestral Puebloans left their mark on the landscape through the creation of thousands of petroglyph panels. While the exact meaning behind the glyphs depicted in petroglyph panels has been blurred by the passage of time and poses a formidable interpretive challenge to archaeologists, the locational context of petroglyph panels has the potential to provide insights into the nature of cultural expression occurring across different rock art sites. While many petroglyph panels within Petrified Forest have a clear association with pueblo settlements located in their vicinity, many more petroglyph sites are in relative isolation on the landscape; these different petroglyph site types may provide evidence for distinctive forms of sociocultural expression occurring at these sites. A GIS-based locational analysis will allow for the identification of isolated petroglyph sites and ethnographically-documented landforms of cultural significance that these sites occur on. This paper will additionally compare the distribution of easily-identified glyphs of

sociocultural significance between isolated petroglyph sites and those associated with habitations to identify possible differences in representations of sociocultural affiliation occurring across these two site types.

Quintus, Seth [34] see Swift, Jillian

Quintus, Seth (University of Hawaii at Manoa)

[354] Small Islands and Hinterlands: Exploring Scale and the Sāmoan Archipelago

The concept of a "hinterland" is a tool. As such, the concept is only beneficial if it can help us understand human behavior or the archaeological record better than alternatives. Recent research has shown that it can be usefully applied in Polynesia, but its application is geographically and substantively limited. This paper will explore the use of the concept to understand social relationships and the archaeological record of the Sāmoan archipelago. The Sāmoan archipelago is one of the largest in Polynesia and occupies a culturally and geographically transitional location. It also features significant environmental variation that results in behavioral variation throughout time and space. Such variation is, in some ways, related to complex socio-political changes that resulted in the movement of power, according to oral tradition, from one side of the archipelago to the other. That shift in power no doubt had implications for how human populations lived and what materials they created and left behind, but I argue that the use of the hinterland concept in this circumstance is only helpful with recognition of scale. In other words, the hinterland concept is useful to the extent that we address hierarchies of spatial and temporal scales.

Quirin, Carley (Seton Hall University), Rhonda Quinn (Seton Hall University; Rutgers University), Jason Lewis (Turkana Basin Institute; Stony Brook University), Kathryn Ranhorn (Peabody Museum of Archaeology and Ethnology, Harvard) and Christian Tryon (Peabody Museum of Archaeology and Ethnology, Harvard)

[47] Mammalian Enamel Stable Isotopic ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) Evidence for Environmental Change during the MSA-LSA Transition at the Kisese II Rockshelter, Tanzania

Environmental perturbations are invoked as an influence of hominin speciation, dispersal and technological innovations. Archaeological occurrences preserving the transition from the Middle Stone Age to the Later Stone Age are critical to gauging environmental influences of human adaptations, yet there is a dearth of well-dated sites in eastern Africa. The Kisese II Rockshelter (Tanzania) has a chronologically constrained $\geq 6\text{-m-thick}$ stratigraphy spanning the MSA/LSA transition and includes lithic artifacts, ostrich egg shell beads, evidence for red ochre use, and hominin and non-hominin skeletal and dental remains. Here we isotopically ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) analyze 109 bulk enamel samples representing 30 herbivorous and omnivorous mammal species in order to characterize the site's environments throughout the succession. Kisese II shows an increase in the percentage of C3-browsers at the expense of C4-grazers and C3-C4-mixed feeders through time. Kisese II faunal $\delta^{18}\text{O}$ values are slightly higher during the latest (Holocene-aged) archaeological occurrence potentially indicating increased aridity and/or changes in rainfall $\delta^{18}\text{O}$ values. Kisese II faunal enamel isotopic data stand in contrast to those of the comparably aged archaeological site at Lukenya Hill (Kenya). Local controls on environments and latitudinal differences in vegetation structure and water availability potentially linked to the African Humid Period are discussed.

Quirós-Castillo, Juan Antonio [363] see Larreina-García, David

Quiroz, Carlos [30] see Hanratty, Colleen

Quispe-Bustamante, Hubert (Proyecto Ak'awillay)

[287] La escultura monumental Inka: Chinkana Grande y Teteqaqa, Cusco, Perú

En las sociedades andinas como la Inka, la preocupación de las poblaciones agrícolas por el agua para sus cultivos conllevo a realizar dos tipos de obras: las obras hidráulicas que suministraban del líquido vital y las obras artísticas realizadas en las nacientes del agua donde coexistía un afloramiento rocoso de dimensiones monumentales. Estas obras artísticas fueron talladas por los Inkas, transfigurando las rocas en esculturas monumentales, con el plan esencial de sensibilizar a los grupos humanos próximos sobre la relación del poder del Tawantinsuyu con las expresiones de la pachamama y la importancia de la preservación del agua. En Cusco existen afloramientos rocosos con tallados en distintas formas, tamaños y composiciones, denominados como elementos compositivos. En este trabajo se presentan los

resultados del estudio de dos de estas esculturas monumentales inkas en Cusco, Chinkana Grande y Teteqaqa. El análisis permite apreciar la plasmación de aspectos ideológicos vinculados a la organización de la sociedad Inka. Estudiar las relaciones entre distintos elementos compositivos tallados sobre estos afloramientos rocosos mejorara nuestro conocimiento del rol desempeñado por la ideología en los imperios tempranos y representara un referente para entender los cultos desarrollados por las religiones prehispánicas en los Andes Centrales.

Quispe-Bustamante, Hubert [289] see Bélisle, Véronique

Raczek, Teresa (Kennesaw State University)

[395] Why Are You Here? What Did You Learn? Assessing Archaeology Outreach and Education in Fair and Museum Settings

In recent years, archaeologists have increased their archaeology outreach and education activities as a way to engage the public, share research, and promote the discipline. However, few such programs are formally evaluated even though assessment helps archaeologists improve their programming, streamline resources, and ensure that the public learns intended lessons. This paper will present a qualitative assessment of archaeology outreach activities conducted at two events: a booth at a Farmer's Market on International Archaeology Day and an activity table for "Science Day" at a natural history museum.

Radde, Hugh [210] see Kennedy Richardson, Karimah

Rademaker, Kurt [45] see Meinekat, Sarah

Rademaker, Kurt [268] see Pratt, Lauren

Radford, Britney (University Of Montana), Kirsten Green (University of Montana), Keith Biddle (University of Montana), Meradeth Snow (University of Montana) and Elena Hughes (University of Montana)

[121] The Use of Forensic Anthropology Methods in Historic Cases

"Historic" is a term commonly used in archaeology and bioarcheology but is not typically associated with forensic anthropology. However, historic cases have been brought to forensic anthropology labs, where biological profiles are built using forensic anthropological methods. These osteological methods used within forensic anthropology can be applied to historic cases, as seen in the cases from Beaverhead County, Montana. The initial request for this study came from an individual that believed a deceased family member had not been transferred to a new cemetery. During the initial exhumation done by the City of Missoula, three individuals were discovered and transported to the Montana State Crime Lab, where they were transferred to the University of Montana. Sex, age, stature, ancestry, and pathology were estimated using forensic anthropology and bioarcheology methods in order to aid in identification. Analysis of sexually dimorphic traits of the skull and pelvis were used for sex estimation. Known changes within the pelvis and skull were used to estimate age-at-death. Morphological characteristic and cranial measurement were used in correspondence with FORDISC 3.1's statistical analyses to determined ancestry. Trauma and pathological analysis were performed and corroborated by Dr. Aldo Fusaro of the Montana State Crime Lab in Missoula, MT.

Radivojevic, Miljana (UCL Institute of Archaeology), Marko Porcic (University of Belgrade, Faculty of Philosophy) and Jelena Grujic (Vrije University Brussels, Artificial Intelligence)

[363] Complexity Science and Archaeological Cultures: Evaluating Archaeological Phenomena Using Networks Analysis of Copper Supply in the Balkans, c. 6200 – 3200 BCE

The concept of archaeological culture is one of the most challenging yet most enduring concepts in prehistoric archaeology. Recently we used innovative method based on complex networks for identifying community structures in the archaeological record that allow for independent evaluation of archaeological cultures that show evidence of copper use in the Balkans,

from c. 6200 to c. 3200 BCE. We employ chemical data of copper-based objects from 79 archaeological sites as the independent variable for detecting most densely interconnected sets of nodes with a modularity maximization method. For each time slice, the structure of the network based on copper tools was compared to the spatial distribution of archaeological cultures. However, the effect of isolation by distance was not explicitly controlled. Here we build upon our previous study and apply the methodological approach developed in Radivojevic & Grujic (2018) to empirically determine if traditionally defined archaeological cultures of the Balkan Neolithic and Chalcolithic (6200-3200 BC) represent meaningful entities from the perspective of dynamics of copper supply networks and technology transfer. Furthermore, we improve our previous method by doing the cluster analysis of the bipartite network instead of the projection as in our previous study.

Radio-Dzur, Alanna (Ohio State University)

[411] Greater Nicoya Metates and the Art Market: A Case Study

A distinctive tradition of intricately sculpted metates—commonly known as grinding stones—flourished along the Pacific coast of Nicaragua and Costa Rica circa 300-900 CE. The Greater Nicoya burials that contain carved metates often include grave goods made of precious materials such as jade and gold. As a result, these sites have been subject to looting since the 16th century when the Spanish thought of cemeteries as “mines.” Interest in other types of artifacts only began to increase in the 19th century as encyclopedic museums clamored for new types of objects to fill their halls. Unfortunately, the preponderance of undocumented artifacts in collections—along with continued looting—has obscured the emergence of a new type of object. Based on archaeological examples, these Greater Nicoya metates first appear in museum collections at the turn of the 20th century, in the same moment that the earliest scientific excavations began in the region. Today, they frequently appear in auctions of Precolumbian art and are on prominent display in museums around the world. This case study describes these metates, showing how they reflect the interests and desires of collectors, particularly in the 20th-century market for “primitive” art.

Rael, Shannan [117] see Holsten, Jarrett

Rafuse, Daniel J. [285] see Gutierrez, Maria

Ragsdale, Corey [192] see Edgar, Heather

Ragsdale, Corey (Southern Illinois University Edwardsville)

[192] Population Structure in the Valley of Mexico at the Time of Spanish Conquest

Cultural processes connected the various regions throughout Mesoamerica. Increased long-distance trade, political alliances, imperial conquest, and spread of religious ideology in the Valley of Mexico facilitated more migration over time. City nucleation to important economic, political, and religious centers increased population variation throughout the Valley of Mexico in the Late Postclassic period (1200-1521) compared with previous settlements throughout the region. This variation resulted in the complex population structures and multi-ethnic cities and towns the Spanish encountered upon their arrival in 1519. Here we present population structure results of Formative, Classic, and Postclassic groups in the Valley of Mexico. We compare dental morphological observations among skeletal samples from the Valley of Mexico and nearby regions, over time, using traditional biological distance and genetic population structure analyses. Results indicate population variation greatly increases during the Postclassic period, particularly during the Late Postclassic. Increase population variation correlates with increased economic, political, and religious complexity throughout the region, most likely resulting from complex migration networks associated with cultural interactions. Our results support increased migration prior to, and throughout the Postclassic period led to a biologically diverse environment in the Valley of Mexico at the time of the Spanish conquest.

[192] Chair

Railey, Jim (SWCA - Albuquerque)

[346] Bedrock Mortars as Symbolic Features

Bedrock mortars are common features in various parts of the world, including western North America. They are most often viewed as food-processing facilities, and indeed there is ample historical evidence for this function, especially from

California and parts of the Great Basin. However, there is also evidence that bedrock mortars, or similar features, were used for more symbolic purposes. This includes ethnohistoric and archaeological examples in which mortars served symbolic functions, or could not have been effectively used for food processing. Known or possible symbolic functions include calendrical devices, earth openings, and sexual representations. After reviewing some known or suspected examples of symbolically functioning mortars from various parts of the world, this paper presents a case study from the Culebra Bluff site in southeastern New Mexico. This site, located along the Pecos River, was occupied over a long period of time and has numerous bedrock mortars in several spatially discrete clusters. The conglomerate bedrock into which many of the mortars were carved would have made them less-than-ideal for food processing. The bedrock mortars at Culebra Bluff may have embodied a symbolic function, perhaps intended, in part, to reinforce the site's status as a persistent place.

Raillard, Daniela (Northwestern University)

[287] Embodied Deathscapes: Above-Ground Mortuary Structures in the Northeastern Peruvian Andes

The northeastern slopes of the Peruvian Andes are ruptured by jagged limestone cliffs containing tombs built into caves, ledges, and overhangs. While these tombs vary considerably in structural and stylistic form, ranging from painted sarcophagi to multi-storyed mausolea, they have been associated with a single archaeological region defined as Chachapoyas. Pedestrian survey conducted in 2017 and 2018 begins to address the significant quantity and diversity of above-ground tombs. This poster examines survey results to propose that the mapping of above-ground tombs can 1) provide insight into questions of the region's social and political diversity and 2) develop understanding of how the dead in the Andes structured the landscape of the living. I introduce a preliminary model of a deathscape to explore how above-ground tombs acted to structure the landscape of the living. Through catchment analyses, settlement patterns and viewsheds, the poster visualizes the embodiment of the dead in a lived landscape. Finally, I complement these analyses with the phenomenological experience of moving through a deathscape on both pre-Hispanic and contemporary trail networks in Peru's northeastern ceja de selva.

Rainey, Audrey [398] see Fulgham, Samantha

Rainville, Charles (University of Oklahoma)

[325] Remote Sensing's Capacity to Identify Shell Deposits at the Silver Glen Springs Complex, Florida

Landscape archaeology is fundamentally directed towards understanding the intersection of natural and constructed places, and their reciprocal influence on history. Mounds constructed of earth or shell have been the predominant focus of Southeastern archaeologist for generations. Subsequently, the spaces outside the bounds of mounded places have not been adequately studied. Remote sensing equipment such as: ground penetrating radar, magnetic susceptibility gradiometer, and electrical resistance meters, as well as coring, and test unit excavations were utilized during the 2018 field season at the Silver Glen Springs Complex in Northeastern Florida. The use of combined remote sensing, coring, and excavations can provide the resolution needed to investigate the subsurface architecture and patterning of the non-mounded spaces. Geophysics' capacity to identify archaeological deposits without the use of destructive excavation has been useful, but methodological concerns persist in its ability to clearly identify subsurface variations in composition, like pit features. This poster delves into the efficacy of multiple geophysics equipment's ability to identify discrete shell deposits and sub-surface architectural elements by comparing the remote sensing data with coring and test unit excavations. It is through this analysis that a protocol is developed for identifying shell bearing middens and other subsurface elements from geophysics data.

Raja, Mussa [82] see Gomes, Ana

Raja, Mussa (ICArEHB-University of Algarve and Eduardo Mondlane University), Nuno Bicho (Interdisciplinary Center for Archaeology and Evolution), Jonathan Haws (Department of Anthropology, University of Louisville), Mussa Achimo (Universidade Eduardo Mondlane) and Ana Gomes (Interdisciplinary Center for Archaeology and Evolution)

[338] Geochemical and Sedimentary-Based Reconstruction of the Palaeoenvironment and Formation of the Late Stone Age Site of Txina-Txina (Massingir, Mozambique)

This study aimed to reconstruct Txina-Txina site (located between the junction of Machampane and Chifati rivers, Southeastern Mozambique) paleoenvironment and site formation processes to better understand its occupation pattern,

preservation of archaeological materials and the impact of palaeoenvironmental changes on human evolution. For this, we collected sediment samples from test pits and sections on the wall of Txina-Txina for textural, morphometric and geochemical analysis. Additionally, the number and weight of lithics was measured on the test pits. These data allowed us to conclude that next to the hill slope there are colluvial sediments with angular boulders. These sediments were overlaid by a conglomerate covered by fine sediments episodically interrupted by gravel layers. The presence of a conglomerate and round gravel layers indicates that there were high energy events along the rivers. According to the dates, the gravel layers were deposited in wet periods that occurred before 29000 and after 14000 years ago, during the African Humid Period. Although our interpretation is that the fine sediments have a colluvial origin, more analysis will be carried out to confirm this hypothesis. The lithic concentrations showed that the site occupation was likely to have been more intense during drier periods.

Rakita, Gordon (University of North Florida)

[185] Bodies of Evidence: Indications of Non-Western Ontologies at Paquimé, Chihuahua

Ethnographic descriptions of historic and contemporary peoples with clear connections to prehistoric cultural groups offer ready sources to explore non-Western views of reality. Researchers working in the American Southwest and much of Mesoamerica benefit from robust ethnographic accounts that can be fairly unambiguously connected to prehistoric cultures. However, in the absence of clear ethnographic analogs, the direct historical approach to elucidating indigenous ontological principles is difficult. The prehispanic community of Paquimé in northwestern Chihuahua, Mexico represents just such a situation. While there are some existing native cultures that provide hints at possible Paquiméan ontology, no direct connection between the prehistoric past and existing cultures has been established. In this paper, we examine what ethnographic materials do exist along with archaeological evidence, especially evidence from human remains, to explore possible Paquiméan views of the body.

[1] Moderator

[185] Chair

Rakita, Gordon [296] see Waller, Kyle

Rakowski, Rebekah [121] see Blatt, Samantha

Ralph, Jordan [22] see Smith, Claire

Ralston, Claira, Debra Martin (University of Nevada, Las Vegas) and Maryann Calleja (University of Nevada, Las Vegas)

[353] Working, Living, and Dying Together: Rethinking Marginality, Sex, and Hierarchy in Kayenta Communities (AD 900-1150)

Pueblo groups living in the Kayenta region of northern Arizona differ remarkably from their contemporaries in adjacent regions. At Mesa Verde and Chaco to the northeast and southeast respectively, there is compelling evidence for rigid hierarchical and political systems of trade, governance, and decision-making that generated inequalities across localities and sex, age, and status groups. In the Kayenta region, communities formed alliances and kin networks across vast spaces, while trading local items within Kayenta boundaries. This study examines patterns of disease, enthesial changes, robusticity, and trauma in adult males and females from the Kayenta region. The comparable distribution of these skeletal markers across sex and age groups suggests a unique form of hierarchy foundational to the people occupying what has been described as a marginal and challenging place to survive as farmers. These data have implications for understanding the successes of the Kayenta populations in terms of health outcomes and growth compared to other groups. What explains this island of heterarchy in a sea of hierarchy? Utilizing Giddens's notion of ontological security, it can be argued that by focusing inward and developing a subculture of equity and security through inclusiveness, Kayenta communities put their faith in collaboration and innovation.

Ram, Sudha [259] see Mills, Barbara

Ramirez, Victoria [88] see Morrison, Heather

Rammutoa, Kefilwe

[82] Trade and Exchange in the Greater Mapungubwe Landscape

Our understanding of the trade and exchange networks systems in Southern Africa during AD 700 to AD 1300 has mostly been drawn from sites located in the Shashe Limpopo Confluence Area (SCLA); a drainage basin that is positioned on the borders of Botswana, South Africa and Zimbabwe. This has led to bias interpretations and conceptualisation on how trade and exchange networks were structured. The question of control and access to materials such as gold, copper, iron, glass beads, ivory and many other remain central. Was access to these objects controlled, if so how? Similarly, more questions need be asked about the objects that archaeologists associate with the high-status elite communities. Were these objects always reserved for and restricted to elite consumption? Alternatively, can we identify variable patterns in the distribution of the different objects, both spatially and temporally? Such question is crucial in reconstructing and understand the trade and exchange network systems in the Greater Mapungubwe Landscape.

[82] Chair

Ramón Celis, Pedro Guillermo [183] see Higelin Ponce De Leon, Ricardo

Ramos, Jorge, Zachary Hruby and Xinwei Li

[255] Obsidian Blade Caches from the 8N-11 Group of Las Sepulturas, Copan, Honduras

Ongoing excavations in Structures 69C and 70W in the 8N-11 group of Las Sepulturas have uncovered pressure blade caches of great complexity and size. While blade caches are relatively common at Copan, these caches were excavated with an eye for context and technology. Careful recording of the relative positions of these blades, as well as a detailed technological analysis reveals previously unrecognized symbolic patterns in their deposition. We discuss the method of excavation and recording of the blades, symbolic meaning and explain the processes of production that must have occurred to create these caches.

Ramos Madrigal, Jazmín (Natural History Museum of Denmark, University of Copenhagen) and M. Thomas P. Gilbert (Natural History Museum of Denmark)

[302] The Genetic History and Diffusion Routes of Early Maize in North America

Archaeological and genetic evidence from modern and ancient maize (*Zea mays*) samples indicate that maize initially reached the southwestern United States (U.S.) by around 4,000 years ago via a highland Mexican route, followed by a second introduction via the Pacific coast, around 2,000 years ago. However, maize diffusion routes northward from the domestication center from southern Mexico up to the U.S. Southwest and Southeast remain contentious. To explore the potential diffusion routes, we generated high-throughput sequencing data from 24 ancient maize cobs and kernels from three archaeological sites dated to different time periods: the Romero Cave in northeastern Mexico (n=2; 2,450-2,750 BP), the Three Fir Shelter in the southwestern U.S. (n=6; 2,075-2,500 BP) and the Ozarks Shelter in the southeastern U.S. (n=16; 70-1,120 BP). By comparing these data to a reference data set composed of modern maize land races and previously published ancient maize samples, we assess the genetic ancestry of early maize in North America and identify potential dispersion routes north from the domestication center into northeastern Mexico and the southeastern U.S.

Ramsden, Peter [73] see Williamson, Ronald

Ramsey, Joshua (Canyon de Chelly National Monument) and Keith Lyons (Canyon de Chelly N.M., Hubbell Trading Post N.H.S.)

[85] *Complexities and Opportunities in a Living Landscape: Developing a Cooperative Management Strategy for Historic Navajo Architecture in Canyon de Chelly*

Canyon de Chelly National Monument's enabling legislation language is unique among units of the National Park system. Rights, title and interest to all lands and minerals were retained by the Navajo tribe upon the Monument's establishment in 1931. Legal authorities are therefore executed by multiple governmental entities including, but not limited to, the Bureau of Indian Affairs (BIA), the National Park Service (NPS), the United States Department of Agriculture, various Navajo Nation departments and local tribal Chapters. While cooperative management between these entities is crucial for protecting the canyon's resources and trust relationship, the canyon's historic vernacular landscape has largely been shaped and maintained by generations of Navajo families. Many significant Pre-Contact architectural sites also contain historic Navajo alterations and structural additions. Despite a shift away from extensive farming and livestock grazing toward tourism, Canyon de Chelly's resident Navajo community still maintains a strong bond with archaeological sites that contain historic Navajo elements. As the NPS joins the BIA and Navajo Nation in developing a Joint Management Plan for the canyon, cooperative preservation strategies will be explored with individual residents whose families have preserved and contributed to the evolution of the canyon's historic vernacular landscape.

Ran, Weiyu

[416] *Households in Middle Neolithic Northeastern China: A Study on Shangchaoyanggou Site Applying An Intensive Collection Method*

The remains of around 40 households within the Shangchaoyanggou site in northeastern China have been collected and analyzed in order to reconstruct the social and economic activities of different households during the middle Neolithic Hongshan period. In the Shangchaoyanggou site, as well as many other Hongshan sites, the original Neolithic cultural layers are shallow and heavily damaged, which prevents delineating the layouts of households via excavation. The method of intensive surface collection offers considerable advantages in coping with such a situation. By applying full-coverage ground survey and shallow earth screening, the distribution areas of Shangchaoyanggou household artifact clusters were delineated and artifacts, such as lithics and ceramic sherds, were collected. Further comparative studies will provide evidence on the degrees of various aspects of social differentiation between different households within Shangchaoyanggou site, and between Shangchaoyanggou households and those in other parts of the Hongshan Area.

Ranaldo, Filomena [144] see Kitagawa, Keiko

Randall, Asa (University of Oklahoma)

[168] *A Post-Archaic Public Structure on the Middle St. Johns River, Florida? A First Look at the Evidence*

One of the more vexing issues facing archaeologists working in the middle St. Johns River valley of northeast Florida is a general lack of architectural evidence for public or private structures. Evidence for landscape terraforming abounds in the form of earthen and shell mounds built for ceremonial or mortuary purposes. Yet, there is little discrete evidence in the form of patterned features or post holes that can be used to delineate how non-mounded spaces were used. With the goal of locating architectural evidence, the combined University of Oklahoma/University of Florida 2018 field school deployed multiple geophysics techniques amid Archaic, Woodland, and Mississippi Period shell and earthen mounds. One result of the survey was the delineation of magnetic anomalies arranged in an oval that measured 15 by 20 m. Test unit excavations along one side revealed a series of post holes and molds arranged in a linear array. At least two of the pits contained inclusions such as a whole ceramic cup and a box turtle carapace, and which date to the St. Johns Period. This poster explores the results of investigations compared to the known examples of historic and archaeological public structures in the region.

Randall, Ian

[301] *Littoral Society and the Heterotopic Fabric of Early Medieval ports*

Ports have long been recognized as nodes within grand skeins of connectivity, the thresholds over which goods and ideas move into a wider hinterland. But how, and to what extent, do ports function as their own world, and what can we say about littoral society and the contextual relationship of sea-adjacent peoples to their material culture? This paper builds off of Myrto Veikou's work to examine Early Islamic ports in the Eastern Mediterranean as Foucauldian 'heterotopias,' and the sea

as a connective fabric that binds together an engagement with material culture qualitatively different from inland areas. Moving from the 7th to the 9th century the ways in which this fabric changes through, what Horden and Purcell have called the 'Early Medieval Depression,' will serve to highlight the 'otherness,' and continued connectivity, of peoples outside of shifting religious and political contexts.

Rangel, David (David Rangel), Ariana Juárez (Universidad Autónoma de Zacatecas), Alejandro Valdes (Escuela Nacional de Antropología e Historia) and José Luis Punzo Díaz (Instituto Nacional de Antropología e Historia)

[375] Continuity and Change in Prehispanic and Colonial Pottery Production at Tzintzuntzan

This poster examines continuity and change in prehispanic and colonial pottery production at Tzintzuntzan through a typological and petrographic analysis.

Ranhorn, Kathryn [47] see Quirin, Carley

Rankin, Adrianne

[16] Prehistoric and Historical Period Agricultural Strategies in the Western Papagueria: Archaeological and O'odham Perspectives

This paper investigates prehistoric and historical period agricultural strategies in the Western Papagueria, a vast area of southwest Arizona and Northwest Mexico. It is the hottest and driest portion of the Sonoran Desert with temperatures that exceed 110° and rainfall of 2"-11"/year. It is also a place of great biological and cultural overlap and diversity. Since 1996 archaeologists have surveyed nearly 200,000 acres and identified about 1,900 archaeological sites on the Barry M. Goldwater Range East. One of the biggest surprises is the presence of large villages and associated features that represent various agricultural strategies. These are examined from the perspective of archaeologists and O'odham Elders working together. Once thought to be too dry and hot to practice agriculture there is evidence for canal irrigation, ak-chin farming, dry farming, and walk-in wells at large Formative period sites occupied from AD 1050-1450. Historically, anthropologists described the Hia C-ed O'odham (Sand Papago) as being hunters and gatherers who lived in small villages/basecamps scattered between the Gulf of California and the Gila River. Recent research and oral history indicates that the Hia C-ed O'odham also practiced agriculture—canal irrigation from marshes, floodwater farming along ephemeral washes, and use of playas for agricultural fields.

Rankin, Caitlin (Washington University in St. Louis)

[49] A Concealed Landscape: Historic Processes of Landscape Change at Cahokia Mounds, IL

Ongoing geoarchaeological research studying the relationship between urbanism and environmental change at the UNESCO World Heritage Site of Cahokia Mounds has begun to unravel a pre-contact landscape concealed by historic land-use practices. Archaeological excavations and sediment coring conducted to understand the environmental conditions during the construction and utilization of the North Plaza, a wetland mound and plaza group within the central precinct of Cahokia Mounds, has ubiquitously uncovered 60 – 100 cm of historic sediment from Cahokia Creek flooding events. These historic flood events have altered both the size and shape of the five Mississippian mounds located within the historic creek floodplain. Using elevations of the original Mississippian ground surface obtained through excavations and sediment cores, we have interpolated a new elevation model of the Mississippian landscape in the North Plaza. This elevation model is not only significant in providing a more complete understanding of the Cahokian landscape, but also has implications for archaeological preservation.

Rankin, Guy [22] see Smith, Claire

Rankin, Lisa and Barry Gaulton (Memorial University of Newfoundland)

[22] A Sense of Community: Archaeology, Participatory Democracy and Social Justice in Canada's Easternmost Province

Memorial University, located in St. John's, Newfoundland, was developed in 1925 to help build a better future for the people

of Canada's easternmost province, whose largely rural fishing communities were rapidly transforming through industrialization and urbanization. Mandated by a "special obligation to the people of the province" university archaeologists embraced applied, community-based projects which encouraged local solutions to the social and economic issues arising from the transformation to modernity. Today, community-archaeology remains integral to our research program and the majority of our research is undertaken in partnership with rural and Indigenous populations who continue to be marginalized both geographically and economically. Two case studies will describe how archaeological resources are being used to promote economic and social justice, as well as reconciliation, and how archaeology has the potential to make valuable local contributions that change lives in the present.

Rankle, Chad (California State University Long Beach), Sachiko Sakai (California State University Long Beach), Alondra Garcia (California State University Long Beach) and Enadina Lozano (California State University Long Beach)

[151] Geochemical Characterization of Sediments for the Understanding of Site Occupation History in Mt. Trumbull

The first excavation of the pithouse structure site was conducted during the summer of 2018 in Mt. Trumbull as a part of settlement pattern investigation in this area. A long trench excavation conducted at the center of a depression observed in this site revealed a large pithouse floor in the limestone bedrock. The profile of this trench shows at least two or three possible occupations above the limestone bedrock layer. The interpretation of the stratigraphy, however, is somewhat challenging, partially due to the small amount of artifacts and ambiguous texture difference. Thus, in this paper, we address the questions about the history of the site use. Specifically, we seek to investigate which stratigraphic level is a human related level (e.g., living floor). Geochemical characterization of soil has successfully been applied to infer human activity elsewhere (e.g., Mesoamerica). By analyzing soil samples for phosphorus content using pXRF spectrometry, the stratigraphy of the excavation is better contextualized and the distinction between human related fill and natural fill in the archaeological feature becomes clearer. In this paper, we are presenting the results of pXRF analysis of sediments from various depth and locations within this trench.

Rankle, Chad [191] see Caro, Carlos

Ranlett, Sarah (University of Toronto)

[386] Economies of Symbolism: Procurement and Production with 'Precious' Materials in the French Upper Paleolithic

Since the Lower Paleolithic, the collections and/or minimal modification of rare or unusual materials – 'precious' materials – such as amber, lignite, soapstone, has been a part of the human behavioral suite (Moncel et al. 2012). During the Upper Paleolithic, this behavior intensified as these materials were routinely incorporated into symbolic systems through the production of beads, contours découpés as well as animal and so-called 'Venus' figurines. Due to the enigmatic nature of the subject matter of objects rendered in these materials, there has traditionally been a morphological focus in their study. But, by examining the patterns of raw material procurement and object production based on the choice of 'precious' material, certain regional and site-specific patterns emerge concerning the organization of craft production in the Upper Paleolithic as well as potential implications for the different societal roles of these materials between regions based on sites of local (<5-10km from source) production and objects whose final disposition reflects a practice of down the line exchange. This will be explored through case studies presenting novel data from sites in the Dordogne and French Pyrenees.

Ranslow, Mandy (Connecticut Department of Transportation) and David Leslie (Archaeological and Historical Services, Inc.)

[72] Not Your Average Shovel Test Pit Survey: Archaeology at the WALK Bridge, Norwalk, CT

The Connecticut Department of Transportation's rail bridge replacement in Norwalk, CT required a variety of innovative archaeological survey techniques. The heavily developed urban landscape, future construction impacts in the Norwalk River, and constantly evolving engineering plans led to a flexible and thorough archaeological survey, which included terrestrial and underwater testing. Archaeological and Historical Services partnered with scientists and students at the University of Connecticut to conduct the testing and analysis. In addition to determining areas of archaeological sensitivity, the recovered data was further used by UConn students to enhance our understanding of coastal changes in Connecticut. This paper will describe the array of archaeological testing used on the project and how the results were achieved efficiently and cost effectively. This paper will also discuss the importance of agency regulators advocating for the incorporation of scientific archaeological techniques and analyses into cultural resource management surveys and excavations.

Rapes, John (Purdue University), Jesse Wolfhagen (Stony Brook University), Max Price (Massachusetts Institute of Technology) and Erik Otarola-Castillo (Purdue University)

[127] *ZooaRchGUI: Novel Implementations to the Statistical Package for Archaeologists in the R Programming Language*

The study of zooarchaeological data illuminates some of the most important and challenging questions in archaeology. Statistical and other quantitative methods are frequently employed to address these questions by evaluating hypotheses with empirical evidence. Such methodologies range from standard “statistical tests” to novel, non-traditional inferential techniques. Unfortunately, no single standard software package exists to encompass the extent of analytical tools used by zooarchaeologists and archaeologists. In 2016, we developed ZooaRchGUI, an open-source and easy-to-use comprehensive statistical software designed for archaeologists interested in using traditional and non-standard statistical methods. ZooaRchGUI is an R package available from the Comprehensive R Archive Network (CRAN). It enables archaeologists unfamiliar with R-coding to manipulate, visualize, and analyze their data by utilizing the latest quantitative techniques available in the R programming environment via a user-friendly Graphical User Interface (GUI). We have made several advances to ZooaRchGUI. Newest developments make the underlying R code available to users, increasing the replicability and transparency of the results. This functionality also improves the utility of ZooaRchGUI as a teaching tool for R and quantitative methods more generally. We will continue to expand the functionality of ZooaRchGUI to provide the most complete experience for computational archaeology across all of its sub-disciplines.

Rapes, John [127] see May, Alejandra

Rassmann, Knut [266] see Davis, Steve

Rauch, Rebecca (The University of Utah Press)

[164] *Discussant*

Rautman, Alison (Michigan State University) and Julie Solometo (James Madison University)

[213] *Ceramic Evidence of Complex Social Boundaries in Central New Mexico*

In the American Southwest, regional sub-divisions in the archaeological record have been defined using linguistic evidence, similarity of artifact assemblages, and ceramic technology and/or styles. In central New Mexico, H. P. Mera's ceramic subdivisions from the 1930s are still helpful in understanding some issues of social and political boundaries during the 14th century, when Glaze A pottery was first adopted. Our initial ceramic studies seemed to confirm the presence of significant cultural and economic boundaries in the region. Additional information regarding the manufacture and exchange of Chupadero Black-on-white pottery throughout the region, however, creates a more nuanced and dynamic picture of how various local groups were differentiated and also integrated during this early Pueblo period.

Ravotto, Alessandro [88] see Turcanu-Carutiu, Daniela

Rawlings, Tiffany [419] see Mendel, Catherine

Rawski, Zoe (The University of Texas at San Antonio)

[217] *Naturalizing Authority: Sociopolitical Inequality and the Construction of Monumental Architecture at Early Xunantunich, Belize*

Over the last decade, the Mopan Valley Preclassic Project has extensively investigated the Preclassic ceremonial center of Early Xunantunich, Belize. These excavations have yielded significant information regarding the construction of monumental architecture during the Middle and Late Preclassic periods, as well as data regarding early ritual activities and sociopolitical organization at the site. Across the lowlands, the Preclassic was an extremely dynamic period of Maya prehistory, during which some of the grandest monumental architecture was erected and the institution of divine kinship

began to take root. As early centers were carved out of the jungle, natural features were often incorporated into the built landscape. In this paper, we share insights from ongoing excavations of a monumental platform structure at Early Xunantunich in order to explore the ways in which the Maya merged their built and natural environments by modifying the natural landscape during these early construction events. We contextualize the architectural history of this important early platform within the broader ceremonial center, incorporating new data on the structure's complex form. Finally, we examine the implications of monumental architectural forms in the processes of sociopolitical complexification and the legitimization of hierarchies.

Ray, Erin (University of New Mexico)

[174] *Chair*

Ray, Erin [174] see Alsgaard, Asia

Ray, Jack (Missouri State University) and Neal Lopinot (Missouri State University)

[176] *Investigations at the Sugar Potato Workshop Site: Repeated and Long-Term Exploitation of Burlington Chert from the Pinnacles Quarry in Central Missouri*

The Sugar Potato site is located on an alluvial fan at the base of the Pinnacles, an eroded upland area that borders the Missouri River floodplain in central Missouri. The lower slopes of the ridges in this area contain residual deposits of high-quality Burlington chert, which were quarried for more than 2,000 years. Test excavations at the Sugar Potato site in 2015 and 2017 revealed a series of six stratified lithic-reduction workshops between 1.5 and 3.7 m below ground surface. Radiocarbon ages from four of the six workshop features indicate intensive quarrying and associated workshop reduction during the Middle Woodland and Late Woodland periods. Concentrated workshop debitage found at higher elevations in the alluvial fan suggests that exploitation of Burlington chert also occurred during later Mississippian (Steed-Kisker) and Terminal Prehistoric (Oneota) times.

Raymond, Tiffany (Binghamton University) and Carl Lipo (Binghamton University)

[325] *An Evaluation of the Relations between Morphology and Thermal Properties among Poverty Point Objects (PPOs) of the American Southeast*

Poverty Point Objects (PPOs) are thought to have functions related to contexts of heating and cooking in areas where stone alternatives are not locally available. PPO morphology and composition, therefore, may potentially be explained by the efforts of prehistoric populations to manipulate thermal properties that impact performance for cooking and heating. In this pilot study, we examine variability in the surface area morphology in relation to the thermal properties of PPO composition to determine whether heat transfer properties vary with form. Using a 3D scanner to detail PPO shape, CT scans to examine internal structure, and measures of porosity and density, we characterize sample PPOs in terms of heat transfer models.

Read, Dwight [396] see Merrill, Michael

Ready, Elspeth (University of Nebraska-Lincoln) and Michael Holton Price (Santa Fe Institute)

[247] *An HBE Perspective on Niche Construction*

Decades of research in human behavioral ecology (HBE) demonstrates that questions about human ecological and reproductive adaptations generally lead to questions about cooperation. Partly for this reason, much recent research in HBE has focused on issues such as marriage, cooperative child raising, and exchange and social support (including food sharing). Here, we review some recent trends in HBE and suggest that, by expanding its' focus beyond functional questions to Tinbergen's other forms of evolutionary explanation, and especially through a deeper interest in history, social structure, and cultural phylogeny, current work in the field addresses some of the critiques made by proponents of the Extended Evolutionary Synthesis (EES). We suggest that a similar shift in perspective can enhance our understanding of human biological and cultural evolution in deep time. However, we argue that some of the tools of the Modern Synthesis (e.g., game theory, foraging theory, and life history models) remain the strongest theoretical grounding for developing niche construction hypotheses and testing them in the archaeological record. We illustrate this approach through an agent-based

model that combines diet breadth with life history constraints to examine the relative cost of maintaining cooperative networks in a context of fluctuating resource availability.

Real, Cristina (Universidad de Valencia), Carmen María Martínez-Varea (Universitat de València. Departament de Prehistòri), Yolanda Carrión (Universitat de València. Departament de Prehistòri) and Ernestina Badal (Universitat de València. Departament de Prehistòri)

[144] Human Adaptability to Fauna and Flora Changes during MIS 5-3. Is the Iberian Mediterranean Region a Refuge?

Neanderthal and AMH from the Early Upper Palaeolithic have a really good knowledge of their environment and its potential resources. The local landscape and its changes should influence their behavior and the availability of resources. In this sense, the faunal remains have been better documented than flora. But our team is getting more information about charcoal and seeds thanks to new sampling methods.

Data obtained from diverse sites (e.g. Quebrada, Cova Negra, Malladetes, Cendres) are presented in order to improve our knowledge of the climatic and edaphic conditions from the Middle Palaeolithic to the Early Upper Palaeolithic in the Iberian Mediterranean region. Available data suggest that refuge areas for thermophilous plants are located south of parallel 40° N. Identified plants may be in categories: temperate/cold conditions, warm/dry conditions, matorral and riverine habitats. The taxonomic diversity shows a steady panorama throughout the sequence under study here. The main faunal species are continuously present, mainly because they are eurytherm. We need, therefore, to focus on species that could be bioindicators, as for example rabbits or pines. Combining the results of our studies with the published data from other sites, we can identify some tendencies regarding latitudinal/altitudinal gradients.

Reamer, Justin (University of Pennsylvania- Department of Anthropology) and Kyle Olson (University of Pennsylvania- Department of Anthropology)

[411] Combating the Curation Crisis Through Dissertation Research: An Argument for Disciplinary Valorization and Financial Support of Legacy Collection Rehabilitation

Over the past 60-plus years, the adoption of more rigorous cultural heritage preservation laws in the U.S. and abroad coupled with a rapid expansion of active practicing archaeologists have led to ever-increasing volumes of archaeological collections. These enormous stores of artifacts and documentation have been acknowledged since the early-1980s as constituting a “curation crisis,” in which there are more collections to be curated than space to keep them or time, resources, and expertise to analyze them. To combat this crisis, archaeologists have advocated for investing in a variety of both analog and digital infrastructures that will allow for both greater access to curated collections and increased reuse of such collections to produce new interpretations. Due in part to changes in archaeological data collection, management, and curation practices, however, many curated collections require serious rehabilitation to be accessible and analyzable. As graduate students ourselves, we focus on the role graduate students can play in combating the “curation crisis” in dissertation research. Drawing from our own work, we argue for the importance of curated collections in dissertation research as not only an inexpensive and non-destructive form of data, but also as an urgent disciplinary and funding priority.

Rebolledo, Sandra [240] see Flores-Fernandez, Carola

Recinos, Roxanne and Sarah Rowe (University of Texas Rio Grande Valley)

[350] Breaking the Site Museum Mold: Designing the Dos Mangas Community Museum

Archaeological investigations began in Dos Mangas in 2006, and continued with excavation of a Valdivia village site, Buen Suceso, in 2009. Those and subsequent excavations carried out by Sarah Rowe have combined archaeological inquiry with community engagement activities such as presentations in the primary school, workshops for community guides, and presentations at community meetings. From early in the project community leaders have expressed an interest in constructing a museum in the village to highlight the archaeological resources that exist on community lands. This paper presents the results of a community-needs assessment conducted in Dos Mangas, Ecuador by Roxanne Recinos in June and July of 2018. A series of interviews with individuals and small groups was conducted to elicit their ideas and interests in relation to this proposed community museum. Themes drawn from these interviews are used to create a museum design that is responsive to community interests and faithful to the archaeological findings. Notably, this design eschews the typical, cultural period-driven presentation of many site museums. Further consultation with community members and leadership will refine this proposal and be used to secure funding and local support for construction in the (hopefully) near

future.

Reckin, Rachel (Okanogan-Wenatchee National Forest) and Lawrence Todd (GRSLE)

[80] Illuminating High Elevation Seasonal Occupational Duration in the Greater Yellowstone Ecosystem Using Patterning in Lithic Raw Materials and Tool Types

In recent years, our understanding of high elevation landscapes' potential contribution to prehistoric foragers' seasonal rounds has developed significantly. This paper advances that understanding further by offering a method for estimating relative occupational duration through time for high elevation landscapes. Using assemblages from the Absaroka and Beartooth Mountains of the Greater Yellowstone Ecosystem, we measure lithic diversity, both in terms of tool types and raw materials, to consider how and why foragers adjusted their seasonal rounds through time. Ultimately, we find that the major drought known as the Early Holocene Warming correlates with the most extended high elevation occupations in the Beartooth Mountains, while the Absaroka Mountains experienced their longest occupational durations during the Middle Archaic, when the climate had ameliorated. Indeed climate, in general, does not clearly correlate with high elevation occupational duration. In addition, we consider the potential impacts of the Numic Expansion, an influx of Shoshone people from the Great Basin whose timing is much debated. In the Absarokas, the increase in obsidian use at high elevations may indicate Numic arrival during the Middle Archaic, while patterns of occupational duration in the Beartooths register no clear disruption to signal the Numic Expansion.

Reckin, Rachel [327] see Todd, Lawrence

Redon, Antonio (University of Iceland)

[142] Female Warriors of the Viking Age

In my presentation I will explore how women in the Viking age contributed to acts of violence by looking into three different cases of burials containing women with weapons and armaments. I will draw these studies from my original Master's thesis published in 2017 and focus solely on the archaeological evidence, leaving out additional textual mentions of women warriors for the sake of brevity. I will also discuss the theoretical approaches one can use when examining these sites, archaeology of gender and feminist theory, and compare them to the original interpretations from these sites and the implications they bring.

Reed, Patrick (Portland State University), Shelby Anderson (Portland State University) and Caelie Butler (Portland State University)

[10] Birnirk and Thule Pottery: Analysis of Arctic Ceramics from Inuigniq (Cape Espenberg), Alaska

We are conducting a multi-year (2009-2018), multi-disciplinary research project at Inuigniq (Cape Espenberg) to explore changing patterns of human occupation, culture change, and environmental conditions in Northwest Alaska. Our current focus is on the emergence of Birnirk archaeological culture ca. AD 1000, and the question of how Birnirk culture factored into the formation of Ancestral Iñupiaq (Thule) culture around AD 1300. We undertook analysis of Inuigniq ceramics to address the question of continuity and change over this transitional period, and to further evaluate data on Birnirk spheres of influence as established by prior ceramic research. Excavation of five Thule and Birnirk semi-subterranean houses at Inuigniq (800 AD and 1400 AD) yielded over 9,100 ceramics. We compared the Inuigniq ceramic technology to ceramics from the Birnirk type site and later Thule sites. We found similarities in ceramic technology over time, and also the development of local decorative styles that are linked to previously established geochemical source groups. These new results inform our understanding of interaction and cultural change during this pivotal cultural period, and also contribute more broadly to the study of circumpolar ceramic technology and foodways.

Reed, Paul (Archaeology Southwest)

[41] Pueblo of Acoma Ethnographic Study of the Greater Chaco Landscape

Over the last 4 years, Archaeology Southwest has been working to protect the Greater Chaco Landscape from the damaging effects of oil-gas development. We have partnered with a number of environmental and preservation organizations, engaged the NM Congressional delegation on numerous occasions, and attended many, many meetings with the New Mexico Bureau of Land Management (BLM) and the Bureau of Indian Affairs (BIA). None of efforts have been

more important than engagement with Native American Tribes, with the primary goal of helping to get Native voices out in front on this critical issue. Together with the Pueblo of Acoma, Archaeology Southwest is completing preservation work in specific areas of the Greater Chaco Landscape (GCL) that are threatened by oil-gas development. Goals of the project include: 1) having Acoma cultural leaders visit the landscapes of Greater Chaco to make connections; 2) collecting appropriate data and creating an Acoma-approved report to help inform Bureau of Land Management and Bureau of Indian Affairs as they manage oil-gas development across the GCL; 3) compiling data and producing a confidential report for the Pueblo of Acoma.

[342] *Moderator*

Reed, William (USDA - Forest Service)

[12] *Fire Archaeology: Preservation in Practice*

This poster focuses on the development and future of Cultural Resource Protection and Management before, during, and after wildfires. As the number of fires and acres burned continue to increase each year cultural resources are at critical risk of being damaged and destroyed. To protect these resources archaeologists work in a variety of ways to assist with fire management, including enlistment and qualification as fire fighters and joining the fire fight. The poster illustrates the variety of roles and techniques in use during prescribed fires, fire suppression, and burned area recovery.

[12] *Chair*

Reeder-Myers, Leslie (Temple University), Ashley Sharpe (Smithsonian Tropical Research Institute), Whitney Goodwin (Southern Methodist University) and Wilmer Elvir (Universidad Nacional Autónoma de Honduras)

[47] *Shell Midden Zooarchaeology and Paleoecology of Guaimoreto Lagoon, Northeast Honduras*

Recent research documents resource use and ecological change at the Selin Farm site, a group of around 30 well-stratified house and shell mounds occupied AD 300 – 1000 near the Guaimoreto Lagoon on the northeast coast of Honduras. A 4.5 m high shell mound with excellent preservation of vertebrate and invertebrate remains provides a full view of landscape change throughout the occupation of the site, including nearby terrestrial, riverine, and estuarine ecosystems. Alongside incipient agricultural practices, people exploited a wide range of wild animals from the region, with a particular focus on deer, several fish species, oyster, and conch. High species richness throughout the occupation, however, indicates an exceptionally high diet breadth and a flexible subsistence system that served the inhabitants of Selin Farm well during the upheaval of economic, social, and political systems that occurred during the 8th-9th centuries A.D.

Reents-Budet, Dorie (Museum of Fine Arts Boston), Ronald L. Bishop (Smithsonian Institution), Christophe Helmke (University of Copenhagen) and Julie Hoggarth (Baylor University)

[199] *Komkom What May: The Ancient Maya Kingdom of Komkom in Time and Place*

Painted and carved pictorial pottery of the Classic Maya (250-850 CE) served primarily as ostentatious serving vessels at feasts and other principal celebrations. The vessels were masterful creations by accomplished artisans and are, for the most part, individualistic expressions. The imagery includes a dedicatory hieroglyphic text ending with the names and titles of the vessels' patrons/owners, implying they were the proud possessions of royalty and the high elite. Among these are the little-known kings of Komkom, who are mentioned in the monumental glyptic texts at Naranjo, Guatemala and on portable ceramic and other portable objects found at the sites of Buenavista del Cayo and Baking Pot, in Belize. Yet its geographic location remains to be verified. Through detailed epigraphic and chemical analyses of objects bearing reference to the kings of Komkom, this paper presents our recent results combining epigraphic, artistic style, and trace elemental chemical analyses. Research goals focus on (1) discerning the location(s) of manufacture of pottery bearing Komkom nominals, (2) establishing the archaeological identity of Komkom, and (3) shedding light on Komkom's socio-political interactions during the Classic period.

Reents-Budet, Dorie [349] see Rich, Michelle

Rees, Mark [251] see Britt, Tad

Reese, Kelsey (University of Notre Dame)

[128] *All for Drone and Drone for Free: A Free and/or Open-Source Workflow for UAV Imagery Collection and Analysis*

Full coverage pedestrian survey to record new sites on unknown archaeological landscapes is costly in terms of money, time, and personnel. Archaeological projects are usually limited in these resources and have to simultaneously balance data quantity with quality within their budgetary means. Researchers have experimented with Unmanned Aerial Vehicles (UAV) and remote sensing technology over the past decade, but the initial cost of equipment, software, and necessary processing power has hindered the ubiquitous implementation of UAV technology for archaeological survey. This poster presents a systematic analysis of UAV orthoimagery in a variety of landcover contexts to determine the most effective means of identifying archaeological sites in a previously unsurveyed area. By implementing the methods presented here, researchers will be able to identify and target areas of interest to visit while in the field through a free and automated process using R, DroneDeploy, and OpenDroneMap. The development of an effective and free methodology for collecting and analyzing aerial orthoimagery increases the accessibility of cutting-edge technology to researchers without the funds to purchase proprietary software. A case study from the Mesa Verde North Escarpment in southwestern Colorado is used to demonstrate the process and results of the proposed free and open-source workflow.

Reese, Kelsey [259] see Portman, Katherine

Reese-Taylor, Kathryn [330] see Milley, David

Reese-Taylor, Kathryn, Debra S. Walker (University of Florida), Verónica Vázquez López (University of Calgary), F. C. Atasta Flores Esquivel (Universidad Nacional Autónoma de Mexico) and Armando Anaya Hernández (Universidad Autónoma de Campeche)

[410] *Evidence for Early Sedentary Occupation in the Yaxnohcah Region, Campeche, Mexico*

Early settlement at Yaxnohcah appears to have been widespread throughout a landscape covering over 40km². In this paper, we specifically discuss the distribution of this settlement in the period from 900-700 BCE and contrast it to the distribution from 700-300 BCE. Initial analyses suggest that the spatial range of the settlement contracted in the latter period. We explore the possible causes of this contraction and its implications for early sedentism in the Maya lowlands.

Reetz, Elizabeth (University of Iowa Office of the State Archaeologist), Jeanne Moe (Project Archaeology, Bureau of Land Management) and Elizabeth Pruitt (Society for American Archaeology)

[184] *The Most Overlooked Component of Public Programming: Approaches to Educational Assessment*

As scientists, archaeologists collect data. Why don't we often collect data on the effectiveness of archaeology education programming? Public archaeology is developing into an essential practice. However, our field lacks extensive comparative information about the outcomes of these programs, and we rarely assess what our participants learn or how effectively practitioners deliver programming. Building a library of such information would help contribute to the long-term success of archaeology education and more informed public stewards of cultural resources. This paper clarifies the need for archaeologists to understand the importance of assessment and evaluation. Through comparative case studies and learning research, the authors outline best practices for developing instruments, conducting formal and informal assessments, and using results to refine public programming. The goal is to lay a foundation for assessment tools that will improve archaeological education and communication going forward.

[376] *Moderator*

Reeves, Jonathan [390] see Frye, Joshua

Reeves, Jonathan [390] see James, Sydney

Reeves, Jonathan [390] see Skosey-LaLonde, Elena

Reger, Brandi [218] see Gonzalez, Juan

Reger, Brandi (University of Texas Rio Grande Valley), Sarah Rowe (University of Texas Rio Grande Valley) and Guy Duke (University of Texas Rio Grande Valley)

[288] Stone Tools from the Buen Suceso Site, Santa Elena, Ecuador

In the summer of 2018, the lithic artifacts of two units of the Late Valdivia (2100 BC - 1800 BC) occupation of the Buen Suceso site were analyzed as an undergraduate research project. The Valdivia people were a settled agricultural society based on the utilization of marine, forest, and riverine resources. The people of Buen Suceso lived on the edge of the cloud forest in western Ecuador, on the banks of the Culebra-Colin River not far inland from the Pacific Coast. Their ancestors were one of the first people to develop ceramic technology in South America, and yet they utilized a simple flake based lithic technology that was little changed from their hunting and gathering predecessors. In this poster, we examine the physical characteristics of some of these lithic artifacts and present some preliminary suggestions about their manufacture. Patterns of material selection and flake sizes are investigated, and changes in flake size and distribution are analyzed. While most of the artifacts examined were amorphous flakes, some may have been designed specifically to be comfortable to hold in the hand.

Regnier, Amanda [155] see Hammerstedt, Scott

Rehren, Thilo [363] see Ting, Carmen

Reibel, Michael [270] see Garcia-Des Lauriers, Claudia

Reich, David (Harvard Medical School)

[196] Genetic Insights into Indo-European Origins

Ancient genomic data has provided important new clues that help to address the more than 200-year-old problem of the origin of Indo-European languages. Beginning in 2015, a series of papers have shown that Yamnaya steppe pastoralists--who spread over the steppes north of the Black and Caspian Seas after around 5,300 years ago--harbored a distinctive mixture of ancestries that is present in nearly all the indigenous speakers of Indo-European languages today. By documenting large-scale population movements correlated to the geographic distribution of these languages, these findings increase the plausibility of the hypothesis that the language ancestral to all Indo-European languages except for the earliest branch (Anatolian languages like Hittite) was spread by the Yamnaya. In this talk I will review the genetic evidence for this process in Europe and South Asia.

Reich, David [253] see Sirak, Kendra

Reichert, Susanne (Bonn University)

[101] Mongol Period Urban Sites and Their Hinterland in Comparison: Karakorum and Khar Khul Khaany Balgas

With its sparse population and few forest coverage, Mongolia is ideally suited for a wide array of surveying methods and as a consequence for landscape archaeological approaches. The proposed paper particularly looks into power and authority as expressed within the landscape. Two valleys in Mongolia will be compared. Both were partially covered by systematic pedestrian surveys carried out by a joint collaboration of Bonn University with colleagues from the Mongolian Academy of Sciences in 2017 and 2018. The Khanui and Orkhon valleys with their large settlement sites dating to the Mongol period serve as perfect case studies. With special emphasis on the Mongol period but including other historic periods also evident within the retrieved materials the following questions will be addressed: How was the landscape used? In which ways can we detect strategies of power in the material record? How is power enacted by objects, sites and landscapes? The paper

presents preliminary analyses of the surveys from 2017 and 2018 to approach these questions.

[101] *Chair*

Reid, Connie and Neil Weintraub (Kaibab National Forest)

[12] *Addressing the Inevitable: Site Preservation Efforts in the Face of Global Climate Change*

Global climate change is contributing to the escalation of large catastrophic wildfires across North America. Fires are increasing in frequency, intensity, and scale, posing one of the greatest contemporary threats to thousands of archaeological and historic properties across the western US. Modern tree densities in many forests far exceed historic norms. Coupled with warmer, drier and erratic weather patterns, forests are experiencing more frequent stand replacement fire. During these events, heavy equipment, extreme heat, winds, and post-fire flooding are resulting in devastating effects to fragile sites. Post fire damages are particularly destructive in the American Southwest, where seasonal monsoon precipitation patterns often generate massive flooding and erosional events immediately following wildfires. On the Kaibab National Forest, archaeologists are working with project planners, fire fighters, scientists, and volunteers to preemptively manage cultural resource sites to increase site resiliency during wildfires and to develop post fire treatments that help preserve sites threatened by erosion and vandalism. This presentation illustrates current methodologies and integrated planning efforts utilized by forest staff to actively protect and preserve vulnerable sites on National Forest lands.

Reid, David (University of Illinois at Chicago), Veronica Rosales Hilario (Universidad Nacional Mayor de San Marcos, Lima), Miguel Vizcarra Zanabria (Universidad Nacional de San Agustín, Arequipa) and Kevin Ricci Jara (Universidad Nacional Mayor de San Marcos, Lima)

[290] *Wari State Expansion and Middle Horizon Roads in the Majes-Chuquibamba Region, Southern Peru*

This project investigates the social mechanisms behind culture change and contact in Peru's southern coastal valleys through the lens of road infrastructure: i.e. the built networks of communication, travel, and commerce. Here we present recent investigations of a pre-Inca road network in the Majes/Chuquibamba region of Arequipa. Excavations at three associated waystation sites indicate the development of road infrastructure was both a product of local communities and an intrusive Wari state during the Middle Horizon. Analyses of recovered materials show various cultural signaling and long-distance interaction between Arequipa and Ayacucho. Excavations at Pakaytambo, a newly discovered Wari enclave and D-shape temple along this road network, indicate the intersection of political economy and ritual that would have embedded local communities into the Wari sphere.

[356] *Discussant*

Reid, Jefferson [245] see Whittlesey, Stephanie

Reid, Rachel (Washington University in St. Louis) and Xinyi Liu (Washington University in St. Louis)

[78] *Crops, Gender, and Food Choices: Investigating the Formation of Chinese Staple Cuisines via Stable Isotope Analysis*

The modern Chinese food system was formed over thousands of years from a diverse set of regional agricultures and cuisines. Isotopic analysis of archaeological skeletons can be used to investigate the importance of different food resources to past diets. This approach has been extensively applied in China in the past decades, with more than 50 publications featuring isotopic results from >2,000 human and >800 faunal skeletal remains. Here we take advantage of the contrasting isotopic signatures of major crops in prehistoric China (e.g., C3 rice, wheat and barley versus C4 millets) to investigate the historic geography of staple cuisines between 6000 BC and 202 AD. By drawing together these numerous isotope studies with recently published archaeobotanical datasets, a new picture of the formation of Chinese staple cuisine in prehistory and its geography starts to emerge. We contextualize the isotopic and archaeobotanical evidence for three successive periods (6000-5000 BC, between 5000 and 2000 BC, and 2000 BC to 202 AD) divided into three major areas with distinct environmental and culinary trajectories: the broad Loess Plateau, the Yangtze and Hai river, and the continental interior. By 2000 BC, three distinct culinary and staple food systems coexisted within China.

Reimer, Rudy [211] see MacDonald, Brandi

Reinhart, Katharine [398] see Sportman, Sarah

Reinman, Lauren (George Mason University), Katie Zejdlik (Western Carolina University), Nyárádi Zsolt (Haáz Rezso Múzeum) and Andre Gonciar (ArcheoTek-Canada)

[386] *Biocultural Analysis of Atypical Mortuary Pattern Symbolism in Three Medieval Transylvanian Millstone Burials*

Unusual treatments of the dead frequently merit extensive archaeological attention as they provide windows on a society's concepts of personhood, use and manipulation of symbolic representations, and cosmology. In this work, we examine the use of millstones placed atop funerary contexts at the Papdomb site located in Văleni, Romania (A.D. 1100-1800). The site encompasses the remains of a medieval church and its associated cemetery. Some 579 burials have been recovered from site. During the 2015 excavation, three simultaneously buried individuals were uncovered from beneath a broken millstone within the walls of the church. Multi-person interments are not unusual at the site, however, the association of three adults underneath a broken millstone required additional investigation. The literature regarding use of millstones in burial is limited and offers only broad generalizations. Here, in contrast, we explore a range of specific possible interpretations, ranging from simple, postdepositional movement of the millstone to considerations of the practical and religious importance of millstones through various cultures and times. By exploring the multiple meanings, symbolisms, and mythologies associated with millstones, this work contributes to the reconstruction of mortuary symbolisms in Romania and approaches to interpreting atypical or unique burial contexts in general.

Reis, Yevgenia [253] see Kim, Alexander

Reiter, Samantha [386] see Walsh, Matthew

Reitsema, Laurie [34] see Reitz, Elizabeth

Reitz, Elizabeth (University of Georgia), Sarah Platt (Syracuse University), Carla Hadden (University of Georgia), Laurie Reitsema (University of Georgia) and Martha Zierden (The Charleston Museum)

[34] *Isotopic Evidence for an Emerging Colonial Urban Economy: Charleston, South Carolina*

Stable isotope analysis enables us to test the hypothesis that specialized animal economies were fundamental to the development of emerging urban centers, including colonial American cities. The distribution of meat and other animal products is a basic urban process and a barometer for the economic development of such early urban centers. Skeletal representation from colonial Charleston, South Carolina suggests urban residents obtained animal products through both direct (home-slaughter) and indirect (market) acquisition. Isotopic variation is high in cattle bones and teeth. Stable isotope ratios ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in cattle bones indicate that animals and animal products were from both local and distant sources within the evolving colonial distribution system. Lower-status/dual-function sites had a different "catchment" for beef than either markets or upper-status residences. A suite of isotopic ratios ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$, $\delta^{34}\text{S}$, $^{87}\text{Sr}/^{86}\text{Sr}$, and Pb-series) measured in cattle teeth indicates that cattle were from both inland and coastal sources. Some cattle were free-ranged and others penned. Isotopic variation could be due to landscape modification (burning or manuring fields) and/or micro-environmental variations such as would be evidence for procuring cattle from distinct, but unspecified, rural sources. Some of these differences may correlate with time.

Reitze, William [3] see Erickson, Katrina

Reitze, William (University of Arizona) and Maria Zedeno (University of Arizona)

[80] *A Preliminary Assessment of Prehistoric-Contact Period Blackfoot Camp Demographics*

The weakest link in reconstructing patterns of organizational complexity among Late Prehistoric Blackfoot ancestors known archaeologically as the Old Women's Phase (1000-250 BP) is the dearth of population estimates that would explain the need to adopt institutions of social control such as esoteric societies and systems of political influence beyond those built on

prestige (e.g., hereditary chieftaincies). Despite the large number of domestic stone architecture in the form of stone rings, little is known about population dynamics of prehistoric camps along the Rocky Mountain foothills. A great part of the problem is the difficulty in establishing contemporaneity of individual rings within aggregated camps. Yet, contact period accounts of camp composition and size provide a solid foundation to analyze the spatial structure of Late Prehistoric camps and aggregation processes. Here we present an assessment of camp aggregation on the Kutoyis Complex, located along the Two Medicine River within the Blackfeet Indian Reservation, Montana, to find new lines of evidence for estimating population and spatial arrangement of large camps, and to suggest future avenues for securing precise radiocarbon dates to aid in reconstruction of camp demographics.

[180] *Discussant*

[180] *Chair*

Rellini, Ivano, Roberto Cabella (DISTAV, University of Genoa), Roberto Maggi (LASA, University of Genoa), Gabriele Martino (Collaborator of the SABAP) and Marco Firpo (DISTAV, University of Genoa)

[195] *An Investigation into Ochres from Arene Candide Cave: Implications for Mineralogical Properties and Provenance Studies in the Liguria Region*

The Arene Candide Cave, a key sequence for western Mediterranean prehistory, became famous in 1942 after the discovery of a Gravettian adolescent buried in a pit filled with ochre and spectacularly ornamented. At the end of the last glaciation, with a similar choice, at least 20 Final Epigravettian burials were deposited on a layer of ochre powder, which gave to this level and the bones themselves a distinctive red color. The provenance and compositional features of coloring material, naturally available in the Liguro-Provençal arc, has received scant attention despite their technical and symbolic value. Over the course of the 2008-2012 excavations, micromorphological samples were collected from the middle portion of the older excavations section, which is dated to the beginning of the Early Epigravettian ($19,630 \pm 250$ BP). Among other findings, the micromorphological analyses recognized, in a specific layer, a relative abundance of ochre fragments scattered in a poorly sorted sediment. The results of the micromorphological and mineralogical analysis and their interpretations and correlations are discussed here. They shed new light on the geographical and geological origin of coloring material in Liguria and suggest that heating played an important role in the processing of the raw ochre.

Rempel, Sidney [32] see Olszewski, Deborah

Ren, Meng [78] see Tian, Duo

Ren, Minghua [32] see Smith, Eugene

Ren, Yuying [299] see Wang, Chunxue

Renaud, Jared (National Park Service)

[16] *Developing a Condition Monitoring Plan for Archeological Sites at Organ Pipe Cactus National Monument*

The Cultural Resources Program at Organ Pipe Cactus National Monument (ORPI) manages multiple cultural resource types across the unit. As part of the National Park Service's (NPS) overall mission to preserve and protect natural and cultural resources, regular condition assessments of the monument's archaeological sites should be a high priority. Monitoring archaeological sites on a regular schedule greatly aids in determining the overall status of the monument's cultural resources, the most frequent site disturbance types, and enables cultural resources staff to make better informed management decisions. Due to staff changes, policy modifications, and budgetary adjustments, many archaeological sites at ORPI have been either inconsistently monitored or not monitored at all since their initial recording. All of these factors contribute to an increasing backlog of needed site monitoring.

This work presents the methods, documentation, and results of the 2018 archaeological site monitoring conducted at ORPI. The study concludes with the resulting data learned regarding the frequency and intensity of disturbance types observed throughout the sites that were assessed, where these sites are most impacted, and what mitigating actions ORPI recommends regarding future site assessments according to site types and the site disturbance frequencies.

Rennie, Samuel [38] see Gonzalez, Silvia

Renson, Virginie (University of Missouri), Evan Peacock (Mississippi State University), Brenda Kirkland (Mississippi State University) and Simon Sherman (Mississippi State University)

[97] *Elemental and Isotopic Geochemistry to Source Shell-Tempered Ceramics – Late Woodland and Mississippian Contexts in the Yazoo Basin*

Sourcing shell-tempered ceramics using compositional analyses has revealed to be challenging, if not impossible in some contexts. Recent pilot studies have shown that freshwater mussel shells from archaeological sites located in different drainages in Eastern and Southeastern United States display different elemental compositions. The present research further investigates and evaluates the potential of elemental and isotopic geochemistry to trace the origin and circulation of shell-temper ceramics within a single basin. We analyzed the elemental chemistry of both whole shells and shell-temper extracted from plain wares. These samples are selected to represent the local signature of multiple sites, from Late Woodland and/or Mississippian contexts, located in the Yazoo Basin (Mississippi). In addition, we are exploring the possibility of using the strontium isotopic composition of freshwater mussel shells as a complementary tracer. These results provide a geochemical database for the Yazoo Basin that is then used to differentiate between local and imported ceramics in a case-study conducted on material from Lake George (Mississippian period).

Renson, Virginie [419] see Werlein, Amanda

Renteria, Bernardo, Sera Young (CSUSB), Ryan Zagala (CSUSB), Bobby Laudeman (CSUSB) and Zach Maie (CSUSB)

[119] *Developing an Archaeology Simulation via the Unity Engine*

Employing virtual reality for academic enrichment is a holistic undertaking. A multifaceted team was formed to attain a pedagogical goal; construct a simulation that teaches archaeological methods and procedures. The Cal State University San Bernardino team encompassed students, staff, and faculty from disciplines including: anthropology, applied archaeology, art design, audio/video production, and computer sciences. The poster will illuminate how each aforementioned discipline contributed to this archaeological simulation entitled “Project Ambrosia.” Poster subject matter will be devoted towards tasks the player would undertake in the virtual world of Ambrosia. Tasks include: choosing suitable gear for fieldwork, conducting a transect survey, examining ceramic artifacts, and interpreting bone remains within site context. By focusing upon tasks one would encounter in a field school curriculum, the poster becomes “archaeology first” in nature. These tasks will further allow a technological component to complement the primary theme of archaeology. Technical skillsets like programming in the Unity game engine, implementing user friendly movement mechanics, and rendering artifacts into interactive 3D models via photogrammetry will expand upon the world of Ambrosia. The poster will create an open discourse into the future utility of virtual reality within both academia and the field of archaeology.

Renteria, Bernardo [223] see Robertshaw, Peter

Renteria, Rebecca [3] see Chavarria, Sara

Resnick, Ben

[22] *Making Public Archaeology More Public*

American archaeology today is focused on the identification and evaluation of historic properties in accordance with the National Historic Preservation Act of 1966. While this has created a body of work in compliance with environmental and historic preservation laws, for the most part, these studies are not visible, or frankly of much value to the general public. Citing examples from the cultural resources management industry, this presentation discusses projects encompassing public engagement including outreach and education, site tours and presentations, historic preservation, and even a reburial ceremony.

Reuther , Joshua [10] see Lanoë, François

Reyes, Omar [364] see Nuevo Delaunay, Amalia

Reyes, Omar (CEHA, Instituto de la Patagonia, UMAG) and César Méndez (Centro de Investigación en Ecosistemas de la Patagonia)

[364] *Biogeographic Barriers, Marginality and Explicit Analytical Scales in the Northern Archipelago of Western Patagonia, Chile*

The last decade of archaeological research in the coast of northwestern Patagonia, specifically in the Chonos Archipelago (43° - 46° S), has been profoundly influenced by theoretical foundations developed by Dr. Luis Borrero. His concepts of marginality and biogeographical barriers and well as the use of explicit analytical scales are included in this paper to shape a study oriented towards measuring the intensity in the use of space along the occupational sequence of this archipelago, starting in the middle Holocene. The methodology has included search criteria that allows us to explain the conditions in which the archaeological record is encountered/preserved in this dynamic geomorphologic setting. The human occupation of the western channels of Patagonia by maritime hunter-gatherers fluctuated during the last six millennia, showing a remarkable concentration in the last 2000 years. Cave sites, shell middens, human burials, and intertidal lithic scatters comprise a complex archaeological record that characterizes this remote and discontinuous landscape. To this date, results show a profound maritime adaptation as indicated by indicators of technology, subsistence, diets, and spatial mapping on the territory. FONDECYT Grant 1170726.

Reyes Parroquin, María

[349] *Where the Laugh Died: The Archaeological Contexts of the Smiling Figurines, a Comparative Analysis*

The smiling figurines found more than half a century ago in Mexico's Gulf Coast, have always captured researchers through their enigmatic smile. Through these scholars' work, we know they were possibly related to deities like Xochipilli or Quetzalcoatl, linked to the main city of El Tajin and perhaps dedicated to the god of death. What we know for sure is that they were used from Late Preclassic to Early Postclassic. But, were all figurines used the same way? In this paper we present the result of our research focused on the contexts of the smiling figurines and how they changed through time and space in order to clarify their last function. We have identified a geographical and chronological region with a group of sites where the figurines were used extensively and in different contexts, both domestic and ritual; while the sites which are farthest from this region have less amount of figurines and only in elite contexts. Finally, we present a comparative analysis that explains the variation in micro and macro contexts, defying original interpretations of the archaeological record and offering a new vision of how the figurines were used for the last time.

Reyes-García, Victoria [358] see Fernández-Llamazares, Álvaro

Reynard, Jerome (University of the Witwatersrand), Liezl Van Pletzen-Vos and Sarah Wurz

[402] *Large Mammal Fauna from Klasies River Main Site: Changing Environmental Conditions during the Late Pleistocene of South Africa*

Klasies River is one of the most significant Middle Stone Age (MSA) sites in Africa with a sequence spanning from c. 120,000 to c. 50,000 years ago (ka). Because it yields one of the largest collections of human remains dated to the Late Pleistocene associated with an abundance of MSA cultural remains, it is an important site for understanding the development of modern Homo sapiens. A key issue in Palaeolithic research are the links between complex behavior and the environment. Given its abundant faunal remains, Klasies may allow us to unpack this relationship. Here, we examine the large mammal faunal remains from c. 120 ka to c. 90 ka layers from the Witness Baulk Cave 1 with the aim of exploring environmental changes through Marine Isotope Stage 5. Our data indicate a taxonomically rich assemblage with high species diversity. Generally, the lowermost LBS member is dominated by grazers with browsers becoming more common in the subsequent SASU and SASW sub-members. Ungulate diversity is highest in the LBS member and the reasons for this will be explored. We also discuss how the Klasies faunal data is linked to changing environments along the South African Cape coast during the Later Pleistocene.

Reynolds, David [260] see Earl, Dale

Rheaume, Ernie (Bureau of Reclamation) and Dennis Gilpin (PaleoWest Archaeology)

[254] Archaeological Evidence of the 1848 Newby Campaign Against the Navajos

In 1848, towards the end of the Mexican War, Colonel Edward Newby, Commander of the Ninth Military Department of New Mexico, responded to Navajo raids on New Mexican settlements by leading a military campaign against the Navajos, which imposed the second treaty between the United States and the Navajos. Unlike most military campaigns of the era, Newby's Expedition did not include a topographical engineer, and Newby did not prepare a report on the campaign, so most of what is known about it is what was reported in newspapers, and the actual route of the expedition has long been conjectural. Ethnographers working on the Navajo-Gallup Water Supply Project consulted with a local Navajo woman who directed them to cavalry inscriptions that proved to be the nine-day campsite of the expedition. Archaeological documentation of the site provides new insights about the Newby Expedition and will lead to preservation of Newby's campsite.

Rhodd, Ben [357] see Stoermer, Stephanie

Rhode, David [323] see Martin, Erik

Rhode, David (Desert Research Institute)

[366] Simmons at DRI: Years of Famine and Triumph

Prior to his long and distinguished professorial career at the University of Nevada-Las Vegas, Alan Simmons spent eight years in Reno at the Desert Research Institute (DRI), an independent soft-money component of Nevada's university system. For a young Near Eastern Neolithic archaeologist to be reliant on Great Basin cultural resource management contracts was a formidable challenge, but one he negotiated with enviable élan (and barely-discernible anxiety). The crush of scarce projects and high overhead always loomed, but Alan's DRI time was marked by singular research successes including his work at Akrotiri Aetokremnos. This paper briefly remembers Alan's time at DRI. Then, because Alan is at heart a dirt archaeologist with a long-standing interest in island prehistory, I consider the early Holocene history of Isla Cedros, Baja California, its transition from a peninsula to an island, and implications for early occupation there.

Rhodes, Jill [314] see Mountjoy, Joseph

Rhoton, Nicole [129] see Stephen, Jesse

Ribot, Isabelle [253] see Lipson, Mark

Ricci Jara, Kevin [290] see Reid, David

Rice, Glen (Rio Salado Archaeology)

[246] Hohokam Platform Mounds and Costly Signaling

Hohokam platform mounds (as well as ball courts and earthen "trash" mounds) are forms of monumental architecture requiring the expenditure of labor for purposes not related to shelter and subsistence. Selectionist theory predicts that economically unessential behavior (wasteful spending, superfluous activity) used for monumental architecture can contribute to group fitness by accurately signaling political power. We use the theory as modeled by Neiman to examine the ultimate function of platform mounds as a form of costly signaling that contributed to the fitness of Hohokam populations. The size of a platform mound was a function of the number of people involved in its construction, and thus a proxy measure of that community's competitive ability in political contests. The ability to effectively judge the size of mound-using

populations enabled small groups to avoid fruitless expenditures of labor and resources in political contests with larger neighbors that they were unlikely to win. We find that ecological factors are correlated with variability in platform mound size as predicted in the application of the model.

[246] *Chair*

Rice, Sarah [36] see Wohlgemuth, Eric

Rice, Shaelyn (University of Calgary), Geoffrey McCafferty (University of Calgary) and Sharisse McCafferty (University of Calgary)

[412] *Structurally Speaking; Architecture of El Rayo and the Greater Nicoya Region*

Located on the shore of Lake Nicaragua, El Rayo is a unique archaeological site, enriched with a large material base and many examples of human burial practices. Dating from the Late Bagaces Period (500-800 CE) to the Sapoa Period (800-1300 CE), El Rayo's stone architectural features cover both major timeframes, indicating a significant occupation of the site, and the importance of the site to the communities which would have inhabited the region. While a great deal of attention has been paid to the burial elements of the site, the functionality of the architecture has been overlooked. El Rayo displays a range of architectural variation. In hopes of bridging the gap, this paper examines the structures excavated at El Rayo, concluding with comparisons to other sites in the Greater Nicoya region.

Rich, Jennifer [114] see Stewart, Caitlin

Rich, Michelle [255] see McCormick, David

Rich, Michelle (Dallas Museum of Art, Art of the Americas), Erin Sears (Smithsonian Institution, Department of Anthropology), Ronald L. Bishop (Smithsonian Institution, Department of Anthropology) and Dorie Reents-Budet (Museum of Fine Arts, Boston)

[349] *Digging the Scene: More on the El Perú-Waka' Burial 39 Figurines*

The ancient Maya resurrection ritual depicted by the 23 ceramic figurines methodically arranged by mourners at the feet of the deceased ruler interred in El Perú-Waka' Burial 39 continues to be a source of intriguing information about the Classic Maya. More recently, extensive examination of the results of Instrumental Neutron Activation Analysis (INAA) demonstrates that the manufacture of the scene speaks directly to what we know from hieroglyphic inscriptions about the complex political situation playing out in the southern Maya lowlands during the mid-7th century CE. These data are especially relevant because of the scene's archaeological context. This paper summarizes the contextual detail that permits a varied and multifaceted analysis of the scene, its layout and meaning, and its greater relevance to Maya geopolitics.

Richards, John (University of Wisconsin - Milwaukee)

[318] *Got Collars?: Braced Rim Jars in the Late Woodland Western Great Lakes*

Pots with rims formed into distinct collars appear in the western Great Lakes during the early eleventh century A.D. and appear to have been produced well into the fourteenth century A.D. Such "collared ware" has a wide, though uneven distribution in the region and includes at least three types of true collared vessels (Starved Rock Collared, Aztalan Collared, and Point Sauble Collared). In eastern Wisconsin, collared pottery often co-occurs with Mississippian shell-tempered varieties. This paper reviews the distribution, chronology, and morphological variability among collared varieties with emphasis on morphological variation within the type Aztalan Collared.

Richards, John [348] see Zych, Thomas

Richards, Julian (University of York Archaeology Data Service), Nicole Beale (University of York), Gareth Beale (University of Glasgow) and Katie Green (University of York Archaeology Data Service)

[87] *DEBS: Using Digital Tools in Community-Led Graveyard Recording*

Discovering England's Burial Spaces (www.debs.ac.uk) is an Historic England-funded project based at the Archaeology Data Service and Digital Creativity Labs in the University of York, UK. We are collaborating with community groups to develop new tools and resources for burial space research, recording and dissemination. We are working with a number of community groups and societies, representing multiple faiths and denominations, to co-design and test training and recording materials that can be used to record burial spaces like churchyards and cemeteries. We have developed a mobile recording application and are also providing training in techniques such as digital photogrammetry to help the groups record and decipher inscriptions of the monuments in their community burial spaces. Alongside this, the ADS has created a pilot national database for burial space research, so that groups conducting work at burial spaces can safeguard their research in perpetuity and share findings with other researchers, using standardised recording methodologies and vocabularies. Our paper will introduce the DEBS project and address the challenges of working with digital technologies with disparate groups to create a coherent national research resource.

Richards, Katie (Washington State University), James Allison (Brigham Young University) and Lindsay Johansson (University of Colorado Boulder)

[84] *Fremont Villages in Their Cultural Landscapes*

Physical and cultural landscapes are integral aspects of everyday life; however, traditionally Fremont archaeologists have focused on studying sites or even features as discrete units instead of attempting to understand them in the broader context of their natural and cultural landscapes. Many Native American groups imbue the landscapes that surround them with cultural and religious meaning which are often materialized in rock art, alignment with celestial phenomena or prominent geographic features, and/or repeated use of meaningful locations. Discerning these meanings is difficult, particularly without ethnographic continuity, but we examine Fremont cultural landscapes from the perspective of several Fremont villages. More specifically, we examine the alignment of buildings within Fremont villages, which are strongly patterned but vary from one village to another, as well as the rock art and other sites in their immediate vicinity. These demonstrate that, as for societies across the Greater Southwest, cardinal directions and landscape features were important to Fremont worldviews.

Richards, Michael (Simon Fraser University)

[341] *Discussant*

Richards, Patricia (University of Wisconsin-Milwaukee)

[60] *Discussant*

Richards-Rissetto, Heather (University of Nebraska-Lincoln) and Ellis Codd (University of Nebraska-Lincoln)

[371] *Community Organization and Urban Dynamics at Copan, Honduras*

For decades, many archaeologists did not consider ancient Maya centers such as Tikal, Palenque, and Copan to be cities. While today most archaeologists would agree that large Maya centers were cities, the nature of Maya urbanism is still little understood. Maya cities seem different, and in attempt to explain these differences, they have been termed "Garden Cities" and "Low-density Agrarian-Based Cities." In this poster, we employ Geographic Information Systems (GIS) to identify potential community boundaries at Copan using a Least Cost Analysis approach. After we define potential community boundaries, we apply settlement-scaling theory to contribute to broader research on Maya urbanism, and urbanism more generally. Finally, we compare these computationally-derived boundaries to ethnographically-defined boundaries (i.e., sian otots) and discuss our findings in relation to community organization and urban dynamics within and between communities.

Richie, Jillian**[3] Culture, Community, and Collaboration: Lessons from the Nome Archaeology Camp**

Since 2015, the Nome Archaeology Camp has hosted over 40 Alaskan high school students in four, week-long explorations of Northwest Alaska's rich cultural heritage. A partnership between federal agencies, regional tribal consortiums, non-profit organizations, and local experts, the annual summer camp engages students in place-based educational experiences with an emphasis on community based participatory research. Through hands-on activities and field trips students are introduced to cultural resource specialists and career paths, and gain experience in archaeological field techniques, heritage preservation practices, and museum studies. Within each lesson, campers return to the theme that local heritage is worth celebrating and protecting, and consider how these goals can be achieved at community, state, and national levels. Here, we'll share lessons learned from creating a collaborative place-based educational experience and hear the next generation's ideas about community led preservation in Northwest Alaska.

Richter, Kim (Getty Research Institute)**[28] Postclassic Huastec Art and the Cult of the Feathered Serpent**

The Feathered Serpent was one of the principal Mesoamerican deities before the Spanish Conquest. During the Epiclassic and Postclassic periods, the cult dedicated to this ancient deity, associated with wind, fertility, and rulership, became firmly established within an international elite network, composed of diverse ethnic and cultural groups. The network shared a conventionalized visual language that transcended linguistic boundaries. Postclassic Huastec art reveals how a Huastec regional identity was constructed, asserted, and negotiated in the context of this interregional network. Artistic evidence from the Huasteca points to a prolonged cultural dialogue with their Gulf Coast neighbors as well as to stylistic and iconographic affinities with the American Southeast, Central Mexico, Oaxaca, and the Maya region. Artistic similarities range from portable artworks such as codex-style incised shell pectorals, polychrome vessels, black-on-white figural vessels, and red-on-cream murals to monumental anthropomorphic stone sculptures representing elite men and women. These elite Huastec patrons signaled their membership within the Epiclassic and Postclassic networks by commissioning such artworks and fashioning their costumes in a cosmopolitan style. This evidence indicates that the Huastecs were active participants in shaping the artistic vocabulary shared across Mesoamerica, while at the same time maintaining their own regional identity.

Richter, Kim [76] see Maldonado Vite, María Eugenia

Rick, John (Stanford University)**[315] Discussant**

Rick, Torben [368] see Hofman, Courtney

Ricketts, Macy (University of Wyoming), Naomi Ward (University of Wyoming) and Todd Surovell (University of Wyoming)**[116] DNA-Based Determination of Microbial Community Structure in Soils from the La Prele Mammoth Site**

Paleomicrobiology is probably best known as an approach that yields anthropological findings connected to human health and disease, such as long-term records of oral microbiomes recovered from ancient dental calculus. However, the tools of microbial ecology have been tested for their potential to address other anthropological questions, and aid in paleoclimatic reconstruction and dating. The latter category includes an experimental approach (Trophic Group Method) that assumes the physiological properties of present-day bacteria in buried paleosols can serve as indicators of climate aridity at the time of soil formation. The method was first systematically tested on samples collected from the Hell Gap site (Grund et al., 2014; Viable paleosol microorganisms, paleoclimatic reconstruction, and relative dating in archaeology: a test case from Hell Gap, Wyoming, USA; J. Archaeological Science 46:217-228). This study prompted us to explore alternative paleomicrobiological methods that directly analyze cellular macromolecules without prior bacterial cultivation to better understand the relationship between extant bacteria and past climate. We will report on microbial community structure in a soil column collected in 2017 from a trench at the La Prele Mammoth site. Community composition is being determined through high-throughput DNA sequencing of biomarker genes for bacteria and fungi.

Ricketts, Macy [329] see Ward, Naomi

Rico, Trinidad (Rutgers University)

[283] *Discussant*

Riddle, Andrew [127] see Duke, Hilary

Ridge, William (University of Illinois at Chicago)

[42] *I Would Walk 500 Miles: Survey of Copper Age Settlements in Eastern Hungary*

The Copper Age (c. 4500-2800) of the Great Hungarian Plain was a period in which the widespread adoption of metallurgy and a series of large-scale population shifts substantially transformed the social landscape. However, research has primarily focused on the large cemeteries (e.g. Tiszapolgár-Basatanya), while the settlements and social structure of the period remain poorly understood. My research focusing on the Bodrogkeresztúr culture group (Middle Copper Age) takes a regional approach to understand the settlement system during a period regarded as, "the real floruit of the Copper Age with its golden symbols of power and the heavy copper axes" (Horváth and Virág 2003). In this presentation, I report on the findings of preliminary fieldwork conducted in the summer of 2018. Guided by the extensive survey work of the Magyarország Régészeti Topográfiaja (Archaeological Topography of Hungary), I visited 70 previously identified Bodrogkeresztúr find spots throughout Békés County, Hungary. The primary goals of this survey were to identify clear Bodrogkeresztúr components at sites – as they are usually obscured by more prominent and dense assemblages from other periods (i.e. Middle Neolithic; Bronze Age) – and to set up the next, more intensive phases of fieldwork, including magnetometry and excavation.

Riebe, Danielle (The Field Museum of Natural History)

[42] *Timing the Difference: New Radiocarbon Dates for Late Neolithic Sites across the Great Hungarian Plain*

Over the past six years, the Prehistoric Interactions on the Plain Project has worked to reconstruct multi-scalar patterns of engagement between Late Neolithic (5000-4500 BC) Tisza and Herpály cultural units on the Great Hungarian Plain. By conducting multiple types of analyses on ceramics and chipped-stone tools, it has been possible to model a strongly enforced socio-cultural boundary during this time. However, what remains unclear is the chronological sequence in which these regional cultural developments occurred. Therefore, in an effort to begin building a stronger chronology for the region we conducted radiocarbon analysis of twelve samples from one Tisza site, Szeghalom-Kovácsbánya, and two Herpály sites, Esztár-Fenyvespart and Szeghalom-Várhely. This paper presents our initial findings and contextualizes the results within the broader macro-region.

[42] *Chair*

Riegert, Annie [371] see Fairbairn, Phoebe

Riegert, Annie (Texas State University), Caroline L. Znachko (Texas State University), Lauren Koutlias (Texas State University) and David M. Hyde (Western State Colorado University)

[371] *Excavation of a Maya Cist Burial at Group A of the Medicinal Trail Community, Northwestern Belize*

Excavation within Structure A-4 at Group A of the Medicinal Trail Community uncovered Burial A-7, a cist burial located below a series of six capstones. Numerous burials have been recovered from Structure A-4, the largest at the group, including the previously excavated Burial A-6, which was situated directly above the six capstones which covered Burial A-7. Consisting of two individuals, Burial A-7 is notable for its types of grave goods including a jade bead and a human ulna that was possibly modified into a flute or similar tool. The large size of Structure A-4, its location on the eastern side of the courtyard, and its continual use as a burial space suggest the structure was a place of communal veneration within the more residential courtyard. This presentation will explore how the complex nature of Burial A-7, and the presence of multiple

burials within Structure A-4, indicate this was a place of importance and likely an example of ancestor veneration.

Riel-Salvatore, Julien (Université de Montréal)**[195] *A High-Resolution Investigation of the Middle-Upper Paleolithic Transition at Riparo Bombrini (Balzi Rossi, Liguria)***

This paper presents an overview of the results of the 2015-2018 field seasons at Riparo Bombrini, a collapsed rock shelter part of the storied Balzi Rossi site complex in Liguria, immediately next to the border with France. The excavation has sought to capitalize on the insights of the 2002-05 excavations at the site with the explicit goal of refining our understanding of the Middle-Upper Paleolithic transition in this key region which is home to some of the earliest Proto-Aurignacian assemblages in Europe. We present here the larger framework of the project to achieve this goal by combining fine-grained spatial analysis, proteomics, micromorphology, lithic raw material proveniencing, multiple dating methods, aDNA recovery and photogrammetry. This, combined with original methodological tools focused on reconstructing mobility patterns from lithic assemblages, provides us with an unprecedented overall picture of process in the region.

[195] *Discussant***[195] *Chair***

Riel-Salvatore, Julien [195] see Zerboni, Andrea

Riendel, Markus [103] see Otto Mejia, Raquel

Rieth, Timothy (IARII)**[29] *Nearly Two Millennia of Occupation along Ylig Bay, Guam: Archaeological, Osteological, and Paleoenvironmental Data***

Through CRM compliance-mandated investigations nearly two millennia of occupation at Ylig Bay, Guam, has been documented. Stratified archaeological deposits at three locales along the northern portion of the embayment reveal late Pre-Latte occupation and a possible decades- to centuries-long hiatus before later Latte Period settlement. Both occupations are represented by burial assemblages. These data are complemented by paleoenvironmental information obtained by Steve Athens and Jerome Ward through sediment coring at the Ylig River mouth. Taken together, the results of these investigations provide insights into land use along a dynamic coastline during much of the island's human history.

[29] *Chair*

Rieth, Timothy [29] see Cochrane, Ethan

Rigaud, Jean-Philippe [403] see Franklin, Jay

Riggs, Chuck (Fort Lewis College)**[220] *Both Secular and Sacred: Kiva Function at Two Sites in the Mesa Verde Region of the American Southwest***

Investigations into the use of space at two sites in southwest Colorado have yielded strong evidence suggesting that archaeologists' understanding of the pit house to kiva transition warrants further study. For many years, archaeologists have asserted that pit houses became formalized ceremonial structures called kivas by the end of the Pueblo I period (A.D. 750 to 900). Thus, by A.D. 900, the function of kivas had become strictly religious, whereas rectangular surface rooms had become the main location for all remaining habitation activities. Recent work at the Bowthorpe and Pigg sites contradicts this traditional assumption and suggests that the structures we call kivas remained primary loci for habitation activities well into the Pueblo III period (A.D. 1150 to 1300). Based on this research, it appears that a strict separation between sacred and secular activities is an ethnocentric interpretation of activity organization and, further, that the strong distinction between kivas and houses in contemporary Pueblo villages is likely the result of a complex series of dynamics including internal changes in Pueblo society, different regional trajectories of development, impacts on Pueblo religion imposed by Spanish

occupation, and other factors.

Riggs, Erin (SUNY Binghamton)

- [83] *Refugees as a Productive Force, National Belonging as Mutable: The Case of 1947 Partition Refugee Resettlement in Delhi, India*

Many archaeologists have focused on the material ramifications of nationalist exclusion. Such works have documented how discriminatory policies impact the ability of immigrants and refugees to build new lives post-migration, and in some cases, even endanger their lives. In this paper, I explore the opposite question: what happens when immigrants and refugees are welcomed? I discuss the example of refugee resettlement in Delhi after the 1947 Partition of India and Pakistan, following which property-less individuals became productive citizens through successful rehabilitation schemes. I analyze the minimal yet effective spaces and buildings the government allocated for their use. Refugees transformed these basic allotments into thriving, modern neighborhoods within a generation. In today's world of increasing exclusion and closed borders, this case study demonstrates how refugees with access to basic resources and social acceptance are a valuable, productive force.

- [83] *Chair*

Riley, Ramon

- [341] *Discussant*

Riley, Tim (Prehistoric Museum @ USU Eastern)

- [89] *Blind Dates and Nervous Anticipation: Adding Temporal Context to Perishable Artifacts in Legacy Collections from eastern Utah*

The Ephraim P. and Dorothy Hickman Pectol Collection, probably the largest single collection of Fremont-associated perishable artifacts, was donated to the Utah State University Eastern Prehistoric Museum in the Spring of 2017. Most of this collection was amassed from sites along the Fremont River during the early 20th century, near what is now Capitol Reef National Park. Unfortunately, little besides this basic information was known about most of the objects in the collection. The museum embarked on a campaign to provide temporal data on perishable artifacts from this and other collections housed at the museum. Over forty objects were selected and sampled for radiocarbon dating through DirectAMS. While many of the results corroborated cultural or temporal affiliations that were already suspected based on chronological and stylistic typologies, some of the results were much younger or older than expected. This initial project of adding a temporal association to these objects has reaffirmed the need for museums and museum-engaged researchers to assess the hidden research potential within existing collections, particularly through modern analytical methods and other novel approaches.

Ringle, William (Davidson College)

- [28] *The Other Flying Serpent*

From at least the Epiclassic period onward, the Feathered Serpent was frequently accompanied by a Cloud Serpent. In the mythology of the Nahuas he was known as Mixcoatl or Camaxtli in his anthropomorphic form, and was either the father or half-brother of Quetzalcoatl. A patron of the hunt, he was also associated with warfare and was central to the pantheons of Tlaxcala and Huexotzinco. A Mixcoatl also functioned prominently in the Mexica peregrinación.

Archaeologically, depictions of the Cloud Serpent at Chichen Itza, in the codices of the Mixteca-Puebla region, and at Tula and Tenochtitlan, among others, strongly suggest a deeper connection with the ideology associated with the feathered serpent. This paper will examine several of these contexts to better understand this connection, making especial use of the Tlaxcalan historical record.

Ringle, William [100] see Seligson, Ken

Riordan, Kyle (The Ohio State University) and Julie Field (The Ohio State University)**[408] Ancestral Pathways of Fiji: Using GIS to Analyze Landscapes of Movement and Lineages within the Sigatoka River Valley**

The concept of landscapes of movement establishes the theoretical basis for understanding meaning behind the creation and use of roads, trails, and pathways. This meaning can be categorized by "prioritized relationships" (i.e., social, political, religious, economic) which ultimately stimulate the existence of landscapes of movement. This research uses GIS to investigate prioritized relationships between the Tualeita, a prehistoric trail system on Viti Levu, and various environmental, archaeological, and genealogical factors. Socially prioritized kinship relationships in Fiji can be distinguished within lineage groups called mataqali. Traditional stories tell of ancestors traversing and settling the Sigatoka valley and locations beyond. With an understanding of ancestral migration networks, GIS analyses reveal the degree to which these routes are connected to the Tualeita. This may suggest either a high or low priority given to social and religious relationships maintained by the Tualeita. Data include ethnohistorical accounts of the Tualeita, aerial photography of trail systems in the valley, and oral traditions pertaining to genealogies.

Rios Allier, Jorge (Indiana University)**[88] Archaeological Heritage Management in Mexico: Current Panorama**

This poster examines the innovations of different finance mechanisms for cultural heritage management (FMCRM) in support of open archaeological sites at the subnational level in Mexico in the last few years. The federal states (subnational level) that have implemented these policies for at least ten years have had diverse designs, implementations, and results. This study aims to show the findings in the literature about the use of financial mechanisms for the application of cultural heritage management in Mexico and other countries experiences, their definition according to their legal framework, the possible dependence on changes regarding political alignment or their socio-economic context. Based on these early studies, this study anticipates that finance mechanisms are firmly related to the political ideology of the current government at national and subnational levels but does not highlight the existence of a relationship with economic growth indicators. This study also emphasizes that the creation of these financial mechanisms for the management of cultural heritage leads to the first steps towards decentralization of the cultural sector as they transfer operational decision-making and collection capacity to the sub-national levels.

Rippee, Kassandra (Coquille Indian Tribe) and Stacy Scott (Confederated Tribes of Coos, Lower Umpqua, and Siuslaw)**[136] Changing Tides: Tribal Engagement in Oregon's Coastal Archaeology**

Archaeology on Oregon's Coast has been largely limited in scope and lacks a holistic viewpoint of coastal history. Archaeological investigations began in earnest around 1930 with avocational archaeologists like Marcus Seale interested in expanding their "trophy item" collections. The heavily male dominated field of professional archaeology began to evolve in the 1940s and 1950s with investigators from varying backgrounds like Luther Cressman who began studying the material culture of the tribes as if they were an extinct group. The push for federal recognition in the 1970s sees increased tribal involvement with archaeologists such as Dick Ross. Unfortunately, tribal interests in archaeology are still not well captured today. Cultural resource professionals at major institutions continue to curate "cultural material" under the egis of science and resource protection, while arguing against the repatriation of material based on lack of skeletal components, or a misguided understanding of "affiliation," and of the Native view of sacredness. We explore the legacy of our predecessors and how we as archaeologists must take a more comprehensive approach to understanding coastal history since time immemorial.

Risner, Lacy [158] see Wann, Kevin

Rissetto, John (Nebraska State Historic Preservation Office [NeSHPO]) and Kelli Bacon (Nebraska State Historic Preservation Office [NeSHPO])**[104] Balancing Public and Professional Interests in Archaeology from a State Historic Preservation Office (SHPO) Perspective**

As the public increases its influence over how the discipline of archaeology defines its scientific and educational value, state-sponsored archaeological institutions, such as the State Historic Preservation Office, must continue to adapt to satisfy their professional and public audiences. In 2017, the Nebraska State Historic Preservation Office (NeSHPO) conducted its five-year review of the State of Nebraska's historic preservation plan. This plan communicates to the National Park Service,

lawmakers, and the public the State's strategic goals regarding how to best record, secure, and distribute cultural resource information across the state. To collect data for this plan, the NeSHPO Archaeology division conducted two independent, online surveys that targeted both Nebraska citizens interested in archaeology and professional archaeologists living or working in Nebraska. Separating the survey populations allowed for a greater definition in which to gauge the unique and sometimes conflicting opinions of both groups regarding their knowledge, experiences, and priorities for how Nebraska archaeology and archaeological resources should be administered by the NeSHPO. This paper will present the methodology of both surveys, compare and contrast the results, and offer suggestions for future surveys that can be models for other SHPOs.

Rissolo, Dominique (University of California, San Diego)**[360] A Reexamination of Postclassic Maya Cave Altars along the Central Coast of Quintana Roo**

The construction and ceremonial use of miniature temples, or shrines, in caves across the central coastal zone of Quintana Roo, Mexico is a well-documented tradition and one that has received recent scholarly attention. Also common in caves throughout the region was the siting of unenclosed altars in a range of different forms and styles. Interestingly, a number of these altars closely resemble those found within the inner-sanctums of temples located at surface sites. Religious specialists who would have had access to (and familiarization with) more restricted temple interiors may have also presided over cave rituals involving those altars that reflect a close stylistic correspondence to their temple-enclosed counterparts. It is proposed that in the case of such cave altars, the cave itself could have functioned as a "temple," thereby enclosing the altar and creating a symbolically analogous performative space.

[227] Discussant**Ristvet, Lauren (University Of Pennsylvania)****[359] Negotiating Empires: Village Dynamics in Naxcivan, Azerbaijan**

Archaeological research on empires has focused on centers and periphery, with much less emphasis on the interstices of empires. During the first century of the common era, the polities of the Southern Caucasus were located between the competing empires of Arsacid Persia and the Roman Mediterranean. Recent fieldwork in Naxcivan, Azerbaijan considers how a small community negotiated this often fraught position. Excavations of high and low status domestic areas and burials highlight the roles of violence and migration along the edge of empire. The analysis of ritual pits and burials located near the remains of the Iron Age citadel and fortification walls illustrate how people engaged with the long term history of the city and crafted a specific local identity. Alternatively, petrographic and stylistic analysis of ceramics indicates how well-integrated this community was with both empires.

[40] Discussant**Ritchey, Melissa (University of Massachusetts Boston) and Heather Trigg (University of Massachusetts Boston)****[351] Reconsidering Cereal Production and Consumption in the North Atlantic: A case study from Northern Iceland**

During the Viking Age, the Norse settled Iceland, a sub-arctic volcanic island at the climatic margin of cereal production. These settlers brought with them a distinctive subsistence economy involving animal husbandry and cereal production, most notably barley. Barley (*Hordeum vulgare*) has been noted by archaeologists and historians as important to early Icelandic society because it is the only cereal grain that could be cultivated in such an environmentally marginal landscape due to its high climatic tolerance. Barley production has been consistently interpreted as restricted to high status farms because of its connections to feasting practices and the sustainment of social hierarchy in the Icelandic political economy. However, new systematic sampling from the Skagafjörður Church and Settlement Survey (SCASS) project of 50 farmsteads has shown that this cereal can be found ubiquitously across both the larger, wealthy sites and smaller, less-affluent ones. Because Iceland is on the edges of successful agricultural production, understanding the regional variation in agropastoral practices adds to the broader discussion of human adaption and colonization of marginal landscapes and new environments.

Ritchison, Brandon (University of Georgia)

[97] *The Downstream Effects of Abandonment: Immigration and Transformation on the 14th Century Georgia Coast, USA*

By 1390 CE, the Mississippian chiefdoms of the Savannah River Valley (SRV) had been depopulated. Settlement and radiocarbon evidence suggest that the former residents of the SRV spread to neighboring regions. On the Georgia Coast, immigrants arrived into a rapidly changing context. Settlement expansion meant the establishment of new locales, occupied for the first time in history. The settlement history of the Kenan Field site, a 60-ha, persistently occupied site on Sapelo Island, provides an example of how residents of the Georgia Coast responded to the arrival of SRV migrants through dispersal and contraction.

Rittenour, Tammy (Dept of Geology and USU Luminescence Lab), Heidi Van Etten (University of Wyoming) and Judson Finley (Utah State University)

[329] *Hell Gap in a New Light: Luminescence Results from the Witness Block*

The Witness Block (Locality I) at Hell Gap preserves a well-studied open-air stratified record of near-continuous Paleoindian occupation. Radiocarbon-based age control has been problematic due to age reversals and inconsistencies related to old and young carbon contamination and calibration uncertainties. Recent work by Pelton et al. (2017) has used Bayesian analysis to tease-out a satisfactory age-depth model using the available radiocarbon ages. However, limited age control from some strata, low calibrated resolution of older radiocarbon ages, and inherent contamination/mixing problems in an open-air site have reduced the precision of the age-depth model. In order to provide independent age control for the Witness Block we have collected 15 samples for optically stimulated luminescence (OSL) dating. Preliminary OSL results range from 13.6 to 11.9 cal ka (stratum D2 to E3) and are in stratigraphic order except for two samples that produced younger than expected ages, likely due to sampling unrecognized krotovina. OSL results from samples spanning stratum D2 to F2 (2 m of section, covering ~14-8 cal ka) will be compared to the radiocarbon chronology and the existing Bayesian age-depth model. We highlight differences and similarities between the two chronologies and discuss implications for site formation and paleoenvironmental interpretation.

Rivas, Alexander (Washington University in St. Louis)

[234] *Discussant*

Rivera, Dina

[215] *Ethics, Etiquette and Engagement: The Role of Archaeologists in Active Opposition*

Stewardship in archaeology has had its run around the debate block regarding definitions and scope as to whom and what archaeologists are exactly protecting and promoting out of the archaeological record. Ethical principles of public outreach, accountability, preservation and reporting coincide with an archaeologists responsibility to utilize their specialized training to promoting understanding and support within the greater community. Today's effusive information accessibility and the popularity of well-produced pseudoscientific infotainment have created bottlenecks of misinformation that have an insidious effect on the public intellect. It is therefore the ethical responsibility for the professional engagement of archaeologists to actively oppose pseudoscience in the media. As false news is passed as educational material, we owe it to the scientific community, the public, and the archaeological record to be stewards on the front line against alternative facts, biased histories, and ancient aliens. This presentation will exhibit the ethical imperative for the professional engagement of archaeologists with pseudoscience in public venues in order to improve and progress scientifically accurate community outreach and social understanding.

Rivera, Irán [406] see Carino Anaya, Tanya

Rivera, Mario (ICOMOS, Chile)

[306] *Junius Bouton Bird, Archaeologist and Explorer*

Junius Bird's legacy to Andean Archaeology is reflected in several fields. Bird's fieldwork, commonly known as "dirty archaeology" was decisive in establishing the first stratigraphic sequences in the three areas where he did work: Patagonia,

Northern Chile, and Central Peru. Bird was the first in reclaiming the antiquity of early man in South America in the 1950's. He also contributed significantly to develop a variety of technical analysis, including the study of Andean textiles.

[306] *Chair*

Rivera, Raiza (Trent University)

[300] *An Ethnoarchaeology Study of Water Rituals at Bagan, Myanmar*

Water is an element which characterizes and links Southeast Asia, however, due to the difficulties of understanding its religious significance within the archaeological record, few studies have examined its symbolic meaning. As part of this ethnoarchaeology study, interviews and observations conducted in ten traditional villages near Bagan were aimed at requesting participants to describe the festivals, healing rituals, and ceremonies in which water has a prominent role. The results indicate that the symbolic use of water was directed towards increasing protection, healing, purifying (or exorcising), renewing, and linking individuals with one another and with supernatural beings. Within the performance of certain water rituals, in particular rain-calling ceremonies, aspects such as by whom, when, and where this ceremony was performed showed greater variability. This is possibly linked to the soil, weather, crop cultivation, and water accessibility variations across villages which have led to diverse water needs. Observation of shrines, offerings, and the material culture used to provide water offerings indicate that the properties attached to water had little relation to the nature of water vessels, and rather depended on the properties infused to it by the power of the Buddhist texts, and the morality of the reader of such texts.

Rivera Prince, Jordi [55] see Sutter, Richard

Rivera Prince, Jordi (Michigan State University) and Gabriel Prieto (Universidad Nacional de Trujillo)

[206] *Defining Markers of Occupational Stress in the Ancient Fisherman of Huanchaco, Perú: When Modern Ethnography and Bioarchaeology Intersect*

Archaeological excavations and bioarcheological analyses reveal that marine resources and fishing are main form of sustenance on the north coast of Peru – these traditional fishing practices have endured over 3,000 years. Although the degree of reliance on marine resources has shifted from the Initial Period (1500-1200 cal. BC) to present day, traditional fisherman continue to utilize the traditional reed fishing boats caballito de totora (*Schoenoplectus californicus* subsp. *tatora* plant). A deep knowledge of marine resources is still prevalent in the small northern coastal town of Huanchaco, Moche Valley, Peru. Past excavations of the Programa Arqueológico Huanchaco (PAHUAN) have recovered the remains of ancient fishermen, as confirmed by their grave goods. Bioarchaeological analysis clearly reveal a common pattern of physical stress on these ancient remains. These specific markers of occupational stress, left by activities related to human interaction with the sea, will be defined. Specific examples from ethnographic study of modern-day fisherman of Huanchaco will be presented, with a discussion of how bioarchaeologists can recognize the same stress markers on the bones of past people by looking to people here today.

Rizvi, Uzma (Pratt Institute)

[161] *Crafting Labor and Landscape*

This paper revisits how landscape and mineral extraction have been contextualized in the third millennium BCE, Ganeshwar Jodhpura Cultural Complex (GJCC), Rajasthan, India. The GJCC has very specific formations of sites around resource-high regions particular to this landscape and time period that demonstrate a focus on copper production and indicate a high level of socio-cultural and political complexity. Site development is a controlled, planned and materially articulated strategy that requires community mobilization, craft specialization and placemaking, and intimate high levels of political, social and economic self-realization. These levels of control are negotiated by and through value placed on new forms of material culture that emerge from high levels of craftsmanship that provide specific forms of sociality to the members of the GJCC community. Rather than considering the landscape only as mise-en-scène and context, this paper will understand landscape as laboring alongside the human body. Investigating the affective response to the landscape, this paper tests the agentive properties of place in relation to ancient subjectivity. The discussion of belonging in relation to labor and its link to placemaking will be investigated in an effort to provide clarity around the question of an agentive and laboring landscape.

[179] *Discussant*

[161] *Chair*

Rizzo, Florencia [364] see Scheinsohn, Vivian

Rizzuto, Branden [288] see Giersz, Milosz

Rmoutilová, Rebeka [386] see Kotterová, Anežka

Roa, Ian N. [374] see Tappan, Katie K.

Roades, Sean, Juliet Morrow (Arkansas Archeological Survey) and J. Christopher Gillam (Winthrop University)

[216] *After the Ice Age in the Ozarks*

Fluted point techno-complexes of the Ozarks include Clovis, Gainey, Folsom, and Dalton. Folsom point-making people are comparatively less well represented in the interior Ozarks possibly because of the lack of grasslands and bison. In this presentation, we explain the origins and evolution of Clovis technology and the exploitation of lithic resources from Clovis to Dalton in North America. Lithic raw material patterns, use-wear analysis, and environmental parameters are the basis for inferences about mobility and range size for each of the cultural complexes. Initial colonizers are on foot, however, by the Dalton period, circa 10,900 to 9,900 rcybp, at least some individuals routinely used watercraft to access non-local resources and mates.

Robbins, Helen

[293] *Discussant*

Robbins Schug, Gwen (Appalachian State University), Nicola Carrara (Museo di Antropologia, Università degli Studi di P) and Cinzia Scaggion (Museo di Antropologia, Università degli Studi di P)

[317] *Bioarchaeology of Madness: A Biocultural Perspective on Transgression, Strangeness, Folly, and Delirium in the Past*

The invention of the Ospedale (hospital) in fourteenth-century Italy marked a turning point in human relations. The othering process of medicalization began as an attempt to provide respite for incurable strangeness, delirium, or transgressive and foolish behavior, particularly for those without family to care for them. The disordered mind became a subject of oversight and confinement even as economic and social changes created new potential for dietary deficiency and fostered the spread of infectious diseases like the Black Death, tuberculosis, leprosy, and syphilis. This paper explores the relational and socio-cultural aspects of madness in Medieval Veneto, Northern Italy. We will discuss the intersection between 'strange behavior', nutritional insufficiencies, and infection. We will examine what is known and what can be hypothesized about the paleopathological record of madness, including both a medical perspective on pathognomonic and non-specific indicators of disease that can result in behavioral changes on one hand and skeletal manifestations of stigmatization and institutionalization in the Medieval context on the other. Through this research, we hope to inspire bioarchaeologists to explore notions of "health," medicalization, the embodiment of mentality, and institutionalization in the past.

Roberts, Alicia and Danielle Kurin

[286] *A Study to Determine Sex of Prehistoric Peruvian Commingled Remains by Comparing Femoral Neck Osteometrics*

The Chanka are a prehistoric agro-pastoral culture that settled in what is now the Andahuaylas province of Peru during the Late Intermediate Period (LIP [ca. AD 1000-1250]). The Wari predate the Chanka and developed their cultural settlement within the Ayacucho Basin during the Middle Horizon Period (MHP [ca. AD 600-1000]). This study will examine excavated remains from two bioarchaeology sites in Apurímac, Peru: Cachi and Turpo. Cachi is a Chanka site and Turpo a Wari site,

each with excavated burial caves. The remains from these caves are commingled and will be analyzed to determine sex of the individuals as well as demography of the sites. Results will determine whether or not there is a demographic pattern to who was placed in these burial caves and if the demographics vary from Chanka to Wari sites. I will conduct this study by taking two measurements on femora found at both sites: the femoral neck width and the femoral neck axis length. I will then compare these results to previous sex determining studies of this collection to find if my results are consistent or if there are discrepancies with other osteometric methods.

Roberts, Heidi

[36] Cholla Bud Roasting in St. George, Utah during the Early Pueblo II Period

Cactus-bud procurement is not typically associated with Virgin Branch Ancestral Puebloan subsistence systems. Yet, when I visited a small artifact scatter on the apex of a rocky, cholla-covered hill near St. George, Utah, I was reminded of cactus-procurement landscapes on the Tohono O'odham Reservation in southern Arizona. Subsequent data recovery investigations proved my suspicions correct, revealing several slab-lined roasting pits that had been used to cook cholla buds. This paper describes those excavations and our experience gathering and processing cholla buds with Southern Paiute Tribal members to study the cholla bud nutritional values and return rates.

Roberts, Heidi [86] see Ahlstrom, Richard

Roberts, James (University of New England, Australia), Lloyd Weeks (University of New England, Australia), Melanie Fillios (University of New England, Australia), Charlotte Cable (University of New England, Australia) and Yaaqoub Yousef al-Aali (Dubai Municipality Government, United Arab Emirates)

[352] The Relationship between Humans and Camels in Late Prehistoric Southeastern Arabia: The Problems of Distinguishing between 'Wild' and 'Domestic' Camels Using Zooarchaeological Materials and Methods

The dromedary camel (*Camelus dromedarius*) is a crucial component of the lifeways of humans in arid regions. Delineating the nature of the early relationship between humans and dromedaries is therefore critical to our understanding of the ancient human societies that co-existed with the dromedary in these areas. Many studies into this relationship have focused on the domestication of the dromedary, attempting to distinguish between wild and domestic camel populations with the assumption that a stark dichotomy exists between the two. This has led to the creation of a model whereby dromedary domestication is hypothesised to have occurred in southeastern Arabia over a short period, around 1000 BCE.

This presentation outlines evidence from a camel bone assemblage recently excavated at Saruq al-Hadid, U.A.E. (2200 – 800 BCE), which questions the assumed dichotomy between wild and domestic camels. The evidence from Saruq al-Hadid reinforces a framework of camel domestication as a longer-term process, as opposed to the commonly accepted short-term model. The theoretical implications of these findings are discussed, and new methods are proposed that might allow future researchers to further elucidate the nuanced relationship between humans and dromedary camels, prompting us to rethink the way we view camel 'domestication'.

Roberts, Jerod (Shumla Archaeological Research & Education Center)

[305] Assessing the Patterns and Variation of a Common Pecos River Style Motif

The Lower Pecos canyonlands of southwest Texas are home to over 350 identified rock art sites containing various pictographic styles. The Pecos River Style is the most well-known and contains many diagnostic characteristics. One of the most ubiquitous is a motif that has been interpreted as a prickly pear pouch, gourd rattle, catfish on a string, dart-headed figure, and a datura seed pod. Shumla classifies this motif as a powerbundle. This referent is not an interpretation, but is solely used as a descriptor. While the names differ, each describes a figure consisting of a line or set of parallel lines extending from a perpendicular line, terminating in an ovoid shape. Over 200 instances of powerbundles have been identified among the 100-plus rock art sites recorded by Shumla in the past 2 years. This presentation discusses new insights into powerbundle attributes and variation, their distribution across the landscape, and patterns in motif association.

Roberts, Laylah**[171] Social Significance of Glass Beads at San Luis de Talimali (8Le4)**

How do the number and type of glass beads found in the structure recovered from FSU's 2018 field school at San Luis de Talimali (8Le4) differ from other Spanish living structures on the site? And what do these beads (especially the special decorated types, such as Cornaline d' Aleppo or striped beads) tell us about the social status and wealth of the people who lived there? Glass beads, which were forms of personal adornment especially in Spanish La Florida, tell archaeologists more about both the Spanish and the Apalachee indigenous to the area. This study will focus on the Spanish and their lifestyle in San Luis—were their glass beads markers of status and did they differ between Spanish households? In order to answer this research question, the glass beads recovered from San Luis during the 2018 field season will be compared with glass beads from earlier excavations. Spatial distribution, bead type, and the number of decorated glass beads will be the main focus of research and will concentrate on the beads excavated from a newly recovered domestic structure in the Spanish village.

Roberts, Patrick [34] see Swift, Jillian

Roberts, Victoria (Shumla Archaeological Research & Education Center)**[305] Bold Line Geometric: Revisiting a Lesser-Known Rock Art Style in the Lower Pecos Canyonlands of Texas**

Bold Line Geometric is one of five currently identified rock art styles in the Lower Pecos Canyonlands of southwest Texas. It has previously been described as thick, glossy pigment applied in bold lines, geometric shapes, and globular anthropomorphic and zoomorphic forms. In 1965, David Gebhard laid the ground work for the initial description and definition of this abstract style using characteristics found at five sites. Solveig Turpin expanded this sample to 14 sites in 1986 and proposed Bold Line Geometric dated to the late archaic to protohistoric time periods based on relative preservation and superimpositioning with older styles, but problems with classification have plagued this style since its initial description. In 2017, Shumla launched the Alexandria Project to collect baseline data at all the known rock art sites within Val Verde County, Texas. Since the launch of this project, Shumla has identified at least 10 additional sites containing possible Bold Line Geometric imagery. This paper presents preliminary research revisiting the attributes, context, and chronology that define the style using this expanded dataset.

Robertshaw, Peter (CSU San Bernardino)**[223] Teaching Archaeology in Virtual Reality: Project Ambrosia**

Field schools have been the best way to provide hands-on experience with archaeological fieldwork in an environment geared to student learning. However, field schools are beyond the financial and logistical reach of many students, particularly first-generation students and those from underrepresented groups. The decreasing costs and increasing accessibility of Virtual Reality simulations have the potential to provide an alternative to traditional field schools. However, most VR applications in archaeology have focused upon immersion in famous archaeological sites, with the student as a passive explorer in this VR world. Our VR development team has instead developed a simulation in which students become members of an archaeological survey team that searches for and records archaeological sites on the fictional island of Ambrosia. Students learn how to conduct archaeological reconnaissance surveys, experience the excitement of discovering sites, and interact with the archaeological materials on those sites to answer questions about site formation processes and learn about the inferences that may be made from material culture, while also being exposed to ethical issues in archaeology. This presentation will provide information on the development and pedagogy of Project Ambrosia, together with data gleaned from student testers.

[223] Chair**Robin, Cynthia (Northwestern University)****[58] Aventura: Understanding Sustainable Cities**

As over half of the world lives in cities today, there is perhaps no more pressing question than: how can people create cities that are sustainable? Archaeology is uniquely suited to answer questions about the longevity of cities, because archaeologists excavate long expanses of human history. The social, political, economic, and environmental pressures that modern people and cities face are not new and archaeology provides a means to evaluate how people in the past successfully and unsuccessfully dealt with challenges in establishing and maintaining cities. This presentation examines

archaeological evidence and public education programs generated by the Aventura Archaeology Project. With a five millennia history, Aventura provided humans a home across periods of vastly differing environmental and socio-political conditions. The Pre-Columbian Maya city at Aventura thrived during the period of the Terminal Classic Maya collapse providing a window to understand how cities survive periods of political and environmental disruption. Public education programs focus on developing local partnerships to sponsor events for a broad range of stakeholders: archaeology fairs for families, summer camp experiences for kids, and workshops for educators and adults.

Robinson, David (Texas Archeological Research Lab, UT-Austin) and Marybeth Tomka (Texas Archeological Research Lab, UT-Austin)

- [346] *Calibration of Chronometric Assays from the WS Ranch Site (LA 3099) and Other Sites in the Middle San Francisco River Valley, West-Central New Mexico*

The aggregation of existing radiocarbon assays and tree-ring and obsidian hydration assays, combined with new linear accelerator dates, allows the potential realignment of regional chronologies in West-Central New Mexico, the Middle San Francisco River valley in particular. The WS Ranch Site Project, sponsored by the University of Texas at Austin and supported by the USDA Forest Service, conducted contextual analysis of chronometric assays collected over 16 years of field research. The research shows the occupation of the river valley at least as early as Cochise Archaic times. Pithouse occupation began as early as A.D. 100 on low as well as high terraces above the river, supported by some degree of maize horticulture. Great Kiva ceremonialism began at A.D. 750 or earlier, and it persisted through the Puebloan occupations, ending slightly later than A.D. 1300. Saladoan sites and limited reoccupations of Puebloan rooms at the WS Ranch site left a few dates in the early A.D. 1500s.

Robinson, Erick [209] see Nabity, Samantha

Robinson, Erick (University of Wyoming)

- [248] *The Role of Edge Effects in Late Holocene Archaeological Radiocarbon Time Series*

Many archaeological radiocarbon time-series throughout the world display a decline of radiocarbon date frequencies from ca. 900-600 cal BP. In this presentation we examine alternative hypotheses that may explain these trends. We analyze whether dramatic declines in radiocarbon date frequencies are due to biases such as i) favoring the use of relative dating using well-known diagnostic artifacts, ii) the use of directly dated historical documents, iii) imprecision in calibrated dates between 900 and 600 cal BP, or iv) whether social-ecological dynamics provide a more plausible explanation. This presentation develops a multiple-proxy method for the assessment of edge effects in archaeological radiocarbon time-series, and we attempt to apply causal methodologies to distinguish between potential edge effects and sharp declines generated by social-ecological processes.

- [344] *Discussant*

- [248] *Chair*

Robinson, Eugenia

- [303] *Ceramics from Q'umarkaj: Heritage Collection and Instrumental Neutron Activation Analysis*

Research on the ceramic collections from Q'umarkaj housed at the Middle American Research Institute, Tulane University, provides an opportunity to apply Instrumental Neutron Activation Analysis to pottery from the site. This research has the potential to delimit areas of ceramic production and trade in the Terminal Classic - Late Postclassic periods of this famous capital in the K'iche' area. This paper will review the results of INAA on a sample of 82 monochrome domestic wares, censers and bichrome ceramics representing 9 types identified by John Weeks at Chisalin. Study of the elite pottery published by John W. Fox et al. in 1992 from a central sector of the site, has started with INAA analysis of a single Tohil-like vessel whose chemistry does not match the Soconusco region. Museum research at the National Museum of Archaeology and Ethnology in Guatemala has found almost all of the vessels from the cache of broken vessels from Q'umarkaj. Eventually research will evaluate the Fox thesis that these vessels date to an Epiclassic-Early Postclassic migratory period tied to the founding of Q'umarkaj and the identification and iconography of the vessels.

- [303] *Chair*

Robinson, Eugenia [303] see Garnica, Marlen

Robinson, Hannah

[51] Clovis Technology on the Southern Colorado Plateau: An Analysis of the Glen Quarry Locality

This paper details my archaeological research on Clovis lithic tool technology at the Glen Quarry Locality, Glen Canyon National Recreation Area, southeastern Utah. As the earliest inhabitants of North America dating from approximately 13,400 BP, Clovis cultures form the baseline for the archaeology of the continent. I report the results of intensive field survey and GPS mapping, in-the-field analysis of artifacts and features, and laboratory analysis of additional collections from regional Clovis localities and sites. My research provides evidence for a Clovis presence at the Glen Quarry locality in the form of diagnostic Clovis lithic technology and provides further understanding of mobility and land use by Paleoindian people in the Glen Canyon area. Glen Canyon National Recreation Area also has extensive evidence ranging from Archaic times to the proto-historic human occupation (Geib 1996). My research at the Glen Quarry locality adds to the growing body of evidence for Clovis presence on the central and southern Colorado Plateau.

Robison, Jade (University of Nebraska-Lincoln)

[220] Memory-Dependent Practices at a Chaco Outlier: Insights from the Ceremonial Deposition of Shell Ornaments at Salmon Pueblo, New Mexico

In the late Pueblo II period, around A.D. 1090, migrants from Chaco Canyon constructed Salmon Pueblo, which would become an important ceremonial and political outlier in the Middle San Juan region of New Mexico. Salmon Pueblo rivals the size of canyon great houses, boasting three stories and nearly 300 rooms, as well as a tower kiva and great kiva. The Ancestral Puebloans who occupied Salmon continued to emulate Chacoan characteristics, especially through the possession and ritual deposition of shell ornaments. In this study, I present the results of research conducted at the Salmon Ruins Museum regarding taxonomic and stylistic classification of the shell assemblage from Salmon. Further, I evaluate the spatial and temporal distribution of the shell ornaments utilizing data from the Salmon Pueblo Archaeological Research Collection (SPARC). Participation in the deliberate creation of a Chacoan locale at outliers like Salmon Pueblo may be enabled by a memory-dependent exchange of objects embedded with high social value. With this in mind, I consider how the attainment and ceremonial deposition of shell ornaments at Salmon Pueblo might inform our understanding of social transformations in the Middle San Juan prior to and following large-scale changes in Chaco Canyon.

Robles Garcia, Nelly (Instituto Nacional de Antropología e Historia)

[173] La Restauración Arquitectónica ante los sismos: Monte Albán 1999 y 2017

Esta ponencia parte de las experiencias de tratamientos de restauración aplicados a los daños producidos por los sismos de 1999 y 2017 a la zona arqueológica de Monte Albán, Oaxaca, México. Apoyados en la larga experiencia en trabajos de restauración monumental llevados a cabo en México desde finales del siglo XIX hasta hoy, los proyectos de recuperación por daños causados por movimientos sísmicos tienden a establecer una especialización que conlleva respuestas inmediatas para salvaguardar los monumentos dañados y prevenir deterioros mayores. Igualmente implica procesos de planeación para la intervención, en los que se priorizan las acciones preventivas, las condicionantes de integridad y autenticidad, la seguridad del monumento, trabajadores y público visitante. Hoy en día, se atienden las causas de deterioro durante los sismos de 2017, lo que significa el establecimiento de modernas estrategias de estudio, de intervención, y la necesaria interdisciplina para resarcir los daños, tanto como para establecer manuales de prevención de daños por desastres naturales en los sitios del Patrimonio Mundial.

[173] Chair

Roche Recinos, Alejandra (Brown University), Charles Golden (Brandeis University) and Andrew Scherer (Brown University)

[219] An Obsidian Workshop at Budsilhá Chiapas, Mexico

One of the persistent difficulties in understanding Classic Maya (AD 250–900) economies has been the challenge of identifying the loci of production (e.g., workshops) and exchange (e.g., marketplaces), and thus interpreting how the two figured into local and regional economies. During the 2013 fieldwork at the site of *Budsilhá*, Chiapas, Mexico—a subsidiary

site of Piedras Negras–Golden, Scherer and colleagues excavated what they interpreted as an obsidian workshop. In this paper we present a preliminary analysis that supports this hypothesis from the data collected over the course of the 2013 and 2018 field and laboratory seasons of the Proyecto Arqueológico Busiljá-Chocoljá. We focus on the differences between household versus non-household areas, drawing comparisons with known production areas in Mexico and Guatemala to argue that Budsilha artisans were among the major producers of prismatic blades in the region. We also present the data from other lithic industries collected during the 2018 field and laboratory seasons, such as chert, to argue for a possible shift from the manufacturing of chert implements to obsidian blades and other artifacts.

Roche Recinos, Alejandra [392] see Seidita, Max

Rockman, Marcy (U.S. National Park Service)

- [251] *Improving Integration of Archaeology into the Work of the IPCC (Intergovernmental Panel on Climate Change): A Status Report*

Modern anthropogenic climate change has its roots in the Industrial Revolution and has developed further through social and economic processes that have grown into world dependence on fossil fuels. Archaeology has much to say about these developments and provides important cultural and natural baseline information from which the scope and scales of change can be better understood. However, to date, information from and attention to the impacts of climate change on archaeology and heritage broadly has had only minimal representation in reports of the IPCC. In 2017, the World Heritage Committee asked the International Council on Monuments and Sites (ICOMOS) to improve these connections. This paper presents a status report on efforts to develop an IPCC expert meeting on heritage, plan for an IPCC special report on heritage and climate change, and engage the archaeological field in developing new and needed approaches to research and publication.

- [225] *Discussant*

Rockman, Marcy [251] see Lees, William

Rocks-Macqueen, Doug [65] see Aitchison, Kenneth

Rockwell, Heather (University of Wyoming) and Nathaniel Kitchel (University of Wyoming and Dartmouth College)

- [324] *The Steven's Site: Investigations of Possible Quarry Adjacent Habitation at the Munsungun Lithic Quarry*

Red Munsungun Chert appears in Paleoindian archaeological assemblages throughout Northeastern North America. While ubiquitous, the source location for this material has only been recently discovered. The NKP quarry, in far Northern Maine, identified by the authors is located within the Munsungun Lake region. Over the past three years, the authors have been conducting geoarchaeological reconnaissance, small-scale test excavations, and geologic sampling. This poster will present results from our most recent fieldwork, lithic and microwear analysis results, and interpretations of the site spatial patterning. The authors contend that they may have discovered a quarry-associated habitation site dating to the Paleoindian period located near the NKP source.

Rodas, Diana (Universidad de las Américas Puebla), Aurelio López Corral (Instituto Nacional de Antropología e Historia Tlax), Ramón Santacruz (Instituto Nacional de Antropología e Historia Tlax) and Nora A. Pérez Castellano (Instituto de Investigaciones Estéticas-UNAM)

- [68] *Estudios Químicos sobre la Cal de Tlaxcallan del Posclásico Tardío (1250-1519 d.C.)*

La cal fue uno de los principales cementantes en Mesoamérica y es considerada un rasgo clave para identificar niveles de complejidad social debido al alto costo energético que conllevó su producción artesanal en sociedades preindustriales. La cal también fue utilizada ampliamente en la antigua Tlaxcallan durante el Posclásico Tardío (1250-1519 d.C.) en morteros para repellados de elementos arquitectónicos, recubrimientos de artefactos, y para el proceso de nixtamalización del maíz. En este trabajo analizamos la estructura físico-química de la cal de diversos contextos arqueológicos en Tepeticpac, Tizatlán y Teotlalpan, tres subsecciones del sitio arqueológico de Tlaxcallan. Empleamos las técnicas de FRX, FTIR y petrografía para establecer los procesos pirotecnológicos involucrados en el quemado de la materia prima y las

características compositivas de los morteros, para así establecer las implicaciones sociopolíticas de su consumo en el asentamiento.

Rodas, Ricardo (Universidad de San Carlos de Guatemala), Omar Alcover (Brown University) and Mónica Urquizú (Universidad de San Carlos de Guatemala)

[100] Refugios y rituales: Conflicto en el Fortín Preclásico de Macabilero, Guatemala

Entre los grupos mayas; fortalezas, armas, y sistemas de murallas defensivas nos indican lo común que era el conflicto en las relaciones sociopolíticas de estas comunidades. En las Tierras Bajas occidentales, fueron pocos los sitios que alcanzaron un alto grado de desarrollo convirtiéndose en grandes centros urbanos para el Clásico. Dentro de la región, una entidad que alcanzó un gran desarrollo durante el Preclásico fue Macabilero, ubicado en las márgenes del Usumacinta. Su localización en la cima de un cerro, su conjunto de terrazas megalíticas y una serie de murallas que cierran los valles circundantes; evidencian que Macabilero funcionó como una fortaleza o refugio defensivo durante un periodo turbulento. Nuestras investigaciones se enfocan en contestar ¿Qué papel jugó el conflicto en el desarrollo sociopolítico de la región? Las investigaciones presentadas en este trabajo, resultado de tres años de excavaciones, se resumen en la documentación, cronología, y función de las terrazas, plazas y estructuras; además de la exploración de las áreas cercanas, identificando varias cuevas que tuvieron un papel importante como foco de prácticas rituales. Todo esto en conjunto nos brindará información importante no solo para comprender Macabilero, sino para entender el desarrollo y dinámicas sociopolíticas de la región.

Roditi, Effrosyni (University of Tübingen) and Britt Starkovich (University of Tübingen, Senckenberg Museum)

[144] Were Neandertals the Original Snowbirds? Zooarchaeological Evidence from Greece

Compared to other parts of Eurasia, the southern Balkan Peninsula had a relatively stable climate during the Late Pleistocene. Zooarchaeological materials from the Asprochaliko Rockshelter in northwestern Greece provide evidence for hominin subsistence strategies in the Middle and Upper Paleolithic. In this study, we employ taxonomic abundance and diversity indices to investigate hominin prey choice, while taphonomic observations provide further information on resource exploitation and site use. We discuss these lines of evidence in relation to data on environmental productivity and site occupation, relying on ungulate evenness and mortality profiles to assess the relationship between hominin subsistence practices and climate. We complement our results with published faunal studies from Klissoura 1, Lakonis 1, and Kalamakia caves in southern Greece. We examine changes in the faunal composition of the four sites in an attempt to identify the extent to which climate influenced resource availability and diversity in the region, stimulating shifts in hominin subsistence. Additional evidence for seasonal variation in site use allows us to evaluate the region's character as a refugium during MIS 5d-3.

Rødland, Henriette (Uppsala University)

[347] Chair

Rodning, Christopher [239] see Pigott, Michelle

Rodning, Christopher (Tulane University), Robin Beck (University of Michigan) and David Moore (Warren Wilson College)

[367] What Happened at Joara, Cuenca, and Fort San Juan: Archaeological Finds from the Berry Site in Western North Carolina

Between 1566 and 1568, expeditions led by Captain Juan Pardo sought to establish permanent Spanish colonial towns and forts along an overland route connecting Santa Elena, the capital of La Florida, in coastal South Carolina, with New Spain and the rich silver mines near Zacatecas, Mexico. Written accounts chronicle the movements of Pardo himself and some of his men, and they record some of the major events that took place at Native American towns in the Carolinas and eastern Tennessee, but documentary sources only record the broad contours of what happened, and why. Written accounts also do not shed much light on how Native Americans themselves interpreted these developments, nor how they responded to the challenges and opportunities created by encounters and entanglements with Spanish conquistadors and colonists. This paper considers recent archaeological finds at the Berry site, in western North Carolina, the location of the Native American town of Joara and the Spanish colonial town of Cuenca and Fort San Juan, with particular emphasis on evidence about how

the people of Joara managed interactions with colonial newcomers and neighbors, and impacts of Spanish colonial history on native groups in the northern borderlands of La Florida.

Rodriguez, Cindy [202] see Holt Mehta, Haley

Rodriguez, Iraida [85] see DeGayner, Jacob

Rodriguez, Jessica [210] see Medina, Shelby

Rodríguez, Alexis [182] see Tantaleán, Henry

Rodríguez, Sylvia (University of New Mexico) and Aaron Wright

[84] Procession and Sacred Landscape

The idea of a sacralized landscape is popularly associated with site-specific Native American religious beliefs and practices, but a landscape and its features can have religious meaning for other people as well. This paper examines the northern New Mexican folk-Catholic tradition of religious procession. Processions belong to a genre of human ritual behavior that involves symbolic discourse through spatial practice. They reference a relationship between those in the procession and the specific topography or territory through which they pass. From an ethnographic standpoint a procession is an observable behavioral event and also a complex communicative text. Such cultural texts are about those who perform them and they symbolically encode peoples' collective relationship to the place where they live. Processions ritually inscribe a circuit or pathway around or through a territory sacralized by constructed sites such as altars, oratorios (built shrines), chapels, churches, camposantos (cemeteries), moradas (Penitente chapter houses), calvarios (large crosses), and sometimes descansos (smaller crosses commemorating a deceased individual). In the Catholic world processions are spatial events that occur within a temporal framework or religious calendar based symbolically on the life and passion of Christ and the lives of saints.

Rodriguez Carpio, Gonzalo [250] see Isbell, William

Rodríguez Domínguez, Virginia (University of Puerto Rico, Río Piedras Campus)

[418] Trade, Professions and Education: Women in Puerta de Tierra, Puerto Rico, 1910

The purpose of this research is to identify the types of trade and professions carried out by women who lived on the Puerta de Tierra neighborhood of San Juan, Puerto Rico using data from the population census of 1910. The information contained in the census allows the study of women by looking at specific variables such as their age group, household composition, place of origin, place of employment, type of work and literacy level, among other things. The data can be further analyzed to shed light on the conditions under which women worked, the types of jobs available by age group, and if certain trades took place in specific parts of the neighborhood. Consultation and analysis of photographers showing women as part of the workforce enhances our knowledge of the types of material culture associated to trades and professions and can be used to create models on the type of artifacts that could have been present in their workplaces.

Rodríguez López, Isabel and Aleksander Borejsza (Universidad Autónoma de San Luis Potosí)

[38] From Tlacolol to Metepantle: A Reappraisal of the Antiquity of the Agricultural Niches of the Central Mexican Symbiotic Region

With the benefit of a culture-ecological mindset and thousands of man-hours spent in the then still extensive countryside of the Basin of Mexico, The Book devoted many pages to the discussion of traditional farming techniques, potential maize yields, and abandoned agricultural features. Terraced slopes, irrigation networks, and chinampas, the triad of intensive techniques identified by Sanders in 1956 as distinctive of his Central Mexican Symbiotic Region, were discussed in this order, one of increasing technological sophistication, labor investment, and yield. The Book theorized that their adoption

roughly followed this order on a regional scale, but acknowledged the pitfalls of dating unexcavated features by association with surface sherd scatters. Stratigraphically-constrained contexts explored in the last forty years in the Basin, Puebla-Tlaxcala, Morelos, and the Toluca Valley put us on a firmer footing in reconstructing the order of infilling of the different agricultural niches. They confirmed the existence of swiddening and early development of irrigation in the Formative but failed to uncover widespread evidence of terracing or wetland agriculture prior to the Postclassic. Aztec agriculture now looks less like the final flourishing of millennia-old traditions and more like a singular historical achievement in the face of adversity posed by inherited land degradation.

Rodríguez Osorio, Daniel (UNIVERSITY OF MINNESOTA), Samantha Porter (University of Minnesota) and Steve Kosiba (University of Minnesota)

- [114] *Photogrammetry Modeling and GIS Analysis at Rumiqolqa (Cusco, Peru), a Multi-ethnic Labor Colony Occupied during Inca and Spanish Colonial Rule*

This poster employs digital archaeological mapping methods such as photogrammetry and Geographic Information Systems (GIS) to examine domestic labor practices, architectural style, and town planning at Rumiqolqa, a massive colony in Cusco, Peru where a multi-ethnic population of forcibly resettled workers quarried stone for Inca and then Spanish colonial regimes (ca. 1400-1650 CE). The goal is to understand resilience and community formation among these workers by documenting patterns in their house construction practices. The study does not assume that house construction style reflects ethnic or cultural background. Rather it documents common house construction techniques to identify groups of builders—communities of practice—who may have shared skills, technologies, and materials. GIS analysis traces the distribution of 35 architectural attributes (e.g., measurements, stone masonry, mortar recipe) to document whether and where workers in the settlement pooled construction labor and materials. The analysis reveals that Inca period work groups organized construction labor in ways that crosscut the town plan and its imposed neighborhood boundaries. A three-dimensional photogrammetry model of the colony, paired with GIS analysis of pathways and viewsheds, will also test whether Spanish colonial era changes in the architecture of Rumiqolqa further constrained or enhanced social interaction among the workers.

Rodríguez Zariñán, Nora (Universidad Nacional Autónoma de México)

- [81] *Canids in the Faunal and Iconographic Record at La Quemada: An Analysis from the Perspective of Huichol Ethnography*

The presence of canids (members of the biological family Canidae, including dogs, wolves, coyotes, and foxes) at the archaeological site of La Quemada in Zacatecas, Mexico has been established through multiple lines of evidence, including broad representation in iconography (e.g., ceramics, shell, carved lithics) and their physical presence identified through faunal analyses. The analysis of canids remains indicates several ritual uses—which attest to various interactions between humans and canids—but what would this have meant in ideational terms. The importance of canids seen in ethnographic evidence from the neighboring Huichol (Wixarika) region suggests that the relevance of canids at La Quemada can be explored through ethnographic analogy. In this paper, we analyze iconography and faunal remains alongside a careful review of ethnographic data from the Wixarika region to explore new ideas about the relationships between humans and canids in the pre-Hispanic past at La Quemada. Specifically, we explore the possibility that canids identified in the La Quemada faunal assemblage were wolves, beings from which the Wixarikari people prefer to keep a distance. We consider this hypothesis in comparison to an alternative, that the canids were dogs who were benevolent spirit companions of departed souls.

- [81] *Chair*

Rodríguez-Alegría, Enrique (University of Texas)

- [238] *Wealth and Ownership of Indigenous Goods among Spanish Colonizers*

Scholars have debated the relationship between ownership of indigenous goods among Spanish colonizers and different economic, cultural, and social variables. Some argue that wealth had a strong impact on consumption patterns, and wealthy colonizers used more European imports and less indigenous goods than poorer colonizers. Others have argued that wealth did not determine consumption patterns, and scholars should focus instead on social and political factors that affected consumption, including strategies of cultural separatism or alliance-building. I contribute to this debate by examining data from the probate inventories of 39 Spanish colonizers who died in Mexico City in the 16th century. The probate inventories allow calculating two separate statistics that will be useful: the wealth of each decedent, and the ratio of European to indigenous goods that each decedent owned. Results indicate that the wealth of these colonizers varies widely, and so does the ratio of European to indigenous goods found in their inventories. But is that variation correlated with wealth? Or

can other variables explain the pattern better? The results will help address the broad implications of economic, political and cultural explanations of consumption among colonizers, and they will aid in understanding archaeological patterns better.

Rodriguez-Rellan, Carlos and Ramón Fábregas Valcarce (University of Santiago de Compostela)**[190] Search Beneath the Rock Surface: Legend Chasers, Treasure-hunters and Rock Art in NW Spain**

Polly Schaafsma has often emphasized the use of ethnographic analogy to get insights into the use and ideological framework of ancient pictographs. While this is both feasible and reasonable in Southwestern rock art, the numerous petroglyphs known in the Galician region mainly belong to a period spanning the Final Neolithic to the Earlier Bronze Age and, as a result, are completely detached in cultural terms from the present inhabitants. At the same time, the presence of the decorated panels in the landscape has not been altogether overlooked by the later, historic communities. In most cases, however, there is no reference in the local folklore to the carved rocks and those effectively acknowledged by the modern peasants generally belong to the so-called geometric group, made up of circular combinations, while other types of representations (such as zoomorphs) remained comparatively ignored. As to the first, the traditional peasants kept a variable disposition, ranging from Christianization -they carved crosses beside or over the prehistoric images- to the pursuit of the bullion allegedly hidden beneath the actual petroglyphs. In this paper, we explore those different attitudes with respect to prehistoric rock art, spanning from the Iron Age to the present day.

Rodriguez-Rellan, Carlos [252] see Valcarce, Ramon

Rodriguez-Saza, Freddy [330] see Fitzgerald-Bernal, Carlos

Roemer, Erwin [75] see Wallander, Amanda

Rogers, Alexander (Maturango Museum) and Christopher Stevenson (Virginia Commonwealth University)**[392] Paleotemperature Adjustments for Obsidian Hydration Dating**

Obsidian hydration dating (OHD) is a method for estimating age of an obsidian artifact based on time-dependent absorption of water. The process is temperature-sensitive, and its application to archaeological dating currently requires assuming that current temperature parameters are a reasonable approximation to ancient temperatures. This is generally valid for ages in the Holocene, but temperature proxy data show significant shifts in ancient temperatures relative to the present, especially for ages before approximately 12-13Kya. For these ages, the prevailing temperatures were significantly cooler than today, and ages computed assuming current conditions will be too young. We describe a simple numerical method for correcting OHD ages for long-term changes in climatic temperature regimes, based on published temperature proxy data. The method is based on reading hydration rims by optical microscopy; however, since the method applies to the ages and not to the measurements themselves, it will also work for other measurement methods: secondary ion mass spectrometry (SIMS); FTIR or IRPAS spectrometry; manometry; or SIMS/SS. We present calibration curves relating paleo-corrected to uncorrected ages.

Rogers, Joe [88] see Walter, Tamra

Rogers, Melinda [172] see Wanstead, Chelsea

Rogers, Michael (Southern Connecticut State University), Sileshi Semaw (Centro Nacional de Investigación sobre la Evolución), Gary Stinchcomb (Murray State University), Naomi Levin (University of Michigan) and Jay Quade (University of Arizona)**[32] The Middle Stone Age at Gona, Afar, Ethiopia: Implications for Regionalization and Migrations**

Tentatively dated to MIS 5/4, the YAS-1 (Ya'alu South 1) site at Gona, Ethiopia is a high-density open-air archaeological site preserving classic Middle Stone Age (MSA) stone tools such as Levallois cores, Nubian cores, points, and blades in

addition to a variety of fossil fauna, some with bone modifications including cut marks. While most of the archaeological material has been found on the surface over the last twelve years, recent excavations have documented both lithics and fauna in situ. Though the zooarchaeological remains and depositional context of the site will be discussed, the emphasis here will be on the lithic assemblage, which includes Levallois points, preferential and recurrent Levallois cores, unidirectional and bidirectional prepared cores, prismatic blades and blade cores, and a small number of retouched tools. Similarities are seen with other late MSA sites in the region (e.g., Aduma), and also with other more distant sites, such as at Wadi Surdud (Yemen) and Rose Cottage cave (South Africa). Ongoing and future research at the site will hopefully refine the site's age, identify the obsidian source(s) of the obsidian artifacts, and expand the archaeological sample.

Rogers, Thatcher (University of New Mexico) and Alexander Kurota (Office of Contract Archeology, UNM)

- [413] *Possible Evidence for Mimbres Integration into Jornada Mogollon Villages: Introducing the Eastern Mimbres San Andres Aspect in South-Central New Mexico*

Investigations at Mesilla and Doña Ana phase villages within and adjacent to the Tularosa Basin have identified a set of cultural traits associated with the Mimbres culture. Extraordinarily high frequencies of Mogollon pottery, as well as similar mortuary patterns, agricultural practices, and possible evidence of gambling point to direct cultural influences from the Mimbres region. Petrographic analysis and INAA sourcing of Mimbres sherds from a sample of these sites indicate they were all made in the Mimbres region. Yet, the sheer volume of Classic Mimbres pottery imported to Jornada Mogollon villages along the San Andres and Organ Mountains suggests that a possible migration and integration of Mimbres groups occurred. There is an emerging cluster of residential sites (Huntington Pueblo, Lake Lucero Pueblo, Ricochet Village, Cottonwood Pueblo, Pole Site, Grandview Pueblo) with hundreds to thousands of examples of Mimbres pottery that we term the Eastern Mimbres San Andres Aspect. This paper synthesizes data from recently documented and prior known sites in the region from survey and excavation projects to assess the potential for and impacts of Mimbres integration into the area.

Rogerson Jennings, Jennifer (California State University, Chico)

- [411] *The Ontological Approach: Applying Social Theory to Physically Manifested Culture*

The practice of collections management is changing with the ever-growing technology that is embedded in society today. The museum's visitor no longer receives information on an analog platform, or at least not the majority of it, so why is this the main form of communication between museums and patrons? This creates a necessity for museums to alter their methods of communication between museums and visitors, both academic and public. The design, integration, and accessibility of digitized collections allows visitors to determine a "thing's" meaning for themselves, instead of having to accept or deny the preexisting representation applied to said "thing." This will create possibilities of expanded representation for objects, cultures, and meaning. The missing component has been access to the cultural heritage devoid of the predetermined and associated meaning. Finally, this work is not designed to negate any of the previous theoretical notions used to derive anthropological meaning, it is purely here to augment and add to the investigative repertoire of both the researcher and the civilian. The creation of a tested and affordable digital integration methodology is not an atheoretical research approach but is a modus-operandi used to answer the looming theoretical ideas which exist within anthropological thought.

Rojas, Laura [57] see Krasinski, Kathryn

Rojas-Pelayo, Lisseth, Erick E. Acero (Programa de Investigación Arqueológica Chavín de H) and Oscar Arias (Programa de Investigación Arqueológica Chavín de H)

- [315] *Chavín after Chavín: Funerary Facts through the Voices of its Protagonists / Architectural Sequences and Occupational Events in the Ceremonial Center Chavín de Huantar during Formative Period (950-550 BCE)*

The Chavín Archaeological Monument is one of the most important ceremonial centers of the Formative period in the Central Andes. The pioneering work in the Temple focused on understanding the ritual complexity of the Chavín world through its monumental buildings, plazas, and sculptures. The crossing of reaching architectural surfaces and elements "Chavín" exposed multiple times "late" architectural elements (societies Mariash-Requay, Callejón and Inca), witnesses of the non-functional occupational continuity of the Temple. John Rick, since 1996, directs the Archaeological Program Chavín de Huántar, focusing his actions on the unveiling of the north esplanade of building C (northern component of the Temple). His findings exposed a generalized picture throughout the site: the reoccupation by adapting spaces and architectural structures associated with different construction phases. Our work focuses on the analysis of one of its fronts: the north

façade of building C, which was joined by a series of enclosures that housed human burials of the Mariash-Recuay society. Funerary data bring us closer to the resident population of the former temple; for this, we use bioanthropological analysis providing data on the biological profile and inferences about their general living conditions, data complemented with the contextual analysis of each funeral unit.

Roksandic, Ivan (University of Winnipeg)**[276] Cuban-Canadian Collaboration at the Sites in the Canímar River Basin and in the Cauto Region**

The Cuban-Canadian research project was developed during the last 10 years between scholars from the University of Winnipeg and the University of Havana, the University of Matanzas and The Cuban Institute for Anthropology in order to investigate problems and help build a more complex picture of migration and exchange within the Greater Antilles and between Cuba and the adjacent continental areas. Our project, using a multidisciplinary approach involving archaeology, bioarchaeology, isotope analysis, paleoethnobotany, bathymetry, ancient DNA, and toponomastics, was concentrated so far on two regions: the Canímar River basin (especially the site of Canímar Abajo) in the west (Matanzas Province), and the Cauto region (especially the site of Playa del Mango) in the east (Granma Province). This contribution will present some important results of our project showing very early use of (exotic and local) cultivated plants, the concurrent existence of two different subsistence systems in Cuba as reflected in the cultural norms and biological profiles of supposedly Archaic Age groups, and their survival till the end of the 1st millennium CE.

[276] Chair

Roldan, Jonathan [30] see Cortes-Rincon, Marisol

Roldan, Jonathan, Makayla Whitney (Humboldt State University) and Taylor Picard (Humboldt State University)**[41] Language as a Cultural Resource: A Case Study with the Tolowa and Hupa Languages**

Through past and current language and Cultural Resource Management (CRM) policies, this study aims to include revitalization efforts in indigenous communities, technology as a factor in protecting and spreading a language, and the state of diversity within Athabaskan languages. The Athabaskan language family contains indigenous languages with long histories riddled with past and current colonialist and language policies. A focus on emphasizing the notion of language as an essential cultural resource to the CRM field will be explored. In recent years, CRM practitioners have been implementing and advocating for progressive policies to help communities that host at risk languages. Using this information, this project will consider the adverse effects to at risk languages when conducting a CRM investigation and develop an understanding for the consideration of language as a cultural resource. A complete understanding of how to use language resource management theories and practices to implement conservation efforts in endangered language areas will be developed by working with tribes, linguistic anthropologists, and CRM professionals.

Rollefson, Gary**[366] The Road More Traveled: 'Ain Ghazal and the Peopling of the Black Desert**

The late Pleistocene and early Holocene Neolithic connections over the maritime routes from the eastern Mediterranean shores to Cyprus have been fruitfully investigated, and those links clearly involved more than the simple movement of ideas. Another development in the transfer of people and ideas occurred during the 7th millennium, but in the other direction. From ca. 11,500 to 7,000 BC population grew rapidly throughout the southern Levant. In the highlands of western Jordan, "megasites" of eight to 25 hectares and with up to 4,000 inhabitants. By c. 7,000 BC there appears to have been a tipping point in the pressure put on local environmental resources. Some 15,000-20,000 people from at least eight megasites left their settlements, raising the question of "Where did they go?" In the first half of the 7th millennium, there was a population explosion in Jordan's Black Desert. Large clusters of permanent dwellings spread along prominent local drainages and seasonal pools. Most of this sudden eruption of population is attributed to the collapse of the megasites, among them 'Ain Ghazal. The redistribution of population set up an exchange network between the hunter-herders of the Black Desert that would last until the end of the Early Bronze Age.

Román, José [182] see Tantaleán, Henry

Romandini, Matteo [195] see Rossoni-Notter, Elena

Roman-Ramirez, Edwin (El Zoz Archaeological Project)

[79] The Moral Community of Pa'ka'n during the Classic Period

Stephen Houston's collaborative article on the moral community and changes in settlement at Piedras Negras, Guatemala proposed that long-term Precolumbian settlement changes should not simply be analyzed in terms of "agricultural potential, land tenure, and natural increase," but should consider beliefs and morality as well. This new framework for studying the rise, life, and abandonment of cities is important because it demonstrates that rulers and the nobility played important roles not only in community development, but also in processes of migration and abandonment. In the Buenavista Valley, evidence shows that dynastic rulers of the Pa'ka'n kingdom were decision makers that designed the urban landscape and were responsible for shifting their communities to new locales with new centers of power. This paper, inspired by the concept of the moral community, will explore these changes through time based on thirteen seasons of research, many of them led by Houston himself, centered at El Zoz and surrounding sites

Romera, Aida [168] see Mann, Evan

Romera Barbera, Aida

[334] Fragmented Bodies: Early Bronze Age Cremation Burials in Kilmagadwood, Scotland

There is a clear dichotomy between the practice of inhumation and the rite of cremation. From an anthropological perspective, a community's preference for one or another reflects changes in its beliefs system. Conceivably, this occurred during the transition from the Neolithic to the Bronze Age when cremation became dominant. The symbolism that accompanies the cremation of the deceased, and its subsequent burial, has long been linked to transformation, fragmentation and reconstruction of the body. Furthermore, with cremation, the mourners have control over the changes inflicted to the body immediately after death. The discovery of a large Early Bronze Age urnfield cemetery in Kilmagadwood, Scotland, opens the door to further investigate the characteristics of such funerary program. Here we present data derived from the examination of cremated bones including osteological and paleopathological analysis, evidence for pyre technology and ritual and the formation process of the mortuary deposit. In addition, the analysis situates Kilmagadwood in the broader conversation about the perception of integrity and life histories of these Bronze Age fragmented bodies.

Romero, Danielle (University of Nevada, Las Vegas)

[263] Cache Flow: An Analysis of Vessel Assemblages from the Elk Ridge Site

Designs on Mimbres pottery have long fascinated archaeologists. These complex geometric and figurative images can shed light on daily activities, household organization, and groups of potters. Excavations at the Elk Ridge Site, a large Classic Mimbres pueblo in the northern portion of the Mimbres River Valley, have yielded numerous complete or nearly complete vessels, many in caches. Vessel caches have been recovered from both household and extramural contexts. The room block under investigation is also of importance because it reveals a sequence of construction that extends from the pithouse-to-pueblo transition until site abandonment at the end of the Classic period. This poster analyzes whole and partial cache vessels recovered from the site to investigate ceramic type and use-wear, puts them in their larger context to determine if they were associated with domestic and/or ritual activities, and how this may have changed through time. Additionally, the designs are examined, both within and between the caches, in order to gain information on their similarities and differences and to ascertain data related to the presence of potters or learning frameworks.

Romero, Levi (Chicana/o Studies)

[193] Mi Querencia: A Connection between Place and Identity

What is the connection between place and identity? The story of human existence is one of movement and settlement. Origin stories the world over feature accounts of where a people came from as a way of telling how they came to be. Northern New Mexico cultural envoy, Juan Estevan Arellano, used the traditional northern New Mexico concept of querencia to define the relationship between place and identity. Querencia, he wrote, "is that which gives us a sense of place, that which anchors us to the land, that which makes us a unique people." Although I grew up hearing the term used,

it had no special relevance for me beyond what I understood querencia to be, the place where one is born and raised. In my contemplations regarding the theme for this presentation, I speak of querencia from an experience embedded in an upbringing amongst close-knit relations and community. For me, querencia is not only personal, it is communal and deeply connected to the people and place where I was raised. It rises from the depths of archaeological remains and makes its way to the every-day platicas (conversations) the local folks have at the village general store.

Romero, Lynda (Poeh Cultural Center)**[311] *Presenting Pojoaque History through Exhibits***

As someone who was born and raised in my own Pueblo, it amazed me how much I don't know of the history of the Pueblo of Pojoaque. I've heard bits and pieces, different versions of stories from different people, and I've read about our history but none made an impact until I was part of a discussion at the University of Colorado, Boulder this past spring as a participant in a public exhibition project about the University's and Pojoaque's collaboration. In 1952, Florence Ellis brought her field school to survey the old village sites in Pojoaque Pueblo. My grandfather was Governor at the time and gave his consent for the survey. After seeing what was taken and reading the report Ellis wrote, I immediately felt that I needed to know more... more about my family, my people, the land, the way we survived. I want to know our past. Through the exhibition I would like to create something to teach our tribal members, visitors, and community members our history...but more so to show what we have endured to survive and how we are working towards for our future.

Romero, Raquel (Northern Arizona University)**[119] *Tribal Youth Engagement: Establishing a Model for Archaeological Outreach***

This poster provides an overview and analysis of four Tribal youth events attended in the Southwestern United States in 2018. Educational outreach is an important field to explore, because Tribal representation in educational institutions is desparingly low (PNPI 2017). The goal of this research was to learn the best methods for performing outreach to youth. I was particularly interested in analyzing if archaeology was present during outreach events and career camps, and how various Tribes conveyed archaeology, if at all. Through participant-observation, I noted that archaeology was not represented at any of the events. Though formal archaeology was not present at all the events I observed, significant time was devoted to cultural preservation activities. In two instances, I observed at least half of the allotted time spent on language and cultural traditions. Pulling from my personal experience and my current research, I argue that archaeology is an underutilized resource for connecting Tribal members to cultural traditions and strengthening cultural appreciation. This poster explains the links I have made between archaeology and cultural preservation, and how this information may be used to connect Tribal youth to their heritage, and hopefully increase the number of Tribal archaeologists in the future.

Romero Escobar, Jhoan [46] see Kellett, Lucas

Romero Padilla, Laura Angelica (Laura Romero Padilla)**[309] *Ritual Cave Utilization Near Tenosique in Tabasco, Mexico***

As part of the Middle Usumacinta Archaeological Project, I conducted reconnaissance in three caves with archaeological remains, named Santo Tomás, San Marcos, and Corregidora. The three caves are located in the Tenosique municipality in Tabasco, Mexico near the border with Guatemala. A detailed examination of the rock art style and pottery found in the caves provides a tentative chronology of ritual cave use. Santo Tomás cave exhibits a group of three elements that were painted in red and black on the southern wall of the main chamber, yet the presence of pottery is scarce. In contrast, the San Marcos and Corregidora caves have concentrations of unslipped and decorated ceramics in most of their passages and chambers, but no rock paintings were found. Based on this preliminary analysis, the evidence suggests that ritual activities were mainly conducted during the Classic period (AD 250-950), and that there were notable differences in the performance of local practices inside these caves. Ritual significance of cave use in this region will shed light on the relationships between local cults and social complexity, and how these practices helped shape lowland Maya society.

Romih, Stanislava (Northern Arizona University)**[280] Unleashing the Beast: Exploring Peri-abandonment Deposits in the Maya Lowlands**

The BVAR project has been investigating peri-abandonment deposits, also known as problematic or terminal deposits, at sites located along the Belize River in Western Belize. These investigations have focused on understanding the formation of such deposits as well as their significance across sites in the Belize Valley region. The project has employed a new microstratigraphic excavation method, that utilizes subplot systems for more comprehensive analysis than ever before conducted on the assemblages of individual deposits. Lower Dover is a recently discovered site located at the confluence of three waterways in the village of Unitedville, right across the Belize River from the site of Barton Ramie. In 2013, excavations conducted on the southern end of the smallest of 4 courtyards which make up the palatial acropolis revealed the first of such deposits at the site. Most recent excavations on the northern end of courtyard 4 have revealed another such deposit of similar composition, which has been excavated using this new methodology. This paper will focus on the research results of a regional comparison of peri-abandonment deposits in the Belize Valley using this new data from Lower Dover site core excavations.

Rondeau, Michael (Rondeau Archeological) and Nicole George (University of Nevada, Reno)**[249] Paleoindian Projectile Points in the Far West**

A review of selected fluted point and Western Stemmed Tradition (WST) studies are highlighted to present a series of intriguing results, implications, and interpretations. This wide ranging overview of themes and unanswered research questions offers a look at the past and present links between fluted point and WST research.

Roney, John [263] see Whisenhunt, Mary

Ronsairo, Karleen (The George Washington University), Jeffrey Blomster (The George Washington University) and Sarah Breault (The George Washington University)**[394] Early Mixtec Urbanization at Etlatongo, Oaxaca, Mexico**

Past studies of early urbanism in Formative Oaxaca, Mexico, have highlighted evidence of the construction of monumental architecture, increased population densities, and the expansion of Middle to Late Formative period occupations onto defensive hilltops. In the Mixteca Alta of Oaxaca, investigations at urban centers, such as Cerro Jazmín, Monte Negro, and Huamelulpan, have provided evidence of Mixtec urbanization during the Early Ramos phase (300-100 BCE). We argue that at Etlatongo in the Nochixtlán Valley of the Mixteca Alta, urbanism began in the preceding Yucuita phase (500-300 BCE), and is contemporaneous with urbanism at Monte Albán in the Valley of Oaxaca based on settlement data, architectural transformations, including the construction of a low platform on the Etlatongo hill, and the changing nature of ceramic crafting. The relative close proximity of early urban centers in the Mixteca suggests the great antiquity of the different nature of Mixtec urbanization compared to that of Monte Albán in the Valley of Oaxaca.

Rooney, Matthew (University of Florida)**[41] Chickasaws and Presbyterians: What Did It Mean To Be Civilized?**

In the decade prior to their removal, the Chickasaws allowed Presbyterian missionaries to set up a school on their lands to gain the benefit of a western education for their children and potential allies in the struggles they were inevitably going to have with the expanding United States. Here, native children were being exposed to missionary tactics to "civilize" them and convert them into idealized Anglo-American-like farmers. This meant exposure to developing capitalist ideas and practices regarding work and gender. It included removing young girls from agricultural work and ensuring that the young boys learned how to farm in addition to their traditional development as hunters. In some cases, missionaries also encouraged natives, with varying degrees of success, to forego their matrilineal kinship system and place more importance on patrilineal relations. Archaeological investigations were performed on this site, Charity Hall, for the first time last summer and will continue this year. I am using materiality theory to guide the excavation process and learn how the material world played a role in this contact situation as well as how students and missionaries may have used it for their own purposes.

[41] Chair

Roos, Christopher (Southern Methodist University)**[20] Pyric Herbivory in Ancient North America**

Fire is a powerful tool for hunting because fire effects have important consequences on habitat and forage for prey species. Using case studies from the northern Great Plains and the Southwest US, I explore how fire-use positively impacted prey abundances or location, resulting in higher encounter rates for particular hunting strategies. Specifically, these case studies document the use of fire to purposefully manipulate bison herds in Montana and, perhaps indirectly, manipulate the location and abundance of ungulates in New Mexico – a strategy that is called pyric herbivory. Using geoarchaeological methods to reconstruct fire use and its impacts on prey populations, we can document variability in human-fire-animal relationships by American Indian populations in North America.

Roos, Christopher [408] see Field, Julie

Roquemore, Katie (Syracuse University), Nikki Waters (Alliance Archaeological Services), David Gilliam (Syracuse University) and Robert Belden (Syracuse University)**[69] Intellectual Disability, Employment, and the Public Record**

Disability is a natural part of the human experience and our work as archaeologists should reflect this. The key to recognizing and minimizing bias in our work is to include marginalized groups as much as possible. But in a field that by its traditional definition demands a high level of intellectual and physical rigor how can we best do this? This paper evaluates this question through an examination of the complexities of working on the Community 4 All project, a Community Based Participatory Research project at Syracuse University, that is creating digital toolkits by, with and for adults with intellectual disability. As we created tools to support deinstitutionalization and lifelong learning and employment, we were forced to confront the histories of state schools, sheltered workshops, and continued segregation of adults with intellectual and developmental disabilities from the community and public record. Our toolkit explores ways of including people with intellectual disability in the exploration of culture and history and finding ways to incorporate their voices archaeological research.

Rorabaugh, Adam (Colville Confederated Tribes)**[175] Evolution for the People: Big Data, Big Software, and How Compliance Archaeology is the Missing Link of Compliance Archaeology**

A growing concern in archaeology is the potential inaccessibility of various methodological and theoretical approaches in non-academic contexts. Open access and open source software (R, Quantum GIS, ImageJ) provide means for applying complex analyses within a budget, but due to cybersecurity concerns these may not be available for archaeologists working for state, federal, or tribal agencies. In an effort to address this issue, I provide several case examples of using standard office suite software to conduct analyses examining artifact metric variation and stylistic variation typically employed in the evolutionary archaeological literature. I argue that these technological issues are not insurmountable for being able to analyze large datasets and that compliance archaeologists can contribute the large datasets necessary to capture variation and properly examine the material record from an evolutionary perspective. In effect their experience and datasets provide a "missing link" for assessing cultural evolutionary hypotheses.

Rosa, Alexander (MSU of Denver), Michael Kolb, Scott Kirk and William Balco**[337] Siculo-Norman Tableware Consumption upon Monte Bonifato: A Spatial Analysis**

After the Norman conquest of Sicily, the newfound rulers of the island found themselves greatly outnumbered in a land where a majority of the population had converted to Islam. Under these conditions, many of the technological and artistic innovations brought to the island by the Arabs continued under the new, Christian regime. Of particular interest to archaeologists are the ceramics that remain so ubiquitous in the archaeological record of this time. This paper focuses on the spatial distribution of Siculo-Norman tableware across Monte Bonifato, Alcamo, Western Sicily. Highly decorated with colorful glazes, this ceramic type is considered characteristic of this time period, though its continued use into the Swabian era makes earlier material harder to distinguish from later developments. Nonetheless, the ornate appearance of this pottery leads most scholars to believe that only the houses of elites would have contained this material. Connecting Siculo-Norman tableware with the presence of rubble features, thought to be collapsed housing, demonstrates that this material can be used to define where elite structures would have been located in the now abandoned medieval village that sits at the

summit of Monte Bonifato.

Rosa Figueroa, Jeffery [360] see Kohanski, Neil

Rosales Hilario, Veronica [290] see Reid, David

Rosch, Heather

[337] *Risk Management in Agriculturally Marginal Areas of Southwestern Anatolia during the Ottoman Period*

The results of recent surveys around the Mediterranean have revealed a wealth of information about rural populations during the Ottoman period that had for a long time been ignored by historical and archaeological research. This has also brought to light the role of people who occupy politically, economically, or socially marginal niches. This paper aims to understand the way agriculturally marginal populations fit into the economic fabric of southwestern Turkey specifically, and how they were often able to retain their presence in areas with poor agricultural potential for long periods of time. Evidence from surveys indicates that not only were populations in marginal areas involved in the economic systems of the entire region, but that it was necessary for them do so as a way to limit the risk associated with their location. In addition to maintaining relationships with other areas that they could call on in times of stress, these populations also diversified their subsistence methods, were often mobile, and retained stores of surplus food stuffs. Despite hardships due to climate change and political policy throughout the Ottoman period, risk management allowed populations in marginal areas a buffer from complete devastation.

Rose, Katherine (Harvard University)

[267] *UAVs, Photogrammetry, and Mortuary Landscapes: A Study of Napatan Cemeteries*

This paper discusses the broad implications and applications of UAV or drone surveys to archaeological data sets, through a detailed case study in Nubian archaeology. The author employs drones to map and model Napatan royal necropolises, dating to the 8th century B.C.E. and located in modern day Sudan, using photogrammetry. The primary research objective of this study is to better understand the diachronic spatial development of necropolises on a landscape scale, within the context of complex and multifarious contact between Napatan and ancient Egyptian cultures. The author argues that physical changes, in terms of the organization of tombs, temples, and other modifications to the natural landscape, are the result of political interactions and negotiations of identity. Regarding the implications of the methodologies involved, drones provide an efficient means of gathering a massive amount of photography and data on a much greater landscape scale than traditional forms of mapping and photography. Furthermore, the capability of drone photography to form the basis of photogrammetric models has implications for the preservation and presentation of cultural heritage. Using drone photography, models of these sites can be shared on open access platforms that allow the public to experience the cultural heritage of Sudan.

[267] Chair

Rose, Nicole (The Graduate Center, CUNY)

[106] *Technology on the Move: The Influence of Mobility on Pottery Production on the Ancient Russian Steppe*

On the desert-steppe zone of southwestern Russia, mobile pastoralism served as the dominant mode of subsistence for much of its history. However, mobile pastoralism as a term refers to a diversity of practices, distinguished across multiple axes, the least of which is the mobile strategy itself. Pottery, as both an everyday object and a form of technology whose use and production is constrained by mobile lifestyles, serves as an avenue of insight into this everyday diversity. Between the Eneolithic and Early Iron Age, or the end of the fifth millennium B.C.E. to the first few centuries C.E., mobile pastoralists would first emerge in the river valleys then expand their exploitation to each available ecological niche of this area of the steppe, before developing into what has historically been recognized as pastoral nomadism. By focusing on pottery from newly emerging camps in this region and period, technical choices concerning resource procurement, clay recipes, and investment, informed by p-XRF and ware-analysis, allow insight into how technological production shifted with increasing mobility, as well as how these technical choices reflect contemporary diversity among potters otherwise engaged in similar subsistence and mobility practices.

Rose, Richard

[343] *Discussant*

Rosen, Arlene [311] see Damick, Alison

Rosen, Steven [95] see Yegorov, Dmitry

Rosen, Steven (Ben-Gurion University)

[399] *The Tabular Scraper Trade: Complexities of a Prehistoric Pastoral Trade System*

Originally modelled as a down-the-line exchange system from the desert to the settled zone, analyses of previously unpublished materials synthesized with newer materials indicate that the flint tabular scraper production and distribution system was a complex mixture of local desert consumption and long distance trade of objects that changed in function, role, and value depending on context and place in their use-life trajectory. These complexities are reflected in: 1. Different kinds of quarry sites reflecting different structures of production, 2. Find proveniences reflecting mortuary offerings, other cultic contexts, trade caches, secondary production sites, and domestic contexts, 3. Chronological variability suggesting changing symbolic meaning, and 4. Techno-typological variability which may, in part, be associated with both geography and chronology. Although originating in a system of desert pastoral production, itself variable in terms of degrees of intensity of production, it is likely that some kind of agent system operated at the seam between the settled and nomadic zones. The original simple down-the-line model must be tempered by these complexities.

Rosencrance, Richard (University of Nevada, Reno)

[249] *Assessing the Chronological Variation Within the Western Stemmed Tradition*

Western Stemmed Tradition (WST) projectile points exhibit considerable morphological variability, which may reflect difference in function, ethnolinguistic affiliation, resharpening/rejuvenation, or age. These ideas represent hypotheses that remain to be tested, and rejecting one or more of them will improve our understanding of the terminal Pleistocene/early Holocene. To address questions surrounding the morphological variability of WST points, I evaluate existing radiocarbon assays associated with WST-bearing archaeological components across the Far West and present new dates from five previously excavated sites where good chronological resolution was lacking or absent. These data are poised to inform on technological innovation and spread, population movements, and how and when early groups settled into the Far West.

[249] *Chair*

Rosencrance, Richard [274] see Jerrems, William

Rosenfeld, Silvana (High Point University) and Matthew Sayre (High Point University)

[250] *Wari Foodways: A Comparison across Space*

The advances in food studies have revealed significant new information about life during the Middle Horizon (AD 600-1000) in the central Andes of Peru. Botanical and faunal data from Wari affiliated sites shows differential use of at least two items: molle (*Schinus molle*) and guinea pigs (*Cavia porcellus*). After examining recent data from the Patipampa sector of Huari, we discuss the possibility that differential consumption of chicha de molle and guinea pig meat during the Middle Horizon could have been an important aspect of a cuisine to sign Wari ethnicity or/and status outside of Huari.

[315] *Chair*

Rosenfeld, Silvana [315] see Sayre, Matthew

Rosenstein, Dana Drake (University of Arizona) and Konstantina-Eleni Michelaki (Arizona State University)

[387] *Petrographic Analysis of Ceramics from Umbro Greek, Southern Calabria, Italy*

Here we present the first results of petrographic analysis on ceramic sherds from Umbro Greek archaeological site, a Classical period farmhouse in Southern Calabria, Italy, dating from the 5th to 4th centuries BCE. The site is located on the Umbro plateau, halfway between the Ionian Sea and the Aspromonte Massif, an area extensively researched by the Bova Marina Archaeological Project over the last twenty years. Michelaki et al. (2012) completed comprehensive petrographic and chemical analyses on sediments within a radius of approximately 4 km around Umbro Greek and identified three distinct geological units with clays suitable for ceramic production. The Classical period sherds examined for this project were made of local clays as well as clays of unknown provenience, indicating that the farmhouse occupants interacted with people from other regions. Comparatively, ceramics from two Early to Middle Neolithic sites were made exclusively of local clays (Michelaki et al. 2015): Umbro Neolithic, a rock shelter, and Penitenzeria, a small open-air terrace, each date to the 6th century BCE and are within a half-km of Umbro Greek.

Rosenzweig, Melissa (Northwestern University)

[200] *Beating Swords into Plowshares: The Role of Agricultural Colonization in Imperial Histories*

In his 2001 monograph, *The Mechanics of Empire*, Bradley Parker methodically utilized archaeological survey data and historical texts to track the Neo-Assyrian empire's growth through the agrarian settlement of deportees in newly conquered territories. Parker's emphasis on agricultural colonization marked an important contribution to understanding the political ecology of empires, past and present. This paper will review Parker's work on agricultural colonization, its impact on ongoing research into the Neo-Assyrian empire, and its resonant value for imperial case studies across time and space.

Rospopo, Steven

[203] *Chair*

Rossi, Franco (University of Illinois at Chicago) and Zachary Hruby (Northern Kentucky University)

[255] *"An Instrument for Seeing": The Multivalent Nature of Volcanic Glass in Mesoamerica*

Throughout Mesoamerica, obsidian commonly turns up in the form of prismatic blades, knives, projectile points and spearheads—pragmatic tools of daily work and routine life in the Pre-Columbian world. Yet these ordinary usages did not preclude obsidian from occupying a prominent place in religious symbolism, ritual practice and political theater across time and space in Mesoamerica. In such settings, obsidian was a material that was symbolically charged yet practical; menacing, yet also protective. With special attention to obsidian "eccentrics" and ceremonial blades, this paper draws from archaeology, ethnohistory, artistic analysis and epigraphy to take a fresh look at the multivalent nature of obsidian in Mesoamerica and explore the symbolisms and contradictions this material came to embody through time.

Rossi, Stefano [195] see Sparacello, Vitale

Rossi, Stefano (MiBACT - Soprintendenza ABAP di Parma e Piacenza), Chiara Panelli (CEPAM, UMR 7264 CNRS, Université Côte d'Azur), Irene Dori (PACEA - UMR 5199 CNRS, Université de Bordeaux), Alessandra Varalli (PACEA - UMR 5199 CNRS, Université de Bordeaux) and Goude Gwenaëlle (Aix Marseille Univ, CNRS, Minist Culture, LAMPEA)

[195] *New Multi-disciplinary Studies Re-shape Our Understanding of Neolithic Peopling and Biocultural Adaptations in Western Liguria (Northwestern Italy)*

Beginning in the mid-1800s, about 200 burials and an undefined number of scattered human remains have been reported from several caves and rock shelters in western Liguria. The skeletal series, excavated following the methodology of the time, were considered likely/probably/possibly "Neolithic" or "Middle Neolithic", and as such were studied by anthropologists. As a result, anthropologists could make only general inferences on "Neolithic" funerary behaviors, biological adaptations, and health and well-being.

We obtained higher-resolution information through surveying the extant Neolithic skeletal series from Liguria, re-analyzing the available documentation, and performing new direct radiocarbon dates (c 150). This allowed for the discovery of burials

from the 8th, and 6th millennium cal BC. Most burials belong to the 5th millennium cal BC, when the Neolithic Square Mouth Pottery Culture was attested in Liguria. Scattered human remains span from the 6th millennium, through the Metal Ages, to historic times, attesting for a long-term use of the Ligurian caves as funerary sites. The new chronological framework allows for a characterization of possible funerary practices. In addition, through the integration of chronological, funerary, and skeletal data, we can explore possible differential funerary behaviors based on biological traits, including sex/age, but also pathology and trauma.

Rossoni-Notter, Elena (Director), Olivier Notter (Museum of Prehistoric Anthropology - Monaco), Suzanne Simone (Museum of Prehistoric Anthropology - Monaco) and Matteo Romandini (Università di Bologna, Dipartimento di Beni Cultur)

[195] Monaco in Prehistoric Times and Further Investigations

The Museum of Prehistoric Anthropology has conducted excavations and research in the Principality of Monaco and surroundings for more than 100 years. In this contribution, we tackle the issue of the prehistoric Liguro-Provencal panorama, including some major comparative items and new results obtained through the assessments of Monaco (e.g. Observatoire, Saint-Martin, Bas-Moulins, Spélugues) and Prince (Balzi Rossi, Liguria, Italy) caves collections. This overview is intended to update our Paleolithic-Neolithic-Protohistoric vision in this area (Liguria, Italy and Alpes-Maritimes, France) which is full of interest as well as to enrich the current state of knowledge for behavioral strategies and paleoenvironment.

Roth, Barbara (UNLV)

[366] Maize Pollen but No Hippos: Alan Simmons' Contributions to Our Understanding of the Adoption of Agriculture in the U.S. Southwest

In 1984 in a remote portion of northwest New Mexico, maize pollen was recovered from an Archaic-period hearth. Alan Simmons' recovery of early maize pollen at a dune site in the Chaco region precipitated a controversy that lasted for over a decade. In the end these pollen grains marked a pattern of early maize adoption that has become increasingly clear as more work has been done. In this paper I discuss Alan's early interpretations of the adoption of agriculture in the Southwest and how they have been supported and enhanced by recent research.

[40] Moderator

[142] Discussant

Roth, Bridget [397] see Stites, Michael

Rothenberg, Miriam (Brown University)

[276] Contemporary Archaeology of the Recent Soufrière Hills Volcanic Eruptions on Montserrat

In July of 1995, the Soufrière Hills volcano began a series of eruptions that would fundamentally alter the communities and landscapes of the small Caribbean island of Montserrat. By the turn of the millennium, two-thirds of the island had been abandoned or destroyed, and a comparable proportion of the population had relocated abroad. This paper presents the initial results of an ongoing research project investigating the villages lost to volcanism, and the Montserratian community's material engagements with this disaster. The project combines archaeological survey with ethnography to better understand the interplay between human actions and natural processes throughout the volcanic crisis. The findings of the project are employed to expand archaeological knowledge in two distinct ways: to understand Montserrat's material record in its distinctly contemporary and Caribbean context, and to offer a degree of detail on site formation processes in volcanic landscapes that cannot generally be achieved when looking at the archaeological record of ancient disasters.

Rowe, Marvin (Office of Archaeological Studies)

[369] In Search of Hot (or Cool) Dates with Larry

Rowe's research group at Texas A&M University changed their direction about three decades ago when they undertook to develop a method for dating rock paintings. The method is based on the use of plasma-chemical oxidation to gently, at low

temperatures, convert to carbon dioxide the organic material that was initially added to prepare paint. Professor Larry Loendorf was among the very first archaeologists to seek collaboration with our group, collaboration that has continued to the present day. Although almost of our dating attempts have been on rock paintings, a recent interesting artifact from Larry, an iron axe head found near a Lewis & Clark encampment in Montana, is discussed. Innovations in the plasma apparatus over the past four years is described briefly.

Rowe, Matthew (School of Anthropology, University of Arizona), Kassi Bailey (School of Anthropology, University of Arizona) and E. Charles Adams (Arizona State Museum and the School of Anthropology)

[415] *The Curious Case of Bunnies: Human Behavioral Ecology Perspectives on Fauna from Homol'ovi I, Room 733*

Human Behavioral Ecology (HBE) models are useful in linking the composition of faunal assemblages deposited in archaeological sites to environmental conditions at the time of their deposition, but questions remain about HBE's utility in evaluating assemblages dominated by small fauna. In this paper, we view the faunal assemblage from Room 733 at Homol'ovi I, an Ancestral Hopi site near Winslow, Arizona through the lens of HBE. Room 733 dates to the Late Homol'ovi Phase (LHP) 1385-1400, but also includes dates from the Early Homol'ovi Phase (EHP) 1330-1365. The room was likely used for maize storage and habitation and closure of the room occurred over an extended period. The resulting fill contained a large trash cone made up of alternating layers of sand and ash. Filling of the room occurred during a period that was much wetter than current conditions, and contrary to predictions drawn from Human Behavioral Ecology, Lagomorphs dominate the assemblage and larger fauna are poorly represented. Given the wetter conditions, HBE models predict that there should be a much greater representation of large fauna. We explore alternative hypotheses to explain the composition of this faunal assemblage and evaluate the applicability of Human Behavioral Ecology models to this assemblage.

Rowe, Robert

[332] *Megafauna 101 for Archaeologists*

The Pleistocene... basically a no-man's land that is trapped between the disciplines of archaeology and paleontology when it comes to the animals that inhabited that period. For American archaeologists, these animals are sometimes too old to be considered as having archaeological connotations. For Paleontologists, these are not fossils and, by some paleontologists' standards, are considered too young for paleontological studies. It is important for archaeologists to understand these animals and their environmental niches. This paper will focus on bison, mammoth, the occasional sabre cat, and a few other species that have been found in archaeological contexts. Using field examples from Colorado, Iowa, North Dakota, and Wyoming, the remains of these animals can be used to ascertain the environment that each lived in and in doing so these data can be used to widen the studies of the prehistoric environment in which the earliest of humankind in the Americas.

Rowe, Sarah (University of Texas Rio Grande Valley)

[59] *Discussant*

Rowe, Sarah [288] see Reger, Brandi

Royle, Thomas (Simon Fraser University), Eric Guiry (Trent University), Trevor Orchard (University of Toronto Mississauga) and Dongya Yang (Simon Fraser University)

[110] *Investigating the Sex Selectivity of Middle Iroquoian Salmonid Fisheries through Ancient DNA Analysis*

Lake Ontario once supported large populations of Atlantic salmon (*Salmo salar*) and lake trout (*Salvelinus namaycush*). However, by the mid-19th century populations of these salmonid species had collapsed as a result of overharvesting and habitat alteration by European settlers. Prior to this collapse, it has been hypothesized Indigenous peoples were able to maintain the productivity of Lake Ontario Atlantic salmon and lake trout stocks through the use of resource management strategies. In this study, we sought to examine whether sex-selective fishing was one of the strategies Middle Iroquoians used to manage Lake Ontario salmonids. To test this hypothesis, we attempted to assign sex identities to Atlantic salmon and lake trout remains from the Middle Iroquoian (ca. AD 1250-1300) Antrex site (AjGv-38), Ontario, Canada, using DNA-based assays that screen for the presence of the salmonid master sex-determining gene (*sdY*). The results of this study provide new insights into the fishing strategies of pre-Contact Ontario Iroquoians.

Rozwadowski, Andrzej (Adam Mickiewicz University) and Janusz Woloszyn (Warsaw University)**[252] Documenting the Complexity of the Petroglyphs of Toro Muerto, Southern Peru**

Toro Muerto, situated in Arequipa Region in southern Peru, consists of over 2.5 thousand stone blocks covered with petroglyphs, which makes this site unique not only in Peru but also in South America. In this presentation we outline the current results of a new project which aims to document the whole site. This includes creating GIS satellite map, aerial photography, photography and tracing of the petroglyphs, as well as recordings of offerings hidden near the blocks with rock images. We also briefly discuss iconography, with a particular focus on geometric designs which prevail in Toro Muerto. These patterns are often associated with human figures, often referred to as danzantes - dancing humans. We will show that surprising similarities to these motifs can be found in Amazonian area of South America, which together with analogies from other parts of America may suggest that at least part of the geometric patterns code cosmological ideas, possibly related to the concept of traveling to the other world.

Ruane, Jonathan**[234] Discussant****Rubenstein, Meghan (Colorado College)****[100] Using Architectural Sculpture to Think about Center and Periphery in the Puuc Region**

The Puuc region of Yucatán is distinguished by its architectural style, composed primarily of low, range-type structures with limestone veneers. These building surfaces, elaborately carved with iconographic content, also served as backdrops for stucco and stone sculptures, which were placed in niches, on projecting platforms, and incorporated directly into the façades. At the largest, and consequently most well-known, Puuc sites there is considerable experimentation with building forms and architectural adornments, while at the smaller sites the structures and their decoration tend to be more restrained. This paper assembles data from dozens of archaeological sites to compare how iconographic elements are distributed across the region as well as their placement on buildings. The aim of this research is to expand what we know about the region's socio-political organization using extant architectural sculpture.

Rubin de Rubin, Julio Cesar [320] see Silva, Rosicler

Rubinson, Karen [196] see Linduff, Katheryn

Ruby, Bret (National Park Service, Hopewell Culture National Historical Park)**[155] Hopewellian Woodhenges: Recent Research at Hopewell Culture National Historical Park**

Monumental timber post circles or "woodhenges" are ancient and enduring elements in the ritual landscapes of Native North America. Examples are known from as much as 3500 years ago at Poverty Point; from 2400 years ago in Adena ceremonial contexts in the Ohio Valley; from 1000 years ago at Cahokia; and in contemporary use at many American Indian traditional ceremonial grounds. Archaeologists are now documenting a growing number of examples in Hopewellian contexts. Recent landscape-scale geomagnetic surveys at Hopewell Culture National Historical Park identified numerous examples ranging from about 10 m in diameter, to a colossal timber post circle more than 320 m in diameter. Small-scale ground-truth excavations at two of these are beginning to shed light on the age and function of these monumental Hopewellian woodhenges.

[155] Chair

Ruck, Lana [390] see Holden, Chloe

Rucker, Teresa [89] see Doershuk, John

Rud, Aleksey [154] see Piezonka, Henny

Ruhl, Donna (Florida Museum of Natural History)

[362] *The Hidden Voice of Forests: Revisiting Archaeobotanical Legacy Collections from Southeastern U.S. Shell Rings*

Can't-see-the-forest-for-the-trees as a metaphor conveys that we sometimes cannot assess situations while we are in the midst of them. Archaeobotanists often report that the most ubiquitous plant type at a site is charred wood. But have we really assessed what these once trees represent: fuel, building remains, indirect evidence of food, or something else? This presentation reviews European settlement legacy accounts, witness-tree documents, paleoecological data and the reevaluation of selected legacy archaeobotanical collections from southeastern U.S. shell ring sites to introduce new research questions. Have we accepted climate as the primary agent of vegetation change during the Holocene? Can charred archaeobotanical assemblages be reexamined beyond diet and subsistence to assess anthropogenic agents of change to forests? For example, are hickory mast deposits at sites evidence of silvicultural or other land management practices, or even potential sacred places? This paper will consider a few traditional perspectives and attempt to develop new challenges for various legacy data sets and how they may inform ancient plant husbandry practices. "Can one see the forest for the trees" or should it be "Can we see the trees for the forest?"

[362] *Chair*

Ruhl, Donna [362] see Van Voorhis, Laura

Ruhl, Thomas (University of Cincinnati)

[371] *Symbolism and Ritual Associated to Ancient Maya Water Management*

Effective water management was key to settle in the Maya Lowlands, where scarce surface water is found. While numerous investigations have showed how complex systems had been organized in Maya sites, implying a great deal of attraction to them, new data, available through LidAR for example, indicates a much more decentralized reality, where household-scale features are not uncommon. This study aims to go deeper into understanding this topic by looking at the ritual and symbolism associated to water and its management. In an animistic society, the possibility of water, or its containers, being perceived as conceptually different, and requiring negotiations in the form of ritual, is an element of the discussion that has been overlooked. While our understanding of the material and functional aspects of ancient Maya water management gets better, it is important to keep asking questions about the symbolism that underlies it, and the rituals that organized it.

[234] *Discussant*

Ruiz Vélez, Gabriela (University of Puerto Rico, Río Piedras Campus) and Taylor Bowden (University of Texas State)

[172] *Analyzing Afro-Caribbean Ware from Fort Amsterdam (SE094) and Battery Rotterdam (SE129) on St. Eustatius, Caribbean Netherlands*

In June 2018, excavations were conducted at Fort Amsterdam, a military fortification, on the leeward side of St. Eustatius, along the Caribbean coast. Many different types of ceramics were found during the investigations, including Afro-Caribbean Ware made by enslaved and freed Africans. This study analyzes the recovered Afro-Caribbean Ware using a typology developed by Barbara Heath (1988) and examines the effects globalization had on the Dutch and enslaved Africans living within and near Fort Amsterdam during the 18th century. Another important aspect is to understand how these two different communities interacted with each other near Battery Rotterdam, Godet Cemetery and Fort Amsterdam. The data for this study was collected from Fort Amsterdam and Godet Cemetery in June 2018 and data from Battery Rotterdam was excavated and collected from December 2016 to January 2018. A total of 387 sherds was recovered and categorized according to Heath's typology. Sherds from the sites are primarily types 1 and 3 (A & B) indicating that the pottery was potentially made locally or on nearby islands.

Runggaldier, Astrid [200] see Aland, Amanda

Rusk, Katelyn [192] see Edgar, Heather

Russ, Jon [97] see Davis, Jera

Russell, Bradley (University at Albany - SUNY), Stanley Serafin (Central Queensland University), Eunice Uc Gonzalez (Centro INAH Yucatan) and Carlos Peraza Lope (Centro INAH Yucatan)

[396] Underwater Investigations of Mass Burials in Two Cenotes at Mayapán, Yucatán, Mexico

With support from The National Geographic Society and The Waitt Foundation, the Mayapán Taboo Cenote Project conducted investigations at Cenote Sac Uayum, a sacred, water-bearing sinkhole located at the Postclassic Maya political capital of Mayapán, Yucatán, Mexico (AD 1150-1450). The work brought together an international collaboration of researchers from the United States, Mexico, Estonia, Italy, France and Australia. The research revealed a large mass burial deposit within the cenote. The study yielded significant new insights into the cenote that many modern inhabitants consider to be “alive” and believe is guarded by a large feathered serpent with the head of a horse. The feature has drawn the attention of researchers working at the site since the first archaeological work began at the ancient city because of its conspicuous and apparently intentional exclusion by the large defensive wall surrounding the bulk of the settlement. This paper will present findings from the study and compare them to the results of the previous study of a second mass burial deposit first discovered in 1997 by a team led by INAH researcher Eunice Uc González. Osteological analysis of samples collected from both locations were analyzed by osteologist Stanley Serafin.

Russell, Hannah

[19] Looking at the World through Rose-Colored Flaked Glass

Flaked glass can be a critical keystone artifact in identifying historic Indigenous sites. Yet flaked glass is frequently overlooked or looked at skeptically and dismissed. The effect of overlooking or dismissing flaked glass is a narrowed archaeological perspective and understanding of the Indigenous experience during the historic period. This presentation will look at flaked glass from known contexts and existing literature to establish a baseline, and then introduce how-to YouTube videos and traditional lithic analysis techniques to explore how to identify and validate flaked glass with a critical and objective eye. Lastly, the presentation will look at flaked glass from two archaeological sites in southern Utah to apply the information and techniques presented. The sum-total goal of this presentation will be to explore this artifact type with new perspective- looking at the world through rose-colored flaked glass- that can enhance our archaeological knowledge of the historic Indigenous landscape.

Russell, Will (Arizona State University) and Sarah Klassen (University of British Columbia)

[81] Then and Now: Conservative and Progressive Politics at the Mimbres Site of Swarts

Social inequality exists simultaneously in a number of domains, and can often be traced - or allegedly traced - to founding lineages. Antecedence is the demonstration of longevity in place and, therefore, claims to moral authority. In this paper, we explore the intersection of antecedence and connectivity. Using data from the Mimbres site of Swarts, we demonstrate the ways in which two competing groups employed and manipulated their pasts and places through spatial separation, antecedence, social histories, and long-distance relationships.

Russell, Will [81] see Shepard, Lindsay

Rutecki, Dawn (Grand Valley State University)

[319] Animals at Spiro Mounds: Patterns from Faunal Specimens and Engraved Shells

This paper discusses results from examination of faunal remains and iconography from Spiro Mounds, Oklahoma. By combining multiple analyses, this research yielded data useful to recognizing animal use patterns at the site that may

suggest how ideological structures affected food choice at the site. In particular, this paper highlights some examples that may clarify why certain animals are depicted in iconography, even when absent from identified faunal remains at the site. I consider these patterns alongside faunal data from sites in the region. Informed by ethnohistoric and ethnographic accounts, I propose that these patterns may clarify our interpretations of social relationships between animals and humans in the past.

Ruth, Susan (Central New Mexico Community College) and James Boone (University of New Mexico)

[8] Clovis/Folsom Endscrapers and Gendered Hideworking: Ethnographic Analogy or Inference to the Best Argument?

Cross-cultural data show a strong positive relationship between latitude and dependence on hunting for subsistence. Higher latitude foragers that were dependent on megafauna for subsistence were equally dependent on animal hides for clothing and shelter to survive through winter, and for the survival and reproduction of corporately organized, hearth-centered family groups. Hunting and clothing/shelter making were strongly gendered in these societies. Both activities require a great deal of skill and training to do well, which in turn require long periods of training and practice during childhood and adolescence. We suggest that strong division of labor between hunting and hide processing results from the channeling of these two skill-intensive tasks onto male and female roles. Hence, the argument that Paleoindian endscrapers were used and probably made by women to process hides in a manner similar to historic Plains bison hunters is more than an ethnographic analogy, a rather weak logical construct, but rather, an inference to best argument. Similar patterns of recent Plains and Pleistocene Paleoindian hideworking and tool use arose under similar biological and social reproductive constraints and thus constitute a form of evolutionary convergence.

Rutherford, Cady [30] see Cortes-Rincon, Marisol

Rutherford, Cady (University of Texas at San Antonio), Marisol Cortes-Rincon (Humboldt State University), Jonathan Roldan (Humboldt State University) and Spencer Mitchell (University of California, Santa Barbara)

[371] Household Variation in the Maya Hinterlands

Hinterland households are an under-explored aspect of Maya area. Further research in this area will help to build our understanding of variation present within and between regions. This analysis looks at several households in northwestern Belize in order to better understand the variation that exists within this region. I analyze the construction methods, the size and layout of the household groups, and the raw materials used to identify household level variations and access to resources in this hinterland area.

Rutkoski, Ashley (Kent State University)

[67] Under Fire: An Experimental Examination of Heat on Lithic Microwear Evidence

Lithic microwear analysis provides important insights into stone tool function by identifying various polishes, residues, and striations that ultimately represent microscopic evidence of how these tools were used. However, recent archaeological analyses have recognized an interesting pattern: burned lithic specimens do not appear to preserve microwear traces to the same extent or frequency as non-burned specimens. With the use of experimental methods, the co-variation was tested to determine if the pattern was causal. The experimental design included fifty lithic flakes that were used to cut wood for long enough period to develop a strong microwear signal. Then, the flakes were exposed to different levels of heat to test this hypothesis.

Ruuska, Alex (Northern Michigan University)

[252] Earth Serpents: Mimesis, Mastery, and Ancestral Memory on the Colorado Plateau

Polly and Curtis Schaafsma have been instrumental in identifying primary archaeological tenets associated with the origin of the Pueblo Kachina Cult. In this paper I revisit key ethnohistorical and archaeological findings of the origins of the Pueblo

Kachina Cult and "Snake Dance" (Tsu'tiki or Tsu'tiva). Utilizing a comparative ethnoarchaeological lens, I examine complimentary geological, archaeological, and ethnohistoric, and ethnographic explanations of Hopi origins and earth changes on the Little Colorado River. Finally, I present preliminary theoretical considerations about ancestral and earth memory, mastery and mimesis as foundations of Hopi and Paiute ritual performances in relation to earth birth and human origin narratives.

Ruvalcaba, Luis [270] see Garcia-Des Lauriers, Claudia

Ruvalcaba Sil, José Luis [39] see Filloy, Laura

Ružicka, Pavel [386] see Koterová, Anežka

Ryan, Christopher (Vandenberg Air Force Base)

[282] *Discussant*

Ryan, Christopher [397] see Scharlotta, Ian

Ryan, Elisa (US Bureau of Reclamation) and Jeremy Foin (US Bureau of Reclamation)

[237] *The Consequences of Drought: Inadvertent Discoveries on Federal Land*

Several years of unrelenting drought in California has resulted in historically-low drawdowns to the state's reservoirs. A corollary effect has been a notable increase in the number of inadvertent discoveries along the newly-exposed shorelines, an occurrence that has clear implications for NAGPRA. In response, the Mid-Pacific Region of the Bureau of Reclamation has developed a suite of new procedures to address inadvertent discoveries of Native American gravesites on Reclamation-owned and managed land. The practical, real-world implementation of these procedures will be illustrated using a case study drawn from a recent inadvertent discovery on Reclamation land.

KEYWORDS: NAGPRA, Inadvertent Discovery, Tribal Consultation

Ryan, Ethan

[327] *Know Before You Dig: Using Comparative Geophysical Exploration and Ground-Truthing for Surgical Excavation*

This poster presents the results of geophysical exploration and excavation from new research at 48PA551, a Middle Archaic (McKean Complex) site in the Sunlight Basin of NW Wyoming. In the field season of 2017, total field magnetic survey was conducted at the site to identify and interpret areas that would be candidates for further geophysical investigation and eventual excavation. In the field season of 2018, further geophysical testing occurred using ground penetrating radar (GPR), specifically in the areas in which magnetic survey was conducted. Finally, 50 x 50 cm test units were excavated in areas suspected of containing anomalies of cultural significance. The outcome of this fieldwork model demonstrates the success of multi-technique geophysical exploration which can lead to highly successful excavation and discovery of cultural features. This method also can significantly decrease the amount of time spent conducting exploratory excavation and instead can surgically target valuable areas of cultural significance within archaeological sites.

[327] *Chair*

Ryan, Ethan [327] see Kaviani, Kelsi

Ryan, Joseph (Okayama University)**[416] How Was Iron Weaponry Obtained by Local Elite during Japan's Kofun Period?**

The Kofun period of Japan, stretching from the mid-3rd century to the late-6th century AD, witnessed the formation of an almost archipelago-wide sociopolitical consolidation centered on the paramount elites of the Nara Basin. Considered by many scholars to have been an early state, this Yamato polity exercised unprecedented control over the production, importation, and distribution of prestige goods, which were bestowed on participating elites. Iron weapons, which displayed a significant increase in burials from this time, are also considered by many scholars to have been distributed, if not produced, by the central Yamato polity. While the case can convincingly be made that the majority of bronze mirrors imported from China and various other ritualistic items were indeed distributed out from the Yamato polity, little research has been carried out on the iron weapons, themselves. In this presentation, the author analyzes the iron weapons buried in the mounded tombs of the Kibi region (present Okayama prefecture) in order to understand how iron weaponry was obtained by local elites during Japan's Kofun period.

Ryan, Karen**[138] Discussant****Ryan, Stacy (Archaeology Southwest)****[263] Classic Period Projectile Point Traditions in Southeastern Arizona**

Similar projectile point types were used by people in central and southern Arizona during the Classic Period (A.D. 1150-1450), a time when considerable changes occurred within the region. An analysis of over 600 points was conducted to examine how social, technological, and environmental factors contributed to projectile point design choices during this period. Metric and morphological attributes were used for comparisons within two areas in southeastern Arizona—the Tucson Basin and the San Pedro Valley. Comparisons between early Classic period sites in the Tucson Basin, where differences in social relationships and access to large game were evident, did not show significant differences in point attributes. However, variation in base morphology is apparent at some sites. Points from late Classic migrant enclaves in the Lower San Pedro Valley are similar to those used by local groups in the area. In contrast, differences are seen at a site to the south, where the presence of northern migrants appears limited. These results indicate that the use of similar point types is consistent with the growth of social networks during the Classic period, but base shape, the presence of serrations, and other microvariables can inform on technological traditions and cultural influences within the region.

[341] Discussant**Ryan, Susan (Crow Canyon Archaeological Center), Shaw Badenhorst (University of Witwatersrand) and Jonathan Driver (Simon Fraser University)****[57] Faunal Remains and Social Organization at Albert Porter Pueblo, a Great House Community in the Northern Southwest**

The Albert Porter Pueblo great house, located in the central Mesa Verde region was surrounded by numerous residential structures during the Pueblo II and Pueblo III periods. Using a variety of ratios to measure the exploitation of wild game and domestic turkeys, we examine evidence of social organization by evaluating similarities and differences in faunal assemblages from the great house and the domestic households that surrounded it. Although the great house was a unique and prominent architectural feature at Albert Porter Pueblo, the fauna from the great house are generally similar to those from surrounding structures. There is some evidence that more meat was consumed in the great house than in domestic structures. All members of this community seem to have had equal access to animals consumed for food and used in ritual and ceremonial practices. We explore different interpretations of social organization suggested by faunal remains.

Sabin, John (Florida State University) and Jessi Halligan (Florida State University)**[216] Shifting Tides and the Role of 'Big Data': Modeling Paleoindian Land Use and Site Preservation in the Aucilla Basin,**

Florida

The past 18,000 years in northern Florida have been characterized by shifts in climate and sea level, which affected settlement patterns and site preservation. Regional sea level curves have only recently been established with the accuracy and resolution required to model paleohydrology (Joy 2018). Advances in non-linear modeling and the use of multi-scalar remote sensing and geoarchaeology allow for a more comprehensive approach to envision the social landscape as it would have existed during the Pleistocene-Holocene transition around what today is the Big Bend region. GIS modeling of the geomorphology and paleohydrology for the Aucilla-Wacissa drainage basin utilizing multiproxy paleoenvironmental records were combined with known site distributions of pre-9500 cal BP cultural components in order to reconstruct Paleoindian site preservation, discuss Paleoindian land use, and to potentially locate additional sites.

Safronov, Alexander, Dmitri Beliaev (Russian State University for the Humanities) and Milan Kováč (Comenius University)

[384] *Rises and Falls of Uaxactun Dynasty: Combining Epigraphic and Archaeological Evidence*

The dynastic history of Uaxactun is one of the most ancient among the political centers of the Maya Lowlands in the Preclassic and Classic periods. The beginning of history of a dynasty concerns to the III cent. BC, and its end to the final years of the IX cent. AD. On an extent more than a thousand-year history the dynasty of Uaxactun has endured some stages of rising and decline in Preclassic, Early Classic and Late Classic periods which have been connected with change in political life of ancient Maya in the area of the Central Lowlands. These periods have found the reflexion as in building activity of the city center corn, and in epigraphic inscriptions on the monuments established by lords of Uaxactun during the periods of blossoming of the kingdom. We will try to track correlation between the basic dates from a dynastic history and the archeological data reflecting stages of development of the early state in Uaxactun. And their relations with the general political situation in Maya Lowlands until the end of the Terminal Classic period.

Sagebiel, Kerry

[284] *Discussant*

Saitabau, Henry [82] see Hu, Lorraine

Sakaguchi, Takashi

[389] *Evolution of Feasting among Jomon Societies Focused on Prestige Wooden Food-Serving Technologies*

Cross-culturally, wooden food-serving items and serving utensils, such as shallow bowl, plate, ladle and spoon, as prestige items are essential elements for conducting ritual feasting among many transegalarian societies in the Circum-Pacific Rim regions. Thus, they are keys to understanding prehistoric feasting and ritual activities, and are strong archaeological signatures of these activities among the societies. Recent development of wet site archaeology in the Japanese archipelago associated with a highly refined Jomon pottery chronology has uncovered the importance of the past wooden and plant use at feasts. This paper explores evolution of feasting among Jomon societies focused on prestige wooden food-serving technologies by 1) building chronology of these food-serving items and serving utensils, and; 2) examining temporal and spatial variability of these items and technologies.

Sakai, Sachiko [151] see Rankle, Chad

Sakai, Sachiko (California State University Long Beach)

[151] *The First Excavation of a Pithouse Site in the Mt. Trumbull Area*

The first excavation of Virgin Ancestral Pueblo structures was conducted at Mt. Trumbull during the summer of 2018 after more than 15 years of intense surface surveys. The goal of this study is to gain a better understanding of the settlement patterns and changes in adaptive strategies among the Ancestral Puebloans who lived in this marginal environment. A potential pithouse site, 71 ASM, was chosen for excavation after a previous GPR survey indicated the existence of a possible subsurface feature underneath a large depression. The OSL dates for previously analyzed ceramics from this site

suggest the time associated with this feature is the Basketmaker III period. A long trench excavation was conducted to answer several questions, such as site function, length of the occupation, seasonality of the site, and the energy devoted to construct this structure. This excavation showed that a five-meter diameter pithouse was constructed by digging into the limestone bedrock, which suggests a relatively large amount of energy was devoted to the construction of habitation during the early occupation in the Mt. Trumbull area. To understand the history of this pithouse, OSL dating of 30 ceramics from various layers will be discussed in this paper.

Sakutra, Rosaria [32] see Pargeter, Justin

Salas, Miriam [199] see Halperin, Christina

Salazar, Diego (Universidad de Chile) and Carola Flores-Fernandez (centro de estudios avanzados de zonas aridas)

- [33] *Swordfish Hunting as Prestige Signaling within Middle Holocene Fishing Communities of the Atacama Desert Coast?*

Since around 8500 years BP, the archaeological record on the Southern Coast of the Atacama Desert shows evidence of growing population density and low residential mobility. A maritime specialization process is also evident by a rich set of specialized tools, and a pronounced increase in the abundance and richness of fish assemblages. Among these fish assemblages, the presence of offshore species like sharks, dolphins and swordfish has been considered as indirect evidence of navigation technology. How do we understand and contextualize the presence of big offshore prey within the context of increasing population and social complexity evidenced by the archaeological record of the Taltal area (25°S)? In the present work, we attempt to discuss, through Costly Signaling Theory, the appearance of swordfish hunting in the context of growing population density and lower residential mobility. We will argue that this social context may have generated the need to differentiate individuals in order to avoid costly conflicts. Can this approach enrich our interpretations of the sociopolitical context of fishing communities from the study area? Was swordfish hunting a mechanism of prestige signaling? The present study aims to discuss these questions presenting archaeological data from the Middle Holocene of Taltal.

Salazar, Diego [240] see Flores-Fernandez, Carola

Salazar, Hector (Connecticut College) and Anthony Graesch (Connecticut College)

- [116] *On Making Kw'ets'tel and Interpreting the Remnants: An Archaeological and Experimental Archaeological Study of Stó:lō - Coast Salish Slate Fishing Knives*

Although critically important to the seasonal work of processing hundreds of thousands of fish for storage, kw'ets'tel, or Stó:lō-Coast Salish slate fish knives, are rarely recovered in the archaeological record. Knife-making debitage, however, is often recovered in great abundance during subsurface investigations in and near Stó:lō dwellings. Debitage assemblages are useful for exploring inter-household variability in labor allocations to knife production, although fuller considerations of household labor investments (and other inferential reconstructions of behavior) have been hampered by insufficient knowledge of kw'ets'tel design and production processes: source(s) of raw material and transport costs; the embodied work at different toolmaking stages; grinding techniques; ideal knife morphology; and ratios of debitage to final tool forms. A culmination of a two-year faculty-student research project, this poster presents and synthesizes new data and findings emerging from recent archaeological research and rigorous experimental exploration of kw'ets'tel production practices. We show how the products of experimental archaeological research afford new insights into routine household practices that, in turn, are critical to comparative reconstructions of household and settlement organization across space and over time.

Salazar, Lucy [64] see Burger, Richard

Salazar, Lucy [286] see Forst, Jannine

Salazar Chavez, Victor [197] see Blomster, Jeffrey

Salazar Chavez, Victor [394] see Vidal-Guzmán, Cuauhtémoc

Salazar Corzo, Blanca [270] see Martinez De Luna, Lucha

Salazar-Garcia, Domingo Carlos [286] see Strauss, Andre

Saldana, Melanie (California State University Los Angeles) and James Brady (California State University Los Angeles)

- [360] *Recent Radiocarbon Dates from the Shaft and Cave under the Osario at Chichén Itzá: Rethinking the High Priest's Grave*

In the archaeological literature, the Osario at Chichén Itzá has been defined by the 998 A.D. long-count date inscribed on a pillar at the top of the pyramid. Although the pillar could have been added long after the construction of the pyramid, the complex is, nevertheless, consistently treated as a late construction. From the outset, this has been problematic. J.C. Harrington, who mapped the Osario, the shaft, and the cave in the 1920s, discovered the soffit of a vault behind the stones of the shaft suggesting that a vaulted structure stood on the stone platform at the base of the shaft before the pyramid was built. An investigation of the Osario by the Gran Acuífero Maya project collected charcoal from the shaft and the cave. Radiocarbon dating establishes that the earlier structure was terminated and the Osario pyramid was constructed in the early eighth century A.D. Thus, the Osario predates the Castillo.

Salgado, Silvia (Universidad de Costa Rica)

- [191] *Fred Lange y la Transformación del Enfoque de la Arqueología de Guanacaste*

En 1968 Fred Lange, como estudiante de la Universidad de Madison, inició su investigación doctoral con preguntas dirigidas sobre las adaptaciones prehispánicas en la Bahía de Salinas y en el adyacente valle del río Sapoá, en el noroeste de Costa Rica. Su enfoque en la ecología cultural marcó cambios significativos en las preguntas y en los métodos de investigación, en la zona sur de la Gran Nicoya. Entre 1968 y 1979 desarrolló trabajos regionales en otras zonas costeras como el Valle de Nosara y la Bahía de Culebra. En esos 11 años, en los que realizó además proyectos en otras áreas de Costa Rica, Fred entrenó un número significativo de estudiantes del programa del Associated Colleges of the Midwest, pero también varios de los primeros estudiantes que se graduarían como arqueólogos de la Universidad de Costa Rica. Múltiples publicaciones en esos años y hasta el presente, son testimonio de la enorme contribución de Fred a la arqueología de la Gran Nicoya.

Discutiremos la importancia de sus trabajos y el impacto que han tenido en las investigaciones realizadas por los arqueólogos costarricenses en las últimas décadas en el noroeste de Costa Rica.

Salgan, Laura [248] see Gil, Adolfo

Sall, Candace (University of Missouri)

- [296] *Polychromes and People at 76 Draw, New Mexico*

People of the Casas Grandes and Salado regions are known for their polychrome pottery. Often pottery from both areas are found at the same sites, but the degree of interaction between the areas is not known. Neutron Activation Analysis (NAA) was conducted on Ramos and Gila Polychrome pottery, as well as some plain wares, from 76 Draw, a Medio period site in Luna County, New Mexico. These data were compared to other researchers' data on the same types from other settlements in southern New Mexico. In total, 217 samples, including all of the Ramos Polychrome NAA samples north of Mexico, were analyzed at the University of Missouri Research Reactor (MURR). Several compositional groups were identified among the types including three Ramos Polychrome groups, a single Salado group (which corresponds to a previously identified production location in the Upper Mimbres), and six plainware groups. From this I conclude that one or more of the Ramos groups might reflect local production, but all of the Salado and likely much of the Ramos polychrome was acquired through trade. This in turn suggests that the Casas Grandes interaction sphere was operating as far north as southern New Mexico.

Salywon, Andrew [302] see Hodgson, Wendy

Salywon, Andrew and Wendy Hodgson (Desert Botanical Garden)

[302] Unravelling the Origins of Pre-Columbian Agave Domestication in Present Day Arizona

Botanical exploration over the last thirty years in Arizona has revealed at least six putative domesticated agaves still surviving in their archaeological context. These agaves share characteristics of relictual domesticated plants including clonality, reduced genetic diversity compared to wild agaves and reduced seed set or complete sexual sterility. Because of the importance of corn, beans and squash to the pre-Columbian peoples of this region it might be assumed that the agaves are also of Mesoamerican origin. In order to identify the ancestors of these domesticated plants we have undertaken traditional Sanger, and now Next-Gen, sequencing to infer the evolutionary relationships. Our phylogenetic data show that the domesticates are resolved in four distinct clades and only one, *Agave murpheyi* Gibson, has a sister relationship with Mesoamerican taxa, the other are in clades with local wild species or in the case of *A. delamateri* Hodgson & Sluson still unresolved. Expanded sampling of wild species and collaboration with archaeologist to pin-down the when and where these domesticated taxa originated is needed for a better understanding of this new secondary center of plant domestication.

Sampson, Christina (University of Michigan)

[70] Trade, Tradition, and Rivalry: Late Pre-Columbian Craft and Exchange on the Central Peninsular Gulf Coast of Florida

This paper examines changes over time in the ways that fisher-hunter-gatherer communities on the central Gulf coast of peninsular Florida participated in the regional trade of specialized crafted goods. The social landscape of the greater Tampa Bay area appears to have become increasingly politically integrated between the end of the Woodland period and the time of Spanish contact; that is, during the Safety Harbor archaeological period. Changes in Safety Harbor sociopolitical organization and ideological schemas emerged through historical circumstances including interactions with neighboring complex farmer (Mississippian) and fisher (Calusa) societies. A recent research emphasis on residential contexts in the Safety Harbor area has expanded possibilities for investigating community organization and the interplay of local interactions and regional patterns of change. Craft production and trade were likely venues for social change at different scales. By transitioning from peripheral participants in Weeden Island era ceremonial culture to purveyors of raw and crafted shell goods, Safety Harbor people created a new role for themselves on the regional landscape, with implications for local historical trajectories.

[70] Chair

Samuels, Amanda and Christopher Wolff (University at Albany)

[10] Assessing Impacts of European Contact on Beothuk Projectile Point Technology

The lithic technology of the Beothuk has seldom been the focus of diachronic or regional comparative studies. Recently excavated Beothuk materials from Stock Cove, a site located in southeastern Newfoundland that has significant time depth, provide an excellent dataset to assess change through time and regional technological variation. The research presented here focuses on potential variation through a systematic examination of Beothuk and ancestral Beothuk projectile points from Stock Cove and extant collections from other sites across the island. Through a comparison of these data, we will compare the morphology of pre-contact points to post-contact examples in an attempt to identify potential impacts that access to European materials and restricted access to traditional raw materials resulting from the presence of Europeans had on Beothuk tool production and use. This comparison will provide important new information concerning diachronic technological variation among the Beothuk that have broader implications regarding the impacts that European contact had on their economic strategies and social structure.

San Román, Manuel J. (Universidad de Magallanes), Flavia Morello Repetto (Universidad de Magallanes), Victor Sierpe (Universidad de Magallanes), María José Barrientos (Universidad de Magallanes) and Jimena Torres (Universidad de Magallanes)

[33] From the Forest to the Steppe: Mobility Strategies of Late-Marine Hunters (Alacaluf) in the Strait of Magellan, Chile

In this paper we discuss the characteristics of marine hunter-gatherer peopling (Alacaluf) in the Strait of Magellan (52°30'-54°00'S) during the last 2000 radiocarbon years. Focusing on zooarchaeological information and other sources of evidence, we evaluated the modalities of use of space and the relationships with seasonal availability and concentration of faunal resources in a region characterized by a marked environmental west-east gradient.

The coastal archaeological record shows an extensive use of this territory, which integrated hyper-humid forest environments predominantly associated with marine resources (western zone) and forest-steppe ecotone areas associated with the combined exploitation of terrestrial and marine resources (central-eastern zone). Based on information on the intensity of occupations, the faunal exploitation modalities and the inferred seasonality for the use of the different zones of the Strait of Magellan, we propose a model for the late settlement of the area, centered on the summer concentration of marine resources in islands (breeding colonies of birds and pinnipeds), and the combined exploitation of terrestrial mammals and marine resources in the steppe-forest ecotone zones of the continental shoreline during winter.

San Román, Manuel J. [364] see Morello Repetto, Flavia

Sanchez, Gabriel (Department of Anthropology, University of California Berkeley)

[231] Zooarchaeological Analysis of Vertebrate Remains from the Santa Cruz Coast

Recent indigenous, eco-archaeological, and low-impact field research on the Central California Coast resulted in the excavation of four sites that were inhabited from the mid-Holocene to the contact period. Vertebrate remains from these sites were sampled using fine-grained recovery methods including flotation and sorted and analyzed to the ≥ 1 mm size fraction. This paper highlights the results of vertebrate and taphonomic analyses of these sites and how these data contribute to our understanding of human-environmental relationships on the central California Coast.

[231] Chair

Sanchez, Gabriel [231] see Fine, Paul

Sanchez, Pedro

[71] La arqueología en México: una fotografía actual

Siendo el INAH la institución que por ley debe proteger, investigar, conservar y difundir el patrimonio arqueológico de México, en el momento actual debe generar respuestas adecuadas a factores que inciden en su quehacer, como son los procesos de globalización, cambios legislativos, reformas estructurales para generar energías, obras de infraestructura, entre otros. Esto para lograr ser resiliente como institución y dar las respuestas que la sociedad espera.

[71] Discussant

Sánchez, Guadalupe [296] see Pailes, Matthew

Sánchez, Hugo [373] see Vidal Aldana, Cinthya

Sanchez Fortoul, Carmen (Independent Researcher)

[407] Characterizing Pottery Fabrics Using Digital Image Analysis: An Investigation of the Socio-economy of the Late Postclassic Maya of Northern Yucatan

Late Postclassic Maya Pottery from northern Yucatán sites, including Mayapán, was analyzed using petrographic, chemical, and surface features analyses, seeking patterns in ceramic technology and social interactions. New information was gained (Sánchez Fortoul, C.G, 2018) regarding the selection and processing of raw materials, ceramic production location and technology, export/import of Mayapán vessels and mechanisms of exchange, and the role of Mayapán and north-central

centers in the sub-regional economy. New insights on the existence, time depth, and scope of technological traditions were gained. Mayapán traditions linking raw materials and some vessel types differ from the minor centers. Furthermore, varied composition characterizes the samples from minor centers, likely from dispersed production, while compositional and technological homogeneity characterize Mayapán samples. However, two fabrics (sparite and micrite sascab), commonly found in north-central samples but rarely in Mayapán samples, remained broadly defined, hindering research on movement of vessels. This paper focuses on further examination of samples using digital-image analysis of thin sections aiming to understand the movement of vessels and social interactions between north-central centers and Mayapán. Preliminary results indicate differences between samples from minor centers and Mayapán suggesting that vessels from the minor centers were not taken to the main center, Mayapán.

Sanchez Guerrero, Andres Francisco (Centro INAH Michoacán), José Luis Punzo Díaz (Centro INAH Michoacán), Lissandra González (Centro INAH Michoacán) and Juan Julio Morales Contreras (Instituto de Geofísica de la UNAM)

[375] Archaeological Analysis of a Colonial Copper Smelting Furnace from Santa Clara del Cobre, Michoacan, Mexico

In 1788 the Spanish Crown wanted to evaluate the mining industry in New Spain in order to start the implementation of new technologies, change the domain and administration of the mines, and create new foundries that would help the mining industry to have more efficiency in all the processes related to this activity. That is why the Crown sent German miners and mineralogists from Europe. Our work refers to Francisco Fisher, because he was responsible for making studies for the Crown of the mining conditions in Michoacan. He was also commissioned to construct a copper smelting furnace based on the new technology of Europe. This poster is about a copper smelting furnace that was found near Santa Clara del Cobre by our team, PAPACSUM, in the 2018 survey season. By comparing archaeological analysis and documents, we show that this smelting furnace is the same that Francisco Fisher constructed. Additionally we reconstruct digitally the smelting furnace starting from sizing the ruins of the site. Moreover, we want to explain why Francisco Fisher's technology did not work in the region, because the copper workers of the area still use the prehispanic and early colonial techniques.

Sanchez Miranda, Guadalupe [16] see Carpenter, John

Sanchez Miranda, Guadalupe (INAH SONORA), Ismael Sánchez-Morales (University of Arizona) and John Carpenter (INAH SONORA)

[187] Current Paleoindian Research in Sonora

Archaeological investigations over the past 15 years have revealed that approximately 13,000 years ago the northern half of the state of Sonora was an important and significant Clovis territory. Currently, 140 Clovis projectile point have been documented within Sonora; 50 as isolated finds and 90 having been recovered from six sites. A variety of site contexts have been recorded to date, including encampments, lithic quarries, and the only known gomphothere kill location. In this paper, we describe and characterize the Sonoran Clovis site patterns, along with the organization of lithic technology, the cultural landscape, the similarities and differences between Sonora and Arizona Clovis record, and an update of the 2018 discoveries at Fin del Mundo Site.

Sánchez Mosquera, Amelia

[350] Cultura Viva y Arqueología, del Registro de la Memoria por Propios y Extraños

El proyecto Cultura Viva se genera a partir de acciones públicas en comunidades interesadas en revalorizar sus costumbres, y que se encuentren dentro del área de influencia de las actividades de los proyectos arqueológicos realizados en la Costa del Ecuador, principalmente. Cultura Viva ha gestionado el levantamiento de rasgos de la herencia cultural por los propios protagonistas de las comunidades rurales en las que se realizan proyectos arqueológicos. Todo esto es determinante para conocer la historia de los yacimientos desde sus habitantes. Se plantea como principio básico crear un proceso de comunicación haciendo uso del lenguaje audiovisual para la sensibilización, valoración y respeto por su propio patrimonio, y su entorno. En este trabajo se presentará los resultados del proyecto Cultura Viva en dos comunidades rurales de Manabí-Ecuador, El Aromo y Los Corrales.

Sánchez Nava, Pedro F. [71] see Zetina-Gutierrez, María De Guadalupe

Sánchez Pérez, Seraffín [68] see Martínez Rojo, Iziar

Sánchez-Morales, Ismael [187] see Sanchez Miranda, Guadalupe

Sánchez-Morales, Ismael [221] see Allaun D'Lopez, Sarah

Sánchez-Morales, Lara (Department of Anthropology, University of Texas- Austin)

- [276] *Towards a Historical Ecology of An Alluvial Plain in North-Central Puerto Rico: Preliminary Geoarchaeological Results*

Under the precept of Historical Ecology landscapes are considered artifacts where the mediation of humans over environments accumulates over time leaving traces of these relationships in the form of sedimentological and paleobotanical records. Alluvial plains in the Neotropics are among the most important environments where humans first settled, beginning the process of landscape domestication seemingly due to their fertile soils, diverse biota and the advantages of rivers for intra-island movement. The alluvial floodplain between the rivers Grande de Arecibo and Grande de Manatí in north-central Puerto Rico has an archaeological record that spans the entire history of human occupation on the island from the Pre-Arawak (5,000 BP) to the present. This area was one of the first in Puerto Rico where humans began the process of landscape domestication; adaptations continued during ensuing centuries with new migrations from South and Central America, and later with the spread of European colonization into the New World. This presentation will focus on an assessment of geoarchaeological data collected during the summer of 2018 to begin elucidating the historical ecology of this alluvial plain.

Sand, Christophe [106] see Chiu, Scarlett

Sanders, Mariana (University of New Mexico), Erik Jurado (University of Colorado Boulder) and Gerardo Gutiérrez (University of Colorado Boulder)

- [39] *Judging a Vessel by Its Surface: Investigating Production Process in Corinthian Ceramics through Use of Multiple Non-invasive Instruments*

Evidence of ceramic production techniques, such as multiphase firing utilized by 4th-century BCE Greek potters, can be observed through use of non-invasive instrumentation. Portable X-ray fluorescence spectrometry (pXRF), fiber-optic reflectance spectroscopy (FORS), multispectral imaging (MSI), and macrophotography are utilized in the analysis of five Corinthian ceramic vessels housed by the University of Colorado Boulder Art Museum. Each of the five vessels are previously identified as Greek ceramics ranging in production dates throughout the 6th-century BCE. Investigation of the objects provided positive evidence that four of the five vessels were most likely produced through the Corinthian multiphase firing technique. The fifth vessel, however, may have undergone a different production process. Non-invasive instrumentation allows investigators to interact with protected material culture in ways previously unimaginable.

Sanders, Mariana [39] see Gutiérrez, Gerardo

Sanders, Mariana [39] see Jurado, Erik

Sanders, Suzanne [172] see McKeown, Ashley

Sandstrom, Alan (Indiana University-Purdue University Fort Wayne (IPFW))

- [243] *Flowers in the Religious Ideology of Contemporary Nahua of the Southern Huasteca*

Flowers are a central feature of religious rituals among today's Nahua of the southern Huasteca. They are associated with

the sun, growing corn, life-giving water, the bounty of the living cosmos, and ancestors who visit their relatives during Day of the Dead. For the Nahua, flowers are far more than simple expressions of beauty; they are seen as evidence of a beneficent universe that, although unstable and filled with forces of chaos and destruction, is responsible for children, abundant crops, health and well-being, and the very possibility of human existence. The word for ritual in Nahuatl is *xochitlalía*, which means “to put down flowers,” and no ritual is ever held without incorporating copious blossoms in elaborate altar displays. While we have no evidence for a well-developed Flower World conception among contemporary Nahua peoples, we have documented the importance of flowers in many areas of their lives, both within and outside the religious context. The privileged place of flowers in myths, chants, and ritual practices of the Huastecan Nahua is most likely an example of the ancient and widespread idea of a Flower World in Mesoamerica.

Sandweiss, Daniel H. (University of Maine)

[33] *Discussant*

Sandweiss, Daniel H. [48] see Hamley, Kit

Sanft, Samantha (Cornell University)

[73] *Timing the Circulation of Nonlocal Materials in Seneca- and Onondaga-Region Sites*

In this paper, I evaluate newly acquired AMS radiocarbon dates for Seneca- and Onondaga-region sites, focusing on what these new dates can tell us about the regional exchange of non-local materials in the circa fourteenth- to seventeenth-century ancestral Haudenosaunee homeland (what is today central New York State). I examine the material properties of non-local marine shell and copper objects (including copper objects of both North American and European origin) and their associated relations and practices. Through the use of macroscopic analyses, digital radiograph imaging, x-ray fluorescence spectrometry, and digital mapping via ArcGIS software, I study artifact forms, manufacturing methods, sources of raw materials, and distributions of artifacts. Lastly, I establish a refined temporal understanding of the incorporation of these materials by employing radiometric dating and Bayesian chronological modeling via OxCal software. The combination of chronology-building and artifact analyses provides new details with which to discuss the exchange of nonlocal materials in the ancestral Haudenosaunee homeland.

[73] *Chair*

Sanger, Matthew (Binghamton University), Mark Hill (Ball State University), Gregory Lattanzi (New Jersey State Museum) and Brian Padgett (The Ohio State University)

[70] *Networks of Exchange in the Late Archaic Southeast: Copper and Crematory Practices*

Societal complexity, once a stalwart of archaeological research, has become increasingly difficult to define as archaeologists increasingly look at its various aspects, including entrenched authority, monumental architecture, and economic specialization as rising independently of one another. To date, long-distance exchange among hunter-gatherer communities has not received the same level of attention as other aspects of complexity. This paper examines the movement of copper across vast distances during the Archaic period (8,000-3,000 B.P.) and considers the implications of this exchange. Found in a mortuary context in a site created, in part, through ritual events, this paper investigates the connection between cosmological belief systems and far-flung trade networks. We also provide evidence that the trade linking the Great Lakes and coastal Georgia was not a simple, down-the-line network in which objects moved through innumerable hands over vast amounts of time, but rather a more direct line of exchange that transferred both objects and information, including mortuary traditions. Alongside other exchange networks through which hypertrophic blades, zoomorphic beads, and other items moved across the Eastern Woodlands, the exchange of copper between the Great Lakes and the Southeast United States suggests a massive reconfiguration of social networks during the Archaic period.

Sanger, Matthew [325] see Davis, Dylan

Sanmark, Alexandra (University of the Highlands and Islands)

[23] *The Seasonality of Ritual Sites in Viking-Age Scandinavia and Iceland*

This paper will address Viking-age ritual sites (cult sites assembly (thing) sites) in Scandinavia and Iceland from the perspective of their seasonality. These sites were used for gatherings of various kinds seemingly at certain points of the calendar year. Calendrical rituals formed a key part of Viking-age religion, although the impact of these have not yet been analysed by archaeologists. An introductory survey suggests that the most important Viking-age feasts and gatherings took place at the times of the year when people were not tied down by key agricultural tasks. In this paper, the interplay between calendrical rituals and daily life will be examined for the first time and the archaeological evidence for gatherings at key points of the year analysed.

Sano, Kyohei [392] see Nakazawa, Yuichi

Santacruz, Ramón [68] see Rodas, Diana

Santacruz, Ramón [238] see López Corral, Aurelio

Santacruz, Ramón (INAH Tlaxcala) and Aurelio López Corral (Instituto Nacional de Antropología e Historia Tlax)

[238] *Conquista y artefactos arqueológicos: Una lectura desde el Derecho Indiano*

El periodo que corresponde a la conquista, establecimiento e imposición del orden español en México, de 1519 a 1821, se caracterizó por la colisión cultural entre poblaciones nativas y colonizadores europeos. En ese contexto, este trabajo analiza a los artefactos de manufactura mesoamericana, hoy denominados arqueológicos, como elementos que trascienden la denominación utilitaria del objeto para ofrecer una lectura del orden social y jurídico impuesto con la aplicación del denominado "Derecho Indiano", en particular: las Leyes de Indias, las Siete Partidas, el Fuero Juzgo y la Novísima Recopilación. Ordenamientos aplicados básicamente para la supresión de prácticas culturales nativas, como para la disposición, enajenación y despojo por la vía jurídica de bienes ancestrales en favor del monarca, por considerarlos bienes con valor económico. Sin embargo, este trabajo demostrará que las relaciones sociales asimétricas entre dos grupos históricamente enfrentados originaron procesos de resistencia cultural donde los objetos antiguos fueron la piedra angular que sustentó la identidad e igualdad étnica y racial entre los pueblos oprimidos para, con el paso del tiempo, constituirse en símbolos de identidad nacional.

Santana Sagredo, Francisca (Universidad de Antofagasta), Julia Lee-Thorp (University of Oxford), Rick Schulting (University of Oxford), Mauricio Uribe (Universidad de Chile) and Chris Harrod (Universidad de Antofagasta)

[102] *Agricultural Practices in the Atacama Desert (Northern Chile): New Perspectives from Stable Isotope Analysis on Archaeological Crops*

Agricultural practice began in arid northern Chile during the Formative Period just prior to 1000 yr BC. Unusually, preservation of crops, including maize, squash, quinoa and beans is excellent due to the extremely arid conditions that characterise the Atacama Desert. In order to explore crop management, and particularly the use of fertilisers, we carried out stable carbon and nitrogen isotope analysis of archaeological plant samples dating from the Formative to the Late Intermediate Period (1000 BC- AD 1450). Prompted by results showing high d15N values for crops from domestic and funerary sites, and by comparisons with modern experimental data (Szpak et al 2012), we explore the ethnohistorical documents that show evidence for manuring in the valleys and oases of the Atacama. Based on these records, different types of fertilisers are discussed in order to explain the high d15N values, including the use of llama dung, llama ashes after incineration, fish-heads, seabird guano and decomposed tree-leaves. We highlight the relevance of fertilisers for the development and consolidation of agriculture in the Atacama.

Santasilia, Catharina [255] see Hruby, Zachary

Santasilia, Catharina (University of California, Riverside)

[349] Early Formative Figurines from Tlatilco - Understanding the Diversity and Individuality

The Early Formative site of Tlatilco, has like so many other ancient sites, been covered by modern-day urbanization. Many of these sites suffered a fate of early exploitation and looting leaving the archaeologists with puzzles that often lack many pieces. With resilience and patience, and often sheer luck, it is possible to stitch back more pieces of the puzzle. Tlatilco is one of the sites that scholars were interested in early on, and rightly so, but while waiting for permits, and other determinants, the site remained under the mercy of brick workers and art collectors, with only sporadic excavation seasons until eventually being completely covered by modern-day Mexico City. My research takes a holistic approach in my attempt at stitching back the puzzle that is Tlatilco. Incorporating archival documentation, museums objects, publications, as well as Instrumental Neutron Activation Analysis, understanding Tlatilco has become a captivating journey. Tlatilco has yielded astonishing objects; particularly the figurines stand out as something extraordinary as they are very diverse and display a sense of individuality! Through my research I have looked at hundreds of Tlatilco figurines in order to determine patterns and trends among this Early Formative community.

[230] Moderator

Santillan Goode, Julianna (University of California, San Diego), Allisen Dahlstedt (Arizona State University), Paul Goldstein (University of California, San Diego) and Kelly Knudson (Arizona State University)

[289] Examining Inter-regional Interaction in the Tiwanaku State (C.E. 500-1100) using $^{87}\text{Sr}/^{86}\text{Sr}$ Analysis of Building Material from a Provincial Ceremonial Center

Recent approaches to inter-regional interaction emphasizing the study of heterogeneous identities in peripheral contexts advance scholarly debate about sociopolitical organization in the archaic Andean state of Tiwanaku (C.E. 500-1100). The present study employs $^{87}\text{Sr}/^{86}\text{Sr}$ analysis to determine the source region of four archaeological ichu grass (*Stipa ichu*) samples from the Omo M10 temple in the Moquegua Valley of southern Peru, where there was significant Middle Horizon (C.E. 600-1000) Tiwanaku-affiliated settlement. Use of ichu grass (*Stipa ichu*) as building material is an architectural technique found in the higher elevation Tiwanaku homeland and it is more well suited to the frigid, rainy climate there than the hyper-arid Moquegua Valley. The present analyses test existing hypotheses concerning how the Omo M10 temple related to Tiwanaku colonists' multi-scalar identities. Surprisingly, the ichu (*Stipa ichu*) samples were found to have $^{87}\text{Sr}/^{86}\text{Sr}$ values within the range of known local values for the Moquegua Valley. This study adds to our understanding of the practices involved in constructing the ceremonial center at Omo M10 and suggests colonists sought to situate ritual activities in a built environment that not only gestured to the homeland, but that also incorporated and sanctified the local landscape.

Santini, Lauren [384] see Carter, Nicholas

Santoro, Calogero [248] see Latorre, Claudio

Santos Valero, Florencia [364] see Martinez, Gustavo

Saper, Shelby (University of Oregon), Richard Rosencrance (University of Nevada, Reno), Katelyn McDonough (Texas A&M University) and Dennis Jenkins (University of Oregon)

[323] Cascade Phase Context and Chronology at the Connley Caves, Oregon

Cascade projectile point chronology in the northern Great Basin is poorly understood, with associated evidence ranging from the early to middle Holocene. The broad temporal range of Cascade points results from the difficulty in distinguishing this type from the more general "foliate" category and lack of well-dated sites containing such artifacts. Recent excavations at the Connley Caves, in the Fort Rock Basin of south-central Oregon, have recovered diagnostic Cascade points in association with directly dated early Holocene cultural features. As such, this site offers a unique opportunity for the refinement of local projectile point chronologies and informs Cascade point user procurement and technological strategies.

This poster presents new radiocarbon dates, projectile point source provenance data, and a preliminary debitage analysis of the Cascade component at the Connley Caves.

Saptomo, E. Wahyu [247] see Veatch, Elizabeth

Sara, César [181] see Tsurumi, Eisei

Sarjeant, Carmen

[363] Trade Networks and Selective Cultural Transmission of Ceramic Technologies in Neolithic Southern Vietnam

New research on trade networks amongst early sedentary Neolithic communities, c. 4200-3000 BP, in southern Vietnam has shown that domesticated cereals and stone resources were imported to the coastal site of Rach Nui. While the stone likely came from quarry locales in the upper reaches of the Dong Nai River, possibly with specialist toolmakers, few fine ceramic wares were transported downstream to Rach Nui. Incised and impressed fine wares commonly seen in Neolithic communities throughout mainland Southeast Asia appear to have not been produced locally at Rach Nui. The local potters at Rach Nui manufactured a limited range of coarse wares not identified at other contemporaneous sites further upstream. This suggests there was no cultural transmission for learning fine ware technology at Rach Nui. A comparative analysis, including sites along the Dong Nai River and from other areas of southern Vietnam, has been conducted using statistical methods to assess the variation between ceramic assemblages in the region. Applying these results, this paper explores the cultural mechanisms, and the limitations of the current evidence, that might have caused the apparent reduced exposure to certain ceramic technologies at Rach Nui compared to other sites in southern Vietnam.

Sartor, Karla [90] see Holtkamp, David

Sassaman, Kenneth [70] see Mahar, Ginessa

Sato, Mari (Bates College)

[123] Micro-residues: Developing a Geochemical Baseline for Archaeological Analysis at Temyiq Tuyuryaq

Geochemical analysis of anthropomorphic sediments in a household context have contributed to our understanding of 'home-making' including spatial organization and use of residential space (e.g. Frink and Goodale). Geochemical signatures can identify micro-residues such as calcium and phosphorous, suggesting activities that have occurred that we may not be able to visually conceptualize. These traces often coincide with cultural memory and place and can indicate continuity or adaptation in a changing environment due to a number of factors such as climate instability and colonial entanglements. This preliminary research analyzes samples collected from both natural and anthropomorphic environments at Temyiq Tuyuryaq in order to establish a baseline for further geochemical analysis relying on field collection using pXRF technology. The portability of pXRF analyzer also provides benefits for collaboration with local students in terms of field collection and analysis as well as the ability to address potential public health concerns such as lead paint and environmental contaminants which have substantial implications in a region relying predominantly on a subsistence economy.

Saucedo, Alfredo and Carl Wendt (CSUF)

[405] Some Temporal Markers in Olmec Pottery from Los Soldados

Los Soldados has been considered by many to be a secondary center with respect to La Venta due to its proximity to the capital; however, in the absence of a tuned ceramic chronology for the Middle Preclassic, this cannot be corroborated. Over a number of seasons, the Arroyo Pesquero Archaeological Project has carried out excavations at Los Soldados, and among the proposed objectives was to generate a chronology. However, radiocarbon dating during the Middle Preclassic present inconsistencies, namely chronological fluctuations do not allow to establish a reliable sequence. For this reason, we intend to carry out a stylistic and morphological analysis that shows the variations in the ceramics materials from this settlement. Thus, this presentation intends to show some morphological transformations identified in the types, shapes and decorations of the archaeological ceramics of Los Soldados. When combined with stratigraphy and excavation data these data can serve as chronological markers and solve the issues of the regional radiocarbon during the Middle Preclassic to be able to

approach a reliable regional typology.

Saule, Jolyane**[169] Domestic Pottery: Styles, Variation and Social Organization at the Droulers Site**

Droulers is a prehistoric Saint-Lawrence Iroquois village occupied during the 15th century in Southern Quebec. The site has been excavated by Université de Montréal's field school since 2010 and the goal of the excavation, under the banner of social archaeology, was to understand the social organization of the village. In continuity with the excavation, my MA thesis aimed to document the social fabric of the group through an intrasite stylistic analysis of domestic pottery. Style can be used to document the social interactions within the village, especially the clan affiliation of the inhabitants. Indeed, the ceramic knowledge was transmitted from mother-to-daughter and the social organization among the Iroquoians revolved around matrilineal kinship. Thus, the interest of ceramic style studies lies in their scope; they help to understand choices made by potters, those being influenced by social constraints. With those premises in mind, my focus was to ultimately understand the variability through two scales: the long-house and the village. My objectives were to make a thorough attribute description of the pottery assemblage, assess if variability was seen within the village, document that variability and interpret it to discuss social organization. This poster will present the outcomes of these objectives.

Saumur, Jennifer (Archam - CNRS/Université Paris 1 Panthéon-Sorbonne)**[197] Foodways and Diet in the Prehispanic Mixteca Alta: Ceramic and Isotope Analyses in the Specific Case of the Tomb 1 Burial in Nduatiucu (San Felipe Ixtapa, Teposcolula)**

This presentation examines the archaeological possibilities for investigating prehispanic foodways and diet. We do this through the analysis of a burial recovered in Tomb 1 at Nduatiucu, in the Teposcolula valley in the Mixteca Alta. The burial first excavated in the 1970s by Winter et al. (1975) and later re-assessed and radiocarbon dated by Saumur 2017 dates to the early Postclassic period (ca. 1000 A.D.). We discuss two specific elements of this find: first, the associated ceramics that inform us about food preparation and consumption in this specific context in the Mixteca Alta; second, the results of an isotopic study of the human remains that inform us about the individual's diet. We will present the aims, methods and results of this case study and compare our results with those from other analyses that have been conducted on early Colonial human remains recovered at Pueblo Viejo de Teposcolula (Yucundaa) (Warinner et al. 2012). This comparative work will also consider the available data coming from other Mesoamerican regions.

Saunders, Christopher**[165] Discussant**

Saunders, Jeffrey [368] see Holliday, Vance

Saunders, Jeffrey [368] see Perri, Angela

Savarese, Michael [9] see Walker, Karen

Savenkova, Tatyana [253] see Kim, Alexander

Sawchuk, Elizabeth [82] see Goldstein, Steven

Sawchuk, Elizabeth (Stony Brook University) and Mary Prendergast (Saint Louis University - Madrid)**[253] How to Choose Samples for aDNA: Bioarchaeological Best Practices for Sampling Human Remains**

Recent methodological advances have rapidly increased the pace and scale of ancient DNA (aDNA) studies, prompting widespread sampling in museum collections and raising ethical concerns about inter-lab competition, treatment of human remains, and the research questions being addressed. Another key issue is selection of material that will be destroyed for this research. Few osteological manuals cover aDNA sampling, and those that do focus on how to identify and handle elements with probable aDNA preservation, rather than which bones should be used. Human samples should be documented prior to any destructive analyses, but few texts specify how or consider that some methods (e.g., casting) may be incompatible with aDNA protocols. Existing resources focus on how to sample instead of what samples should be sacrificed. This creates a climate in which morphologically-informative elements like petrous pyramids and teeth are preferentially destroyed for aDNA, often with minimal documentation and from understudied collections. Here we suggest some simple rules for choosing human remains for aDNA research that balance laboratory needs with preserving material for future study. We hope that this will lead to the adoption of best practices among archaeologists, geneticists, and others, paving the way for more integrated research on archaeological human remains.

Sayle, Kerry [111] see Hamilton, Derek

Sayre, Matthew [250] see Rosenfeld, Silvana

Sayre, Matthew (High Point University) and Silvana Rosenfeld (High Point University)

[315] *Life Outside of the Ceremonial Center of Chavín de Huantar*

The monumental site of Chavín de Huántar in the Central Peruvian Andes has been the subject of archaeological investigation for close to a century. One person, more than any other, has been associated with the archaeology of the site for the last twenty five years. John Rick and the Stanford team have led research in the monumental sector of the site. The project has also encouraged work in other sectors of the site. The domestic sector of La Banda, located across the Mosna River from the monumental sector, offers the best opportunity to analyze contiguous domestic space from the Chavín time period. Research in this sector has focused on analyzing local production practices as well as the nature of exchange with outside regions and sites. Just as no site exists in isolation it is also important to consider that no sector of a site exists in isolation. This paper will analyze connection between the La Banda sector and the monumental sector of Chavín as well as the relationships that existed between the broader site of Chavín and other contemporary sites.

Scaffidi, Beth (Arizona State University) and Kelly Knudson (Arizona State University)

[111] *Crowd-Sourcing Isoscapes in (Bio)archaeology: The Andean Paleomobility Unification (APU) Project and Geolocation of Skeletons and Artifacts*

Stable and radiogenic isotopes are fundamental in (bio)archaeological studies of migration and trade, reflecting the isotopic catchment during tissue development. Foreign outliers have been defined by matching samples to a statistically "local" range. Because outlier provenience cannot be identified where the local range is undefined, researchers have increasingly studied water, soils, flora, and fauna to establish baseline values in broader areas. However, these studies are limited: 1) sample collection is largely limited to areas around easily accessed sites (tourist destinations and active excavations); and 2) we do not fully understand how to characterize regional variation in complex isotopic systems like the Andes. Predictive isotope models have been applied to geolocate samples in ecological and forensic contexts, but their power and accuracy is increased by spatially-systematic sampling and robust geostatistical analysis. The APU project uses an open-source spatial database for collecting baseline isotope samples along regular intervals across hydrological systems. Here, we interactively present the APU database. We also test the power of strontium and oxygen isoscapes generated from the data by using maximum likelihood estimation to create probability density surfaces for skeletal and artifact samples. Results demonstrate the potential for isoscapes as a tool for geolocation in (bio)archaeological contexts.

Scaffidi, Beth [206] see Greenwald, Alexandra

Scaggion, Cinzia [317] see Robbins Schug, Gwen

Scaramelli, Kay

[159] Predation and Production in the Rock Art of the Middle Orinoco: Food for Thought

The interpretation of rock art is fraught with difficulties, even when images may appear to be easily identified with cultural objects or elements found in nature. When considering the possible meaning of images of animals, plants, and artifacts depicted in the rock paintings and petroglyphs in the Middle Orinoco, we propose that an ethnographically informed approach may offer potentially fruitful insights into the symbolism related to food procurement, production, and consumption. By viewing the rock art in its broad social and geo-environmental setting, and as an integral participant in the conformation and structuration of the indigenous landscape, we will explore its possible role through time in 1) the mediation of the relations between predator and prey/society and nature, and 2) activities related to agricultural production and consumption. The use of rock art motifs in other media, such as body paint and stamps, basketry, maracas, and, to a lesser degree, ceramics, points to a ritual complex that permeated daily life as it related to food production and consumption in its broader context of societal reproduction, wellbeing and health.

Scarborough, Vernon (University of Cincinnati)

[58] Archaeology as Our Urban Futures

Archaeology is at a crossroads with a new generation of scholars more mindful of our disciplinary role within the social milieu we occupy. For years, the word “applied” in several corridors of our discipline implied something other than rigor and certainly of less significance than the real work of reconstructing past environments or modeling ancient societal activity. Although anthropology on campuses of the late 60s and 70s was a match for our politics, with time most of us invested in the immediacy of earning our degrees focusing on well-defined paradigms and the intellectual safety of our disciplinary silos. Most of us have carried that latter orientation and perspective forward in making anthropological archaeology a formidable study with incredibly well-controlled datasets. However, we are now in a position to significantly address our futures and at a time when few other disciplines can. This paper will examine the role of our urban futures drawing from the resilience of dispersed but sizable urban aggregates found in past contexts; and why the notion of “city state,” with our new realities like climate change, community cohesion, geographical scalar issues, etc., may be more flexible and better positioned than our current views of the nation state.

Scarry, C. Margaret (Univ. of North Carolina-Chapel Hill)

[404] Agricultural Wealth, Food Storage, and Commensal Politics at Azoria an Archaic City on Crete

Azoria (630-480 BC) is a small urban center on the island of Crete. Ten seasons of large-scale excavations have shed light on the formation, organization and operation of this Archaic city. At its heart is a massive civic complex with shrines, assembly halls, public dining rooms with associated kitchens and storerooms, a large free-standing storehouse, and an olive press. Surrounding the civic complex are “townhouses” of important families: here too, storage, preparation and consumption of foods were prominently displayed. The layout and contents of these public and residential buildings manifest the importance of food storage and display in urban politics. This paper draws on ceramic, architectural, and archaeobotanical evidence to discuss the mobilization and storage of agricultural products—particularly from vineyards and orchards. We argue that city authorities, or some other supra-household group, administered the mobilization, storage and distribution of a range of foods (such as grain, pulses, olives, wine, oil, and almond) for display and consumption in symposia and larger banqueting events.

[404] Chair

Scarry, John (U of North Carolina)

[239] Purification Ritual and the Creation of Place in the Mississippian Southeast

While the indigenous societies of the Eastern Woodlands shared ways of life, they also differed in many important ways so that we cannot view them as a single culture. Even where material cultures and iconography appear to have been shared across great distances and over significant periods of time, the meanings and practices connected to those representations and items undoubtedly varied. Here I look at a particular assemblage (the beaker-bottle complex of the Chattahoochee-Apalachicola Valley and adjacent areas) and ethnohistorical accounts of Apalachee rituals connected to their ballgame to interpret an assemblage from Mound 6 at the Lake Jackson site and to argue that the peoples of this area were distinct from Mississippian peoples in other parts of the Eastern Woodlands in terms of their ritual practices. I argue that the people who lived at Lake Jackson employed the material culture of the beaker-bottle complex to create purified (sanctified) space for the construction of mounded architecture. I go on to suggest that this space and the mound that capped it likely served as a locus for rituals connected to the Apalachee ballgame (rituals that may also have involved the beaker-bottle complex).

Scerri, Eleanor (Max Planck Institute for the Science of Human History)

[247] Rethinking Trees, Species and Hybridization in Recent Human Evolution

Models of recent human evolution are fundamentally rooted in the idea of tree-like genealogies and species concepts, regardless of the specifics. The range of explanatory models has elicited some consideration of the need for flexibility, yet without a reconsideration of the fundamental heuristics, we are limited in our ability to fully describe processes of recent human evolution. In this paper, I will argue that the recency of the emergence of humans problematizes the concept of hybridization with more divergent hominins, problematically referred to as 'archaics'. This is the case irrespective of the fact that the wellspring of contemporary humans lies in Africa. I will argue that the concept of dynamic metapopulations is a far more flexible conceptual framework than reticulating trees for understanding human origins and earliest prehistory. Moreover, this framework recognises that population structure exists, as it has always existed and did not come into being at a certain point in evolution as suggested by certain models (e.g. Classic Multiregionalism). Finally, this framework offers a way out of what have become overly polemical views of human origins that have affected interpretative approaches for too long.

Schaafsma, Curtis and Polly Schaafsma (Museum of New Mexico)

[28] Which Serpent Are We Talking About?

In many parts of the world including the Americas, snakes are incorporated into symbolic and metaphorical constructs in order to better describe and understand natural and social components of various cosmologies. As a result, their depictions are often enhanced with attributes that depart from nature, granting them the visual characteristics that define their various roles. In this paper we review the portrayals of the horned and often feathered serpent in the Greater Rio Grande Tradition in the American Southwest, which includes Paquimé. We identify variations in its temporal and spatial distribution and distinguish it from other modified snakes. While details vary, its depiction is remarkably stable throughout, an indication of ideological standardization. For at least 1000 years, its attributes in the archaeological record and its meaning today among the ethnographic Pueblos, confirm its link to the complicated Quetzalcoatl complex of Mesoamerica in its many manifestations. Its cosmological dualities are more specifically defined via its ties to terrestrial waters, plus Venus and warfare in the celestial realm, and finally in leadership roles.

Schaafsma, Polly [28] see Schaafsma, Curtis

Schaafsma, Polly (Research Associate, MIAC\LOA) and William Tsosie (Navajo Tribal Archaeologist)

[84] Making a Homeland and Navajo Cultural Landscapes

In indigenous America fundamental consideration in addressing "the materiality of religion" is the land itself. In native thinking the land and the people comprise inseparable entities that interact and give definitions to each other. The Navajo, in their migrations into the Southwest, adapted to cultural landscapes already defined by various Pueblo people who preceded them and were still spiritually engaged with topographic features to which they had long ago ascribed mythic/historical meanings and supernatural powers. The Navajo, heeding previous meanings, added new places of significance, thereby creating a cultural landscape of their own. Making rock art was part of this process. With a focus on the Navajo homeland, or Dinetah, we examine the ways in which rock art and the oral traditions and beliefs it promoted functioned to establish a Navajo identity between ca. AD 1670 and 1760.

[190] Discussant

Schablitsky, Julie (Maryland Dept. of Transportation)**[292]** *Discussant***Schach, Emily (Arizona State University)****[290]** *Preliminary Analyses of Materials from the Terminal Terrestre, Moquegua, Peru*

Archaeological investigations in Moquegua indicate that this valley has been the site of multi-ethnic imperial processes since the Middle Horizon. Large cemetery sites in Moquegua have largely dated to the Middle Horizon Period, however, and thus little work has focused on the transition between the Late Intermediate Period and Inka occupation. Rescue excavations conducted in 2010 from a large cemetery site under the bus station have the potential to address important questions regarding Late Intermediate Period multi-ethnic processes and responses to the Inka Empire. This poster presents preliminary analyses of skeletal and ceramic specimens conducted during the summer of 2018. Assessment of ceramic vessels indicates that this site was used primarily during the Late Intermediate Period, and contains ceramics associated with Cabuza, Tumilaca, Chiribaya, Estuquiña, Gentilar, and San Miguel styles. This site also contains ceramic vessels associated with the Inka Empire, reflecting continued use of the cemetery during the Late Horizon. Skeletal analyses reveal multiple styles of cranial modification, antemortem cranial trauma, and vertebral lesions consistent with tuberculosis. Thus, materials from the terminal terrestre rescue excavations have the potential to address multi-ethnic processes in the Moquegua Valley during the Late Intermediate Period and responses from contact with the Inka Empire.

[290] *Chair*

Schach, Emily [290] see Witte, Emilee

Schachner, Gregson (UCLA)**[188]** *Keith Kintigh and the Cibola Region over the Long Term*

This paper provides a brief overview of Keith Kintigh's career and contributions, with a special emphasis on his research on Pueblo archaeology in the Cibola region of western New Mexico and eastern Arizona. The seeds of many themes in Dr. Kintigh's research and professional contributions can be seen through his research in the region, which began as a field school participant with the Cibola Archaeological Research Project in the 1970s. His investigations in the Cibola area exemplify the power of a mix of fieldwork, particularly survey, collections research, quantitative methods, and the gradual accumulation and preservation of data for understanding some of the grand challenges of archaeology, including human population movement and responses to environmental change. Through a presentation of the results of this work, including a "grand synthesis" of current settlement data, we explore important themes in Dr. Kintigh's career and archaeology more broadly.

[188] *Chair***Schaefer, Benjamin (University of Illinois at Chicago)****[206]** *Reconstructing Life Histories at the Site of Estuquiña: Incorporating Isotopic Data from Archaeological Hair to Investigate Palaeodietary Trends*

The site of Estuquiña is a Late Intermediate Period (AD 1100-1476) site in the Osmore drainage near the modern city of Moquegua in southern Peru. This time period is characterized by regional socio-political decentralization and transition of imperial polities throughout much of Andean South America. Previous research on human remains from the site investigated segmented cortisol levels to examine psychosocial stress, however this study incorporates $\delta^{13}\text{C}$ keratin and $\delta^{15}\text{N}$ keratin from archaeological hair ($n=12$) to elucidate how diet may have played a pivotal role in regulated cortisol production, social inequity, and overall health. Segmented isotopic values demonstrate variation in diet in the months leading up to death and illuminate which individuals had access to certain foodstuffs. Preliminary results range from -16.3‰ to -23.4‰ for $\delta^{13}\text{C}$ keratin and 9.7‰ to 13.1‰ for $\delta^{15}\text{N}$ keratin and suggest a lower dependence on maize and higher dependence on local flora and fauna.

[206] *Chair*

Schaefer, Jonathan (University of Missouri), Jeffrey R. Ferguson (University of Missouri), Suzanne Eckert (University of Arizona), Deborah Huntley (Tetra Tech, Inc.) and Timothy de Smet (Binghamton University)

[213] In-Field XRF of Obsidian from Sites in the Lion Mountain Community of West-Central New Mexico

The Lion Mountain Community of west-central New Mexico is the largest and most easterly example of what has been described as a Zuni Region phenomena. A focus of this research is examining interactions both within the community and the broader region. In contrast to other lines of evidence, such as architecture and ceramic typology, in-field ED-XRF analysis of obsidian provides a narrow but precise indication of broader regional interaction. The McDaniel Tank obsidian source, located just southeast of the study area, dominates the assemblages of the 13th century sites associated with the Zuni Region phenomena, while an earlier adjacent pithouse site is dominated by the Mount Taylor sources to the North.

Schaefer, Michael J. [318] see Neubauer, Fernanda

Schafer, Jordan [252] see Simek, Jan

Schaffer, William (Arizona State University) and Robert Carr (Archaeological and Historical Conservancy, Inc.)

[37] Sensorial and Transformative Qualities of Caves among the Lucayan-Taíno of the Bahamas

Caves act as the mythological archetype and physical portals that validate the cosmogony-cosmology-eschatology spectrum of many past and present human societies. Among the prehistoric Lucayan-Taíno of the Bahamas, caves played an important role in both validating perceptions of the cosmos, but also the maintenance of ancestral spirits. These roles were implemented through material objects, human remains, and in ritual performance to invoke and adulterate particular deities (or cemis) as part of a pantheon known as cemiism. This presentation seeks to use the known mortuary record of the Lucayan-Taíno to examine the way in which caves provided ritual platforms for ancestral worship and the preservation and maintenance of the cosmos, including the sensorial and transformative qualities of caves and material culture to entreat and perpetuate cemiism.

Scharf, Elizabeth (University of North Dakota)

[393] Reducing Large Data Sets Using Granger Causality: A Paleoecological Example from the Columbia Plateau

This paper presents proxies of vegetation, climate, human population, and fire from late Holocene sediments from the Columbia Plateau (USA). Statistical analyses such as multivariate regression and Granger Causality time series analysis are used to reduce complexity and illuminate the underlying structure of the data set. Results show that multivariate regression can overfit a model in such cases, identifying variables as statistically significant when they are not. Granger causality removes multicollinearity and identifies a smaller set of more tightly interconnected variables, revealing basic lead-lag relationships over several time intervals. Differences in conclusions based on the two statistical procedures are discussed, along with the implications of choosing one method over the other.

Scharlotta, Ian (Texas State University)

[397] Habitat-Specific Marine Reservoir Corrections along the Central California Coast: The Effects of Differential Upwelling

A confluence of natural factors has created three different ecological habitats for marine shellfish with potentially unique marine reservoir offsets along the central California coast. Deep-water trenches adjacent to the rocky points (e.g., Arguello, Conception, Sal), create localized upwelling environments. Reported offsets range from 400-1000 years for rock-dwelling species that comprise most shell middens. Sandy beaches dominating this section of shoreline were an historically important shellfish source formed by an offshore shelf; hypothesized to approximate average California coastal offsets (~225 years). Muddy lagoon species have yielded offsets of 90-150 years. The range of uncertainty between aquatic niches and terrestrial organics leaves sizable data gaps that could produce poor chronological precision and incidental evidence for extended habitations. Lowered sea levels would have brought the accessible coastline closer to these marine trenches potentially exacerbating the problem. Paired samples covering different ecological niches from twelve short-term archaeological sites were analyzed to gauge the offset(s) during primarily the late Holocene. Two main hypotheses are

tested through this research: 1) quantify reservoir effects and determine appropriate ΔR values including any localized variance; and 2) outline the presence and extent of ecological niche-specific offset corrections needed for rocky shoreline, sandy beach, and lagoon shellfish species.

[397] *Chair*

Schavelzon, Daniel

[53] *The Nazi Hideout of South America: Studies on the Teyu Cuare 1945 Neighborhoods*

The discovery of the Nazi refuge on the border of Argentina and Paraguay during 2015, built around the year 1945 and abandoned shortly after, led to work inside it first to demonstrate the hypothesis of use and chronology. Last year, the mapping of the area and the survey of the surroundings intensified, finding new structures and groups strategically located in the accesses to the protected area, between the main cliffs that control entrance to the place.

Schechter, Heeli (The Hebrew University of Jerusalem), Nigel Goring-Morris (The Hebrew University of Jerusalem) and Daniella Bar-Yosef Mayer (The Steinhardt Museum of Natural History, Tel Aviv)

[15] *Shells at Death – The Use of Shells in Neolithic Mortuary Contexts*

Shells constituted a cultural resource for human groups throughout history. As such, they were used and incorporated in different aspects of life – and death. In this study we examine the use of shells in mortuary contexts, focusing on the Pre-Pottery Neolithic B (PPNB) cultic/mortuary site of Kfar HaHoresh. Architectural elements, material culture and mortuary practices change through the Early, Middle and Late PPNB sequence found at the site, reflecting changing cultural behaviors, norms and beliefs.

A large molluscan assemblage (>3,200 shells), including marine, freshwater and land-snail shells, was found in different contexts at the site. Here we focus on marine shells from mortuary contexts. They are all of Mediterranean origin, dominated by bivalves. A small fraction of them are worked, perforated, or otherwise manipulated to function as beads and pendants. Different use-trends, including the choice of taxa, intentional manipulation of the shell, and possible use-traces, are examined. These trends are compared between interred individuals, burial types, and PPNB phases, in order to highlight different aspects of the cultural use of shells, as part of evolving Neolithic mortuary practices.

Scheiber, Laura (Indiana University)

[19] *Native Narratives and Settler Colonialism in the Rocky Mountain West*

The study of the social and material effects of European colonization on indigenous inhabitants has been a regular topic of archaeological discourse in the United States for the last twenty years, with strong publication records in the Southeast, Southwest, and California. A generation of recent scholars embraced a redefinition of prehistoric and historic archaeology in the 1990s, but in practice the divide between the two remains strong. The use of the Protohistoric as a term continues despite its inherent flaws. Extensive European contact in the Plains and Rocky Mountains occurred much later than other areas, with a florescence of culture change in the nineteenth century. Archaeological investigations here often remain in a liminal state, in part because of the invisibility of Native presence in post-reservation periods. In this presentation, I will discuss my research exploring historic-period sites of the mountains and Plains in northwestern Wyoming, an area deeply influenced by Cowboy-Indian dichotomies. I give examples of ways that archaeological sites and culturally-significant places played their own roles in historic narratives of the twentieth century, with legacies that continue today.

Scheiber, Laura [80] see Hawley, Kirsten

Scheidecker, Dave [19] see Mahoney, Maureen

Scheinsohn, Vivian (INAPL-CONICET/ University of Buenos Aires), Florencia Rizzo (INAPL-CONICET) and Sabrina Leonhardt (INAPL-CONICET)

[364] *"In pursuit of the past": Borrero Influences in Our Regional Research in the NW of Patagonia (Chubut, Argentina)*

This presentation aims to highlight the theoretical and methodological relevance of Borrero's work to address regional research in Patagonia through our own project in Genoa and Pico valleys (NW of the Argentinean Patagonia). From a theoretical standpoint, it was argued that Borrero's peopling model (1989, 1994-1995) was utilized in two ways: 1) strong or direct, allowing to generate archaeological expectations for each one of the peopling stages, and 2) the most frequent one, a weak or indirect utilization, as a post hoc interpretation of data. In our study area, this model was utilized in both ways: weak or indirect (Caridi and Scheinsohn 2016) and strong or direct, for analyzing the human settlement of Northwest Patagonia during the last 12.000 years (Rizzo 2018). From a methodological standpoint Borrero (1988, 2001) posited a regional taphonomic perspective to consider the way in which different processes affect preservation and artifacts localization in a regional scale. This perspective was incorporated in the Genoa and Pico Valleys to generate a baseline from which to begin to discuss the past human occupation in these areas.

Scherer, Andrew [79] see Garrison, Thomas

Scherer, Andrew (Brown University)

[79] *The Death Within: Bone as Material among the Maya*

Houston's "The Life Within" is among the most perceptive and nuanced statements on Classic Maya materials and the animate quality of things. Here, I draw inspiration from this future-classic work to more deeply probe Maya understandings of bone – a material most generally treated by archaeologists as either a window into ancient bodies and beings, or, more simply, a malleable material from which to fashion a range of utilitarian and (occasionally) decorative and ceremonial objects. Yet there is much more to be said about how past peoples perceived this complex material. A key paradox of bone is that it is both emblematic of death yet represents a vital element of living beings. Although this paradox may seem a universal truism, in this paper I highlight what is especially distinct about Maya philosophies of bone as they relate to matters of the living and the dead.

[79] *Chair*

Schiappacasse, Paola (University of Puerto Rico, Rio Piedras Campus)

[418] *Incorporating "Otherness" to Archaeological Research*

Much has been written about widening our research scopes to incorporate peripheral topics that include ethnicity, class, gender, age, and status. Although these past decades there has been significant progress, we should ask ourselves how can we impact and motivate students to address these issues. This presentation will demonstrate the benefits of teaching how to use primary sources to develop research projects in undergraduate archaeology classes. Drawing from my experience, I will use examples of the types of documents that can shed light on the "forgotten" protagonist of our recent past and the ways in which existing archaeological collections can be incorporated.

[418] *Chair*

Schiele, Trista (Utah State University), Judson Finley (Utah State University) and Erick Robinson (University of Wyoming)

[248] *The Suitability of Dry-Farming and Its Impact on Fremont Paleodemography in the Northern Uinta Basin*

Recent work in Utah's northern Uinta Basin shows close relationships between precipitation variability and population dynamics during the Fremont period, AD 300-1350. In this study, we evaluate the role that changes in the suitability of local dry-farming conditions had on observed regional settlement patterns and community formation. We examine the relationship between dry-farming suitability and Fremont demography using tree-ring derived estimates for precipitation and temperature. These environmental proxies, combined with a GIS model that accounts for topography, soil conditions, surface-recharged springs and regional variations therein, are used to build the dry-farming suitability model. Using ~500 radiocarbon ages, we compare the dry-farming suitability of the northern Uinta Basin to a Fremont Period population curve based on both a summed probability distribution and a bivariate kernel density estimation integrated into the GIS model. This research has the potential to explain the rise in population between AD 300 – 750 and the marked shift in population and site distribution after AD 750 and again after 1050. In a broader sense, this research addresses socioeconomic changes in forager-farmer subsistence and settlement strategies within a context of emergent agriculture.

Schiery, Benjamin [127] see May, Alejandra

Schiery, Benjamin (Purdue University), Paul Burnett (Director, Cultural Resources, Denver and Fort Coll), Lawrence Todd (Professor Emeritus, Colorado State University) and Erik Otarola-Castillo (Purdue University)

[128] Comparing the Performance of Machine Learning and Traditional Approaches to Archaeological Site Modeling and Prediction

Site prediction models have helped archaeological resource management in site prospecting, impact mitigation, and information recovery. Beginning in 2009, we developed probability models for the Shoshone National Forest (SNF). These models helped to prioritize inventory of areas burned in wildfires, to rapidly appraise archaeologically sensitive areas. The methodological tool most used in model-building has been logistic regression. However, developments in Data Science via traditional and Machine Learning algorithms provide opportunities to improve predictive ability. Here, we use SNF archaeological presence/absence location data with several modeling techniques to create and compare predictions. Predictive methods include Generalized Linear Modeling, Generalized Additive Modeling, MaxEnt, Multilayer Perceptron, Conditional Inference Trees, Recursive Partitioning and Regression Trees, Random Forest, Flexible and Mixture Discriminant Analysis, Radial Basis Function, Support Vector Machine, Gradient Boosting Machine Learning, Partial Least Squares Regression, k-Nearest Neighbors, and Neural Networks. We compared predictions using 17 diagnostics including gain, true/false positive rates, true/false negative rates, likelihood ratios, diagnostic odds ratio, accuracy, positive/negative predictive values, false discovery/omission rates, the F1 score, Youden's J statistic, markedness, and Matthews coefficient. Techniques offer prediction tradeoffs depending on the diagnostics used. We recommend users become familiar with the diagnostic tools that best reflect modeling goals.

Schiffer, Michael (School of Anthropology, University of Arizona)

[318] Discussant

Schilling, Timothy [45] see Donaldson, Tyler

Schjellerup Jørkov, Marie-Louise [386] see Walsh, Matthew

Schlanger, Sarah [75] see Larralde, Signa

Schleher, Kari (Crow Canyon Archaeological Center)

[86] The Social Implications of Pottery Technology, Production, and Design from the Basketmaker Communities Project

The Dillard site (5MT10647)-the earliest community center identified in the Mesa Verde region-may contain among the oldest examples of multi-household pottery production during the Basketmaker III period. A thorough understanding of how pottery was produced, decorated, and obtained at this early large pithouse village, which is centered on a great kiva, provides important insights on village organization and interpersonal relationships. In addition, comparison of pottery from small, contemporaneous habitation sites surrounding the Dillard site allows exploration of the social connections across the community. In this paper, I explore typological, compositional, and decorative variation in pottery from the Dillard site and a number of small Basketmaker III period habitation sites. These lines of evidence allow me to identify spatial patterns in the distribution of pottery and its potential differences among the pithouses at the Dillard site and small habitation sites in order to address the organization of production, as well as the extent of influence the Dillard site may have had on the broader surrounding community through pottery production and exchange.

Schleher, Kari [86] see Hughes, Katherine

Schleher, Kari [257] see Penman, Shawn

Schmader, Matthew [112] see McCanna, Aaron

Schmader, Matthew (University of New Mexico)

[367] *The Persistence of Resistance: Resiliency and Survival in the Pueblo World, 1539-1696*

From the first instance of contact with outsiders, native peoples of the American Southwest have been confronted with, and have confronted, challenges to survival and cultural continuity. The earliest organized exploration of the Southwest by Fray Marcos de Niza in 1539 resulted in an initial act of resistance by Zuni pueblo: the killing of his Moorish guide, Esteban. In 1540, the huge expedition led by Francisco Vázquez de Coronado caused wide-spread impacts met by many acts of Puebloan resistance, ultimately ending in bloodshed. A 40-year period of disinterest in Nuevo Mexico ended in the early 1580s with small explorations and attempts at establishing a colony. By the time of Juan de Oñate's 1598 colony, Spanish attitudes and administration shifted from exploration to goals of missionizing native peoples of New Mexico. The 1600s were marked by intense in-fighting between Franciscan missionaries and newly-formed colonial governance. Pueblo peoples were caught up in this dispute and shifting inter-tribal alliances were common. Equally common throughout the 1600s were terrible governorships, famine, drought, disease, and resettlements. In the face of multiple challenges, native groups resorted to various passive and active tactics to ensure long-term survival, up to and including the 1680-1696 Pueblo Revolts.

[26] *Discussant*

[367] *Chair*

Schmid, Clemens and Ben Marwick (University of Washington)

[175] *A Population Graph Based Style Transmission Model*

The now classic Neiman (1995) is a baseline for many influential applications of Cultural Transmission to explore Stylistic Variability in archaeology. It and many of its successors represent social interaction and generational development in a deliberately simplified way to facilitate the exploration of parameters and algebraic analysis. While justified, this omits both the theoretical trajectories of information transmission elaborated by Cavalli-Sforza and Feldman (1981) as well as the insights archaeologists have gained through social network analysis. This paper explores an alternative, agent-based simulation framework that attempts to be more flexible: a diachronic population graph is established as a landscape, in which ideas as entities with individual agency seek expansion -- the meme's eye view. The social network can be constructed to represent archaeological knowledge concerning population size development, the degree of intra- and intergroup exchange or spatial or cultural patterns of interaction. Ideas may be long-term static or evolving over time, selectively neutral or functionally different, distributed randomly or according to real world examples. Population graph generation and idea expansion simulation are implemented in R and C++ and accessible with an R interface - but computationally expensive. The presentation will elaborate on the concept and show an example application.

Schmidt, Kari [153] see George, Richard

Schmidt, Peter (University of Florida)

[13] *Discussant*

Schmidt, Ryan [253] see Blohm, Tre

Schmitt, Dave, Karen Lupo (Southern Methodist University), Jean-Paul Ndanga (Université de Bangui), D. Craig Young (Far Western Anthropological Research Group) and Christopher Kiahtipes (University of South Florida)

[82] *The Early Iron Age and "Hiatus" Occupations: Archaeological and Chronometric Data on Holocene Human Settlement in the Northern Congo Basin, Southern Central African Republic*

Recently, Lupo and colleagues (2018) reported data on the nature and timing of late Holocene human occupation in the northern Congo Basin rain forest, southern Central African Republic and this paper presents new archaeological and chronometric information. Field reconnaissance identified 25 new archaeological sites, including additional iron smelting features, and 19 radiocarbon dates from 14 of these mark human habitation across some 1900 years. Together with the previously reported investigations a diverse suite of sites have been identified, including the only documented iron ore mines in the Central African forest, and radiocarbon assay of nearly 50 charcoal samples have returned dates for 32 sites that signal nearly contiguous occupation of the lower Lobaye River basin over the past 2300 years. Among others, these data 1) provide, for the first time, an Early Iron Age date on charcoal from a northern Congo Basin rain forest site containing evidence of iron production; 2) include calibrated age estimates on multiple sites dating to the alleged hiatus in regional human occupations ca. 1300-800 BP; and 3) afford a number of additional dated contexts that fall during the Late Iron Age increase in sites reported in other forested regions of Central Africa.

Schmitt, Dave [415] see Lupo, Karen

Schmitz, Kelsey A. [216] see Beggen, Ian

Schmuck, Nicholas [10] see Carlson, Risa

Schmuck, Nicholas (University of Alaska Fairbanks), Risa Carlson (Obsidian Consulting Services) and James Baichtal

[10] *Shaheen: Early Holocene to Contact*

The Shaheen area on the west coast of Prince of Wales Island, Southeast Alaska is a crenulated stretch of coastline protected from outside waters and fed by multiple freshwater streams. Paleoshoreline modeling following Carlson and Baichtal's predictive model (2015) suggested areas suitable for early Holocene settlement. Recent investigations have identified several archaeological sites occupying a series of uplifted terraces, from a village along the present shoreline to an expansive pebble tool/core and blade/microblade site at 20 meters above Mean Lower Low Water.

Schneider, Joan

[235] *Discussant*

Schneider, Tsim [19] see Panich, Lee

Schneider, Tsim (University of California, Santa Cruz)

[294] *Moving beyond Redemptive Archaeology on the California Coast*

The past two decades of archaeology in California have produced several examples of successful indigenous and community-based research. There are still other examples of a lingering tension between archaeologists and tribes as the agendas of western science and indigenous epistemologies grate against one another. This current climate of getting along while staying the same gives shape to an archaeology in which the values of indigenous communities are often secondary to an archaeology driven by a sense of debt or threat. As we discuss, this redemptive archaeology conceals two important ideas. First, examples from the 1970s and earlier demonstrate that California tribes and archaeologists can and have worked productively under a rubric of social justice. Second, archaeology has the capacity to be much more than meets the eye. To illustrate this, we present two case examples of our efforts at practicing more inclusive and socially just research. This work, ostensibly called "archaeology," is fundamentally about empowering Indigenous communities by foregrounding their histories, concerns, and goals. The first example addresses two decades of research in Marin County with Coast Miwok and Southern Pomo people. The second example examines the early stages of a collaborative project co-created with Salinan T'rowt'raahl in Monterey County.

[19] *Chair*

Schnell, Joshua [96] see Watson, Sarah

Schnell, Joshua (Brown University)

- [96] *Patients and Practitioners: Archaeological and Ethnohistorical Approaches to Ancient Medicine and Healing Practices in the Americas*

Medicine, health care, and healing comprise a sub-set of cultural practices that are under-represented in archaeological work in the Americas. In other parts of the world, rich textual traditions consisting of medical treatises or surgical manuals combined with archaeological evidence in the form of metal implements or tools have contributed to the rising popularity of an archaeology of medicine. Such textual traditions do exist, to an extent, in the Americas, often the focus of colonial or ethnohistorical work which is subsequently used by archaeologists to interpret archaeological data. However, there is much more that archaeologists can be saying about medicine and healing in the past, particularly from the perspective of material culture, or how these practices might have interfaced with the human body. Collaboration between archaeologists and ethnohistorians on this topic has the potential to truly paint a holistic picture. This paper will examine the history of the study of medicine and healing in the Americas from the perspectives of archaeology and ethnohistory and discuss some of the ways in which archaeological data from osteology, paleoethnobotany, archaeometry, and other methodologies can contribute to the study of medicine and healing in the Americas.

- [96] *Chair*

Schnitzer, Laura Kate (New South Associates) and Susan Olin (New South Associates)

- [357] *Refining Archaeological Probability Models: Case Studies from Georgia DOT Systematic Wetland Surveys*

The results of several recent wetland surveys for the Georgia Department of Transportation are raising new questions about traditional archaeological probability models for inundated areas. Wetlands are often left largely uninvestigated during archaeological surveys due to restricted access, logistics issues, and by assumptions that swamps were not suitable for long-term habitation. This logic is somewhat flawed, as wetland resources are known to have been crucial to certain precontact subsistence strategies and many “swamps” are only newly or seasonally inundated. This presentation will use recent data from systematic wetland surveys, combined with regional LiDAR data, to initiate discussions on how to more accurately distinguish between high and low probability areas in different wetland types, how to determine appropriate levels of effort in searching for wetland sites, and how updates to traditional field methods can increase survey accuracy for these areas.

Schofield, John [271] see Currie, Elizabeth

Scholl, Nathan (Gray & Pape)

- [72] *Tuners Falls Gorge Geoarchaeological Investigations: Modeling Landscape and Archaeological Developments within the Connecticut River Valley.*

The Tuners Falls Gorge region of the Connecticut River Valley is composed of a dynamic post-glacial alluvial landscape which contains extensive Pleistocene and Holocene deposits as well as an abundance of Pre-Contact archaeological sites spanning the last 12,000 years before present. This paper presents a new geoarchaeological study of the geomorphological formation of the post-glacial alluvial landform in the Tuners Falls Gorge region of the Connecticut River Valley using soil and geomorphologic information combined with dating based on radiocarbon samples and temporally diagnostic, cultural artifacts. Previous geoarchaeological studies within this study area have focused on landform development in relation to the location of archaeological sites just above the falls. This study focuses on landforms and sites below the falls. A synthesis of this modern study with past geomorphological or geoarchaeological studies is presented to provide a model of landscape development which can be used to help predict the location and age of archaeological sites both on and buried below the landscape in the Tuners Falls Gorge region.

Schollmeyer, Karen (Archaeology Southwest)

[40] *Discussant*

[263] *Chair*

Schollmeyer, Karen [213] see Stoj, Kiley

Schollmeyer, Karen [315] see Leckman, Phillip

Scholnick, Jonathan (Lycoming College), Viviana Amati (Department of Humanities, Social and Political Science), Jessica Munson (Lycoming College) and Habiba Habiba (Department of Computer and Information Science)

[127] *Using Event History Methods to Analyze the Diffusion of Dynastic Rituals in Classic Maya Society*

Diffusion of innovation describes the way novel cultural traits or information spread in a population. Understanding the specific factors that account for the spread of these innovations calls for a multivariate approach. Event history analysis provides a set of statistical methods to explain and predict the occurrence of events for the entities within a population. These methods have been successfully applied in a range of disciplines to examine the determinants of events such as migration, death, failure of components, and recently, the adoption of novelties. Multivariate event history models allow simultaneously testing the effects of various diffusion determinants, including information content (e.g. trait characteristics), entity's attributes (e.g., prestige), and social and contextual factors (e.g., geographical proximity). These factors are interlaced, and therefore, their effects cannot be analyzed separately as done in recent archaeological studies. In this paper, we apply event history techniques to study the diffusion of dynastic rituals in Classic Maya society. We examine the role of different network configurations on the spread of rituals recorded on hieroglyphic monuments. We demonstrate the effectiveness of this approach by discussing its application to a wider set of cultural traits, like ancient technologies or artifact styles, when time of adoption is available.

Schon, Robert [421] see Blake, Emma

Schortman, Edward (Kenyon College)

[256] *Discussant*

Schott, Amy (University of Arizona, Petrified Forest National Park)

[180] *Geoarchaeological Assessment of Agricultural Quality in an Eolian Landscape*

The region of Petrified Forest National Park on the southern Colorado Plateau is often considered to be a marginal area during prehistoric occupation. This is due to the expected low potential for agriculture, and the location in between major cultural centers. This study uses geoarchaeology to engage the question of whether this landscape is a marginal area and to further examine agricultural potential in the landscape of Petrified Forest National Park, which is dominated by sandy, eolian soils. Specifically, this study tests the inference that the area is only of marginal quality for cultivating crops using analyses of soil physical and chemical properties. Results confirm that soils are of low agricultural quality, but within the range to support crops. The area's geologic setting may have improved the water holding capacity for the sandy soils, and local microenvironments likely played a role in selection of agricultural fields. Despite the low potential for agriculture, the area was occupied nearly continuously from the Basketmaker II through Pueblo IV periods (c. AD 400-1450) and shows evidence for long-distance trade and extensive movement within the region. This suggests that social factors may have been an important draw for habitation of the region.

Schoville, Benjamin (University of Queensland), Jayne Wilkins (University of Cape Town), Kyle Brown (University of Cape Town), Alexander Blackwood (La Trobe University) and Jessica von der Meden (University of Cape Town)

[32] *Landscape Technological Strategies in the Southern Kalahari Basin: North of Kuruman Archaeological Survey, South Africa*

The southern Kalahari Basin in the northern interior of South Africa has provided evidence for early use of fire, Mode 3 technological developments, early stone-tipped spears and pigment use. Innovations seen in the southern Kalahari Basin early in the Middle Stone Age may represent changes in how human populations were able to adapt to changing environments. Excavations at the new site of Ga-Mohana Hill are developing a stratified rockshelter sequence to contextualize the open-air archaeological discoveries in the region. However, here we report on an initial survey of archaeological occurrences and carbonate formations (calcrete, tufa, and breccia) in the region north and west of Gamohana Hill in the Korannaberg and Kuruman Hills out on the landscape. The survey targeted rockshelters along the dolomite and banded ironstone formation contact zones where brecciated carbonates and tufa features were identified. Access to limited water resources may influence social behaviors in many ways that influence technological organization including reduced levels of group fluidity. Identifying how MSA foragers adapted to these environments provides context for identifying potential drivers of technological innovations that developed in the southern Kalahari Basin.

Schoville, Benjamin [32] see Wilkins, Jayne

Schreg, Rainer [386] see Fisher, Lynn

Schrenk, Alecia

[273] *What Happened to the Victims? Constructing a Model of Care for Cranial Trauma from Non-lethal Violence at Carrier Mills, Illinois (8000 – 2500 BP)*

A different model of care is required for trauma resulting from non-lethal violence. In the prehistoric Midwest, raiding and warfare were endemic, making trauma from non-lethal violence a part of everyday life. As such, the peoples living in this region would have needed a model of care specifically designed to treat individuals suffering from traumatic injuries resulting from non-lethal violence. This paper examines cranial depression fractures (CDFs) on skeletal remains from Carrier Mills, Illinois (8000 -2500 BP) and highlights the model of care required for cranial trauma resulting from non-lethal violence. Sixteen individuals (10 males, 5 females, and 1 subadult) had CDFs severe enough to require direct healthcare and accommodation to survive their injuries. A general model of care for CDFs is constructed to highlight the similarities and differences of caring for each case. This paper indicates that the people of Carrier Mills were no strangers to violence yet they provided healthcare for members of the community who survived the raiding and warfare endemic to their region.

[273] *Chair*

Schroder, Verginica [88] see Turcanu-Carutiu, Daniela

Schroder, Whittaker (University of Pennsylvania)

[100] *Processes of Collapse, Resilience, and Reorganization at El Infiernito, Chiapas*

Discussions of political collapse in archaeology have shifted recently to approaches that incorporate the adaptive cycles of resilience and reorganization that highlight the continuity of certain cultural practices, belief systems, and worldviews alongside the disintegration of political systems. This approach has garnered support especially in the Maya area to explain the processes of social transformation that took place during the Terminal Classic period. This paper introduces a case study in the Usumacinta region at the site of El Infiernito, Chiapas. This site was founded during the Late Preclassic period and resettled early in the Late Classic period through the Early Postclassic period. This occupational history is contextualized in terms of the site's proximity and political integration with nearby Piedras Negras, Guatemala throughout the Classic period. Furthermore, the processes of collapse and resilience are examined during the Terminal Preclassic period and the Terminal Classic period to understand how El Infiernito may have served as a refuge for populations during periods of political crisis and transformation. Changes and continuities at the site from the Late Classic to the Early Postclassic period are also examined, especially in terms of evidence for political reorganization and the maintenance of long distance trade.

[165] *Discussant*

[100] *Chair*

Schroder, Whittaker [392] see Seidita, Max

Schroeder, Bryon (Center for Big Bend Studies - Sul Ross State University)

- [400] *Context-Free Archaeology: Private Collections, Data Quality Assessment, and Achieving Meaningful Research at Heavily Looted Sheltered Sites—A Case Study from West Texas*

There is a long history of engaged amateurs providing the professional community with productive field efforts and artifact collections and of equal length is the controversy surrounding this work. The controversy, from the perspective of this talk, focuses on the issue of artifact context and the gap between the professional and amateur communities' stances on the issue. In spite of this, the importance of private collections and amateur involvement as valuable sources of knowledge about the past seems to have gained more attention with the development of interest groups like the Archaeologist-Artifact Collector Collaboration Interest Group (ACCIG) by the Society of American Archaeologists and the increasing recognition of the topic in more professional publications. The example I present from Spirit Eye Cave is typical of research with private collections: one side places the importance on the recovered artifacts, the other laments the loss of context while both groups acknowledge the importance of the site to the field of archaeology. However, in the case of Spirit Eye Cave, I de-emphasized the importance of context with the collectors and worked from a position of mutual respect. The results of this approach are the subject of this talk.

Schroeder, Sissel (University of Wisconsin-Madison)

- [348] *Migration, Population Change, and Climate at Cahokia*

In this paper we explore sociopolitical, economic, and climatological aspects of the population history of Cahokia and compare these with the timing of the appearance of Cahokia materials at hinterland sites to better understand some of the factors that may have contributed to the migration of people out of the American Bottom. Paleoenvironmental proxies from two sediment cores from Horseshoe Lake, Illinois, are integrated with fecal stanol data from the same cores to investigate the relationships among environmental events, climate change, and population size for Cahokia and the Horseshoe Lake watershed between ca. AD 800 and 1600. A radiocarbon age model developed for one core shows close correspondence between archaeologically derived models of the population trajectory for Cahokia and the fecal stanol data, while the paleoenvironmental proxies and stanol data show a significant decrease in population within the Horseshoe Lake watershed after a major flood event and after the onset of decreased summer rainfall ca. AD 1150. Based on the timing of the appearance of Cahokian ceramics at sites across the Midwest, migration out of Cahokia predates these climatic changes, and population decline at the site accelerates after the flood and onset of decreased summer rainfall.

- [40] *Discussant*

Schroll, Andrew [99] see Grooms, Seth

Schuldenrein, Joseph (Geoarcheology Research Assoc)

- [72] *What Next? The Pivotal Role of Archaeological Science in Heritage Management*

Heritage Management and CRM are relatively new, evolving industries that have changed the charge of archaeological work in the past half-century. Previously, archaeological sciences were developed and applied in research settings (universities and museums) to extend the range of archaeological exploration and interpretation. But times have changed. Archaeology has transitioned from a research to management and preservation-based endeavor at a dizzying pace. We no longer dig or explore what we want but apply our craft to landscapes threatened or designated for preservation by private and public interests. Recent advances in remote sensing, geoarchaeology, zoo-archaeology, forensic sciences and GIS have all found applications in archaeological settings. These sub-fields and others have altered research designs and maximized the efficiency of archaeological exploration and data recovery. The trend is to less digging and more non- or minimally invasive technologies. I trace the history of inter-connected CRM and archaeological science efforts. I promote the thesis that innovative archaeological science in CRM is both cost-effective and high yield. Cases from various sub-fields are drawn upon to demonstrate this thesis. The future of archaeological science is bright in an age of diminishing budgets where ever-increasing development concerns take center-stage under a legal compliance umbrella.

- [235] *Discussant*

[22] *Chair*

Schuldenrein, Joseph [99] see Wiley, Kevin

Schulting, Rick, Joanna Ostapkowicz (School of Archaeology, University of Oxford), Michael Pateman (Turks & Caicos National Museum), William Keegan (University of Florida, Gainesville) and Fiona Brock (Cranfield University)

[37] *Bones of the Lucayans: Radiocarbon dating of human remains from the Bahamian Archipelago*

The Bahamas were among the last islands to be settled in the Caribbean, with no known occupation prior to ca. AD 600 and reportedly complete depopulation by ca. AD 1520. The constrained island setting and restricted timescale provides an excellent opportunity to address a range of questions relating to island adaptations, all requiring a robust chronology. In this paper, we present the preliminary results of a new AMS radiocarbon dating project focusing on human remains from the Bahamian archipelago, which will eventually provide 60 new determinations, comprising nearly half the total number of human remains known from the islands. The preliminary results – combined with previously available dates on humans and other materials – are modeled using Bayesian statistics, in order to address questions of initial colonization and post-Columbian collapse, the latter particularly catastrophic in the archipelago. Spatial and temporal differences in island adaptations will also be explored using stable carbon and nitrogen isotope measurements of the dated human remains.

Schulting, Rick [37] see Snoeck, Christophe

Schultz, Elliot (Los Alamos National Laboratory)

[90] *Public Perceptions: The Utility of Narrow-Scope Visitor Surveys to Improve Cultural Resource Interpretation*

As budgets for resource preservation and protection are outpaced by increases in visitation, managers in many parks, monuments, and protected areas depend on public interpretation as a cost-effective strategy to safeguard sensitive cultural and historical landscapes. Interpretative programs are an effective avenue for reinforcing resource protection narratives, cultivating institutional support among allied stakeholders, and building public interest in underrepresented or controversial cultural subject matter. To maximize the impact of resource interpretation, thorough assessments of visitor perceptions are crucial. However, designing a rigorous survey program targeted to improve resource interpretation can be a highly complex enterprise: costly to develop, time-consuming to design, and difficult to analyze by interpretative specialists. This study explores the utility of generalized, narrow-scope, visitor surveys as a surrogate for more complex interpretative statistical analysis. Using the example of a data collection operation from the Los Alamos unit of the Manhattan Project National Historical Park, this exploration will concentrate on the benefits and challenges of developing meaningful interpretative outreach strategies with limited technical resources. The study includes a discussion of the unique problem of attempting to extrapolate a generalized visitor experience from surveys of highly specialized populations, and the difficulties inherent in using non-robust datasets for program development.

Schultz, John (University of Central Florida, Department of Anthropology), Megan McCollum (University of Central Florida), Kevin A. Gidusko and Patrishia L. Meyers (University of Central Florida)

[160] *Integrating Close-Range Photogrammetry Methods for Outdoor Scene Documentation of Scattered Remains*

Documenting the context of outdoor crime scenes with decomposing bodies and skeletal remains using traditional methods can pose a challenge due to the complexities of outdoor scenes and various taphonomic processes that can modify the remains and the scene. While the use of close-range photogrammetry (CRP) methods are currently more often utilized within archaeological settings, these methods are not currently used as a standard documentation method within forensic archaeology settings. Photogrammetry is a data collection technique that utilizes a series of 2D images to generate a 3D digital resource. The application of CRP to forensic archaeological settings offers a number of documentary advantages over traditional photographic methods, including preserving the overall context of a scene, producing a 3D model, and various imagery outputs generated from the 3D model. The purpose of this presentation is to discuss the advantages of integrating CRP methods for documenting outdoor scenes with scattered remains on the ground surface. A number of simulated common forensic scenarios with human skeletons were constructed utilizing different ground surfaces. All scenarios were photographed with ground control markers and 3D models were rendered using Agisoft Photoscan Professional.

Schulz Paulsson, Bettina (University of Gothenburg)**[358] Sperm Whales and Neolithic Whaling Societies along the Coasts of Atlantic Europe**

Sperm whales played a central role in the cosmological world view of early megalithic societies (4700-4200 cal BC) in the Bay of Morbihan, Brittany, France. The whales were engraved as iconic signs on colossal standing stones, some of which were re-used to build megalithic graves. The largest of these standing stones, the Grand Menhir, was originally 24m high and weighed 330 tons and was erected in a collective symbolic act by these megalithic societies. The re-documentation of some of these whale stones" with new documentation and visualization techniques revealed boat engravings in association to the sperm whales. This paper discusses the possibility of the whaling of large whale species by Neolithic societies and with Neolithic technologies. We applied an agent-based modelling approach for Neolithic whaling societies along the coast of Atlantic Europe, taking into consideration factors such as whale reproduction rates, whale behaviour, seafaring risks, hunting strategies, Neolithic boat technologies, the bathymetry, etc. to address this question.

Schulze, Niklas (FCSyH-UASLP) and Luis Barba (IIA-UNAM)**[41] Pyrotechnology in the Ethnohistoric and Archaeological Record of Prehispanic Mexico**

In pre-Hispanic Mexico the use and the importance of fire are demonstrated by materials and objects that, without the use of high temperature processes, or pyrotechnology in general terms, would not exist. As examples it will be sufficient to mention ceramics, metals and lime production. The processes that do not qualify as industrial and that employ lower temperatures also were very significant for the development of everyday life. We find the byproducts of production processes that depend on the transformative power of fire, the ashes of combustion that increase pH values, soil color changes, carbonized materials, traces left by high temperatures on the facilities used to manage and contain fire, and changes in magnetic properties of the heated areas. In some cases, even possible remains of fuels can be identified in the archaeological contexts. In this presentation the authors compare the expected remains of pyrotechnological processes with archaeological finds and information from ethnohistorical and ethnographic sources. The main example used to highlight a discrepancy between the expected and the actual archaeological finds is the metallurgical production process.

Schumacher, Emily (The University of Tulsa)**[170] It's a Date: A Comparison of Pipe Stem and Ceramics Relative Dating at Christiansted National Historic Site**

Dating techniques, both relative and absolute, are key members of the archaeological toolkit. They serve to chronologically situate the remnants of past peoples, material or otherwise, in the overarching narrative of a place or region. However, not all methods of dating are created equal, and the utility of a particular method for clarifying the historical and archaeological records can be context-specific. This project is a comparative analysis of two datasets derived from an artifact assemblage recovered as part of the CHRI-92 Tree Stump Removal Project conducted by the National Park Service at Christiansted National Historic Site. More specifically, this project compares the results of the seriation of the pipe stems and ceramics within the CHRI-92 assemblage as a means of determining the utility of the dating method for archaeological sites within the former Danish West Indies.

Schurr, Mark (University of Notre Dame) and Madeleine McLeester (University of Notre Dame)**[239] Native Voices: Contributions by John Low, Alysha Edwards, Denise Pouliot, Paul Pouliot, and Others**

In this session, we seek to reveal rituals that have been silenced and broaden our understandings of indigenous rituals in North American archaeology. The treatment of this topic requires a diverse set of perspectives due to its complexity as well as the ways that past rituals continue to reverberate in the present. Central to the aims of this session, we present a series of short contributions by American Indian collaborators, elders, and historians that briefly address the role of archaeology in investigations of native ritual and the contributions that archaeology can provide on this topic. Their insights help us reflect on the intellectual and practical impacts of our work on the descendants of those we study through archaeology.

Schurr, Mark [239] see McLeester, Madeleine

Schuylar, Lucy (Maxwell Museum of Anthropology - Volunteer)

[25] The Jewelry of Tijeras Pueblo

Beads, pendants, and other items of personal adornment were recovered during excavations at Tijeras Pueblo in 1948, 1968, the 1970s, and 1986, and are stored at the Maxwell Museum of Anthropology in Albuquerque and the Laboratory of Anthropology in Santa Fe. Shells from the Gulf of California, turquoise, and items resembling Mesoamerican designs indicate trade and the spread of design ideas. The locations of jewelry artifacts within the site were examined for possible differences in ornament use within the site. Comparisons with Arroyo Hondo, Coconito, Gran Quivira, Paa-ko, Pecos, Tonque, and Pottery Mound allow more general statements of ornament use in Classic period Rio Grande culture.

Schwadron, Margo (NPS-Southeast Archeological Center)**[362] Lost and Found and the Peculiar Lives of Collections: Examples of Bridging Ethical Stewardship and Research with Florida National Park Legacy Collections**

Many of our culture histories and chronologies were built by early generations of archaeologists who targeted superlative sites, often excavating voluminous areas or entire sites. Decades later, many of these collections remain uncatalogued, unstudied, or worse—relegated to garages, garbage piles, or lost completely. Contemporary archeologists and institutions face many modern challenges, including: lack of public support and funding; lack of space in curatorial facilities; and the looming threat of climate change which threatens the loss of sites, security, and stability of existing collections. These issues drive current and future collection policies as we continue to increase our collections and face capacity issues while salvaging sites being lost to climate change. We are running out of room—and so it is often asked, do we have room for legacy collections? Using examples of recent research on lost, rescued and legacy collections from Florida National Parks, we illustrate the incredible value and potential that legacy collections have to inform paleoclimate and paleoecology; refine spatial and temporal variability among sites, artifact typologies and chronologies; rewrite culture histories; employ new digital technologies; provide public outreach and educational opportunities; and offer new interpretations of Florida iconic sites.

Schwartz, Christopher [34] see Oas, Sarah

Schwartz, Christopher [81] see Hundtoft, Brooke

Schwartz, Christopher (Arizona State University)**[246] Elevating Animals: Exploring Ritual Fauna and Socially Integrative Architecture in the Tonto Basin**

The frequent deposition of animals in public spaces suggests an essential role in public rituals in the pre-Hispanic U.S. Southwest. Using ethnographic evidence and large-scale analysis of faunal remains in the Tonto Basin area of central Arizona, I ask whether ritual fauna cluster in socially integrative spaces and what implications this had for integrating migrant Puebloan populations with local people. Though typically considered Hohokam, the Tonto Basin exhibits influence from neighboring Sinagua and Puebloan regions. The emergence of the Salado phenomenon and public architecture in the region is evidence of broad sociopolitical and religious change, which involved specific treatments and storage of fauna. I find that ritual fauna cluster in room contexts associated with socially integrative architecture, suggesting a centralization of ritual practice and storage. Ultimately, Tonto Basin communities targeted specific taxa for the enactment of public activities, aiding in the integration of non-local people.

Schwartz, Erin (The College of William and Mary) and Nick Belluzzo (The College of William and Mary)**[295] Forged by Many Hands: Analyzing Transformations of Space in the Antebellum Industrial South**

Often overshadowed by agriculture-based slavery, industrial slavery shaped the physical, economic, and cultural landscape of the antebellum South on multiple scales. Mills, factories, mines, industrial plantations, and other operations exploited natural resources and enslaved labor on large scales, as enslaved industrial workers and communities attempted to use their limited degrees of autonomy and resources to create their own space. The Buffalo Forge iron plantation in the Shenandoah Valley of Virginia offers a unique opportunity to investigate enslaved workers' alterations of space. While Buffalo Forge's ironmasters oversaw its large workforce across discrete, yet interconnected spaces, spaces around enslaved quarters in particular could be used to participate in diverse individual and communal activities invisible to ironmasters. This project focuses on the area surrounding two standing women's quarters, tacking between geospatial,

archaeological, and architectural data. While initial archaeological work focused on the front yards of both quarters, geospatial data generated from drone-acquired aerial imagery identified previously-invisible features and areas of visibility, prompting alterations in sampling strategy. Subsequent archaeological work has illuminated enslaved spaces as shifting over time and space. In providing both a novel method and new interpretations of industrial spaces, this project promises to advance scholars' understanding of our industrial past.

Schwartz, Joshua [116] see Milton, Emily

Schwendler, Rebecca (PaleoWest Archaeology)

[357] *Metamorphosis of the Unique Pueblo III–IV Hokona Site in the El Morro Valley of New Mexico*

In 2007, the New Mexico Department of Transportation (NMDOT) sponsored full excavation of a small prehistoric archaeological site located on NMDOT and State land adjacent to Highway 53 a few miles east of El Morro National Monument in Cibola County. Earlier documentation suggested that the site comprised three basalt field houses and a surface artifact scatter. However, excavation revealed a complex sequence of 45 partly superimposed features that included a masonry roomblock, habitation pit structures, hearths, post holes, and human burials. Artifacts included stone pendants and blanks, curated projectile points, abundant and diverse ground stone and ceramics, and minimal floral and faunal remains. Hokona's most intensive occupation dated to the late Pueblo III and early Pueblo IV periods, ca. A.D. 1275–1300, although the site was also used before and after that time. Hokona's significance lies in its exhibition of qualities that are both typical and unique. The small site reflects a relationship with larger social and political trends in the El Morro Valley and beyond. Yet, it also exhibits uniquely frequent remodeling and diverse and far-ranging cultural connections. As such, Hokona expands our knowledge of the complexity of prehistoric life in the El Morro Valley.

Schwendler, Rebecca [400] see Cool, Autumn

Schwitzalla, Al (Al W. Schwitzalla Millennia Archaeological Consulting), Marin Pilloud (Department of Anthropology, University of Nevada) and Terry Jones (Department of Social Sciences, California State Po)

[142] *Women Warriors among Central California Hunter-Gatherers: Egalitarians to the Last Arrow*

Participation of females in inter-group combat is well-attested in the historic and ethnographic record of central California, but is often overlooked and/or trivialized in contemporary archaeological research. Drawing from the Central California Bioarchaeological Database (CCBD) that includes information on more than 16,820 individuals dating between 3050 B.C. and A.D. 1899, we evaluate the relative involvement of males and females in sharp-force and blunt-force trauma. Specifically, we analyzed ante and peri-mortem trauma in relation to location, trajectory, and number of instances per individual. We then summarize the temporal and spatial distribution of evidence for female participation in violence during times of trouble and demonstrate that, while female combatants were fewer in number relative to males, they clearly were involved during all periods.

Scimeca, Anthony [26] see Johnson, Amber

Scott, Alyssa (University of California Berkeley)

[69] *Archeology, Disability, Healthcare, and the Weimar Joint Sanatorium for Tuberculosis*

Social expectations regarding normative abilities, behavior, and bodies have changed through time. Archaeology lends itself well to the study of disability because social expectations about normative ability and behavior are embedded into the built environment, landscape, artifacts, material culture and daily practices. Archaeologists are well situated to study and destabilize these norms by investigating the ways in which normative expectations varied over time. Additionally, locating the body in buildings, landscapes, artifacts and other forms of material culture can assist in separating the study of disability and the body from a humanist concept of individuality. Archaeology can also be a mode of exploring the intersection between embodied experiences, agency, and identification, and archaeological research into embodied and social experiences of disability can inform current debates about accessibility and healthcare inequality. This paper presents approaches to studying disability in the past using examples from the Weimar Joint Sanatorium for tuberculosis in Placer County, California.

Scott, Ann (Terracon Consultants)**[360] *Turning a Critical Eye on the History of Maya Cave Archaeology***

A major reformulation of the history of Maya cave archaeology has recently been proposed for the second half of the twentieth century. Jon Spenard, in his dissertation, has suggested that modern cave archaeology began to emerge during the Post War Period (1950 – 1980) based on work carried out in Belize. This paper takes a closer look at that assertion and notes that far more significant work was actually being carried out at the time in Yucatan, which Spenard did not appear to take into consideration. Although J. Eric Thompson and Doris Heyden do propose a ritual use of caves, models of ritual cave use during this period still lack and actual field studies by Andrews and Pendergast still endorse cave habitation. A critical comparison of the Balankanche Cave monograph by Andrews with the Naj Tunich report leaves no doubt that a major shift in cave investigations occurred during the 1980s and not before.

[167] *Discussant*

Scott, Paula [194] see Garraty, Christopher

Scott, Rachel (DePaul University) and Finola O'Carroll (Blackfriary Archaeology Field School)**[310] *Burial at the Black Friary in Trim, Ireland: 700 Years of Friary-Town Relations***

The Lord of Trim, Geoffrey de Geneville, established a Dominican friary to the north of the town in AD 1263. Ongoing excavations at the Black Friary since 2010 have documented a sequence of burials that date from the 13th through the early 20th centuries. Despite this continuity in the use of the site, the characteristics of the interred individuals varied over time. As an important religious center in the late Middle Ages, the Black Friary provided a final resting place for both the Dominican friars and the lay population living around the town. The friary lost its formal religious status in AD 1540 during the dissolution of the monasteries under King Henry VIII. Yet the site retained significance for local Catholics who continued to bury their dead within the church and cemetery. The most recent interments are all infants and young children, suggesting that the final stage of burial took the form of a cillín, or burial ground for unbaptized children. In this paper, we explore how these temporal differences in the burial population not only reflect larger changes in religious practice in Ireland but also illuminate the long relationship between the Black Friary and the town of Trim.

Scott, Simmons [198] see Mayfield, Tracie

Scott Cummings, Linda [110] see Clark, Caitlin

Scott Cummings, Linda (PaleoResearch Institute, Inc.)**[397] *Dating Charred Food Crust: Offsets, Pretreatment, and Organic Compounds***

Unlike charcoal, charred food residue has an obvious advantage of fundamental association with use of the pottery and hence, human activity. Food is annual or short-lived. Usually animals hunted for food live only a few to perhaps a few tens of years. Therefore, good dates on food residue from ceramics or pottery should tighten ceramic chronologies and provide more accurate chronologist of occupation. What, though, are good dates? Recent focus on dating annuals to better understand chronologies has included dating ceramic residues under the assumption that they were equivalent to annuals. Examining and comparing dates on annuals, wood, and ceramic residues from many locations has shown otherwise. Focus on freshwater reservoir offsets suggests the problem may be regional and embedded in the food; however, dating reference bones indicates that trophic level of fish contributes to offset making assigning offset values impossible. Food crust from different locations on a single vessel may yield different dates, suggesting the rim and neck are better sampling locations. Combining lab pretreatment and location of food crust on the vessel appear to provide the tools necessary to obtain congruent dates on charred food crust and annuals. FTIR analysis tracks soluble compound removal prior to dating.

[167] *Discussant*

Scott, Stacy [136] see Rippee, Kassandra

Searcy, Michael (Brigham Young University), Todd Pitezel (Arizona State Museum, University of Arizona) and Steve Swanson (Environmental Planning Group)

[84] *Envisioning Natural and Built Environments as Sacred Landscapes in Prehistoric Casas Grandes, Mexico*

We develop a hypothesized cosmography in an attempt to evaluate the sacred landscapes of the Casas Grandes cultural tradition of northern Mexico. This analysis includes attention to the relationships among archaeological features and aspects of natural geography in the Casas Grandes region. We draw on previous research regarding hilltop sites, architectural features, settlement patterns, and astronomical alignments noted at Paquimé, to envision how the Casas Grandes people mapped their landscape on both the built and unbuilt environments.

Searcy, Michael [253] see Summers, Rachel

Seare, Abraham (The Oriental Institute of The University of Chicago) and Katherine Hodge (The Oriental Institute of The University of Chicago)

[285] *Online Cultural and Historical Research Environment: Flexibility versus Standardization*

In this first season of excavations by the Corral Redondo project in southern Peru, a database was needed to capture excavation, conservation, and survey data in the field and later respond to the reporting standards set by the Peruvian government. The Online Cultural and Historical Research Environment (OCHRE) proved to be a powerful tool for this data capture and storage, as well as flexible enough to cater to the Peruvian government's wishes. A project using OCHRE may create a project vocabulary, or taxonomy, from scratch, or build on existing structures used by other projects. But, when taxonomic elements are shared between projects, it allows easy comparison between project datasets. This opens the door for cross-comparisons between projects which may have separate data capturing or reporting standards, but which share similar details that would allow OCHRE to detect patterns across time and space. With this poster we intend to demonstrate the successful implementation of OCHRE in the field for the Corral Redondo project and its potential for future research. (The Corral Redondo project wishes to acknowledge and thank the Institute for Field Research for funding the excavation and field school).

Sears, Erin [303] see Woodfill, Brent

Sears, Erin (University of Kentucky/Smithsonian Institution)

[349] *The Intersection of Late Classic Figurines at a Crossroads of the Maya World*

This presentation explores how miniature ceramic figurines were incorporated into the daily lives, rituals and intentions of the Late Classic period Maya of the Alta Verapaz region. Ceramic figurines are also the remnants of Maya musical instrumentation and have been recovered from settings of ancient ritual expression and production. When comparing museum figurine specimens with those recovered through current fieldwork, the diversity of imagery expressed within the corpus of ceramic figurines from this region creates a larger understanding of Maya human presentation, the natural world, as well as ancient ideas of what constitutes supernatural veneration.

Sebastian, Lynne (SRI Foundation)

[75] *What Makes Some Mitigation Measures and Programs "Creative"? (And Where Does That Leave the Rest of Them?)*

A quick search for antonyms for "creative" yields obvious results like uncreative, unimaginative, and uninspired, but also terms like dull, derivative, and stodgy. Yikes! What is it about a mitigation measure or program that leads us to term it "creative," and how can we expand those defining qualities of creative mitigation measures and programs to enhance the quality of standard mitigation approaches? How can we make them, if not creative, at least not stodgy?

Sebastian Dring, Katherine [244] see Silliman, Stephen

Secord, Paul (Friends of Tijeras Pueblo)

[25] *Turquoise, Lead and Copper at Tijeras Pueblo and Environs*

How did the people of Tijeras Pueblo acquire and use non-lithic and non-ground stone mineral resources? What role did such resources play in communities in the region east of the Sandia and Manzano Mountains? Minerals addressed include turquoise, galena (lead ore), and various copper compounds. Prehistoric mining and processing sites, coupled with the use and trade of these minerals, will be covered.

Sedig, Jakob (Harvard University)

[253] *Building a More Precise Understanding of the Past by Merging Techniques from Archaeology and Ancient DNA Analysis*

Ancient DNA (aDNA) data have provided unprecedented new insights on demographic changes through time. This paper demonstrates that aDNA can also enhance well-established archaeological techniques, by building on research that has explored how aDNA data can help refine radiocarbon date range estimates. Previous research established that since there is a biological maximum for the number of years between the deaths of relatives, the ability to identify first- and second-degree related individuals through aDNA analysis can serve as a constraint on date range estimates for related and radiocarbon-dated individuals. Since the initial research on this topic, myriad new relatives, and in some instances multiple-generation lineages, have been defined through aDNA analysis, which have helped further refine the methodology. Additionally, data from ethnographic accounts and historic death records have been compiled to create more realistic date of death separation estimates than biological maximums for first- and second-degree relatives (i.e. ethnographic/historic data suggest that, on average, a parent and offspring are separated by about 25 years, not the biological maximum of 125 years). Finally, this paper reviews a few key case studies to explore how this technique can serve to augment both archaeological and aDNA approaches.

[291] *Discussant*

[291] *Chair*

Sedig, Jakob [263] see Gilman, Patricia

Sedov, Sergey [38] see Solleiro-Rebolledo, Elizabeth

Seeber, Katherine (Binghamton University)

[14] *"Life is Better in Flip Flops": Erasure of Coastal Indigenous and Gullah Geechee History and Communities by the Beach Vacation Industry*

Beaches have long attracted day-trippers and vacation goers who come to soak up the sun, splash in the ocean, and collect shells along their expanse. Nearly all coastal areas have their beach attractions and accompanying tourist industries. But the beaches along the American Southeastern coastline have long been contested spaces, where Indigenous, Euro-American, and African American communities have clashed for land and property rights, among other things. This paper will discuss the ways in which the vacation and tourist industry in Hilton Head Island, South Carolina benefits from pop culture notions of the beach; pristine, uncomplicated, neutral places where the weight of the world's problems fade into the sunset. Aspects of film and television, the internet, and particularly social media platforms will be analyzed to discuss how popular notions about vacation beaches maintain their ahistorical reputations. Furthermore, by effectively erasing Hilton Head's deep Indigenous and Gullah/Geechee past, how these pop culture ideas of beach and vacation places perpetuate stereotypes of each community. Lastly, I will discuss how contemporary Gullah communities on Hilton Head are using these same platforms, combined with public archaeology to help regain control of the dominant vacation narratives so pervasive on this island.

[376] *Discussant*

Seetah, Krish (Stanford University), Sasa Caval (Stanford University / Reading University), Diego Calaon (Ca' Foscari University) and Alessandra Cianciosi (Ca' Foscari University)

[347] *Indian Ocean Comparative Dimensions of Slavery: Resistance and Memory from Mauritius*

The materiality of slavery has received much attention over recent decades. Unequivocally focused on the Atlantic experience, comparative models from the Indian Ocean serve to enrich our understanding of slavery on a global scale. The body of literature on slave artefacts, mortuary practices, and diet highlight the nuances and complexity of slave life-ways. This presentation focuses on Mauritius, and draws on a decade of work into the dynamics of both forced and free labour on the island, and wider region. Using a range of case studies, I illustrate the nuances of slave-lifeways as they are understood from this region: what do we know about the process of arrival; working conditions, and daily existence? How were mortuary practice enacted? At a greater level: how did slave communities resist, and maintain memory? And finally, in order to enhance the comparative power of the region even more: how did the system of slavery enforced on this island compare to new methods to provide labour once emancipation was enacted? By tackling these questions, the paper provides both insightful similarities to Atlantic counterparts, as well unique features that help contextualize the experience of slavery in this part of East Africa and the South-western Indian Ocean.

Seibel, Scott (AECOM)

[133] *Katie Bar the Door: The Time for Archaeologists to Respond to Climate Change Impacts is Shorter than We Think*

Even the most aggressive models of sea level rise don't predict major inundation in the Middle Atlantic for many decades. However, the time available to archaeologists for managing coastal archaeological sites and mitigating their inevitable destruction may be far shorter than that. As awareness by politicians and the general public of the threats to coastal infrastructure hits an inflection point, there will come a time when political and physical necessity results in the monies once available for archaeological site management being reallocated to what may be rightly seen as more pressing and important issues. We need to ensure that plans are in place over the next few years to triage resources (archaeological and monetary) before the decisions are made for us.

Seidemann, Ryan (Louisiana Department of Justice)

[135] *State-Level Law and Prosecutorial Interest in Archaeological Resources Protection*

Archaeological site damage, destruction, and looting is nothing new. For years, the archaeological community has bemoaned the minimal protections for these resources under federal law. Little discussion has occurred regarding what protections may exist under various states' legal regimes. This paper reviews Louisiana's archaeological resource protection laws with an eye towards identifying how such laws can work in tandem with federal law to expand resource protection as well as to examining the existing laws for possible improvements. These laws are also reviewed through the lens of real-life experiences in Louisiana related to looting at the Toledo Bend Reservoir and Lakes Vernon and Anacoco. Included in this latter review is a brief discussion of prosecutorial discretion and mechanisms to raise interest in local law enforcement communities and ethical obligations of archaeologists in this process.

[60] *Discussant*

Seidemann, Ryan [160] see Halling, Christine

Seidita, Max (Brandeis University), Whittaker Schroder (University of Pennsylvania), Alejandra Roche Recinos (Brown University), Charles Golden (Brandeis University) and Andrew Scherer (Brown University)

[392] *Variation in Obsidian Source Consumption within the Kingdom of Piedras Negras*

More than a decade of archaeological research has characterized the political landscape of the middle Usumacinta river valley as a tense political rivalry between the Classic period Maya (250 – 900 C.E.) kingdoms. Recent archaeological work in the kingdoms of Piedras Negras and Yaxchilan has sought to unravel how the internal economies of these kingdoms functioned. Here we contribute to these efforts by presenting the results a pXRF study (n ~2100) from nine archaeological sites in the modern nations of Guatemala and Mexico. This includes large data sets from the polity capital of Piedras

Negras; an obsidian workshop at the subsidiary site of Budsillha; hinterland communities within the suspected borders of the Piedras Negras kingdom and interstitial communities which were not affiliated with any known political entity. By elucidating how obsidian source consumption shifts in terms of political borders and relationship to political centers, this regional study aims to add a nuanced perspective to the economic structure of these kingdoms. In particular, we emphasize that within the borders of Maya kingdoms the availability of obsidian sources is uneven with more politically centralized communities enjoying greater access to a variety of obsidian sources despite apparent access to markets.

Seifers, Ryann (University of Wyoming)

[382] *Intersections of Identity, Health, and Diet in the Wyoming Territory*

The mid to late 19th century in the United States is noted by the Department of the Interior as a significant period of westward colonial expansion, leading to an extension of colonial power structures. This biocultural Master's thesis research on Wyoming Territory burials establishes methodological and theoretical approaches for associating stable isotope results regarding diet and mobility, developmental anomalies, and sociocultural contexts in historical Wyoming. Previously, a sample of the remains was analyzed for light stable isotopes to reconstruct diet and mobility in this context. Individuals buried at historical sites across the state (Red Mountain AD 1880-1910, N=6; Platte Bridge Station/ Fort Casper AD 1859-1867, N=3; and Korell-Bordeaux AD 1830 to 1890, N=17) will be analyzed for developmental anomalies and nonspecific indicators of stress. Relationships between the osteological and stable isotope analyses will then be explored. Results will inform a discussion of these peoples' lived experiences embodied in their material remains. Using a postcolonial lens augmented by Critical Discourse Analysis of historical documents to provide insight into the identities of these individuals, the historical narrative can be viewed critically and systematically in order to illuminate a more multivocal history of Wyoming.

Seifers, Ryann [382] see Vanosdall, Wesley

Seikel, Katherine [212] see Levin, Maureece

Seitsonen, Oula [154] see Houle, Jean-Luc

Seitsonen, Oula (University of Oulu, Finland)

[154] *Taskscapes of Reindeer Herding: Changes in the Land-Use Dynamics and Campsite Organization of the Sámi Pastoralists of Northern Fennoscandia c. 700–1800 AD*

Domestication of reindeer commenced amongst the Sámi of northern Fennoscandia in the 8th century AD, and was accompanied by significant cultural changes. This presentation focuses on diachronic changes in the land-use, inter- and intra-site settlement patterns and human-environmental relations. I focus especially on two pivotal stages: 1) the initial domestication of reindeer within a hunter-fisher-gatherer society (700–1050 AD); and 2) the shift to nomadic large-scale reindeer husbandry (c1500/1600–1800 AD). The initial shift from hunting-gathering and fishing based livelihoods to small-scale reindeer herding in the Middle Iron Age changed people's everyday lifeworlds, environmental perception and human-reindeer relations. This is mirrored in archaeological record by the changing campsite organization and structures, most importantly by the introduction of so-called rectangular hearths, which are also placed differently in the landscape than the earlier hunter-gatherer sites. Also, the shift to large-scale nomadic pastoralism in the Middle Ages is reflected in the archaeological record. Nomadic pastoralist sites appear at different locations and with differing features than the previous rectangular hearth sites related to small-scale use of domesticated reindeer. The pastoralist landscapes should not be approached as purely anthropogenic constructs, and instead, the agency of animals and things should be acknowledged using a pluralistic perspective.

[154] *Chair*

Sejas Portillo, Alejandra (University of Pittsburgh)

[18] *Conflict, Spatial Organization and Group Identity during the Late Intermediate Period in the Bolivian Southern Altiplano*

During the Late Intermediate Period, the Southern Altiplano region was characterized by the presence of conflict and fortified settlements. These societies have been described as having a corporate leadership, linked to a founding ancestor, which granted them privileged access to resources. Little is known about the dynamics of spatial organization of the settlements and its relation to group identity formation among these corporate groups who were in constant conflict with their neighbors. This investigation studied this relationship through a comparison of the socio-spatial organization of residential areas among villages, in terms of settlement planning, and interhousehold variability. Differences between villages' distribution, delimitation, placement, and proximity to their dead help us understand the dynamics of group identity formation. The importance of building group identity during conflicting times is one of the key aspects to maintain social structure and integration. Settlements studied in this research were registered in a 91 km² full coverage survey around the Yaretani Basin, north of the Uyuni Salt Lake. Data were collected through detailed architecture mapping, systematic collection of materials as well as stratigraphic excavations conducted in these settlements.

Selden, Robert [200] see Aland, Amanda

Selden, Robert [355] see Covey, R. Alan

Seligson, Ken (University of Southern California), Melissa Galvan (Tulane University) and William Ringle (Davidson College)

[100] *The Yaxhom Valley Survey II*

The second season of the Yaxhom Valley survey, conducted during the summer of 2018, continued its assessment of LiDAR imagery collected by an NSF-sponsored mission flown over the eastern Puuc region of Yucatan, Mexico. Our focus shifted to Muluchzékel, which LiDAR revealed to be the dominant site of the entire valley. We covered approximately one square kilometer of the site center during the 2018 pedestrian survey and used LiDAR to suggest possible excavation loci in our search for the earliest civic architecture in the Puuc. The survey data allowed us to refine our understanding of the LiDAR signatures of various classes of features in the imagery and to quantitatively assess feature identification confidence levels in areas yet to be ground-truthed. Digital elevation models of Muluchzékel provided insight into the network of public structures and elite households involved in the administration of both agricultural production and quarrying, and revealed extensive modification of hilltops along the interface of the valley with the Bolonchen Hills. This paper discusses possible involvement of these hilltop groups in the production of construction materials and suggests that administration strategies for environmental resources at Muluchzékel differed noticeably from sites in the eastern part of the valley.

Sellen, Adam (Universidad Nacional Autónoma de México)

[394] *La Sorpresa Hotel in Mitla, Oaxaca: Gateway to 150 Years of Mexican Archaeology*

In this paper I will investigate 150 years of Mexican archaeology by analyzing La Sorpresa, a hotel-museum-research center located in Mitla, Oaxaca. Using archival materials, principally photographs and correspondence, I will explore the hotel as a memory space, emphasizing the interactions of archaeologists and travelers who stayed there, considering also the curation and final destiny of the archaeological collections that were displayed in the museum in the second half of the twentieth century. By focusing on the dynamics of this space, my aim is to elaborate a parallel narrative of Mexican archaeological practice and politics from the nineteenth century to the present and tell the compelling story of Oaxaca's archaeology through the lens of those who participated in the endeavor.

Seltzer, Heather (Aspen CRM Solutions)

[272] *Prehispanic Pueblo Use in the Rio Grande del Norte National Monument*

Prior research in and around the Rio Grande del Norte National Monument has predominately focused on the Archaic use of the area. Minimal focus has been emphasized to explore the use by Pueblo groups. This paper examines use of the landscape from the Developmental Period (900-1200 A.D.) through the Classic Period (1350-1540 A.D.) in the National Monument and surrounding area and compares it to the better understood Archaic Period. Data explored in this paper was acquired through large-scale archaeological survey projects. The objective is to assess whether differences are able to be detected in land use during the aggregation of large pueblos along the Rio Grande Valley in the Classic Period (1350-1540 A.D.). Trends noted within the Rio Grande del Norte National Monument are placed within both a local and a regional scale. By examining differences in material culture (i.e. pottery versus projectile points) and site locations, diachronic trends in

types of settlements and land use will be better understood.

[272] *Chair*

Seman, Spencer [373] see Buckley, Gina

Semanko, Amanda (New Mexico State University) and Robert DeBry

[260] *The Ritual Lives of Southwest Dogs*

Dogs, as the first domesticated species, have held a wide range of roles in human societies including hunting assistants, guardians, companions, and food sources. In this poster we will explore their ceremonial roles through a comparative analysis of the life histories of ritually deposited dogs. Specifically, we will compare Southwest dog burials to a late Pithouse Period (A.D. 550-1000) dog internment from Kipp Ruin, a multi-component Mogollon site on the Mimbres river of southwest New Mexico. These dog remains exhibit traces of human-caused physical trauma including skinning, bludgeoning, and dismemberment followed by ceremonial disposal. We will also contextualize the Kipp Ruin dog through morphological, chemical, and genetic testing to assess potential evidence of breed, coat type, fur color, diet, and possible migration of dogs with people across the region.

Semaw, Sileshi [32] see Rogers, Michael

Semon, Anna (University of North Carolina)

[168] *A Regional Comparison of Complicated Stamped Pottery Designs from Coastal Georgia*

Late Mississippian ceramic assemblages from the Georgia coast contain abundant quantities of complicated stamped pottery. Motifs include concentric circles, figure nines, nested squares, and the fillet cross. Recent research tracking fillet cross design variation from assemblages on St. Catherines Island, GA was successful in identifying twelve unique variations of the fillet design. In this poster, I build on the St. Catherines research and present results from an ongoing regional study that tracks complicated stamped designs from several Late Mississippian sites on the Georgia coast. These data expand our knowledge of Late Mississippian iconography, pottery practices, networks, and social interactions.

Semon, Anna [380] see Edwards, Alexandra

Semple, Catriona [289] see Dahl, Ellen

Seowtewa, Octavius

[62] *Discussant*

Seowtewa, Octavius [122] see Baxter, Erin

Serafin, Stanley [396] see Russell, Bradley

Seramur, Keith C. [120] see Bradley-Lewis, Neeshell

Sereni Murrieta, Rui Sérgio [46] see Bitencourt Mañas, Diego

Sereno-Uribe, Juan**[373] Survey and Architecture of Piedra Labrada, Guerrero, Mexico**

Recent surveying and excavation works on the coast of the state of Guerrero and Oaxaca has shown that this is a region with ample archaeological potential. Dr. Román Piña Chan who made several visits during the sixties in that area, already indicated that the systematic study of the coast, would allow us to understand the development of various groups located in the central valleys of Oaxaca, as well as those established in the central highlands. The present poster focuses on one of the sites with the greatest amount of sculpture and monumental architecture found in the Costa Chica of the state of Guerrero. This site is Piedra Labrada, which has a large concentration of architectural complexes distributed throughout the site, as well as 23 sculptures that decorate the different public spaces of the pre-Hispanic city. In this poster I will present the results of the surface survey made on the site, as well as the association of the architectural spaces with the sculpture that is scattered throughout it.

Serra Puche, Mari Carmen (IIA-UNAM)**[38] "The Basin of Mexico: Ecological Processes in the Evolution of a Civilization" y nuestras excavaciones en el Sur de la Cuenca de México**

Cuando llegó a nosotros el contenido The Basin of Mexico: Ecological Processes in the Evolution of a Civilization se nos abrió un horizonte nuevo para explorar una región fundamental de nuestro patrimonio arqueológico como es el sur de la cuenca de México.

Guiados por las enseñanzas de William Sanders, Jeffrey Parsons y Robert S. Santley, se llevó a cabo el proyecto "El Hombre y sus recursos en el Sur de la Cuenca de México" con la excavación de tres sitios clave: Terremote-Tlaltenco, un islote artifical que explotaba los recursos lacustres del periodo Formativo; Temamatlal, al pie de Monte, edificado sobre lava y con un juego de pelota también del Formativo y algunos sitios del Epiclásico en el lago de Xochimilco.

Los resultados de estas excavaciones se dan a conocer en el presente trabajo.

Sesma, Elena (University of Massachusetts Amherst)**[122] Mapping Place and Materializing Memory: Contemporary, Collaborative Archaeology in the Bahamas**

This poster documents a community-based archaeology and oral history project in the Bahamas, and makes the case for accessible, digital methods in recording and preserving sites in areas vulnerable to development, climate change, and economic difficulties. The site in question was a 19th century plantation estate on the Bahamian island of Eleuthera, which was left by the last owner to the descendants of her former slaves and servants in 1871. This descendant community still maintains their rights to this acreage and continue to live on this and surrounding lands. Under a framework of contemporary archaeology, this project utilized a combination of pedestrian survey, digital mapping, photo documentation, and oral history interviews to create a community archive of life in the region over the past 200 years through present day. This poster illustrates several key methods within the community-based and collaborative project to study and preserve the historical and cultural landscape of the area, including the construction of a Google Tour of standing structures, compilation of a historical report, and the creation of 360-degree panoramas which can be used to recreate sites in virtual reality.

Seuru, Samuel [128] see Paquin, Simon

Seuru, Samuel (Universite de Montreal), Liliana Perez (Laboratoire de Géosimulation Environnementale, Dep) and Ariane Burke (Département d'Anthropologie, Université de Montreal)**[128] Dynamic Simulation of Large Herbivore Distribution during the Last Glacial Maximum: Implications for the Distribution of Human Populations**

In this study we propose the use of agent-based modelling (ABM) and cellular automata (CA) to test the impact of predator-prey relationships on the distribution of prehistoric human populations. Our research goal is to establish a dynamic model of the distribution of large herbivores that constituted the main food source for human populations during the last Glacial in Western Europe. We propose the application of ABM and CA as an innovative methodology for modelling, simulating and analysing artificial herbivore communities in order to study predator-prey dynamics and their impact on human populations.

Long-distance migrations of mammals can significantly impact the spatial dynamics of local populations and communities. ABMs, when coupled with CA, enable us to capture explicit representations of spatial processes, spatial interactions and multiscale phenomena and is tailored to the study of ecological and social systems. If this promising approach is to reach its full potential, the integration of data, models, and expertise from multiple fields into ABMs of organism migration is necessary. Thus, we will rely on already available data such as climate simulations and static modelling of the distribution of prehistoric human populations.

Seyler, Samantha [306] see Erickson, Clark

Seymore, Mason (University of Haifa), Reuven Yeshurun (University of Haifa, Zinman Institute of Archaeology), Ruth Shahack-Gross (University of Haifa, Department of Maritime Civil) and Dani Nadel (University of Haifa, Zinman Institute of Archaeology)

[402] *Shacks and Scraps: Understanding Middle Epipaleolithic Site Structure in the Southern Levant through Taphonomic Analysis of Faunal Refuse*

We explored the spatial organization of the Middle Epipaleolithic site of Neve David (Mt. Carmel, Israel) through macro and micro contextual taphonomy of ungulate bones. The Epipaleolithic (23,000-11,500 cal BP) of the southern Levant is renowned for its cultural diversity, culminating with the complex hunter-gather Natufian culture. Emerging research from earlier Epipaleolithic sites suggest complex behavior began prior to the Natufian and this assumption should be reevaluated against preceding evidence. The site of Neve David is an exceptional case study to understand pre-Natufian site structure, due to its high density and diversity of finds, in situ activity areas, and stone architectural features. Our study incorporates micro and macro zooarchaeological techniques to characterize differential preservation and distribution of bones from various localities. Fourier Transform Infrared spectroscopy (FTIR) assisted in assessing the preservation of bone, augmented by conventional taphonomic analyses. FTIR results revealed no evidence of differential bone mineral or collagen preservation from each intra-site locality. Contextual taphonomy showed increased activity in one context, associated with higher frequencies of burned specimens. These macro and micro observations allowed for a more nuanced understanding of bone assemblage formation and site organization, contributing to our knowledge of pre-Natufian site structure.

Seymour, Deni

[164] *Discussant*

Seymour, Linda [407] see Meanwell, Jennifer

Sgarlata, Cosimo (Western Connecticut State University)

[94] *Household Archaeology of a Late Archaic Pit-house in Southern New England*

The focus of this paper is the Warner Site, a Late Archaic Pit-house in Southern New England. The research combines traditional and modern perspectives of household archaeology. Traditionally, archaeologists relied on spatial analysis of activity areas, and ethno-archaeological comparison. However, more recently there has been a concern for overcoming ethnocentric assumptions of the function, construction, and organization of households. This more progressive perspective is necessarily data driven, because it must allow for new and non-traditional analysis and interpretation. It also forces archaeologists to acknowledge interconnections among peoples and sites, and production of data at multiple scales.

Shackley, M. Steven (UC, Berkeley)

[316] *Discussant*

Shackley, M. Steven [316] see Clark, Jeffery

Shaffer Foster, Jennifer (Archaeological Survey, University at Buffalo)**[351] Just Beyond the 'Land of Women': Examining Gender in Early and Late Medieval Ireland**

In 1996, historian Lisa Bitel published "Land of Women: Sex and Gender in Early Ireland," a critical study of medieval gender, which remains influential over 20 years later. While more recent historical and literary research is available, there have been relatively few archaeological investigations of gender roles and constructs in the Irish Early (c. AD 400-1200) and Late (c. AD 1200-1600) Medieval Periods. Most discussions of medieval gender reference early Irish laws, which provide perspectives on social status and the roles of men and women in society. The laws suggest that women were largely engaged in traditional domestic activities and that their position in society was constructed in relation to their male family members; men are portrayed as lords, farmers, craftsmen, scholars, and clerics, all of whom had status in their own right and dominant gender roles. Archaeological knowledge of medieval Ireland has expanded dramatically in the past decade, enabling a much more nuanced understanding of gender than the laws alone can provide. This paper will address the complexities of interpreting Medieval Irish gender from archaeological remains vis-à-vis past expectations of the roles of men and women drawn from textual accounts.

Shahack-Gross, Ruth [402] see Seymore, Mason

Shakour, Katherine (University of South Florida)**[279] Ignored by Some, Remembered by All: Challenges of Disaster Archaeology of the Great Famine**

Archaeologists have explored disasters throughout the discipline's history, and these calamitous events range from volcanic eruptions, floods, earthquakes and more. The material footprint of the Irish famine presents a challenge to archaeologists investigating disasters. Further, famine-era sites are from the nineteenth century, a time not protected under Irish laws. Those most impacted by the famine have been left voiceless due to the marginalization of the famine sites. Employing archaeological and ethnographic methods, this project aims to understand the disaster known as the Great Famine in Ireland. Through a case study and comparisons of Westquarter village on Inishbofin County Galway, an island five miles off the western coast of Ireland, I consider how archaeologists regard the Famine and the various factors which impact archaeological investigations on the disaster. I conceptualize how to study a disaster that has been largely ignored by archaeologists and official heritage bodies. Further, this research investigates how to study a time and an event when the sites are at risk. This work reframes how archaeologists can understand disasters and how to work within a system that ignores the disaster for political reasons.

[279] Chair

Shao, Lei, Jianfeng Cui (Peking University) and Zhanghua Wang (East China Normal University)**[242] Sea Salt Production 4,000 Years Ago in the Eastern Coast Of China: The Excavation and Research at the Daxie Prehistoric Salt Production Site in Ningbo, Zhejiang**

Daxie prehistoric sea salt production site is located in Daxie island, Ningbo city, Zhejiang Province, between the Ningshao Plain and the Zhoushan Islands. The prehistoric cultural deposits at the Daxie site, dating back to 4400-4100 years ago, were the earliest known sea salt production remains found in the eastern coast areas in China. These findings provide rich data for exploring the original development of sea salt industry in ancient China and cast light upon other important issues such as salt transportation, salt trade, and social complexity in eastern coastal areas.

Shapiro, Beth [231] see Fine, Paul

Shapiro, Craig (The Ohio State University)

[408] Navigating Public LiDAR in Samoa

In 2014, The World Bank helped the government of Samoa to launch a climate resilience program. Included in this initiative was the financing of a light detecting and ranging (LiDAR) survey throughout the entirety of the country. Although originally meant solely for national climate information services and hazard mapping, the LiDAR dataset has since been shared between The Samoan Ministry for Natural Resources and the Environment and The Center for Samoan Studies (CSS) at The National University of Samoa. This information sharing was prompted once the data set's use as an instrumental tool for archaeological survey was identified. CSS intends to further this information sharing in order to elicit assistance in expanding upon their archaeological survey of recent years. Soon, this LiDAR dataset will be available to the public with the hope that Samoans will take a more active role in rediscovering their own cultural heritage. This paper overviews the archaeological research in Samoa in the years since 2014 and provides direction for a potential upwelling of public archaeology in the islands. Additionally, this paper discusses how the people of Samoa may interpret, add to, or reject the information drawn from the newly public information.

Sharp, Emily (Arizona State University)**[353] Old Tomb, New Ancestors: Investigating the Role of a Preceramic Burial in Huarás Community Formation**

The social and physical history of a place often plays a crucial role in people's decisions regarding where to establish a community. In the ancient Andes, burial monuments offered powerful connections to landscape and shaped community identity by demonstrating claims to a shared ancestry and legitimizing access to ancestral lands. In this paper, I examine how a Late Preceramic mortuary space at Queyash Alto (Ancash, Peru) influenced where and how people established a small Huarás and later Recuay settlement during the Final Formative and Early Intermediate Periods (200BC–AD700). Previous work by Joan Gero emphasized how the Huarás performed large feasts at Queyash to organize collective labor. Some feasts were situated directly outside a tomb entrance thought to include Huarás remains. I present recent radiocarbon results from human teeth, which indicate that the people who feasted outside the tomb were separated by several millennia from those interred within it. These individuals were not recently deceased loved ones but were Queyash's earliest inhabitants who occupied the site 2,000 years earlier. Through my bioarchaeological research on these burials, I interrogate what the reuse of this old mortuary space suggests about cooperative forms of community decision-making and the extended agency of long-dead ancestors.

Sharp, Kayleigh (Southern Illinois University Carbondale)**[54] Gallinazo Networks: Economic Complementarity and the Persistence of Gallinazo-Mochica Social Interrelationships**

Early archaeological works that overemphasized societal elites and funerary contexts have led to several biases that limit comprehension of society's lower-echelon, or their roll in quotidian social spheres (political, religious or economic) during the latter part of the first millennium on Peru's north coast. This is a topic of much interest when considering long-term coexistence of groups like the Gallinazo and Mochica that persisted beyond the 8th century (based on C-14 dates) in the Lambayeque region. What characterizes the form and content of Gallinazo-Mochica coexistence? Did these groups work side-by-side and economically complement each other, or did they occupy different environments (coast vs. middle valleys vs. highlands) for centuries without interacting? My recent investigations at the Songoy-Cojal site in the mid-Zaña Valley suggests that long-term social interrelationships were built upon asymmetrical engagements in mining, irrigation, and multi-craft production industries. These combined factors are the constituents of what I define as Economic Complementarity: the mutually interdependent relationships of production, distribution, and consumption of goods and services. In this paper, I explore the development and application of my approach, which combines broadly applicable techniques of archaeological network analysis and geostatistics, summarizing key findings that help to elucidate Gallinazo-Mochica social interrelationships.

[54] Chair

Sharpe, Ashley [47] see Reeder-Myers, Leslie

Sharpe, Ashley (Smithsonian Tropical Research Institute)**[309] Shifting Course: Change as the Norm in the Preclassic Usumacinta Faunal Record**

The Usumacinta River and its tributaries played an integral role in the survival and growth of Maya communities in the southern lowlands of Mexico and Guatemala. Early human settlements relied on the river as a source of food and

transportation. Examining the animal bones and shell remains from Preclassic (c. 2000 BC – AD 250) communities along the river provides clues as to what the wildlife was like in the region before the advent of large human populations. Some activities, such as the procurement of large quantities of freshwater snails, attest to seasonal-timed events that are not found in later periods of Maya history. At the site of Ceibal, Guatemala, a decline in the numbers of certain fish and shellfish species over time suggests that increasing human habitation along the river resulted in a cultural or environmental change that was responsible for their gradual disappearance from the faunal record. Other animals, including unique breeds of dogs and various marine shells, begin to appear over time in the region, attesting to long-distance trade and the river's use as a means of transport.

Sharratt, Nicola [206] see Schaefer, Benjamin

Sharratt, Nicola (Georgia State University)

[335] *Crafting Community: A Multi-site Analysis of Craft Production and Exchange in the Aftermath of State Collapse*

Techniques derived from analytical chemistry are critical to examining the impact of macro political change on the production and circulation of craft goods in the past. LA-ICP-MS analyses of objects and the raw materials used in their manufacture in the Moquegua Valley of southern Peru have been directed at reconstructing patterns of production and exchange in a region subject to episodes of conquest and colonialism over 1500 years. To date, analyses addressing production and exchange in the wake of state disintegration have been limited to one site, Tumilaca la Chimbá, established circa AD 1000 as the Tiwanaku state's authority faltered in Moquegua. Complementing that preliminary work, which suggests that this post-collapse community both engaged in altered long-distance economic networks and continued to draw on pre-collapse knowledge about resource procurement, I present compositional data generated through LA-ICP-MS analyses of 80 ceramics derived from an additional four contemporaneous, post-collapse sites in the Moquegua Valley. I draw on those results to examine a) the extent to which different communities participated in shared or distinct patterns of long-distance exchange, 2) whether and in what ways different communities made varied choices about resource procurement, and 3) the organization of ceramic manufacture within each community.

[335] Chair

Shaul, David [44] see McNeil, Lynda

Shaul, David (University of Colorado, Boulder) and Scott Ortman (University of Colorado, Boulder)

[311] *Incorporations into Tewa Language and Culture*

Linguistic acculturation during the Columbian exchange traditionally focused on loan words from European languages into Native American languages, privileging European culture. Southwestern studies in particular have presented lists of Spanish words in native garb, with little discussion other than possible borrowing strata, based on how well the loans fit the local sound pattern. We deconstruct this, considering total production of Tewa linguistic artifacts during the 1600s that refer Spanish concepts, comparing native materials (calques; coined words) versus loans from Spanish. We compare the Tewa situation with other communities of the Rio Grande culture area, and with peripheral speech communities (Zuni, Hopi). Between 50% to 75% of the attested lexical artifacts of acculturation were created using Native lexical resources. Tewas and other native people, not passive recipients of European culture, exercised agency in adapting to and naming the benefits (largely dietary) and impositions (religion; government) of European culture.

Shaum, Katherine, Neil Dixon (Front Standard Photography) and Katharine Williams (University of New Mexico Department of Anthropology)

[85] *RTI Photography inside a Hohokam Great House*

The Great House at Casa Grande Ruins National Monument is a monumental 11 room, three/four story structure made of puddled mud "caliche" that has been called "the pinnacle of Hohokam architectural achievement" and is significant for its high degree of preservation. The building is home to intact prehistoric red and pink earthen plasters and washes as well as three "plasterglyphs". Yet these glyphs had never been extensively documented due to the inherent difficulties of working inside an important archaeological and ethnographic resource, including access, lighting, and animal waste issues. Following tribal consultation and a grant award from the Western National Parks Association, researchers and resource managers were able to employ a digital photographic technique called reflectance transformation imaging (RTI) photography. This technique generated very high resolution images of selected plaster surfaces and fulfilled project goals:

baseline documentation of physical condition, study of layer stratigraphy and age, and investigation for previously unknown elements in surrounding areas. Because of its surface enhancement and lighting features, RTI photography is especially useful in archaeology when one needs to look at objects with low-relief etching or carving, as is the case with petroglyphs, headstones, and certain artifacts.

Shaw, Chris (U.S. Forest Service) and Jason Millet (U.S. Forest Service)**[213] A Survey of Gallina Phase Sites in Santa Fe National Forest**

This poster presents the results of an archaeological survey near Laguna Jacquez in the Cuba region of Santa Fe National Forest, which was performed in advance of a prescribed burn to mitigate damage to archaeological resources. An inventory of newly-discovered Gallina phase sites is described in the context of contemporary issues in Gallina archaeology, including settlement patterns, social violence, and the cultural affiliation of the inhabitants of the Gallina area in relation to other Ancestral Puebloan groups (Constan and Bremer 2017). The effects of controlled fire are also investigated through field observation and participation during the burn.

Shaw, Jennie (Salix Archaeological Services LLC)**[312] The Tricky Business of Dating Shell Middens and Improving Regional Chronologies**

Fifteen years ago, Julie Stein spearheaded research into the often problematic task of dating shell middens and interpreting their accumulation. By examining paired charcoal-shell dates from the San Juan Islands, Stein and colleagues refined the local marine reservoir correction (ΔR) associated with radiocarbon-dated shell, thereby enabling construction of more accurate chronologies in and around the Salish Sea. Her methods for quantifying shell midden accumulation rates helped differentiate gradual versus punctuated occupation and, perhaps more importantly, highlighted the benefit of an extensive dating regime. The ripple effects of these two research programs continue, as archaeologists working in various coastal settings increase chronological control by developing regional reservoir corrections and more rigorously modeling site accumulation dynamics.

Shaw, Justine (College of the Redwoods)**[146] Surviving the Apocalypse: A Late Terminal Classic Household in Northern Yucatan**

Following the widespread Terminal Classic florescence that saw booming occupations at every site in the Cochuah region of west-central Quintana Roo, Mexico, many settlements were entirely abandoned. However, some sites possessed late Terminal Classic populations, living in novel architecture yet continuing other Classic Maya material practices. One such round foundation brace, at the site of Sisal, was excavated in 2018, with its interior and immediate exterior subjected to detailed spatial analyses of its ceramics, lithics, shell artifacts, soil chemistry, and burials. Comparing and contrasting these patterns to those of other ethnographic and archaeological examples provides a rare window into the household activities and practices that characterized this generally ignored point of collapse, as the few remaining resilient inhabitants both clung to past practices and attempted new strategies to provide for themselves and their households.

[146] Chair**Shaw-Müller, Kyle, John Walden (University of Pittsburgh), Michael Biggie (Los Angeles Maritime Institute), Abel Nachamie (University of Pittsburgh) and Qiu Yijia (University of Pittsburgh)****[113] The Spatial Distribution of Wealth throughout the Neighborhoods of the Late Classic Maya Polity of Lower Dover, Belize**

The formation of neighborhoods and their integration into polities necessarily involves changes to the wealth of their inhabitants, especially as certain economic activities such as craft production intensify. For example, households that were among the first in a community, especially in low-density agricultural communities such as those of the ancient Maya, probably had more extensive property rights that afforded a greater accumulation of wealth-indicating items. Alternatively, households established later in time were often located in marginal zones with access to fewer resources, unless patronized by an emerging elite. This poster diachronically reconstructs the spatial distribution of wealth across the political landscape as three small Maya communities dating to the Middle Preclassic (1000-300 BC) were integrated as neighborhoods into the Late Classic (AD 600-900) polity of Lower Dover, Belize. Specifically, we address whether wealthier commoner households clustered concentrically around older minor centers and how this pattern changed with the emergence of politico-economic

entities such as specialized production areas and the civic-ceremonial center of Lower Dover. In sum, the economic effects of communities' political integration (into a newer, larger polity) upon their pre-existing patterns of wealth distribution is the central topic of this poster.

Shaw-Müller, Kyle [280] see Qiu, Yijia

Shea, John (Stony Brook University)

[32] The EAST Typology: A Remedy for Eastern Africa's "Lithics Systematics Anarchy"

Eastern Africa boasts the world's longest archaeological record, more than 3.4 million years so far. And yet, that record defies easy synthesis due to "lithics systematic anarchy." Archaeologists working in Eastern Africa describe and measure stone tools in so many different ways, that detailed comparisons within major age-stage are difficult and long-term comparisons across major time periods nearly impossible. This paper introduces the Eastern African Stone Tool (EAST) Typology, a hierarchical framework for describing stone tool variation specifically designed to establish concordances among different typologies and to facilitate long-term comparisons across the full sweep of Eastern African prehistory.

Sheets, Kimberly (Washington State University)

[260] Using Strontium Isotope Analysis to Source Nonlocal Bighorn Sheep, Northeast Arizona

Archaeological bighorn sheep (*O. canadensis*) have been recovered in high frequency from the Homol'ovi Settlement Cluster (HSC), northeast Arizona. This is salient because these animals are non-endemic to the Middle Little Colorado River Valley, with the nearest source being the Grand Canyon approximately 160 km away. This study uses strontium isotope analysis to source bighorn sheep recovered from the HSC to four potential source locations where bighorn sheep have been historically documented in the region: the Grand Canyon, San Francisco Peaks, White Mountains, and Black Mesa. This study has implications for understanding socioeconomic landuse by ancestral Hopi groups.

Sheets, Payson [191] see Fowler, William

Sheets, Payson (University of Colorado)

[255] Was the Elaborate Chert Eccentric from San Andres, El Salvador, Made by the Rosalila Copan "El Maestro"?

Many decades ago Stanley Boggs discovered a particularly elaborate chert eccentric from San Andres, El Salvador, yet he never published the find. Here we compare it to the set of more elaborate eccentrics manufactured by "El Maestro" for the Rosalila cache at Copan. The similarities in morphology, symbology, and manufacturing techniques are so similar that I posit they all were made by the same person. The San Andres eccentric is so fragile that I believe it must have been manufactured at San Andres, shortly before being cached. So it was the craftsperson who traveled, not the finished artifact. Rather, the craftsperson must have carried the eccentric in blank or roughout form, along with manufacturing tools, to San Andres. That craftsperson's home might have been Copan, or some other Maya city. This supports the "itinerant craftperson" model that is often posited but generally has little direct evidence.

Sheldrick, Nichole (University of Oxford)

[77] Big Data, Heritage Management, and the EAMENA Project

Heritage inventories are crucial for effective cultural heritage protection, especially during conflicts or disaster situations. Digital technologies, particularly remote sensing, are making it easier and faster than ever to create and disseminate these inventories, and collect data on a scale not previously possible. Since 2015, the Endangered Archaeology in the Middle East and North Africa (EAMENA) Project has been integrating new and existing datasets into an open-access database to identify, record, and assess disturbances and threats to archaeological sites across the MENA region, and to aid heritage officials in the management and protection of their cultural heritage. But how can we best utilise these ever-increasing quantities of data to manage and protect heritage, particularly where the human and financial resources available for these activities remain limited? Furthermore, how does the ability to collect vast amounts of data from afar change the relationship between local stakeholders and foreign researchers? Using the EAMENA Project as a case study, in this paper I will reflect on how the rapid collection and analysis of large amounts of data is changing heritage management methodologies and

practices, and the advantages and challenges of this kind of approach in the MENA region.

Shellenberger, Jon [122] see Hackenberger, Steven

Shelley, Nathan (Eastern New Mexico University)

[89] *Assessing Archaeological Applications of Curated Sediment Samples: A Case Study at Mesa Portales*

This project assesses the research utility of curated sediment samples excavated at Mesa Portales, New Mexico. These archaeological deposits date to the Pueblo III period (1150-1300 AD) and contain evidence suggesting two traditionally estranged cultures, Gallina and Chacoan, co-existed. This evidence stands in contrast to other instances of Gallina archaeology appearing to represent a culturally isolated population. Curated samples were compared to new geologic-core samples from the site vicinity to characterize site-formation processes and test stratigraphic context of artifact provenience and previous interpretations of cultural interaction at Mesa Portales. In addition to contributing to our understanding of the occupation sequence at Mesa Portales, project goals include developing protocols for using curated sediments to address new geoarchaeological problems and generating information regarding the utility of curated sediments to aid in future collections-management decisions. Evaluation of certain curated archaeological materials, such as sediment samples, is needed to determine their archaeological value and whether their continued curation is appropriate. As the archaeological community awaits the long overdue approval of updates to 36 CFR 79 (Curation of Federally-Owned and Administered Archeological Collections) the ability to discard federal collections remains in limbo and research involving the curated Mesa Portales samples can provide an invaluable perspective.

Shen, Chen [299] see Cheng, Wen Yin

Shen, Chen (Royal Ontario Museum)

[377] *Moderator*

[299] *Discussant*

Shennan, Stephen [352] see Altman, Arie

Shepard, Lindsay (University of New Mexico), Will Russell (Arizona State University), Christopher Schwartz (Arizona State University) and Robert Weiner (Brown University)

[81] *The Social Use and Value of Blue-Green Stone Mosaics at Sites within Canal System 2, Phoenix Basin, Hohokam Regional System*

The occurrence of nonlocal objects, raw materials, and ideas in the southwestern United States (US SW) has long been recognized as evidence of interaction between prehispanic peoples of this region and those of greater Mesoamerica. Though many archaeologists have analyzed the directionality and potential means by which these objects and concepts moved across the landscape, few have assessed the degree to which Mesoamerican practices and traditional assemblages remained intact as the artifacts and ideas moved farther from their places of origin. The current study analyzes the distribution and deposition of blue-green stone mosaics, a craft technology that originated in greater Mesoamerica during the late Formative period (400 BCE – 200 CE) and spread to the US SW by the start of the Hohokam Pioneer Period (475 CE). We assess the spatial distribution, contextual deposition, and morphology of mosaics at sites within Hohokam Canal System 2, located in the Phoenix Basin of central Arizona. These data are used to infer mosaics' social value and function within Hohokam social structure. Analysis suggests that, while the concept and technology of mosaics may have originated in Mesoamerica, the contexts and ways in which mosaics were used in the Hohokam region were decidedly Hohokam.

Shepardson, Britton (Terevaka.net Archaeological Outreach, Northern Arizona University)

[408] *Making Geospatial Data FREELY Accessible: Potential for Crowd-sourcing, Site-monitoring, and Multimedia Data Archiving*

The island communities of Oceania, and none more so than that of Rapa Nui (Easter Island, Chile), continue to develop their economies, modern identities, and narratives of their cultural past based on plentiful archaeological remains that are

visited by hundreds, or even thousands, of people on a daily basis. While archaeologists surge ahead with ever more impressive technology, local communities struggle to find ways to benefit from advances in research. A spreadsheet-to-website approach to GIS allows archaeologists to host interactive, multimedia data on a Google Map to provide access to information, informational crowd-sourcing, and conservation-oriented site monitoring at no cost for the archaeologist or for the users who access the data. A combination of Excel, HTML, JavaScript, XML, and Google Maps API allows for automatic generation of interactive webpages to host massive, multimedia data sets (text, images, links, files, videos, 3D viewer, etc.). This freeware approach to GIS provides great potential for local communities to play a more active role in, and benefit sustainably from, collaborative international heritage management.

Sherfield, Anne (University of Michigan)**[52] *Dig Until You Find Blood: A Spatial Investigation of Menstrual Seclusion Practice at Deir el-Medina***

Ethnographic investigations into menstrual seclusion practices worldwide show that investigating these behaviors is not only fruitful, but also integral in understanding a community's ideology and social structuring. Texts dating to the New Kingdom and Demotic periods suggest that ancient Egyptians engaged in a menstrual seclusion practice that included a strong spatial component within the household. This material manifestation of Egyptian menstrual seclusion opens the topic to archaeological inquiry that will compensate our textual understanding of the behavior. To that end, this paper analyzes the access, viewshed, and movement possibilities within 28 domestic structures at the New Kingdom site of Deir el-Medina (1550-1070 BCE). The aim of these investigations is to determine whether or not the architectural layout of the houses allows for the intentional segregation of women away from the rest of the household. The results of these analyses dispute the common notion that the houses at Deir el-Medina were too small to contain menstrual seclusion behaviors. Instead, the analysis finds that every house contained a space that could have been used opportunistically for seclusion while a woman was menstruating. Additionally, two houses contained rooms with unusually limited access that may have been used specifically to house menstruating individuals.

Sheridan, Kelton**[145] *Buying Into It: A Study of Economic Engagement on the Eastern Pequot Reservation***

This multi-scalar project examines economic patterns and foodways related to Native American ceramic use on the Eastern Pequot reservation in North Stonington, Connecticut. Engagement with local Euro-American markets by the Eastern Pequot was necessary during the late 18th and early 19th centuries. Analysis of ceramic assemblages focusing on ware type, vessel form, and decoration inform how the Eastern Pequot negotiated these markets and utilized ceramics. The three sites from the reservation examined in this study date to different time periods, allowing for a diachronic study of Eastern Pequot ceramic use and associated household practices. The analysis of ceramics lends insight into consumer and social practices on the Eastern Pequot reservation. Using additional comparative site analysis, this study provides a unique addition to the discussion of indigenous experiences during colonialism through a focus on market engagement and foodways. In order to solidify these interpretations, the three sites are then compared to nearby Anglo sites at Lake of Isles in southeastern Connecticut and the Nipmuc site of the Sarah Boston farmstead in Grafton, Massachusetts.

Sheridan, Susan (University of Notre Dame)**[317] *Social Media as a Tool for Research and Outreach in Bioarchaeology***

Social media has provided bioarchaeology a tool for collaboration with colleagues around the globe; interaction with legislators, the press, and the general public; a means to quickly disseminate research; an educational tool for reaching a younger audience; and, a means to employ the latest Web 2.0 technologies. The BioAnthropology News Network (BAN) was established to capitalize on these possibilities. BAN fosters cross-disciplinary interaction using Facebook, Twitter, YouTube, and Instagram. Bioarchaeology utilizes the sciences and humanities to explore life in the past, emphasizing an integrative anthropological approach to understanding our place in the natural world -- not surprisingly, it has benefited the most from the BAN platform, with 8X the number of posts of other areas of anthropology. It draws ~23,000 viewers combined, fostering collegial interaction in the discussion of even contentious topics, providing teaching tools for professors and students, networking scholars across 100 countries on all seven continents. We have developed a video series provides depth to topics making the news, have compiled a massive database of bioarchaeology publications for research use, offer a weekly suite of educational modules, and are working on introducing 3D components to permit in-depth exploration of research in a virtual reality environment.

Sherman, Simon [97] see Renson, Virginie

Sherwood, Haley [207] see Carlson, Kristen

Sherwood, Sarah (Sewanee: The University of the South)

[312] *Soil Fertility and Chronology at the RapaNui Rano Raraku Megalithic Statue Quarry*

Rano Raraku on Easter Island (RapaNui) is famous as the source of the megalithic moai statues. Past research by the Easter Island Statue Project (EISP) documented and mapped the statues. Other studies, based on coring the freshwater lake in Rano Raraku, identified microbotanical evidence of a cultivated landscape inside the quarry. This paper concentrates on recent excavations of statue 156 confirming that the statue was permanently placed in this location and was not “in-progress” or awaiting transport. We present a Bayesian model based on 20 radiocarbon dates that addresses the timing of the raising or “use” of Statue 156, visitation to create secondary petroglyphs, and the tempo of sedimentation that buried most of this statue. Micromorphological analyses reveal the presence of incipient surfaces as the slope deposits accumulated around the statue. Results from the soil chemistry indicate that the quarry was exceptionally fertile and likely produced uniquely high yields of traditional cultivars on an island struggling with poor soil conditions. This complex land use history for Rano Raraku has significant implications for understanding how specialized craft production may have impacted or otherwise influenced the evolution of social relationships on the island in the 16th through early 18th centuries.

[312] Chair

Sherwood, Sarah C. [325] see Carmody, Stephen B.

Sheumaker, Christian (University of Texas at San Antonio (UTSA))

[345] *Moving Off-Road: Traversing Taskscapes at Wari Camp, Belize*

The study of movement has long been relegated to the background of archaeological investigations, as its materialization proves multifarious yet equally elusive. The resulting collection of archaeological “movement studies” generally focuses on the most formalized manifestation of movement: road systems. Yet at the ancient Maya community of Wari Camp, the lack of constructed roadways (i.e., sacbeob) warrants a step back from roads to return to the fundamental questions of: 1) What constitutes movement? and 2) How does movement materialize archaeologically? In doing so, movement is theorized more broadly via the cultural rhythms of engagement between humans and things. This paper will explore the process of movement in the production of landscapes through the lens of Tim Ingold’s notion of “taskscapes”. In doing so, taskscapes extend movement beyond the physical act of traversing space but constitutive of the daily, accumulated activities that come to craft fundamentally different landscapes, the communities that dwell therein, and the insidious powers at play in their development.

[345] Chair

Shewan, Louise [27] see Tayles, Nancy

Shibayama, Nobuko [39] see Phipps, Elena

Shillito, Lisa-Marie [209] see Blong, John

Shimada, Izumi (Southern Illinois University) and Amy Szumilewicz (Southern Illinois University)

[335] *Large-Scale Craft Production and the Andean Religious Center: A Reconsideration*

Our conventional conception of the prehispanic Andean religious or ceremonial center emphasizes a limited range of sacred, ritual activities, intermittent public gatherings, a relatively small resident population, and perhaps small-scale

production of craft items for offerings. At the Middle Sicán (900-1100 CE) religious center of Sicán, however, the large central plaza was not only surrounded by a dozen monumental and minor platform mounds, but also at least two major metal workshops and a large food preparation area. One of the workshops we excavated in 2014 and 2018 measured at least 20 m E-W and 25 m N-S, had three superimposed floors, food residues, and numerous burnt features including a series of large (over 1 m across), adobe-lined, open furnaces that remind us of the well-known Moche sculptural representation of at least four metalworkers surrounding a furnace. These features suggest a highly intense and permanent precious metal working involving well over a dozen artisans with a reliable support system, particularly high-quality charcoal fuel and food. Overall, the impressive scale and intensity of metalworking along with these factors force us to reconsider the significance of the Andean religious center.

Shimek, Rachael**[80] A Dearth of Dogs? The Archaeological Record of Canids in Wyoming**

Despite ethnographic and ethnohistoric evidence suggesting the Great Plains were teeming with canids during prehistory and the contact period, the archaeological record of canids (wolves, coyotes, dogs, and foxes) in Wyoming seems rather sparse. This presentation briefly describes the nature of the canid record in Wyoming, including the types of evidence available and its distribution across time and space. I offer possible explanations for the nature of the record, focusing on behaviors both prehistoric and contemporary which shape the expression of the canid archaeological record. Finally, a few archaeological sites in Wyoming will be highlighted as interesting cases illuminating canid function, care, and health among prehistoric Wyoming groups.

[281] Discussant

Shimek, Rachael [329] see Walker, Danny

Shin, Sook-Chung [156] see Kim, Ha Beom

Shingo, Hidehiro [299] see Niwa, Takafumi

Shiratori, Yuko (The Graduate Center, CUNY)**[227] Moderator**

Shirvalkar, Prabodh [232] see Chakraborty, Kalyan Sekhar

Shock, Myrtle (Universidade Federal do Oeste de Pará), Mariana Franco Cassino, Laura Pereira Furquim (Universidade de São Paulo), Francini Medeiros da Silva and Manoel Fabiano Silva Santos**[404] From the Early Holocene to Amazonian Forest Groves**

Ecological studies in the Amazon increasingly report groves of economically useful tree species thought to be legacies of past human occupation and management practices, in contrast to an inherent composition with high species diversity and low species concentration. Brazil nut (*Bertholletia excelsa* – Lecythidaceae) trees occur in grove-type forest formations and are currently a principal non-timber forest product and major source of income for indigenous and rural populations. Paleoethnobotanical results from 18 archaeological sites in the Brazilian states of Acre, Amazonas, Pará and Rondônia contribute a temporal dimension to discussions of the degree to which humans influenced, managed, and/or created Brazil nut groves. The majority of analyzed archaeological sites have remains of Brazil nut seed testa and occupation dates vary, ranging from 12,000 years ago to the late Holocene. The results indicate that human populations have had a long history of interaction with Brazil nuts and corroborate the hypotheses that these relationships, over millennia, contributed to the distribution of *Bertholletia excelsa* across the Amazon Basin. Furthermore we consider new dynamics in human-plant interactions where trees are a major component of the environment as they are conducive to different management practices than those employed in the production of annual plants.

Shook, Eric [33] see Wren, Colin

Short, Laura (Texas A&M)

[397] Deciphering Raman Analysis of Fire Cracked Rock

Residue analysis has the potential to reveal hidden information about objects' use; however, interpretation must be done carefully. Presented here are the final results of Raman analysis of food residues on fire cracked rock (FCR) from south-central North America. For this, the residues on archaeological FCR were compared to residues on experimental FCR, control samples, and a reference collection. While the exact origins of the residues could not be determined, it confirms that these residues are likely the result of cultural rather than environmental processes. This is a major step for residue studies of FCR; however, there is still much work to be done, before this is an economical process for the average archaeological researcher.

Shortland, Andrew [363] see Degryse, Patrick

Shott, Michael (University of Akron)

[23] Hunter-Gatherer Fission-Fusion in Ethnographic and Archaeological Records: From the Mbuti to Paleoindians

Archaeology views hunter-gatherers as nature's children or launching pads to complex society. Ethnographic hunter-gatherers exhibit fission-fusion cycles that we explain variously, including modular organization of group sizes (e.g., "scalar-stress"). However well models explain ethnographic pattern, archaeological tests pose challenges when we approach remote hunter-gatherers using what the Mbuti teach us. We believe that Paleoindians practiced fission-fusion, based partly on sites considered aggregations because they are unusually large and possibly organized as collections of smaller modules. Precisely because of the flexibility that encompasses fission-fusion, however, large sites can be one-time aggregations or accumulations from repeated occupations. Seeking ethnographic pattern in material data requires archaeological measures of group size and occupation span. Assemblage size and composition reflect size and behavior, but also span (itself parsed as aggregate or per capita) in ways not always appreciated. Surovell's models of hunter-gatherer assemblage accumulation and methods to estimate span may distinguish synchronic aggregation from diachronic accumulation in eastern North American Paleoindian data, corroborating or confounding ethnographic patterns applied to the past. Whether nature's children or autocrats-in-waiting, prehistoric hunter-gatherers can be understood only knowing how their material records formed.

Shott, Michael [88] see Nolan, Kevin

Shrader, Mason (Millsaps College) and George J. Bey III (Millsaps College)

[387] In the Hands of the God or in the Depths of a Well? Examining the Evolution of Disability in the Ancient Mediterranean Basin

This study presents a cross-cultural comparison of disability in ancient Greece, Rome, and Egypt from the beginning of the Bronze Age to the 4th century CE. I use archaeological and textual data to examine the temporal evolution of notions of disability in these three cultures. Results suggest that prior to Macedonian and Roman imperial expansion, Egypt's notions of disability were generated through a model of supernatural significance. As this model developed throughout time, physically impaired individuals were increasingly elevated as functionally specialized, unique, and eventually associated with the divine. In contrast, Greece and Rome developed notions of disability largely through a socio-political model in which physical impairments were only seen as debilitating if they did not contribute appropriately to society. The specific metric for being "disabled" changed in relation to when the socio-political system of Greece and Rome changed. While Egypt's model of disability may seem to lend itself more towards a "positive" outlook on the physically impaired, both models actually provided room for compliments and derision of the physically impaired. Finally, both models became intermixed as cultural diffusion occurred via Macedonian and Roman imperialism.

Shrestha, Ramesh [280] see Estrada-Belli, Francisco

Shurack, Nichol (Ute Mountain Ute THPO) and Terry Knight (Ute Mountain Ute THPO)

[244] *Ute Mountain Ute Tribal Historic Preservation Office Reflections on Tribal-Archaeologist Collaborations*

The Ute Mountain Ute Tribal Historic Preservation Office has worked regularly with archaeologists. While archaeology focuses largely on scientific understanding, the effects of this work on tribes and other stakeholders also needs to be considered. Through this talk, we highlight ways that archaeologists and tribes can more effectively collaborate and to find scientific inquiries of interest to both parties. Some important considerations include providing sufficient time for the tribe to consider the project and provide recommendations, bringing results back to the tribal community, not speaking for the tribal community, and respecting the sacred nature of many archaeology sites cultural landscapes. Such collaborations will deepen both relationships and understanding of the resulting data.

Shurack, Nichol [313] see Knight, Terry

Shurik, Katherine (University of California, Merced)

[134] *Digitization of Small Artifacts*

Over the past 20 years, technology has been developing at great speeds. Multiple methods of digitization have been emerging and been applied to archaeology. The most commonly used tools have been photogrammetry and laser scanning. However, one of the problems encountered with those tools when digitizing archaeological data occurs when working with small-sized artifacts. This paper compares the outcomes of three methods of three-dimensionalizing small figures and artifacts: photogrammetry, laser scanning, and structured-light-technology (SLT) scanning. The comparison focuses on quality of three-dimensional image outcome as well as the time and labor required to complete it with each method. The SLT digitization method resulted in much faster process as well as more precise three-dimensional models.

Sieg, Lauren (National Museum of the American Indian)

[178] *Moderator*

[293] *Discussant*

Siegel, Peter E.

[37] *Discussant*

Sierpe, Victor [33] see San Román, Manuel J.

Sigworth, Claire [317] see Buzon, Michele

Sillar, Bill [233] see Ogburn, Dennis

Sillar, Bill (Institute of Archaeology, UCL)

[233] *Prior to Pachacuti: A Pre-Imperial Phase for Monumental Construction in Cuzco?*

The plan of Inca Cuzco is sometimes explained as following a unified design, which some historical accounts attribute to the 9th Inca leader, Pachacuti. While Cuzco was a planned settlement, it was constantly being reconstructed and altered to accommodate a growing Inca elite, to facilitate the needs of the emerging state and the priorities of successive rulers, to better express Inca values, and to facilitate their rituals. It is difficult to identify phasing within Inca architecture, but our

mapping of variations in the style, location of walls, and choice of building stone within central Cuzco suggests a sequence for early Inca constructions prior to the re-building of Coricancha associated with Pachacuti. This includes constructions using green diorite such as at Hatun Rumiyoc, and the use of small andesite blocks from varied sources as in Cusicancha and Amarucanca. These buildings demonstrate Inca access to a growing labor force and more distant raw materials, which was made possible by the expanding reach of Inca alliances and control during this phase of state development. The construction and form of these early buildings also has implications for understanding their functions and the role of monumental architecture within the nascent Imperial capital.

[233] *Chair*

Silliman, Garrett and Daniel Contreras (University of Maryland)

[256] *Crouching (Jade) Monkey, Hidden Lessons: A Formative Period in Honduras*

The authors, along with many others, got their first immersion in archaeology thanks to Pat and Ed as part of the Kenyon Honduras Program. Their subsequent trajectories in archaeology took both of them away from Mesoamerica, albeit in very different directions, but both trace their origins to the Naco Valley during the Spring of 1995. Using examples from their work, ranging from the Levantine Neolithic to Civil War battlefields of the American Southeast, they reflect on the significance of that early inspiration, and consider why it was so effective in fostering their respective careers.

Silliman, Stephen (University of Massachusetts Boston)

[244] *A Braiding, Not Abrasive, Approach to Indigenous Cultural Heritage and Archaeology: The Eastern Pequot Example*

A key challenge in the development and sustainability of collaborative archaeological approaches with indigenous communities is ensuring that community members participate as true partners in knowledge production and dissemination. If not, hopes for a braiding knowledge approach could end up being more “abrading” to community participants. The indigenization of archaeology and community heritage can involve indigenous community members having more voices in academic worlds, but it can and should also involve indigenous people being able to use and develop heritage materials for community-based initiatives that draw upon the skills and resources of the archaeologists who work with and for them. The Eastern Pequot Archaeological Field School has been exploring these issues since 2003, and despite what we feel are notable successes, the maturation that more than 15 years brings has helped us realize some gaps and new opportunities. We use this paper to outline new heritage directions that we have been developing that ensure more community voices are in the foreground of this project, including the weaving together of a commemorative book, videography, guided tours, and augmented reality applications.

[162] *Discussant*

Sills, E. Cory (University of Texas at Tyler) and Heather McKillop (Louisiana State University)

[372] *Chemical Analyses of Obsidian from Classic Maya Paynes Creek Salt Works, Belize*

The Paynes Creek Salt Works were an ancient Maya Classic Period (A.D. 300-900) salt industry located in a shallow salt water lagoon in southern Belize. The rise of the Paynes Creek Salt Works mirrored the growth in population at inland communities during the Late Classic Period (A. D. 600-900) where salt—a basic biological necessity—was scarce. The demand for salt and other marine resources underscores the importance of coastal trade. Small amounts of ceramic pottery from inland sites has been recovered from survey and excavation at the Paynes Creek Salt Works suggesting that inland cities were consumers of coastal salt. Forty obsidian blades were collected from systematic flotation survey between 2005 and 2008. These blades were assayed using a portable X-ray fluorescence in order to obtain the qualitative data to source the material as well as quantitative data to compare with other published obsidian sources. Assigning Maya obsidian artifacts to their geological source locations by chemical characterization is useful for reconstructing trade routes between the volcanic highland outcrops and lowland Maya consumers of obsidian. Identifying the source locations of obsidian from the Paynes Creek Salt Works will aid in the identification of the consumers of Paynes Creek salt.

Silva, Flavio [407] see López, Eos

Silva, Rosicler (Pontifícia Universidade Católica de Goiás), Julio Cezar Rubin de Rubin (IGPA/PUC Goias), Edilson Teixeira (AL consultoria Ltda) and Marcio Antonio Teles (Griphus consultoria Ltda)

[320] Archaeological Open Air Hunter-Gatherer Sites in the Serranópolis Region, Brazil: An Interpretation of the Landscape

The archaeological region of Serranópolis in Southeastern Goiás/Brazil stands out for its cultural material in rock shelter sites occupied by groups of hunter-gatherers and agricultural ceramists from 10,400 B.P to 915 B.P. The purpose of this paper is to verify the low frequency and visibility of open air sites, applying variables such as landscape, geology, geomorphology, soils and vegetation to establish a number of hypotheses. These open air lithic sites are associated with rock slab outcrops of silicified sandstone or quartzite as in the case of the Cahoeira 3 archaeological site.

Silva, Rosicler [395] see Estrela, Vitória

Silva De La Mora, Flavio

[146] Beyond the Palace Walls: Daily Life and Domestic Activities during the Late Classic in the Maya Lowlands (600-875 CE)

This presentation centers on the daily life of Maya commoners from the Classic Maya site of Chinikihá in Chiapas, Mexico. The excavations are part of a regional effort to understand rural communities and social complexity. The presentation will offer an intimate view of the materiality of the daily life of non-elite groups from a domestic context, offering a bottom-up perspective. The residential group excavated was also associated with a specialized production area that illustrates the technological ability and social knowledge embedded in non-elite groups. The site of Chinikihá is located in the Maya Lowlands, close to larger nodes of settlement known for their epigraphy, urban complexity, temples, and elite groups; like Palenque. The presentation illustrates the results from the study of visual and non-visual evidence using different techniques to analyze and better understand the material culture of daily life and the use of space. This study will contribute to our understanding of social organization and the interdependence between commoners and elites during the Late Classic.

Silva Santos, Manoel Fabiano [404] see Shock, Myrtle

Silva-Iturralde, María Isabel [409] see Winemiller, Terance

Simborth, Erika [286] see Cheever, Sylvia

Simek, Jan, Stephen Alvarez (Ancient Art Archive), Alan Cressler (Atlanta, GA) and Jordan Schafer (University of Tennessee)

[252] 3D Photogrammetry and Woodland Mud Glyphs from 19th Unnamed Cave, Alabama

The production of 3D models with photogrammetry has seen some recent application in rock art studies as a means of documenting sites and presenting them to the public. However, the use of photogrammetric models as data sources for discovery and analysis has received little attention. In this paper, we present work at 19th Unnamed Cave in Alabama, a Woodland Period mud glyph cave art site containing a rich assemblage of glyphs. 3D modelling has allowed us to see rock art images we were unable to see without the method and to begin to treat the models as quantitative spatial data.

Simeonoff, Sarah [254] see Williams, John

Simmons, Alan (University of Nevada Las Vegas, Department of Anthropology)**[275] Neolithic Voyagers: Why Colonize the Mediterranean Islands—The Example from Cyprus**

The “Neolithic Revolution” in the Near East and Anatolia is the oldest known in the world. This transformative economic and social event occurred in several mainland locations, and conventional wisdom was that it did not spread to the adjacent Mediterranean islands until relatively late, essentially being a “Neolithic footnote.” Cyprus has the oldest Neolithic, and until the past two decades or so, the aceramic Khirokitia Culture, starting around 7,000 cal. BC, was believed to be the oldest on any of the islands, and to represent the first human use of the island. Newer research, however, has dramatically reversed this perspective, and now Cyprus has both PPNA and PPNB occupations, as well as Late Epipaleolithic ones, that pre-date the Khirokitia Culture. The former are, in fact, as old as the mainland Neolithic. These findings raise several issues, such as seafaring and navigational skills, importation of floral and faunal resources, and the development of unique island identities. The ultimate question is why colonize these islands in the first place? This presentation examines these issues from the perspective of Cyprus and, specifically, the PPNB upland site of Ais Giorkis.

Simon, Arleyn [194] see Lindauer, Owen

Simon, Arleyn**[194] Chair**

Simon, Marcelo [302] see Kistler, Logan

Simon, Rebecca**[86] Rules Are Made to Be Broken: Reassessing Use-Life of Basketmaker III Structures**

Basketmaker III earthen architecture in the northern Southwest is commonly understood to have a use-life of one, maybe two generations. This understanding comes in part from experimental studies combined with the recent modeling of momentary populations. Crow Canyon Archaeological Center identified and tested over 40 Basketmaker III pit structures during the Basketmaker Communities Project (BCP) and found enough variation to suggest that the generalization of use-life and even function of these structures may be premature. As an example, ancestral Pueblo peoples repeatedly remodeled Mueller Little House (5MT10631), a “typical habitation site” tested during the BCP, suggesting a longer commitment to a singular structure than usually accepted. This study will reassess the applicability of generalized pit structure use-life in the northern Southwest with detailed architectural data and dating from the BCP.

[6] Discussant

Simone, Suzanne [195] see Rossoni-Notter, Elena

Simpson, Diana and Keith Jacobi (The University of Alabama)**[325] Bioarchaeology of the Little Bear Creek Site: New Insights into Health, Violence, Mortuary Behavior, and Identity in Prehistoric North Alabama**

Although many prehistoric shell burial mound sites within the Pickwick Basin of the Tennessee River Valley of Alabama have been the subject of extensive archaeological and osteological analyses, The Little Bear Creek Site (1CT8) was excluded from such modern study until recently. However, the most recent skeletal inventory of the site revealed high levels of perimortem trauma, violence, and disease within this population when compared to neighboring sites. Based on this, the site was selected for a more detailed bioarchaeological analysis and contextual interpretation during the summer of 2018. Considering site population level demographics, as well as detailed osteobiographies of certain notable individuals, and integrated grave good analysis and burial records, this study was able to demonstrate several unique insights into life and death at 1Ct8. It is argued that production and manufacturing were occurring at the site during the Archaic Period based on skeletal activity markers. Additionally, interpretation of postmortem processing and mortuary treatment indicate the presence of complex ritual and identity during this early period. These results contribute to an expanding archaeological understanding of life and death at 1Ct8 and provide valuable data for future comparison, contributing to our overall

understanding of prehistoric Alabama both synchronically and diachronically.

Simpson, Erik (Bureau of Land Management, Farmington Field Office)**[44] *Making and Breaking Boundaries in the American Southwest***

This presentation explores two related but temporally detached examples of communities interacting with the physical and cultural boundaries that partially define them. During the AD 700s and 800s communities in the La Plata and Animas river drainages of New Mexico and Colorado moved away from each other creating an unoccupied region between themselves during a time of significant societal and ideological change and violence. Later in the AD 1200s, communities in the Gallina region of New Mexico, who have been widely noted for their persistent isolation, begin to settle and trade among neighboring groups along their southern margins. These are considerations of just two of the many possibilities available to communities living within the borders that delineate them.

Simpson, Ian [269] see Madsen, Christian K.

Simpson, Jennifer [325] see Carmody, Stephen B.

Sinclair-Thomson, Brent [347] see Challis, Sam

Sindbæk, Søren (Aarhus University)**[23] *The Strange Attraction of Viking-Age Urbanism: The Predicament of Emporia***

Maritime trading emporia were nodal points of social networks and economic interactions in Viking-age Scandinavia. Despite their social centrality, archaeology shows that such places were rather small, unassuming, and sometimes short-lived settlement. This contrasts with a wealth of evidence pointing to communities sustaining a complex economy involving intensive long-distance trade and the practice of specialized, professional crafts. Research debates have centered around whether Viking-age emporia can be characterized as a form of urban settlements, and if so, why aspects of an urban economy would be maintained in otherwise overwhelmingly non-urbanized societies. This paper approaches the problem of urbanization as an emergent historical dynamic, converging upon – but not fully determined by – a complex set of cultural attractors. It reviews results from recent, major excavations in the Ribe, Denmark, and argues that a trajectory converging towards an urban pattern of society emerged from diverse attractors including multi-craft collaborations, the search and transaction costs of early commercial seafaring, and the social control of foreigners and ‘weak ties’.

Sinelli, Pete (University of Central Florida)**[37] *You Come from Where? Ceramics and Cultural Exchange at Palmetto Junction***

The Palmetto Junction site on Providenciales, Turks & Caicos Islands provides an abundant and diverse ceramic assemblage. These artifacts help describe movements of people, goods, and ideas among Lucayan Taino groups in the Bahama archipelago and affiliated Greater Antillean settlements to the south. The assemblage includes Meillacoid and Chicoid ceramics that were likely produced in Hispaniola and are commonly found in Lucayan sites in the Turks & Caicos Islands. However, the presence of sherds with elements of Saladoid zone-incised-crosshatch (ZIC ware) suggests ongoing contact with peoples east of the Mona Passage, perhaps Puerto Rico. Moreover, the discovery of an unusual style of imported pottery, adorned with fiber mat marking on the exterior body of the vessel, suggests that traditional Palmetto Ware motifs may have diffused out of the Bahama archipelago to influence potters in the Greater Antilles.

Sinensky, R. J. [175] see Gjesfjeld, Erik

Sinensky, R. J. (University of California Los Angeles)

[258] *The Early Brown Ware Horizon in East-Central Arizona, AD 300-550: Preliminary Results from Recent Survey, Excavation, and Collections-Based Research*

The Early Brown Ware Horizon, also known as the Basketmaker II-III transition, is one of the most pivotal yet poorly understood temporal intervals in the Prehispanic northern Southwest. This poster reports on recent site reconnaissance, small-scale excavations, and collections-based analyses focused on an area with a dense occupation at this time, East Central Arizona. Recorded sites range in size from small hamlets with a handful of structures to large sites with over 50 pithouses. Spatially extensive test excavations and intensive paleoethnobotanical sampling at two large sites provides new high-quality chronometric data and a robust botanical record with implications for understanding mobility practices. Survey and excavation data also suggest important differences between the routine activities that took place at contemporary sites located in higher elevation and lower elevation areas. Further research on this transitional period will help shed light on the scale and tempo of the social and economic changes that accompanied the shift to sedentary agrarian life across much of the region.

[86] *Discussant*

Sinensky, R. J. [365] see Farahani, Alan

Singletary, Jennifer (University of South Florida) and Jose L. Peña (University of South Florida)**[222] *Fibers and Weaving Techniques in Casma Textiles, Huarmey Valley-Peru***

Textile production was one of the most important aspects of Andean economy, since households were required to produce it for elites or local authorities, and in other instances, large specialized centers were exclusively producing textiles for the state. The excavations conducted at the site of Santo Domingo, which is a large cemetery, have provided information about ancient Casma people including access to resources and funerary practices. Although this cemetery has been affected by looting, remains of textiles were recovered during the excavations and in some instances, they were found as part of the few burials excavated at the site. Analysis of the textiles was conducted using a digital microscope to observe the weaving techniques and the different fibers used by Casma inhabitants during the Late Intermediate Period (A.D. 1000 – 1400). The aim of this research is to obtain valuable information about the pattern of textile production, interregional exchange and social function of textiles for the Casma people.

Sinkovec, Christina**[241] *Slope Armoring at Leone Bluff: A Collaborative, Landform-Scale Effort at In Situ Preservation***

The US Army Corps of Engineers recently undertook a project to mitigate cumulative adverse effects to the Leone Bluff archaeological site at the Corps' Trinidad Dam and Lake Project in Las Animas County, Colorado. The Leone Bluff site is one of two type sites for the Sopris Phase (AD 1000-1250), a cultural manifestation almost exclusive to the Park Plateau. The site has been subjected to multiple sources of disturbance, including excavations from the 1950s to the 1970s that resulted in a substantial collection of significant artifacts. Continued erosion in recent years, in part from high lake levels, exposed additional buried archaeological deposits. In response, the Corps collaborated closely with the Colorado State Historic Preservation Officer and with Tribes to stabilize and protect the remaining buried deposits and repatriate culturally significant items. The Leone Bluff site stabilization project is important because it is a large-scale, non-project-related effort by the Corps aimed directly at the preservation of a valuable archaeological resource. The project is also important because it represents a comprehensive collaboration with Tribes regarding both creative mitigation strategy and the disposition of culturally unidentifiable items.

Sinton, John [316] see Kahn, Jennifer

Sirak, Kendra (Department of Genetics, Harvard Medical School)**[253] *Genetic Variation and Sociocultural Dynamics in Two Early Christian Cemeteries from Kulubnarti***

Skeletal remains from two contemporaneous Early Christian Period (550–800 CE) cemeteries at Kulubnarti in Sudanese Nubia have been the subject of a decades-long biocultural research program. Craniometric and dental analyses have suggested biological similarity between members of the "R" and "S" cemetery communities, while analyses of health and survival have suggested that the "S community" experienced more stress and disease than the "R community." These data support a hypothesis of a single population, biologically related and culturally unified, but divided into socially-distinct

communities.

To test this hypothesis from a new perspective, ancient DNA data were generated for 14 individuals from each community. These data were analyzed to investigate if the two communities were a single genetic population and to assess their ancestry and genetic affinity to present-day populations. Results identified no genetic population substructure and suggested that both communities showed most genetic affinity to present-day Northeastern African populations. Unexpectedly, Eurasian-associated patrilineal ancestry was overrepresented in the "S community", while Eurasian-associated matrilineal ancestry was overrepresented in the "R community." These data revealed a previously-unknown pattern of sex-specific and community-based genetic variation and demonstrated the importance of investigating patterns of genetic variation within a context of known sociocultural dynamics.

[253] *Chair*

Sisneros, Brianne, Calvin Lehman (SWCA Environmental Consultants), Megan Weldy (SWCA Environmental Consultants) and Ryan Brucker (SWCA Environmental Consultants)

[94] *Pre-Contact Land Use of the Gallinas Mountains, Lincoln County, New Mexico*

SWCA Environmental Consultants is conducting heritage resource surveys across 4,388 acres of lands managed by the Cibola National Forest. These surveys will aid the U.S. Forest Service and the Claunch-Pinto Soil and Water Conservation District of Mountainair, New Mexico, in completing landscape-level treatments designed to protect an unburned forested watershed in the Gallinas Mountains, Lincoln County, New Mexico. The project area lies at the northern end of the Sierra Blanca region, along an ambiguous border with the Salinas area. Previous surveys in this area were restricted to roadways; the vast majority of the acreage had not been inventoried for heritage resources. SWCA archaeologists have surveyed 2,900 acres thus far, and have identified strong evidence of resource exploitation, lithic reduction, and tool manufacture/refurbishment, beginning in the late Paleoindian period and continuing into the 1400s. This paper would provide an initial overview of the environmental setting and cultural history of the project area and a brief literature review of prior research in the area, and present field results from 2017 and 2018 surveys with a focus on lithic reduction and tool manufacturing technologies. The goal of this analysis is to encourage a deeper understanding of pre-Contact lifeways in the Estancia Basin.

Sitdikov, Ayrat [320] see Vyazov, Leonid

Sjogren, Darren [223] see Freeman, Andrea

Skaggs, Sheldon [113] see Cartagena, Nicaela

Skaggs, Sheldon (Bronx Community College CUNY), Brian Gil (John Jay College CUNY), Nicole Diaz (Lehman College CUNY), Peter Cherico (City College CUNY) and Terry Powis (Kennesaw State University)

[118] *In the Third Degree: Modeling and Photogrammetry at the Ancient Maya Site of Pacbitun, Belize*

The archaeological site of Pacbitun is located in west central Belize and has a long history of occupation at the site. Starting in the Middle Preclassic (600 – 400 BC) and continuing until AD 800-900. Recent student research projects have led to three differing uses of photogrammetry. First has been for public education and outreach, with students converting artifacts found in elite burials and caches into physical replicas using 3D printing. The second has been the construction of models of the units for mapping and profiling of the excavations. Additionally, the 3D models are hosted online and allow collaborators a more detailed explanation of the structures found at the site. Finally, morphological characteristics of similar sorts of artifacts have been compared across excavation units. The modeling of these fragments allows researchers to compare new landmark feature measurements that were not directly measured in Belize. This means the artifacts can still be numerically analyzed, without the cost and difficulty of removing them from the home country. For example, mano fragments from a production area were compared to those found in other contexts to determine which have been used for maize processing.

Skaggs, Sheldon [199] see Micheletti, George J.

Skeates, Robin**[92] Sensory Archaeology: Key Concepts and Debates**

This presentation defines and evaluates some the key concepts and debates in sensory archaeology, arguing that this field is necessarily a work in progress. Today, there is a growing archaeological interest in the senses, experience and perception; but are we justified in calling for or claiming a 'sensory turn' in archaeology? And, besides seeking to understand what is meant by terms such as 'sensorium', 'sensory model', 'ways of sensing', 'the sensory field', 'sensory attributes', 'affect' and 'sensescapes', are these terms useful additions to archaeological vocabulary and theory. What are the implications of sensory studies for museum archaeology? Finally, how should archaeologists undertake 'sensual scholarship'?

Skibo, James (Illinois State University)**[318] Discussant**

Skinner, Jane (Pennsylvania State University), Darcy Calabria (Pennsylvania State University), Monica Genuardi (Independent Scholar), Mark Van Horn (University of Pennsylvania) and Ann E. Killebrew (Pennsylvania State University)

[388] Phoenician Iron Smithing and Cult at Tel Akko, Israel

Recent excavations (2010 - 2018) directed by A. E. Killebrew and M. Artzy at Tel Akko, a major eastern Mediterranean Phoenician maritime center and emporium, have uncovered an unprecedented quantity of iron smithing slags, hearths and cultic artifacts, all dating to the sixth - fourth centuries BCE. This assemblage includes fragments of figurines and masks, a standing stone, a possible animal sacrifice and a fifth-century-BCE Phoenician inscription, which alludes to dedications made by Akko's metal-working guild to an unspecified deity. These findings, interpreted in their coastal Levantine context, provide an unparalleled opportunity to explore the connection between iron production and cultic activities at late Iron and Persian period Akko. This poster presents the preliminary results of the chemical and mineralogical composition of Tel Akko's iron slags and the possible provenience of the iron ore; the spatial distribution of these smithing slags, hearths and iron objects in relation to associated cultic artifacts; and a reconstruction of the economic role of the iron industry at Akko, which during the sixth - fourth centuries BCE served as a major administrative and military center for the Achaemenid Empire.

Skinner, Sarah**[67] A Geometric Morphometric Analysis of Projectile Point Maintenance using Experimental Resharpening Techniques: An Examination of PFP1 Curation, Cooper's Ferry Site, Idaho**

The implementation of controlled experiments to identify and describe the behaviors of the past has been influential in understanding the material evidence left behind in the archaeological record. This in combination with the advent of new 3D scanning technologies and geometric morphometric analysis methods can be used to establish novel approaches to topics like stone tool curation. A unique opportunity to further morphometric research in tool curation has presented itself in recent findings at the Cooper's Ferry Site in western Idaho. Excavations have revealed a pattern of stone tool caching associated with a late Pleistocene-aged Western Stemmed Tradition (WST) cultural occupation. In particular, the fourteen projectile points in Pit Feature P1 (PFP1) have been described as displaying distinct characteristics of use and resharpening before being interred into the ground (Davis et al. 2017), an assumption that will be further explored in this study. By introducing a series of resharpening experiments and geometric morphometric analyses, stages of resharpening will be identified and described as a comparative tool for stone tool curation.

Skinner, Trent [211] see Donnermeyer, Christopher

Skolnick, Skelly [412] see Lowry, Justin

Skosey-LaLonde, Elena (University of Connecticut; ICArEHB), Jonathan Reeves (George Washington University), Matthew Douglass (University of Nebraska-Lincoln), David Braun (George Washington University) and Emmanuel

Ndiema (National Museums of Kenya)**[390] A Characterization of Site Formation Processes at FxJj34, Northern Kenya**

Any inference of behavior based upon the spatial distribution of archaeological material requires an understanding of site formation processes. Natural agents, such as water flow, may be responsible for post-depositional alteration of buried materials and can result in spatial patterns which mask the behavioral processes associated with the initial deposition of artifacts. FxJj34 is located in Area 129 within the Okote Member (1.56-1.39mya) of the Koobi Fora Formation in Northern Kenya. Excavations revealed dense accumulations of artifacts (50 artifacts/m²), confined to a horizon of coarse sands. Excavated lithics exhibit variable degrees of rounding, suggesting that FxJj34 is not representative of its primary depositional context. This study investigates the impact of such formative agents in the depositional history of material at FxJj34 through a series of geoarchaeological proxies that provide insight into site formation processes. This includes regional- and site-based sedimentation sequences, artifact and material sorting, orientation analysis, and artifact rounding. While the results of orientation analysis do not support post-depositional displacement of artifacts, results of geoarchaeological proxies suggest that water acted as an agent in the formation of FxJj34. These results demonstrate the nuanced relationship between the anthropogenic agents and the geological processes that form the archaeological record.

Skowronek, Russell [218] see Gonzalez, Juan

Skriver, Claus [240] see Benjamin, Jonathan

Slade, Alan (University of Texas) and Michael Collins (Texas State University)**[326] A Comprehensive Study of the Variability in Flake Scar Patterns on Clovis Fluted Points**

Clovis fluted points are the earliest and most technologically recognisable artefacts that covered North America between $\sim 11,080 \pm 40$ to $10,800 \pm 25$ 14C yr B.P. (12,994 to 12,817 Cal yrs B.P.). Although Clovis is the most well documented of the Paleoindian cultures, much more is yet to be learned from their apparent rapid expansion over the North American Late Pleistocene landscape. Previous studies have led researchers looking at the variability and similarity of Clovis fluted points; some suggesting a uniform technology across North America, whilst others propose a more local regional adaptation. This study is part way through a joint project that is investigating similarities into flake scar patterns on Clovis fluted points from North America, especially the Southern Plains and Desert Southwest. With a large enough sample it is anticipated that flake scar patterning will reveal insights into Clovis technology, chronology, and regionalization.

Slater, Greg [232] see Chakraborty, Kalyan Sekhar

Slaughter, Mark [36] see Wohlgemuth, Eric

Slaughter, Michelle (Metcalf Archaeological Consulting)**[139] Discussant**

Slaughter, Michelle [184] see Larkin, Karin

Slayton, Emma [37] see Pouncett, John

Slayton, Emma (Carnegie Mellon University)**[378] There and Back: An Evaluation of Modeling Pre-sail Seafaring Exchange Routes**

In the field of modeling water-based movement, many researchers have focused on modeling colonization or larger migration patterns. However, longer and more exploratory voyages encompasses only part of humanity's use of sea travel.

Evaluating closely connected sea-oriented communities can provide key insights into the everyday nature of sea movement, which is reflected in coastal archaeological findings around the globe. There is also ample evidence for peoples using the sea as a highway for both the movement of materials and for maintaining distant social relationships beyond exploration purposes. Additionally, more attention needs to be paid to non-sail powered vessels, which in some cases had less reach than those with sails. This mode of transport likely influenced the location of travel corridors. Here, I seek to build off this evidence by exploring movement between known archaeological sites and evaluating possible corridors of reciprocal exchange between them. By evaluating shorter voyages connected to communities known to be in contact or to have collected resources on neighboring islands, it may be possible to evaluate relationships between mariner and travel corridor. I will discuss my own research into this paradigm, as well as explore broader implications for modeling between known points of connection.

[378] *Chair*

Sliva, RJ (Desert Archaeology, Inc.)

[261] *Light, Sharp, Lethal: Functional and Social Implications of Cienega Point Technology in Early Agricultural Period Southern Arizona*

The Cienega phase (800 BC-AD 50) of the Early Agricultural period in southern Arizona is marked by an abrupt shift in projectile point technology from the large, heavy, side-notched San Pedro dart points of the preceding San Pedro phase (1200-800 BC) to significantly smaller, deeply corner-notched Cienega points. Investigations over the past two decades at residential sites in the floodplain of the Santa Cruz River in Tucson, Arizona have recovered numerous Cienega points that exhibit a range of design variation on the basic template that was originally defined in 1995. Recent excavations at the Clearwater site, AZ BB:13:6(ASM), indicate design differences between points recovered from pithouses and points recovered from burials—including points found within the skeletons of presumed homicide victims. These points are placed within the context of the larger regional database to explore the functional and social implications of a new technological tradition that was quickly adopted within the Santa Cruz and San Pedro drainages of southern Arizona at the beginning of the Cienega phase.

Slocum, Diane (Fort Huachuca Cultural Resources)

[189] *An Investigation of Demographic and Spatial Patterns at the Fort Huachuca Cemetery, Arizona*

This paper investigates the development of the Fort Huachuca Cemetery, an active burial ground first established in the late-nineteenth century on a military post in southern Arizona. The cemetery is known as a final resting place for a unique combination of individuals including Apache Scouts, Buffalo Soldiers, other late-nineteenth and early-twentieth century military members, non-military early pioneers, and modern-day military personnel. In this study, I use archival data in combination with a survey of the layout of the cemetery to shed light on cemetery demographics and spatial distribution. The data derived from this research contextualize the cemetery in the historical-period development of Fort Huachuca and Euromerican settlement in southern Arizona.

Slocum, Kat (Wayne State University)

[414] *The Forest through the Trees: Using Vivifacts to Analyze How Native American Landscapes Shaped Colonial Encounter*

In 1836, after centuries of occupation, Native Americans signed over 13 million acres of Northern Michigan land to the U.S. in an attempt to curtail complete removal from their ancestral homeland. This research project examines the transitional period of land loss in the mid-19th century to analyze to what extent Native Americans utilized the landscape before, during, and after reservation allotment and how Native American landscape use shaped colonization. Using a landscape approach, this research evaluates primary source accounts of missionary cartographers as they mapped the region and identified land for reservations. These reservations intended to limit Native Americans to smaller defined territories and challenged mobility outside of those allotted spaces. In contrast to the emerging colonial landscape, this research examines to what extent Native Americans maintained mobility within the broader landscape and whether this mobility played a central role in maintaining a distinct cultural identity. Using mapping of culturally modified trees and excavation, this research reconstructs the Native landscape at a key point in the colonization process and contributes to current debates in anthropology surrounding indigenous landscapes, how colonial power is actively negotiated, and the relationship between exploration and colonization.

Slotten, Chelsi (American University)**[273] *Surviving Violence: Healthcare in the Danish Viking Age***

The Viking Era has been characterized as a time of great violence in both modern and historical accounts, however, little work has been done to analyze the cultural norms and practical considerations surrounding healthcare during the Viking Age. If Viking Age society was as violent as purported, it would have needed to have well-honed systems of care in place to deal with the inevitable aftermath of these violent encounters. Bioarchaeological data provides an avenue for exploring how this society dealt with non-lethal violence through an examination of the actual bodies that experienced and received forms of healthcare. This paper will utilize the bioarchaeology of care method to analyze the care that one individual from the Danish Viking Age site of Bogøvej received after suffering blunt force trauma to the skull.

Slovak, Nicole [315] see Wolf, John

Sluka, Victoria (University of Wisconsin-Madison)**[13] *Discussant*****Small, David (Lehigh University)****[384] *Chair***

Smallwood, Ashley (University of Louisville), Charlotte Pevny (SEARCH, Inc.), Thomas Jennings (University of Louisville) and Julie Morrow (Arkansas Archeological Survey)

[325] *Explaining Shifts in Dalton Paleoindian Adaptations at the End of the Pleistocene through Usewear and Technological Organization Analyses*

During the Late Paleoindian period in North America approximately 12,000 years ago, Dalton hunter-gatherers substantially altered their hunting technology by modifying their point blades with teeth-like serrations and bevels. The functions of these attributes have been the focus of a long-held debate. Some argue that the variation relates to use as knives and drills, showing an adaptive shift to processing smaller game like deer, and others suggest these new attributes were crafted only to tip darts of an atlatl for projectile hunting. Investigating the functions of these points is critical for understanding how humans technologically adapted to a return to glacial-like conditions and the extinction of megafauna at the end Pleistocene. In this study, we use experimentation to build analogues for interpreting usewear traces on an archaeological Dalton point assemblage. We then consider changes in point functionality within the broader context of the organization of Dalton lithic technology and how these changes reflect adaptations to the emerging Holocene environment.

Smeeks, Jessica (Binghamton University)**[98] *Constructed Landscapes: Late Intermediate Period Architecture and Spatial Organization in the Huamanga Province of Peru***

According to landscape archaeologists, structures are not passive forms of material culture or passive backdrops of culture. They are cultural modifications that not only reflect, communicate, or symbolically express past ideas and cultures but also actively mold or influence future human actions. Architectural form depends on functional and social demands—a wide range of cultural decisions. Drawing on five months of archaeological survey work in the Huamanga Province of Peru, this paper considers the architectural designs and layouts of 17 Late Intermediate Period (ca. AD 1000-1450) sites. In an effort to understand the socio-cultural logic behind architectural construction during this time period, I combine four forms of analysis—stratigraphic analysis (analyzing the architecture vertically like a site by looking at the design and construction processes), spatial analysis (breaking down social space to identify site layout, different structure types, and architectural features), movement analysis (evaluating accessibility), and visual analysis (noting perception from and perception of various structures). This is a first step in understanding the everyday lives of these prehistoric people.

[98] *Chair*

Smiarowski, Konrad (CUNY Graduate Center), Christian K. Madsen, Michael Nielsen and Jette Arneborg

[251] *Environmental Threats To Viking Age and Medieval Norse Sites in Southwestern Greenland*

This presentation is one of the products of a series of ongoing inter-connected, international, interdisciplinary fieldwork projects coordinated by the North Atlantic Biocultural Organization (NABO) research cooperative since 2005 in Greenland. The projects drew upon more than a century of prior field research, where four generations of archaeologists described and assessed organic preservation conditions at their sites in several regions of the Norse Eastern Settlement. This created a unique form of "archaeological TEK" (Traditional Ecological Knowledge) that represents an invaluable guide into the changing preservation conditions since late 19th century. Between 2005-2017 we conducted extensive coring surveys of over 100 Norse middens, and open area and small test excavations at over 15 sites. The results show a shocking and almost complete loss of once outstanding organic preservation in a region where only 60 years ago wood, bones, leather, wool, and feathers were recovered. Our findings draw attention to the destructive process of the modern climate change that has been affecting the organic preservation conditions for at least 60 years, and to the need to organize a circumpolar-wide, international response strategy to rescue the endangered sites and their unique cultural heritage before it is too late.

Smiley, Francis [187] see Tumelaire, Jacob

Smit, Douglas (University of Pennsylvania)

[271] *Photovoice and Participatory Strategies for Community Heritage in the Peruvian Andes*

The Huancavelica mining landscapes in the Peruvian Andes present two historical narratives that continue to shape contemporary heritage discourse. On one hand, Huancavelica was the "crown jewel" of the Spanish empire due to lucrative mercury mining. For indigenous Andean peoples forced to labor underground, Huancavelica became known as "the mine of death" due to the lethal toxicity of mercury extraction. More recently, the Peruvian Ministry of Culture placed Huancavelica on the UNESCO Tentative List, and ongoing heritage discussions continue to follow this interrelated binary of wealth and violence. However, for the Santa Bárbara community, the high-altitude grasslands near the colonial mines and ruins of smelters are not just spaces of past exploitation or technological development, but home. In this talk, I examine how the people of Santa Bárbara negotiate the development of cultural heritage in their community in concert with and sometimes counter to the narratives of government officials, outside consultants, and North American archaeologists. Drawing from archaeological fieldwork and oral histories collected since 2013, as well as a PhotoVoice project initiated in 2018, I show how Santa Bárbara people root their heritage claims in a communal notion of landscape, rather than specific historical sites.

Smith, Adam (Cornell University)

[196] *The Stone Bridge: Obsidian Circulation and the Friction of Persistent Frontiers*

In Jose Saramago's classic "The Stone Raft", the Iberian peninsula breaks free from Europe to float unmoored into the Atlantic, etching into continental geology what David Anthony has termed a "persistent frontier": a fault line demarcating durable cultural, ethnic, and linguistic differences. In the archaeology of Southwest Asia, stone has typically been understood, contrarily, as a resource that, as early as the Neolithic, was able to move through and across significant social, cultural, and economic zones with relative ease. Obsidian, in particular, looms large thanks both to Renfrew's examinations of exchange patterns and to recent chemical characterization studies. What remains less clearly defined are the specific spheres of practice within sites that were linked by this stone bridge. Did all households participate in the same material flows or is there evidence of differential participation? Did some institutions nurture some network pathways over others? This paper will present the preliminary results of a pXRF geochemical characterization study of obsidians from residential, mortuary, and divinatory contexts at the Early and Late Bronze Age site of Gegharot in northwestern Armenia in order to assess stability and change in one site's link to the stone bridge.

Smith, Alexander (The College at Brockport, State University of New York), Nathan Hayes (Cumming Nature Center), Vincent Feucht (Cumming Nature Center) and Chris Matagne (Rochester Museum and Science Center)

[118] *The Excavations at Frost Town: Public Archaeology at a 19th Century Logging Settlement*

The Cumming Nature Center of Naples, New York contains a significant portion of the remains of a 19th century logging settlement, once known as Frost Town. The site, home to many Euro-American settlers throughout the 19th century, saw the rapid rise of a logging-based economy associated with the growing industrialization of Western New York, following the construction of the Erie Canal. Frost Town subsequently saw the decline of this industry as environmental circumstances

changed and the old-growth forests disappeared due to over-logging. This led to some failed attempts at farming, followed by the eventual abandonment of the site in the early 20th century. The Cumming Nature Center is part of the Rochester Museum and Science Center. In recent years, the center has increased its efforts to engage with the museum's public via Family Archaeology Weekends and collaborations with the College at Brockport. This poster will showcase the work being done at Frost Town by undergraduate archaeology majors, local archaeology enthusiasts and area children during our outreach events. This poster and project will add to the continuing conversations on how best to responsibly integrate students and the public into archaeological excavations at Frost Town and beyond.

Smith, Alexander [387] see Gosner, Linda

Smith, Alexia [404] see Proctor, Lucas

Smith, Benjamin [32] see Brandt, Steven

Smith, Benjamin (University of Western Australia)

[358] *Discussant*

Smith, Claire (Flinders University), Jordan Ralph (Flinders University), Jasmine Willika (Flinders University and Barunga Community), Guy Rankin (Barunga Community) and Gary Jackson (Flinders University)

[22] *Mapping Unmarked Graves in Remote Australian Aboriginal Communities*

This presentation outlines the public good that is being produced by a project being undertaken at the request of the Elders from the remote Aboriginal community of Barunga, Northern Territory. It may be hard to believe, but in 2018 the vast majority of graves of Aboriginal people in remote Northern Territory communities are not recorded in any register. When someone dies they are buried, but there's no written record of which grave belongs to whom. This makes it difficult to mourn properly, or to care for that person by caring for their grave. Accordingly, this project is locating unmarked graves, identifying the occupants of those graves, mapping the cemetery and developing a burial registry for the Barunga community. This research will make it possible for family members to mourn for their loved ones properly, to care for them by caring for their grave. In addition, this project addresses the need for new models of employment that allow Aboriginal people to stay on country. Having the skills to work as archaeological field assistants will broaden the employment opportunities of people trained in this program.

Smith, Daniel [73] see Conolly, James

Smith, Eugene (University of Nevada Las Vegas), Racheal Johnsen (University of Nevada Las Vegas), Jayde Hirniak (Arizona State University), Minghua Ren (University of Nevada Las Vegas) and Curtis Marean (Arizona State University)

[32] *Cryptotephra Studies in Africa: A Tool for Precise Dating and Continental Correlation of Archaeological Sites*

Placing archaeological sites on the same timeline across the African continent is essential for determining the initial appearance of key human behaviors and cultural features. Analytical error associated with traditional dating techniques makes these determinations difficult. Cryptotephra, which are small (<80 micron) volcanic glass shards that occur invisibly in sediments and are deposited nearly instantaneously after an eruption, can provide a new dating tool suitable for addressing questions that cannot be answered without precise age control. This can be particularly valuable in situations where radiocarbon and other techniques are not applicable. One widespread tephra deposit ideal for this purpose is the

Youngest Toba Tuff (YTT), erupted ~74,000 years ago from Indonesia. YTT was identified at Lake Malawi (Lane et al., 2013) and on the southern coast of Africa at Pinnacle Point and Vleesbaai (Smith et al., 2018). YTT may have covered most of central and southern Africa, making its identification ideal for linking archaeological sites. Our goal is to provide regional correlation of archaeological sites by searching for YTT across Africa. We collected and processed samples from the Diepkloof rock shelter and Klasies River and plan to extend our work to other critical sites in southern, eastern and central Africa.

Smith, Eugene [403] see Hirniak, Jayde

Smith, Geoffrey (University of Nevada, Reno)

[249] *The First Centuries after Clovis: A Review of Younger Dryas Western Stemmed Tradition Occupations in the Great Basin with a Focus on What They Can Tell Us about How and When Humans Colonized the Western United States*

In recent years the number of researchers who argue that the Western Stemmed Tradition (WST) marks the descendants of colonizing populations who traveled along the Pacific Coast before moving inland has increased. The Paisley Caves and Cooper's Ferry sites have provided compelling evidence that groups in the Intermountain West used WST points at around the same time that groups used fluted points on the Great Plains and the Southwest. In the centuries that followed the Clovis Era, additional WST sites were occupied for the first time. These sites provide snapshots of Paleoindian life during the last few centuries of the Pleistocene. In this presentation, I review what we know about WST lifeways during the Younger Dryas with a focus on what the earliest sites in the Intermountain West can tell us about how and when groups colonized the region.

Smith, Gerard (University of Alaska Fairbanks)

[269] *A 2000-Year-Old Family: Interpreting Site Structure and Human Behaviors at the Swan Point Site, Interior Alaska*

This paper seeks to interpret the spatial patterning of the Swan Point Locus 2 site, interpreted to be a seasonal residential site. The site, located on a hill overlooking a small northern tributary of the Tanana River, consists of several features in excellent preservation. The assemblage suggests a pattern of features and artifacts consistent with a residential site. The features (housepit, cache pits, and footprint) are a unique look into domestic behaviors of the later millennia of the Northern Archaic tradition. The lithic and faunal assemblages suggest either impoverished activities, or possible adherence to later known Athabascan behaviors consistent with cleansing a site upon abandonment, rather than a reflection of economic success. The interpretive results suggest an interesting case study where the investigator's cultural biases can inform the results into very different conclusions.

Smith, Gregory [407] see Alonso, Alejandra

Smith, Heather (Eastern New Mexico University)

[51] *Variability in Clovis Biface Morphology from the Type-site, Blackwater Draw Locality 1*

The Blackwater Draw Locality 1 site provides one of the most unique perspectives of Paleoindian behavior in North America. Spatial evidence surrounding faunal and lithic assemblages have inspired researchers to hypothesize site function to represent kill, scavenging, caching, or domestic activities. Its setting relative to other localities of resource acquisition has served as a heuristic for models of early Americans' mobility and technological organization. However, thorough analyses of biface collections from the site have not been completed in entirety. This is partially because of a history of excavations conducted by an array of institutions where the assemblage resides in pieces across the country. This research represents the launching of an endeavor to compile an exhaustive dataset of lithic bifacial artifacts from Blackwater Draw, beginning with examination of the morphological variability of artifacts curated at Eastern New Mexico University using Geometric Morphometrics. Intra-assemblage morphological variability will be compared to that of Paleoindian sites from across the Southwest representing specific behaviors, such as kill and quarry activities, to increase our understanding of the function of Blackwater Draw in the late Pleistocene.

[51] *Chair*

Smith, Heather (Kent State University)**[92] Rock Music: The Sounds of Flintknapping**

All natural substances have intrinsic acoustical properties. Flint, obsidian, and basalt, because of their comparable structure, have very similar sound properties. We explore here whether every piece of knappable stone, within certain parameters, will produce the same fundamental pitch along with its associated partials. The partials of the harmonic sequence are determined by wave theory. This pitch can be modified slightly in a few ways, but the wide majority of the sounds produced are at the exact same frequency. Variables such as stone quality, morphometrics, pressure, and heat treatment may have differing effects upon the sound of the stone. The distance that the knapping sounds can be heard would vary according to several ecological factors. The sounds of flintknapping may have influenced many aspects of the life of ancient peoples, including their choice of raw materials.

[92] Chair

Smith, Heather [117] see Jeu, Michael

Smith, J. Gregory (Northwest College) and Kierson Crume (BLM, Cody Field Office)**[17] Archaeological Collaboration in Northwest Wyoming: Recording BLM Sites with College Students**

This paper reports on a developing collaboration in northwest Wyoming between Northwest College (NWC) and the Bureau of Land Management, Cody Field Office (BLM). The collaboration began as an informal partnership where college students visited prehistoric archaeological sites on BLM land as part of an extra credit field trip. This past fall, the partnership became more substantial as now an entire NWC course has been built around recording BLM sites. Using a range of recording techniques both ancient (tape, compass, paper) and modern (drone, photogrammetry) students documented a prehistoric stone circle ("tepee ring") site in Park County, Wyoming. The site has seen increasing impact from proliferation of Off-Highway-Vehicles, which instilled a tangible sense of stewardship for the students. In addition to learning field methods, the students applied the newly acquired data to complete a Wyoming Cultural Properties Form. The project is mutually beneficial in that NWC students get some hands-on experience doing archaeological fieldwork and the local BLM office gets much-needed documentation about cultural resources under their jurisdiction.

Smith, Jane**[12] The Ranger Boat Chugach**

The Forest Service in Alaska has long relied on marine vessels to access the wild and remote country of the Chugach and Tongass National Forests. The MV Chugach, a ranger boat listed on the National Register of Historic Places, was integral to successful forest administration and the maritime history of the Pacific Northwest. Launched in 1925 she influenced the regional economy while providing for the welfare and safety of isolated communities and vessels in distress. Her role in revealing the rich and complex cultural identity of Alaska Natives is well documented, not only by the hundreds of archaeology sites discovered off her bow but by the likes of noted archaeologists and anthropologists who plied Alaska waters. Frederica de Laguna, Kaj Birket-Smith, Aleš Hrdlička and Robert F. Heizer all spent time aboard the Chugach visiting villages and staging significant excavations.

Smith, Jaye**[343] Moderator**

Smith, Jen [17] see Guilfoyle, David

Smith, Jolene**[177] Discussant**

[385] *Chair*

Smith, Karen (South Carolina Department of Natural Resources), Meg Gaillard (South Carolina Department of Natural Resources) and Sean Taylor (South Carolina Department of Natural Resources)

[88] *Archaeological Salvage at Pockoy, a Late Archaic Period Shell Ring Site on the Botany Bay Heritage Preserve, Charleston County, South Carolina*

Coastal property owners and managers face a range of ever-growing threats, from frequent flooding to wholesale land loss, as the effects of anthropogenically induced climate change come home to roost. The problem is particularly acute for land managers of archaeological sites already at or near sea level. Pockoy (38CH2533), a late Archaic period shell ring site on the Botany Bay Heritage Preserve, Charleston County, South Carolina, is one such site. Land loss on the windward side of Pockoy Island is occurring at an astonishing rate of about 9m a year, causing direct and irreparable harm to Pockoy 1, one of the two rings that make up 38CH2533. The 60m diameter shell ring will be gone by 2025, if erosion rates hold. In this poster, we present our efforts to recover information about this significant site before it is lost forever.

Smith, Karen [168] see Stephenson, Keith

Smith, Kevin (Haffenreffer Museum, Brown University)

[31] *EAGERs and RAPIDs – Small Grants with Big Outcomes at Surtshellir Cave, Iceland*

Anna Kerttula's stewardship of NSF's Arctic Social Sciences program not only expanded opportunities for large-scale collaborative research projects in the North, but also increased opportunities for supporting smaller "high risk" and "time-sensitive" projects through the EAGER and RAPID programs. These smaller projects, funded at the discretion of the program officer, generally attracted less attention but had the potential to generate significant results, set larger projects in motion, or resolve crisis situations efficiently.

In this presentation, I discuss my own experience with EAGERs and RAPIDs in the re-investigation of a unique Viking Age site located inside a lava cave within Iceland's rugged interior. While an EAGER initially allowed us to test the capabilities of an NSF-funded photogrammetric program inside the confined setting of a cave, the work done on that small project revealed the presence of unanticipated intact deposits that were threatened not only by unregulated tourism but also by the very work we had done. A subsequent RAPID allowed us to mitigate that risk through the site's excavation, producing new and surprising data on this unique site that has forced a reconsideration of its role and of myth, ritual, and leadership in Viking Age Iceland and perhaps beyond.

[138] *Moderator*

Smith, Kevin [348] see Meeks, Scott

Smith, Kimberly

[265] *The Western Gateway: Identification and Recommendation of the Hoosac Tunnel National Register Historic District*

The Hoosac Tunnel is a 7.6 km long railroad tunnel within Hoosac Mountain located in northwestern Massachusetts, extending between the towns of Florida and North Adams. The project was deemed of utmost value to encourage efficient trade between opposite sides of the Hudson River, which is why, regardless of its obstacles, the construction continued and was completed by 1877. Overall, the construction of the Hoosac Tunnel was and remains one of the largest engineering feats within North America. The Hoosac Tunnel itself was listed on the National Register of Historic Places in 1971, however, none of the associated structures required for the construction (e.g. the Deerfield dam and compressor building and machine shop) had been documented, let alone assessed for eligibility for inclusion in the National Register of Historic Places. A recent hydroelectric relicensing project within the region, required under Section 106, has identified seven archaeological areas associated with the construction of the Hoosac Tunnel, and as a result, has recommended the creation of the Hoosac Tunnel National Register Historic District. This paper will discuss the recent findings and their

association with the construction of the Hoosac Tunnel.

Smith, Kimberly [265] see Donta, Christopher

Smith, Maria (Syracuse University)

[331] *Where the River Flows: Water Politics and Textile Production in Colonial Peru*

Water is intrinsically linked to textile production. The dye process requires a substantial amount of water to acquire a consistent and proper color. Colonial textile mills, known as *obrages*, were strategically built near bodies of water for this reason. *Obrajes* significantly shaped colonial water politics. Their presence on the water changed waterscapes, or the way that local communities culturally and sensorially interacted with the water. *Obrajes* additionally altered the waterworld by changing how society and water sources were connected. The *obrages* policies altered traditional textile production roles, often among new gendered and racialized lines, thus changing the ways people were connected with water. This paper focuses on the *obraje de San Marcos de Chincheró* (Ayacucho) to examine how *obrajes* changed the waterscape and the waterworld of the region. The *obraje de San Marcos de Chincheró* located in the Ayacucho region of Peru operated from the 1570s through the 1820s. Built on a Pre-Hispanic sacred landscape the *obraje* significantly defined how people interacted with and experienced the nearby Huancapi river and a tributary which runs alongside the *obraje* site. The *obraje* provides an excellent case study to understand the relationships between water politics and textile production in Colonial Peru.

Smith, Mark [129] see Magoon, Dane

Smith, Michael (Arizona State University)

[23] *Temporary Aggregation Sites in the Past: Are They Really So Strange and Anomalous?*

Recent research suggests that temporary aggregation sites were more common in the past than many traditional models would predict. Why have scholars failed to recognize these sites? Why do they seem so strange? Beyond the development of more refined methods of settlement analysis, a major reason is a pervasive conflation of urbanism and social complexity. While these two processes more often than not co-occurred in the deep past, each may exist without the other. A growing number of archaeologists (including Justin Jennings and David Wengrow) are now suggesting that urban settlements preceded states in the past. I present a sketch of a simple model that explores the drivers of aggregation and dispersion, for hunter-gatherers, village farmers, and complex polities. There are strong economic and social reasons to resist aggregation, and it may take serious threats of violence or conquest to overcome these forces. But, social complexity can thrive in the absence of permanent urban centers, as we know from Anglo-Saxon England and some of the case studies in this session. An appreciation of the nature and diversity of temporary aggregation sites can help us develop better explanations of settlements and urban dynamics in the past.

[225] *Discussant*

[23] *Chair*

Smith, Michele (Haffenreffer Museum of Anthropology)

[31] *Norse Textiles at the Western Edge of the North Atlantic*

Anna Kerttula's vision of Arctic research incorporated a desire to see female scholars succeed and work on issues pertaining to women's lives in the North. Three NSF-funded grants from Arctic Social Sciences, focusing on textiles as women's production, used over 1500 textiles from Iceland, Greenland, the Faroes, and Scotland to emphasize the work of women in the North Atlantic's past and have helped contribute to a gendered archaeology of the North. In this paper, I will focus on textiles from Norse Greenland, where new data indicates that the emergence of weft-dominant cloth was a strategic response by Greenlandic women to climatic deterioration at the start of the Little Ice Age. Moving farther west, new NSF-funded research on sporadic textile finds from the Canadian Eastern Arctic demonstrates that while the Norse did travel these northern seas, and interacted with Indigenous people, leaving evidence including *vaðmál* from Skraeling Island and northwest Greenland, they did teach not the Dorset to spin as was previously assumed. In these NSF funded projects, textiles have been analyzed as valuable expressions of culture, rich with meaning and significance,

providing new details about Norse subsistence, culture and life style at the edge of the medieval European world.

[138] *Moderator*

Smith, Monica L. (UCLA)

[24] *Discussant*

Smith, Morgan (Texas A&M University), Shawn Joy (SEARCH, Inc.), Timothy de Smet (Binghamton University) and Michael Faught (SEARCH, Inc.)

[325] *Toward the Remote Identification of Stone Tools in Submerged, Buried Contexts Using Acoustics*

Since the inception of geophysical survey, archaeologists have longed for the ability to detect the presence or absence of artifacts in buried contexts remotely. This ability is particularly desirable underwater, where accuracy in site location and efficiency in excavation are paramount given the expense and logistical burden associated with performing archaeology underwater. Generally speaking, traditional remote sensing instruments used in area survey, such as side-scan sonar and magnetometers, only identify underwater historic sites, or in rare circumstances, exposed prehistoric sites. The search for submerged prehistoric sites in buried geologic contexts largely relies on identifying high-probability landforms through sub-surface geophysics or bathymetric survey. However, recent research pioneered by Dr. Ole Grøn and colleagues demonstrates the potential for using acoustics to identify and map offshore prehistoric sites by remotely identifying human-worked flint. Here, we test the reliability and replicability of this method on submerged prehistoric sites in Florida. We present the results of controlled laboratory experiments on the acoustic resonance signatures (in kHz) of different stone tool raw material types. We then present the results of sub-bottom sonar surveys of fresh and saltwater prehistoric sites in Florida. Last, we discuss the implications of our findings for CRM, government, and academic archaeology.

Smith, Nicole (University of Michigan)

[8] *Materiality and Memory: Understanding the Clandestine Movement of Child Migrants along the U.S.-Mexico Border*

The Undocumented Migration Project (UMP) is a long-term anthropological analysis of clandestine border crossings between Northern Mexico and Southern Arizona that began in 2009. The UMP uses a combination of ethnographic and archaeological approaches to understand the distinct experiences of migrant subpopulations. This study focuses on child migrants and how they are represented through public discourse and the archaeological record. Lab analyses were conducted on the artifacts that the UMP has collected to examine how child migration is represented in the archaeological record. Archival research was utilized to investigate statistics related to child migration and the ways in which the subject is discussed in popular media and policy reports. Additionally, interviews were conducted with undocumented youth regarding their immigration experience. The statistics indicate that tens of thousands of children are migrating, however, the minute amount of archaeological evidence does not correlate. This research project aims to demonstrate the relationship between the materiality of migrant children and their narratives and memories in order to make these lived experiences visible. Little work has been conducted on understanding child migrants, therefore this study sets out to shed light on their experiences and the ways in which we think about children migrating across borders.

Smith, Oliver (University of Copenhagen), Glenn Dunshea (University of Copenhagen), Robin Allaby (University of Warwick) and Tom Gilbert (University of Copenhagen)

[253] *Beyond the Genome: Unravelling Life Processes Using Epigenomes and Ancient RNA*

The power of ancient DNA to archaeological research needs little introduction. Recent technological revolutions in DNA sequencing have allowed entire populations, lineages, ecosystems, and epidemics to be reconstructed. While these large-scale studies address 'big picture' questions of prehistory, more subtle, specific questions about past organisms' interactions with their surroundings - for example, those surrounding domestication, sudden palaeoclimate change, or local adaptation - can also be asked as part of wider archaeological themes. Recent technological developments allow complex, elusive questions of 'in vivo' processes - what genomes actually do, as opposed to what they are - to also be asked as archaeological questions, through the lens of evolutionary biology. By studying ancient epigenomes, for example, we can see how and when genes are 'switched' on or off, and better understand past, causative environmental events. By sequencing ancient RNA, we are moving towards confirming these processes and more: new research shows the potential

to identify otherwise unknown tissues, uncover a greater range of palaeopathogens, and even observe their hosts' genetic responses at the moment of death. Here we present several case studies of our original research using these techniques, illustrating how the various layers of ancient genomics can help serve wider archaeology.

Smith, Ryan (University of Pittsburgh)

- [18] *An Alternative Pattern of Coalescence: A Study of Architecture and Organization at a Non-fortified, Pre-Inca Town in the Southern Highlands of Peru*

This paper presents a detailed analysis of architecture and spatial organization at Maukallaqta de Nuñoa, a pre-Inca site in the highlands of southern Peru. Maukallaqta was constructed at a time when societies across much of the central Andean highlands were constrained by persistent threats of violence and political decentralization, as indicated by the coalescence of large communities perched atop hills with large man-made walls, reinforced natural defenses, sweeping views to survey the surrounding landscape, and often very little in the way of permanent architecture other than relatively simple 'round-house' foundations and defensive walls. Contrasted by its immediate neighbors which all conform to these patterns, Maukallaqta's residential sector is distinguished by the presence of over 400 well-made domestic structures of relatively uniform size, form, construction, and orientation along with several dozen above-ground chullpa burial towers scattered throughout. The organization and spatial relation of these structures in addition to the site's non-fortified nature provide immediate clues as to the exceptional use of this space during this time. Preliminary results based on site-wide architectural mapping and further GIS analysis focus on comparing site planning, use of space, and nature of social life at Maukallaqta with that of contemporaneous hillforts in the Andes.

Smith, Susan and Karen Adams (Consulting Archaeobotanist)

- [86] *Subsistence and Daily Needs at the Basketmaker Communities Project: Insights Through the Microscope from Plant Remains, Wood, and Pollen*

Large archaeobotanical datasets concentrated in a specific region are rare, especially those representing multiple sites excavated over several years. The Basketmaker Communities Project is one such rare research program that resulted in the analysis of hundreds of macrobotanical, flotation, and pollen samples. This exceptional record documents the intense Basketmaker III (A.D. 500-750) investment in maize agriculture and an intimate knowledge of the useful resources in these peoples' home landscapes. Recovered plant remains represent species from local canyons, water sources, and the fertile rolling hills of Southwest Colorado.

Smith, Tam (The University of Queensland)

- [240] *Coastal Southeast Queensland, Australia: An Historical Ecology Model of Mid- to Late Holocene Settlement and Subsistence*

Coastal Southeast Queensland covers an area stretching from Fraser Island in the north to the border of northern New South Wales in the south, and possesses the best documented and most intensively scrutinized coastal archaeological record in Australia. The area was a major focus in the late 1970s when the Moreton Regional Archaeological Project, a long-term multi-stage regional project, was established at The University of Queensland to coordinate archaeological investigations. Initial studies provided the basis for a regional chronology, as well as models of settlement and subsistence based on the exploitation of the area's rich marine resources. In the time since the original work was conducted the research foci for coastal archaeology have moved toward more complex issues such as assessing the impact of humans on marine ecosystems, the identification of patterns in resource exploitation strategies, and the use of molluscs as proxy evidence in local and regional environmental reconstructions. Re-analysis of midden deposits from differing locations in Southeast Queensland in the context of recent regional palaeo-environmental reconstructions indicates considerable variability in site characteristics across the region, strongly influenced by local environmental factors.

Smith, Tara D. [405] see Stanley, Brendan

Smith, Taylor [109] see Glencross, Bonnie

Smushko, Svetlana [253] see Kim, Alexander

Snead, James (California State University Northridge)

[19] *Discussant*

Snitker, Grant (Arizona State University) and Sean Bergin (Arizona State University)

[47] *Did the Neolithic Revolution Revolutionize the European Landscape? An Analysis of the Relationship between Climate, Vegetation, and the Arrival of Agro-pastoral Subsistence*

Archaeologists have long recognized the spread and adoption of agro-pastoral subsistence in Europe as a transformative economic and social process. While many studies have tied site-specific changes in vegetation communities to the arrival of the Neolithic, very few attempts have been made at synthesizing these data to examine the Neolithic revolution in Europe as a whole. Our recent research highlighted transitions in vegetation communities associated with the arrival of Neolithic agriculture across much of Europe through a segmented regression analysis of over 400 pollen records. In many cases, the timing of these shifts coincides with the arrival of Neolithic agro-pastoral land use, but not all. In this paper, we extend our analysis to focus on how changing climate associated with the early and middle Holocene may help explain vegetation changes not tied to the arrival of the Neolithic. Moreover, we now explore how intensifying land use related to post-Neolithic population growth may have resulted in delayed vegetation responses beyond the initial Neolithic revolution throughout Europe.

Shoeck, Christophe, Rick Schulting (School of Archaeology, University of Oxford, UK), Michael Pateman (Turks and Caicos National Museum, Grand Turk), William F. Keegan (Florida Museum of Natural History) and Joanna Ostapkowicz (School of Archaeology, University of Oxford, UK)

[37] *Coming to the Islands: Strontium and Oxygen Isotope Investigation of Human Mobility in the Bahamian Archipelago*

Initial settlement of the Bahamian archipelago is currently thought to have derived from Cuba and/or Hispaniola. The first forays may have been seasonal, with permanent settlement not in evidence until ca. AD 1000. As well as initial settlement, we might expect a continued movement of individuals between the Greater Antilles and the Bahamas. Strontium and oxygen isotope analyses of human dental enamel provide the opportunity to explore both early settlement and subsequent movements. A recent strontium isotope study of modern plants from the Bahamian archipelago demonstrates very homogeneous results, so that outsiders from different geologies should be readily apparent. This paper presents the first strontium and oxygen isotope results on human remains from the archipelago, with associated radiocarbon dates enabling an investigation of the temporality of migrations.

Snow, Cordelia [367] see Trigg, Heather

Snow, Meradeth [110] see Clark, Lauren

Snow, Susan [3] see Hernandez, Jorge

Snow, Susan (San Antonio Missions National Historical Park)

[85] *Mindful Preservation: Lessons Learned from the 2016-2018 Preservation Workshops at San Antonio Missions NHP*

From 2016-2018 San Antonio Missions National Historical Park along with support from the Center for Cultural Sustainability at University of Texas, San Antonio, Mission Heritage Partners and the Vanishing Treasures Program, has sponsored a preservation workshop on stone construction, lime plasters, and painted plasters. The workshop has included roundtable topics on preservation philosophy as well as hands-on demonstrations and learning. This paper will discuss the goals of the workshops and lessons learned. A best practices manual and a final symposium are planned for 2019-2020.

Snyder, Daniel [401] see Curteman, Jessica

Snyder, Thomas (Vanderbilt University), Natasha P. Vang (Vanderbilt University) and Tiffiny A. Tung (Vanderbilt University)

[286] *Reconstructing Childhood Diet in the Aftermath of Wari Imperial Decline: Stable Carbon Isotope Analysis of Human Dentition from Huari-Monqachayoq-Solano, Peru*

Stable isotope analysis can illuminate aspects about a population's diet and migration patterns otherwise unavailable through skeletal analysis. The population for this study is a mass burial at the site of Huari-Mongachayoq, excavated by Francisco Solano in the 1980s. The skeletons date to the second half of the Andean Late Intermediate Period, ca. 1275 – 1430 CE, approximately two centuries after the political decline of the Wari Empire. This time was also characterized by a long-term drought, which may have affected agricultural production, thus affecting the diets of these post-Wari individuals. Our study uses stable carbon isotope analysis of human dentition to explore how specific aspects of childhood diet changed, if at all, from Wari to post-Wari times. Furthermore, because dental enamel forms during childhood, we can investigate whether juvenile males and females consumed distinct diets, an insight that can shed light on gender norms and gender roles in post-Wari society. We also explore how isotope values differ between those with cranial modification and those without. Forty-eight enamel samples from this population will be compared to previously published data from the same site, which showed $\delta^{13}\text{C}$ values ranging from -7.9‰ to -2.3‰, and the mean $\delta^{13}\text{C} = -4.7\text{‰}$ (s.d.=1.5).

Sockalexis, Chris [136] see Wheeler, Ryan

Soderberg, John (Denison University)

[351] *Care and the Disregard of Care in Medieval Ireland*

In recent years, bioarchaeologists have become interested in developing archaeologies of care. Their goal is to articulate evidence of disease/trauma/impairment on skeletons with social processes that shape healthcare and other forms of assistance. Realizing the full potential of this perspective requires deepening understanding of care as a social phenomenon and explaining why scholars have often disregarded care as an important social dynamic. This paper offers two steps toward developing an archaeology of care, using medieval Ireland as a case study. The first expands application of the perspective to a different type of archaeological data: animal bones. Zooarchaeological reports on "pathologies" are often little more than lists of conditions identified. This paper will examine how such data on the health of animals reflects changing social conditions in medieval Ireland. Second, the paper considers how inquiry into medieval Ireland has been impaired by disregard for care and how establishing care as an important social dynamic provides new insights.

[266] *Discussant*

Soderland, Hilary (Attorney at Law)

[377] *Discussant*

Sogaard, Sofie [123] see Joseph, Willky

Soler, Manuel (Posgrado en Antropología Universidad Nacional Autónoma de México), Ana Aguirre (Instituto de Investigaciones Antropológicas - Univ) and Verónica Ortega (Instituto Nacional de Antropología e Historia -Teo)

[110] *Estudio de la variación del ADN mitocondrial en entierros de Tlailotlacan, Teotihuacan*

Teotihuacan fue una ciudad del periodo Clásico (100-650 d.C.), que tuvo una gran interacción con otras áreas de Mesoamérica como el Occidente y el Golfo de México, el Área Maya y Oaxaca. Este trabajo se centra en el análisis de restos óseos del barrio oaxaqueño en Teotihuacán, que también se conoce como Tlailotlacan. En este barrio existe evidencia de intercambio de bienes que proceden de Oaxaca, del Valle de Toluca y del Occidente de México. El análisis de marcadores moleculares del DNA mitocondrial humano en conjunto con los datos geográficos, arqueológicos, históricos y culturales permiten realizar estudios a nivel regional, para comprender mejor la composición genética y dinámicas de las poblaciones antiguas. Este estudio se centra en conocer la estructura genética de la colección ósea de los antiguos habitantes de Tlailotlacan, a partir del análisis de los haplogrupos amerindios del DNA mitocondrial. DNA de fragmentos de huesos largos y falanges de 20 individuos fue extraído para calcular distancias genéticas con FST, de acuerdo a la distribución de haplogrupos mitocondriales. Un flujo génico fue reconstruido entre otros barrios teotihuacanos y grupos del

Centro y Sur de México de la época prehispánica del período Clásico y Posclásico.

Solis, Kristina (University of Texas at San Antonio)

- [111] *Postmarital Residence Patterns of Late Archaic Hunter-Gatherers from the Loma Sandia (41LK28) Site, Live Oak County, Texas: An Analysis Using 87Sr/86Sr*

Archaeologists researching hunter-gatherers in the Texas Coastal Plains (TCP) and Central Texas have noted differences between sexes in carbon and nitrogen isotope studies. One explanation offered for these differences is due to mate exchange, specifically patrilocality. Evidence for hunter-gatherer patrilocality in Texas also comes from the ethnographic record but there has been little other archaeological evidence to evaluate this possibility. The study presented here will utilize strontium (Sr) isotope analysis as a more direct archaeological method to evaluate postmarital residence patterns in the Late Archaic TCP. Human male and female 87Sr/86Sr were analyzed and compared to each other, and also to the local faunal bioavailable strontium, in order to understand postmarital residence patterns. This presentation reports the results of strontium isotope ratio (87Sr/86Sr) analysis from 47 samples from Loma Sandia (41LK28), a Late Archaic site in Live Oak County, Texas.

Solis, Reyna (MUSEO DEL TEMPLO MAYOR-INAH) and Emiliano Melgar (Museo del Templo Mayor)

- [39] *Archaeometric Characterization of the Lapidary Objects from Teopancazco and Xalla, Teotihuacan*

One of the main goals of the archaeological researches in Teotihuacan is the analysis and classification of the material culture in order to distinguish local and foreign goods among this multiethnic settlement. In this paper, we will present different archaeometric studies applied to the lapidary assemblages from the neighborhood center of Teopancazco and the palace compound of Xalla. These objects were analyzed by non-destructive techniques (UVF, IRR, OM, SEM-EDS, and μ Raman) to identify their chemical composition, mineralogy and provenance, and the characterization of their manufacturing traces. We detected raw materials from diverse geological origins, like jadeite, green quartz, serpentine, white and green travertine, amazonite, pyrite, slate, and marble, among others. With the traceological analysis we distinguish four technological patterns. Their comparison with the lapidary traditions developed in Classic Mesoamerica allowed us to identify them as Teotihuacan, Mezcala, Maya, and Zapotec. Also we appreciate specific relationships and cultural preferences between some types of raw materials, objects, and techniques. Finally, the temporal and spatial comparison of these lapidary items with other areas at Teotihuacan showed the existence of different mechanisms of production and distribution of these goods.

Solis, Reyna [192] see Melgar, Emiliano

Solleiro-Rebolledo, Elizabeth (Instituto de Geología, UNAM), Georgina Ibarra (Posgrado en Ciencias de la Tierra, UNAM) and Sergey Sedov (Instituto de Geología, UNAM)

- [38] *The Role of Pedogenesis in Palaeosols of Mexico Basin and Its Implication in the Paleoenvironmental Reconstruction*

Most of the paleoenvironmental information for the Basin of Mexico for the basin comes from sedimentary proxies, which unfortunately are incomplete for the terminal Pleistocene and the Holocene. In this paper, we present a temporal and spatial reconstruction of past soil cover in the south and north of the Basin of Mexico, during the MIS 2 and 1 (Marine Isotope Stage 2 and 1). Palaesol profiles were selected from three locations (Cuiculco, Copilco, and Avon) in the south basin, and compared with soils studied in the Teotihuacan valley, Pachuca, and Texcoco at north of the basin. The results show that the Pleistocene soil cover is more homogeneous, dominated by the presence of Luvisol type soils with secondary carbonates, dated to around 20000 cal yr BP. During the Holocene, the soil distribution changes, with Andosols developing in the south while Vertisols and Calcisols form in the north. The new soil distribution reflects differing climate conditions during the Holocene, conditions which characterize the basin today. The Andosol cover in south basin although represents the result of short term pedogenesis, are considered high quality soils and attractors for the settlement of sedentary villages.

Solometo, Julie [213] see Rautman, Alison

Solometo, Julie (James Madison University), Wesley Bernardini (University of Redlands), Dalton Olson (James

Madison University) and David Biddle (James Madison University)**[258] Shields and Shield Bearers in Hopi Rock Art**

Shields and shield bearers are recurrent and widespread motifs in Pueblo IV (AD 1300-1540) rock art. Polly Schaafsma has argued that depictions of shields and shield bearers in the Rio Grande were part of an iconographic complex that expressed ideas about warfare and war ritual. When inscribed on the landscape, shields may have recalled actual warfare, but they also may have been intended to attract supernatural protection and to project the village's strength and willingness to defend itself. Schaafsma has argued that war iconography is more frequent, diverse, and complex among the protohistoric Eastern Pueblos, suggesting the eastern origins of the imagery and associated concepts. However, her conclusions are based on a limited sample of Western Pueblo rock art. This poster evaluates Schaafsma's claims about Western Pueblo war iconography with more than 100 representations of shields and shield bearers recently recorded on the Hopi Mesas. Potential sources of shield iconography at Hopi are explored with reference to Pueblo III (AD 900-1300) rock art and through Hopi migration accounts. Temporal and spatial variability among Hopi shield depictions suggest that multiple communities of practice produced shield iconography and that they may have had diverse origins or influences.

Somerville, Andrew (Iowa State University)**[81] Reconstructing Past Environmental Landscapes in the Semi-arid Regions of North America Using Stable Isotope Analysis of Faunal Bones**

Stable isotope values of carbon, nitrogen, and oxygen in animal bones are influenced by the environmental and climatic conditions present during the lifetime of the organisms. Stable isotope analysis of faunal bones thus permits the reconstruction of past environmental landscapes of archaeological settlements. This paper presents stable isotope results from analyses of rabbit and hare bones at the archaeological sites of La Quemada (Zacatecas, Mexico), La Ferreria (Durango, Mexico) and Pueblo Grande (Arizona, USA). The environmental implications of the results are discussed and contextualized in relation to the known culture history of the region.

Sommer, Caitlin (Crow Canyon Archaeological Center)**[86] Oversized Pitstructures in the Central Mesa Verde Region**

The Basketmaker III period (A.D. 500-725) in the northern U.S. Southwest was typified by new technologies, new social and religious practices, and groups of people from distinct cultural backgrounds living in close proximity for the first time. In this sociopolitical milieu, new architectural forms played an important role in the development of larger communities. Oversized pitstructures, such as the one on the Ridgeline site (5MT10711), were one such kind of architecture. These structures had floor areas of greater than or equal to 60 square meters, making them significantly larger than other domestic structures within a community. This paper explores the rise and role of oversized pitstructures in the central Mesa Verde region.

Sonderman, Elanor**[89] Evaluating Sandal Types and Chronologies in the Lower Pecos Region of Texas**

Recent research on an existing archaeological collection from Conejo Shelter (41VV162) in Texas explored potential spatial and temporal changes within sandal styles of the Lower Pecos. A sample of 122 sandals, excavated in the late 1960s and stored at the Texas Archeological Research Lab were examined. This research produced 30 new radiocarbon dates for the region, including 17 directly dated sandals. These new dates refined date range estimates based on lithic artifact types - and indicate that the site was occupied as early 7,500 years ago. While the data were not robust enough in early time periods to conclusively suggest distinct stylistic changes through time, some regional affinities were observed. Additionally, a small subset of the sandal assemblage was further evaluated for potential use in children's play or craft learning. Beyond expanding our current understand of sandal use and manufacture in the Lower Pecos, this research also promotes and exemplifies the potential of conducting collections-based archaeological research.

[89] Chair**Sonenshine, Krista (The Evergreen State College) and Ulrike Krotscheck (Professor)****[107] Excavations at the Bush Homestead in Tumwater, Washington**

The family of George Bush has been described in the written record as the first family of mixed white and African American heritage to settle in Washington territory. Systematic excavation of this homestead was not carried out until 2015, at the request of the landowners. This paper describes three seasons of excavation, including two field schools, of the Evergreen State College, and summarizes the results. The excavations uncovered several hundred diagnostic artifacts from the 19th and early 20th centuries, helping to validate written and oral histories of the family. First, surveys were conducted at the site, identifying two main areas of interest: one, the possible location of one of the original barns, the other, possibly the location of Bush's original split log cabin. The 2015 and 2016 field schools yielded numerous diagnostic artifacts clearly showing a consistent agricultural use of the land as well as trade beads and other items from 19th century daily life. The 2018 season focused on a midden deposit, which contained artifacts of similar nature as well as carbonized paper. The archaeological evidence corroborates the historical descriptions of the Bush's livelihoods as well as of their amicable trade relationship with sound Puget Sound Native peoples.

Sørensen, Lasse (The National Museum of Denmark)**[141] Jadeite Axes in the Aegean and Anatolia—The Emergence of a New Network**

The largest known jadeite source in the Aegean is located on the Cycladic island of Syros. During sampling, several patinated flakes and preforms of considerable age were identified, demonstrating, for the first time, the presence of several knapping places around the large jadeite boulders. In order to classify the specific trace elements from the source of Syros a series of investigations has been initiated using radiospectrometry, XRD, and ICP-analysis.

In connection with the study of jadeite axe assemblages in the Aegean and Anatolia, several Neolithic and early Bronze Age sites contain these rare objects, thus allowing comparison between larger geological jadeite and archaeological artefacts. The results indicated that the axes originated from jadeite sources in the Italian Alps, the local source on Syros and unknown sources. Another ground-breaking result was the discovery of jadeite axes originating from Syros, found at the site Cukurici Höyük in Western Anatolia. The axes were found in layers dated by 14C analysis to 6500 cal. BC, making them the earliest evidence of jadeite exploitation in the Eastern Mediterranean region, which was contemporary with the first farmers in Western Anatolia.

Sorenson, Kalib [122] see Ferrales, Esmeralda

Sorresso, Domenique**[204] Analyzing the Utilization of Shell in Chickasaw Pottery Using Petrographic and Chemical Composition Techniques**

Archaeological and ethnographic records indicate that a change in ceramic technology from recent shell to fossil shell temper took place as the contact period Chickasaw of Mississippi migrated north and adjusted to upland settlements of the Blackland Prairie. While this shift is widely accepted within the archaeology of the region, it can be difficult to apply to specific ceramic assemblages. In order to examine the phenomenon of Chickasaw shell tempered ceramics in more detail and investigate the proposed shift, sherds from three sites in northeastern Mississippi have been analyzed in detail using ceramic petrography, X-ray fluorescence and scanning electron microscopy. Using these techniques, analysis was completed to discern the characteristics of the recent shell and fossil shell tempers, determine the provenance of the ceramics, and understand if elements of the ceramic creation process, such as paste preparation and recipes, were consistent between sites or individual to a single site. Results show compatible versions of recent shell and fossil shell paste recipes across the sites were followed using clay local to each site. This data also demonstrates that macroscopic temper identification is helpful for rough sortability, but fails to recognize key characteristics, such as the use of both tempers simultaneously.

Sosa Aguilar, Danny [381] see Fitzsimons, Chandler

Sosa Aguilar, Danny and Chandler Fitzsimons**[401] Collaboration, Accountability, and Performativity: Defining Collaboration in Northern New Mexico Archaeology**

In recent years, collaborative approaches with descendant communities play an important role in archaeological research. One single understanding of "collaboration" does not prepare the archaeologist for the pitfalls and problems of engaging with communities. The result is a multitude of methodological approaches that display as a "continuum" of archaeological projects with collaborative experience that is essential in developing collaborative approaches. "Continuum" and "spectrum" are words that resonate with terms usually associated with Butler's "performativity" in gender identity, but in this case,

collaboration is not defined by the archaeologist's or community's intention, but rather by the outcome or result of knowledge production from working together. The result allows the archaeologist to be accountable to all stakeholders, participants, and partners in all aspects to build community capacity while incorporating multiple forms of knowledge. A local or descendant community can either make or break an archaeological project making collaboration detrimental to several milestones in a project related to research questions, permits, and distribution of knowledge. Learning from previous collaborative projects and working together with the Merced del Pueblo de Abiquiu in northern New Mexico on issues of knowledge distribution gives this descendant community an opportunity to share their history in their own terms.

Soto, Gabriella (Trinity College)

[193] *Absent and Present: Contested Landscapes and Undocumented Migration at the U.S.-Mexico Border*

In pursuing archaeological research on contemporary undocumented migration at the Arizona-Sonora border, it became necessary for me to address the myriad and potent absences that made the entwined processes of undocumented migration, humanitarian efforts on behalf of migrants, and border security aimed against migrants tangible to me through scales of space and time. I confronted a landscape filled with traces of undocumented passage, but where undocumented people were seldom encountered, for many reasons. These traces, most often in the form of intimate survival belongings left behind by migrant travelers, were also changing and disappearing as ephemeral objects subject to degradation in the desert and active removal through organized "trash" clean-ups. Contextualizing all of this was my knowledge of the thousands of deaths and disappearances of undocumented travelers that were also largely absent from view. In this paper, I pair Bender and Winer's seminal work on contested landscapes with Bille, Hastrup and Soerensen's work on the Anthropology of Absence, outlining how material engagements with the conflict landscapes of contemporary undocumented migration must also engage absence. On a broader scale, I query how the power engagements that produce contested spaces might be better understood through an analysis of absence.

Soto, Maria [32] see Mercader, Julio

Soto, Maria (University of Calgary), Siobhan Clarke (University of Calgary), Jamie Inwood (University of Calgary), Patrick Roberts (Max Planck Institute for the Science of Human History) and Julio Mercader (University of Calgary)

[334] *Decontaminating Archaeological Dental Calculus: A Protocol for Reliable Extractions*

During dental calculus formation, mineralization preserves microbotanical remains. These provide paleoenvironmental and dietary information. However, modern contaminants on archaeological samples overlap with target species thus necessitating decontamination procedures. We present an efficient protocol to avoid the presence of contaminants: a) testing the efficacy of Sodium hydroxide, calcium hydroxide, sodium EDTA and alpha-amylase when degrading starch polymers; b) synthetizing artificial dental calculi, from co-precipitating ammonium phosphate and calcium chloride; c) decontaminating samples under controlled conditions; and d) decalcification with EDTA and hydrochloric acid. Precipitation of synthetic calcium phosphate entrapping potato starches simulated the mineralization process in the oral cavity. These matrices were contaminated with a corn-glycine solution (1ml: 1.11M-2.66 M) to simulate the effect of modern contaminants. The immersion of samples in sodium hydroxide (1ml: 0.5M) for 24h, and deionized water (15ml), eliminated the corn granules. Starches originally trapped in the matrices remained undamaged, showing higher resistance to enzymatic and chemical reactions. Calculi were then decalcified using EDTA (1ml: 0.5M) and hydrochloric acid (1.5ml: 0.5M). This protocol has been applied to decontaminate calculi from a late Holocene Congolese individual, with a known C4-dominated diet, demonstrating the elimination of modern contaminants allow stronger paleo reconstructions.

Soto Maguino, Jorge Luis [398] see Lofaro, Ellen

Southard, John [194] see Cureton, Travis

Souza De Lima, Jelly Juliane

[185] *Ritual Commensality in the Lower Amazon on the South of Amapá State, Brazil, During the Precolonial Period*

In many Amerindian worldviews, commensality pervades to different degrees both mundane and ritual spheres, being a way of caring and building relationships as revealed by available information from ethnology and ethnohistory. Based on these issues, this paper explores the central concepts of body fabrication and ritual commensality as possible ways to interpret

two villages in the south of Amapá State, Brazil, in the lower Amazon river, dating to the 8th to 15th centuries AD. The archaeological structures are associated with two distinct cultural complexes, Jari and Koriabo. These cultural complexes present, based on the depositional contexts, a formalization of the ceramic deposition and arrangement related to funerary program. Possible interpretations include that the archaeological structures could be markers of differences and sociabilities related to ancestor worship.

Soza, Danielle (University of Arizona), Evelyn Pickering (University of Arizona), François Lanoë (University of Arizona) and Maria Zedeno (University of Arizona)

[8] *Four Horns Lake: Physical and Spiritual Interactions*

Four Horns Lake, located on the southern end of the Blackfeet Indian Reservation in Montana, was surveyed in July 2018 as part of the expansion and rehabilitation project for the Four Horns Dam. Built in the early 1900s, current focus on this dam has induced action to record resources that may be impacted by development. The sacredness of Four Horns Lake to the Blackfeet people is demonstrated by the multitude of associated archaeological sites, stories, and cultural practices. Tipi rings and cairns surround the lake, as do culturally-significant plants and other natural resources. Additionally, the lake is known for being a collection area for Iniskim (ammonites) and the home of Soyeitaapiks (water spirits). This poster will provide an overview of the use and occupation of this area through an archaeological and cultural perspective to comprehensively contextualize and demonstrate the complex culture history of this place concerning pending development.

Spangler, Jerry [35] see Codding, Brian

Sparacello, Vitale (UMR5199 PACEA Université de Bordeaux), Stefano Rossi (DISTAV, Università degli Studi di Genova, Italy), Julien Riel-Salvatore (Département d'Anthropologie, Université de Montréal), Irene Dori (Dipartimento di Biologia, Lab. Antropologia) and Alessandra Varalli (Department of Archaeology, Durham University, UK)

[195] *New Discoveries on Late Upper Paleolithic (Final Epigravettian) Funerary Behavior at Arene Candide (Finale Ligure, Italy)*

The Epigravettian “necropolis” at Arene Candide Cave (Finale Ligure), excavated in the 1940s, yielded a large Late Upper Paleolithic skeletal series consisting of 10 primary burials and six clusters of bones in secondary deposition, accumulated during two distinct phases separated by a few centuries (AMS dates spanning 12,028 – 11,181 and 12,816 – 12,421 cal BP). At the site, older depositions were intentionally moved aside, then bones (especially crania) were selected and rearranged around the new burial. In one case, two individuals bearing skeletal evidence of congenital dysplasias (possibly X-linked rickets) were put in relation through this funerary behavior, suggesting that disease and relatedness may have been factors determining mortuary gestures. New analyses demonstrate that one child burial excavated in the 1940s, and attributed to the Neolithic, belongs in fact to the terminal Pleistocene (12,098-11,827 cal BP). The spatial position of this burial suggests the presence of additional burials in the unexplored layers of the cave. One adolescent individual unearthed in the 1970s presents a radio-ulnar dysplasia compatible with Madelung deformity, a dominant X-linked condition, further suggesting that congenital disease, possibly due to inbreeding, may have been central during life, and during the representation of death, in the Final Epigravettian.

Sparaga, Joseph (USACE), Kelly Eldridge (USACE) and Forrest Kranda (USACE)

[241] *You're Building What Where?: Innovation with MOAs in the Far North*

The U.S. Army Corps of Engineers (USACE), Alaska District conducts numerous undertakings in the Arctic regions of the United States. Many of these undertakings, such as coastal erosion protection and small navigation improvement projects, require Memorandums of Agreement (MOAs) among the USACE, the State Historic Preservation Officer, local governments, land owners, and the combination of federally recognized tribes, Alaska Native village corporations, and Alaska Native regional corporations. Many communities in Alaska have both historic structures and precontact sites either within or in their immediate area. A number of proposed undertakings are also located within National Historic Landmarks, where additional considerations for mitigation are needed. Determining appropriate mitigation of cultural resources requires not only collaboration with all concurring parties, but also taking into account the logistical challenges which come with conducting Section 106 in the Far North. This includes both the distance of communities from roads and port facilities, and working in the variable Arctic environment. These restraints create opportunities for innovative MOAs that benefit communities and protect their cultural resources.

Sparks-Stokes, Dominique (University of Cincinnati) and Kenneth Tankersley**[374] Mineralogical and Chemical Properties of Preclassic Maya Ceramics from Colha, Belize**

This paper examines the question of whether or not Preclassic Maya exploited volcanogenic ceramic raw materials, which have refractory properties such as thermal conductivity, resistance to thermal shock, abrasion, chemical weathering, and thermal decomposition. Scanning electron microscopy, energy dispersive X-rays, energy dispersive X-ray fluorescence, and X-ray diffractometry are used to examine the mineralogical and chemical composition of Preclassic Maya pottery from Colha, Belize. These analyses demonstrate that the pottery was manufactured from ancient volcanogenic minerals, which has significant implications for understanding the Preclassic Maya ceramic technology. Potential sources of these ceramic raw materials are illustrated.

Spaulding, Britta (University at Buffalo)**[279] "Wars are good for the economy": Warfare and Industrialization in Sweden**

Industrial archaeology has been defined in the anthropological literature of the last several decades to analyze the period, related archaeological record, and resultant and surrounding socioeconomic changes of western industrialization—the establishment of large-scale manufacturing—from 1800 CE to the present. In considering a “movement” such as industrialization to be both the result of human agency and of outside conditions around it, I think it is possible, where appropriate, to extend the scope of this sub-field to before the oft-cited mark of 1800 CE. By the 17th century, after the dissolution of the Kalmar Union, Sweden had become a nation-state and would continue to engage in warfare with Denmark for several more centuries. Swedes made preparations for warfare in early modern Europe, with its theaters on land and sea, and increasing sophistication in engaging on both, possible through adapting pre-existing routines of supplementing farming with other economic choices. This background allowed them to increase the scales of resource acquisition, transportation, and ultimately production related to military needs. I look at how industrial archaeology's methodologies and theoretical lenses help to research how early modern, especially naval, warfare was possible with a largely agrarian, rural population.

Speakman, Robert [94] see Napora, Katharine

Speakman, Robert**[316] Things People Do with XRF**

Over the past 15-20 years, archaeological chemistry has moved largely from centralized laboratories of interdisciplinary expertise to decentralized laboratories where expertise often times is lacking. This shift is most pronounced in the widespread adoption and use of inexpensive, compact, highly portable XRF instrumentation. The proliferation of this technology has resulted in an increase in “black box” science where some practitioners analyze anything and everything with complete disregard for foundational studies that demonstrate such an analytical approach is not feasible, desirable, or even possible and/or where the practitioners ignore fundamental issues of reliability and validity in the measurements. In this presentation, I explore published examples of XRF “gone wrong” using case studies solicited from the archaeological science community.

Speakman, Robert [380] see Edwards, Alexandra

Speal, C. Scott (State of Connecticut), Jean Howson (NV5 Global, Inc.) and Leonard Bianchi (NV5 Global, Inc.)**[357] Re-discovery of the Jackson Street “Dog’s Nest” in Waterbury, Connecticut: The First-Generation European Immigrant Experience in New England’s Brass City**

Section 106-mandated review associated with two recent transportation projects—one a City-driven US Department of Transportation TIGER grant program designed to stimulate economic development through local road improvements, and the other a Connecticut State Department of Transportation (CTDOT) undertaking involving construction of a temporary bypass to support repairs to a freeway interchange—resulted in re-discovery of a forgotten first generation immigrant community along the Naugatuck River near downtown Waterbury, Connecticut. Situated in a less-than-pristine location between the city’s famous brass mills, a railroad yard, and a coal gasification plant, this neighborhood was home to

hundreds of predominantly Irish, and subsequently Italian, immigrants between 1850 and 1911 attracted to the labor opportunities provided by the many industrial plants comprising America's 'Brass City'. The cultural resources consulting firm NV5 was tasked by CTDOT with determining what remained of this neighborhood and investigating its historic significance and material integrity through both documentary and archaeological efforts. The resulting investigations have brought to life the trials and tribulations of first generation European immigrants to the United States during the late 19th/early 20th Century, and shed light upon the people who lived in this rough and tumble neighborhood once referred to as "The Dog's Nest."

Spears, Michael [16] see Hopkins, Maren

Spears, Michael (Anthropological Research L.L.C.)

[244] Zuni Perspectives on Historic Preservation

The federal historic preservation program of the United States is built on a framework that privileges Western epistemologies of time and space and perceives historic properties as inanimate and valuable for their scientific potential. The concept of historic preservation is far more personal for the Zuni people, however. Zunis see their historical sites as "memory pieces" where culture and history are recalled and discussed, and where ancestral spirits live on and offer power and strength to today's generations. Zunis believe that any disturbance to these places will have negative and lasting effects on the Zuni people and the world as a whole. Zunis thus define historic preservation as the maintenance and continuity of Zuni culture through the protection, commemoration, and continued respectful interaction with their historical sites and ancestors. In this paper, we explore Zuni perspectives on historic preservation and provide recommendations on how the process of mitigation of adverse effects on historic properties can be improved to better reflect Zuni interests.

[62] Discussant

Speer, Charles (Idaho State University)

[67] Simulating Organic Projectile Point Damage on Bison Pelvis

A *Bison latifrons* pelvis was discovered eroding out of shoreline sediment at American Falls Reservoir in Idaho in 1953. The ischium section had a unique groove and hole with a depth of 35 mm and 10 mm in diameter. The pelvis was X-rayed in 1961 for indicators of the origin of the damage and this could not be ascertained. An experiment was developed to determine whether a dart fitted with an organic projectile point could re-create the same damage. The experiment consisted of encasing 120 fresh, mature *Bison bison* pelvis (ischium as target point) in ballistics gel to simulate bison musculature and skin. A total of 40 projectile points were manufactured to a similar size and morphology from antler (10), bone (10), ivory (10), and wood (10). The points were mounted on a 2 meter dart of 15 mm ash dowel weighing between 180-200 grams. Each point was used 3 times before being replaced unless damaged. These darts were launched using compressed air to between 38-42 m/s. The speed of each shot was recorded using a ballistics chronograph. The various breakage patterns were analyzed and compared. This research provides new data for taphonomic and archaeological interpretations of bison bone damage.

Speller, Camilla [20] see Zona, Margherita

Speller, Camilla (Department of Archaeology, University of British Columbia), Erin Thornton (Department of Anthropology, Washington State University), Aurelie Manin (BioArCh, Department of Archaeology) and Kitty Emery (Florida Museum of Natural History)

[419] Exploring Turkey Exploitation and Management in the Maya Lowlands

As one of the few intensively managed species in Mesoamerica, the turkey plays a key role in understanding cultural interactions and subsistence, particularly in the Mayan lowlands. Two populations of turkeys were exploited in this region: the local, wild ocellated turkey (*Meleagris ocellata*) as well as the non-local Mexican turkey (*Meleagris gallopavo*), likely introduced by the Late Preclassic. Here, we apply biomolecular methods to archaeological and modern turkeys to explore the timing of the adoption of turkey husbandry, and the intensity of turkey management in the Maya Lowlands. We conduct ancient genomic analyses to document the distribution of ocellated and common turkeys within archaeological contexts, identify the sex ratios of the birds, and provide insight into genetic diversity of local and non-local turkeys. We combine these results with stable carbon and nitrogen isotope analyses to document the diversity of feeding strategies in captively-

reared and wild individuals.

Spenard, Jon (Cal State University San Marcos)

[339] *Cosmopolitan Caves of the Pre-Hispanic Maya: What Can Cave Artifact Assemblages Tell Us about Maya Socio-political Interactions?*

Although the field of Maya archaeology has come to recognize caves as locations of prime social importance for the pre-Hispanic Maya, those underground places and their artifact assemblages are frequently overlooked by researchers who do not study them directly. In this paper, I aim to challenge this perception of cave artifacts by discussing how they can help us realize the interplay of local and far-reaching socio-political connections that have been inconspicuous or understood incompletely from settlement contexts. I present three case studies documenting regional and interregional interactions made apparent in the cave ceramic assemblages from Pacbitun, Belize, and Cancuen, Guatemala. For one case, I discuss evidence for a socio-political connection between Pacbitun, and Xunantunich in the Late Classic period, complicating long-held understandings of the former city being held sway by the major polity of Caracol to its south. In another, I discuss a molded-carved ceramic production mold from a rockshelter at Pacbitun and the ties to secondary elite gifting networks during the Terminal Classic period it implies. Lastly, I discuss long-distance pilgrimage from around the site of Ixcun, into the greater Cancuen area in light of the latter city being a hub connecting Maya groups from the highlands and lowlands.

[339] Chair

Spence-Morrow, Giles (University of Toronto) and Stephen Berquist (University of Toronto)

[356] *The Petroglyphs of Quilcapampa la Antigua*

The site of Quilcapampa la Antigua is hypothesized by Jennings et al. (in press) to be a “moving place”, strongly associated with roads leading up out of the valley bottom onto the pampa above. As the roads near the site, they pass beneath white sandstone cliffs. The visually striking cliff face is incised with hundreds of petroglyphs, with designs ranging from simple camelids and foxes to what appear to be representations of mummy bundles, solar figures, and perhaps even hallucinogenic plants. These petroglyphs vary greatly in size and visibility. Some are only seen as one passes near them on the road while others are visible from across the valley. Some petroglyphs are hidden from sight almost entirely. This paper presents our analysis of the designs as they relate to Quilcapampa’s own unique culture history as well as the broader petroglyphic tradition of the Sihuas region, an area replete with petroglyph and geoglyph sites contemporaneous to the era. Following the methodology proposed by Berquist et al. 2018 we also investigate how the designs were distributed in space as well as differential patterns of visibility. Finally, we evaluate whether certain designs were associated with specific routes or destinations.

Spencer, Kaylee (University of Wisconsin - River Falls) and Maline Werness-Rude (Ventura College)

[410] *Head on a Platter: A Reexamination of a Cache Vessel Lid*

Narratives featuring the Maize God are well represented on Classic Maya ceramics. Appearing with numerous other characters and plants in underworld settings, this deity is abundantly documented in scholarly literature. Despite his ubiquity in ancient imagery, the Maize God remains a slippery creature, with an identity that overlaps with other supernaturals. What is more, his image was used to further diverse, and often differing, ancient agendas. One famous example, a carved ceramic cache vessel lid, shows the Maize God’s head resting atop a platter. The artist surrounded the disembodied head with images of bloodletting, water, and the Water Lily Monster. While these icons are readily identifiable, closer examination of specific features reveal nuanced narratives that layer axiality and cosmology onto the standard Maize God theme. Scale and compositional relationships suggest an interplay between text and image, and further blending can be observed in the introduction of solar iconography. Such additions take this beyond a ‘simple’ presentation of agrico-bloodletting as world-sustaining; we offer a detail-oriented reinterpretation of the lid in its entirety, exploring the fluidity between conceptual categories and how such blurring contributes to the rich messages contained within the scene.

Spengler, Robert (Max Planck Institute for the Science of Human History)

[302] *Examining the Shift in Seed-Dispersal Mechanisms During Early Plant Domestication*

Scholarship is reframing the study of plant evolution under cultivation to focus on the effects of complex human harvesting practices (seed predation), increased human population size, and sedentism, while turning away from conscious human selection. Research has pointed out that parallelism in domestication is linked to seed-dispersal mechanisms, but few of

these studies look beyond the role of tough rachises in large-grained cereals or non-dehiscent pods in legumes. Gene flow through seed dispersal is one of the most prominent drivers in plant evolution in the wild and appears to have been under early cultivation as well. Hundreds of thousands of plant species have evolved mutualistic bonds with seed dispersers; these evolutionary changes are driven by the selective advantage of strong gene flow and often evolve from a predatory relationship. Additionally, few scholars have discussed the fact that most crop progenitors were endozoochoric dispersed. In order to understand the earliest traits of domestication in these crops, we need to understand seed-dispersal-based mutualism before human intervention. Evolution under cultivation is no different than the evolution of mutualism or anti-herbivory defenses as a response to heavy herbivory in nature and is simply an example of keeping pace with the Red Queen.

Spezia, Anne [49] see Kelley, Alice R.

Spiess, Arthur [49] see Kelley, Alice R.

Spilde, Michael [380] see Porter, Douglas

Splitstoser, Jeffrey (George Washington University) and Gabrielle Vail

[76] To Spin and Whorl: Functional and Symbolic Associations of Chancay Weaving Tools

Archaeological sources suggest that textiles from Chancay culture (ca. 1000-1470), occupying the central coastal region of Peru, were produced in large quantities. While they are ubiquitous in collections all over the world, they remain to be systematically studied, as do the tools that were used to make them. Along with textiles, weaving tools stored in reed baskets are commonly found in burial contexts. Included in the baskets are spindles, often wound with thread and with the whorls in position; balls of yarn; weaving battens; and other wooden implements used in the weaving process. Additionally, textile samplers from this period have also been found, adding to our knowledge of weaving methods and technologies. Our focus will be on the spindles, which are often painted with bands of colors, and the whorls, which come in a variety of shapes and have incised and painted designs that may be either geometric or zoomorphic (with birds being seemingly common) in composition. In addition to being tools made with a specific purpose (i.e., the production of thread), their decoration also appears to have had a symbolic function, and it is this intersection that forms the core of our analysis.

Sponsel, Emily [115] see Johnson, Kyra

Sportman, Sarah (AHS, Inc. and University of Connecticut) and Katharine Reinhart (Archaeological and Historical Services, Inc.)

[398] Forest and Farm, River and Sea: Food and Diet at Three 17th-Century Sites in Connecticut

Recent research in Connecticut has focused on the 17th century and archaeological investigations at several significant sites are ongoing. Extensive work at three sites, an early 17th-century (ca. 1615-1640) coastal Native American trading fort in Norwalk, a first period (ca. 1630-1640s) domestic site in Wethersfield, and a mid-late 17th-century (ca. 1650-1710) farm on the Connecticut frontier in Glastonbury, resulted in the recovery of large and extremely well-preserved assemblages of faunal and macrobotanical remains. The sites represent a microcosm of 17th-century daily life in Connecticut and this unique dataset provides the opportunity to explore Native American and English food procurement strategies, diet, and foodways in the tumultuous early colonial period. This paper outlines the overall research strategy for investigation of the food remains from these sites and presents the initial results of the faunal and botanical analyses.

Sprengeler, Kari [186] see Morgan, Christopher

Springer, Chris (Simon Fraser University) and Dana Lepofsky (Simon Fraser University)

[70] Conflict and Territoriality: An Archaeological Study of Ancestral Northern Coast Salish-Tla'amin Defensiveness in the Salish Sea Region of Southwestern British Columbia

Coast Salish ethnohistory describes how various locations associated with settlements were used for defence within the Salish Sea region of southwestern British Columbia. During times of conflict, these linked places formed defensive networks that functioned to maximize defensibility at both the settlement and allied settlement scales. Examining the distribution of such defensive networks in time and space provides insights into the role of conflict in broader social contexts including territorial and tenurial claims expressed through territoriality. In this paper, we explore the relationship between defensive networks, social networks, and expressions of territoriality among the ancestral Northern Coast Salish-Tla'amin. Combining visibility analysis with an index of site defensiveness, we find that Tla'amin defensive networks were in place from at least 900 years BP. This in turn suggests the longevity of territorial and tenurial claims expressed through defensive territoriality, as noted in the ethnohistoric record.

Spurr, Kimberly (Museum of Northern Arizona)

[5] Moderator

[93] Discussant

Squires, Kirsty (Staffordshire University)

[379] All in a Day's Work: The Health and Welfare of Children Living in 19th Century Staffordshire, UK

Children played a key role in coal mining and the pottery industry in 19th century Staffordshire (UK). The number of children that worked in this region during the study period fluctuated between 13% and 33%, and one fifth of the workforce comprised of 5-14 year olds. Long working hours and hazardous conditions had a detrimental effect on the health and well-being of children. Children working in coal mines were susceptible to stunted growth and respiratory conditions and were vulnerable to accidents, such as explosions and roof collapses. Stunted growth, lead poisoning, and silicosis were among the most common conditions experienced by those working in the pottery industry. Legislation was introduced over the course of the 19th century to improve the working conditions of children, though these were not wholly effective in the early 1800s. This paper aims to shed new light on the health and longevity of children that worked in 19th century Staffordshire. Census data, testimonies, and modern clinical data will be used to explore how their roles in industry ultimately affected their health and quality of life. It is hoped that this research will provide a more comprehensive insight into child labour in 19th century Staffordshire.

[379] Chair

St. Amand, Ani (University of Maine Climate Change Institute)

[47] Contributions from the Archaeological Record: Climate Proxies and El Niño-Southern Oscillation

El Niño-Southern Oscillation (ENSO) is a complex climatic phenomenon that has shaped both the environment and human behavior on the North Coast of Peru for millennia. Currently, El Niño, a component of ENSO, occurs every 3-8 years. Often associated with heavy rains that penetrate this normally arid coastal desert, ENSO brings flooding, erosion, and an interruption of marine upwelling that disrupts fisheries productivity. Archaeological records show that ENSO activity and intensity have varied throughout the Holocene. Key to better understanding ENSO's impacts on human populations is the improvement of our current, incomplete record based on multiple, often conflicting proxies. Additionally, understanding past variations of ENSO is imperative to improving modeling and predictions of El Niño, particularly important in the current regime of anthropogenic forcing. Archaeological data are among the most promising sources of climate proxies in this desert, where higher-resolution metrics such as nearby marine corals, tree rings, and pollen are often nonexistent. This metadata study develops a database of ENSO proxies for temporal and spatial comparison. Samples producing conflicting stories of ENSO behavior are examined to understand potential sources of error. Gaps in the overall record are addressed with legacy archaeological and climatological data and fieldwork.

Stade, Cory [186] see Janulis, Klint

Stafford Jr., Thomas W. [48] see Keene, Joshua

Stafford Jr., Thomas W. [249] see O'Grady, Patrick

Stafford Jr., Thomas W. [397] see Scott Cummings, Linda

Stagg, Sarah (University of Wyoming) and Jason Toohey (University of Wyoming)

[252] *Spatial Analysis and the Interpretation of Rock Art at the Cajamarca Site of Callacpuma, Peru*

Callacpuma is a multicomponent archaeological site in the Cajamarca Basin of the northern highlands of Peru with a long and complex history of human occupation spanning from at least 1000 BC to approximately AD 1500. An estimated 3,000-4,000 rock art panels dot the landscape of Callacpuma. Over the past three field seasons, 100 panels have been recorded. We use this sample to examine the spatial relationships of the rock panels to each other and to other important features on the landscape. This research provides an example of how GIS-based spatial analysis can be used to employ rock art panels in understanding the patterns of human occupation at archaeological sites. The work also presents preliminary conclusions regarding the chronology and function of the Callacpuma rock art. Thus, contributing to our understanding of both the development of prehistory in the Cajamarca Basin as well as the use of spatial analysis in rock art studies.

Stahl, Alan (Princeton University) and Lee Mordechai (Hebrew University of Jerusalem)

[310] *FLAME: Framing the Late Antique and Early Medieval Economy*

The FLAME project is a collaborative effort of a dozen scholars worldwide to track the production and circulation of coinage in western Eurasia from CE 325-750 in order to investigate the transition from ancient economies to those of the Middle Ages in Europe, North Africa, and Western and Central Asia. The core of the project is a database with two distinct data sets. The first data set records all of the coinage issues throughout the regions and periods under study and presents the data either as maps or data that can be customized by time spans and regions and can be downloaded as data; this phase of the project is online at coinage.princeton.edu. The second database includes the records of hundreds of thousands of finds of coins of the period throughout the regions under study; it uses input from published reports and the transfer of data from ongoing surveys in Great Britain and Israel. The 2019 SAA Annual Meeting will represent the first public presentation of the query, report, and mapping capabilities of the circulation phase of the project.

Stahl, Ann (University of Victoria)

[87] *Co-Creating Digital Heritage Resources in Ghana: How Is It Going?*

Funded by a Canadian SSHRC-funded partnership development grant, our working group of collaborators is engaged in training and capacity building in digital heritage methods in Ghana. Project aims include fostering a community of practice inclusive of archaeologists, heritage practitioners, students and community members who appreciate the value of and are versed in practices of sustainable digital archiving; are committed to producing digital heritage resources relevant to communities and usable in local schools; and who are committed to expanding the community of practice through development of accessible training resources. I'll provide an assessment of how things are going as we approach the end of our first year in a 3-year project, sharing our successes but also addressing the challenges we've faced in co-creating sustainable and relevant digital heritage resources.

[347] *Discussant*

Stahlschmidt, Mareike C. (Max Planck Institute for Evolutionary Anthropology, Leipzig), Christopher Miller (University of Tübingen) and Susan Mentzer (University of Tübingen)

[417] Charred Organic Matter in the Middle and Later Stone Record in South Africa: Exploring Multiple Anthropogenic Processes and Origins

Middle and Later Stone caves and rockshelters in South Africa are commonly rich in organic matter. The formation history of the organic component in the archaeological deposits is still unclear and several natural and anthropogenic processes can be considered. This paper will focus on a discussion of possible anthropogenic processes of organic matter deposition and their alteration by burning. People transported plant material to sites as food, tools, construction materials and fuel. Microcontextual analyses of deposits have proven very helpful in identifying the latter two. At Sibudu, for example, plant beddings make up the bulk of the organic matter component of the deposits and many of these beddings were burnt as a form of site maintenance behavior. In other sites, preservation conditions are less ideal. Combustion features and beddings are prone to destruction by reworking and other post-depositional alterations including human behavior, for example rake out and dumping of material. This raises the question if and how much of the (charred) organic matter in Stone Age deposits in South Africa results from the variable forms of fire use, bedding construction and site maintenance behaviors.

[417] Discussant

Stalla, David [211] see MacDonald, Brandi

Staller, John (The Field Museum)

[64] An Endemic Maize (*Zea mays L.*) Landrace on the Copacabana Peninsula, Bolivia

An endemic variety of maize (*Zea mays L.*) cultivated on terraces around the Copacabana Peninsula between 3600 – 4100 masl has been identified in the altiplano of Bolivia. This is the only known maize variety cultivated above 3600 masl. Indigenous communities in this region refer to this maize variety as tunqu and they consider it sacred. There were widespread landscape modifications such as raised fields and terraces geared to the cultivation of food crops by Pre-Columbian civilizations of this region particularly maize. Ethnohistoric and ethnographic evidence indicate it is primarily consumed as maize beer (aqha, or chicha) and central to ritual offerings extending back to the Yaya Mama religious tradition (ca. 800 BCE). Its phenotypic characteristics are unlike any other known landrace. It is an endemic maize variety particularly adapted to this part of the Titicaca Basin. Evapotranspiration around the lake reduces the diurnal temperature variation just enough to make its cultivation possible in the Bolivian altiplano. Its cultivation, preparation and consumption among Indigenous cultures are analyzed as are its botanical and biological characteristics.

Stanish, Charles (University of South Florida)

[182] Buried Sites in the Chincha Valley Floodplain

The Peruvian coastal valley of Chincha is the largest in the south coast of Peru. Research by our team since 2011 has discovered and excavated a number of archaeological sites that date from 3200–1000 BP. The data from this research provide exciting data to test models of early social complexity in Andean society. First, we discovered buried Paracas villages (ca. 800–200 BCE) under two meters of sediment in the floodplain suggesting a vastly larger population. It is probable that heretofore “missing” Initial and Preceramic period sites are also buried in the floodplain. Second, our paleobotanical and other data indicate that at least some areas of the valley prior to initial village settlement were rich natural marshes and not open desert as has been generally presumed. Instead of a scenario of early agricultural settlement that irrigated the desert valley floors, we have data that suggest that these marshlands were drained and converted to agricultural landscapes. If this empirical fact is correct, it may be key to understanding why complex societies developed late on the south Peruvian coast, relative to the north.

Stanley, Brendan (Texas State University) and Tara D. Smith (Texas State University)

[405] Jaguar Serpents, Smoke, and Ropes: Iconographic Analysis of Olmec Thrones incl. La Venta Altar IV and Oxtotitlan Mural I

Formerly identified cosmograms for the Olmec culture include the Dallas Plaque and the Las Limas figure. Politically, this vision is centered by Olmec rulers which is visible through the iconographic interpretations of works including La Venta Altar 4, Oxtotitlan Mural 1, among others. These interpretations build on the work of previous scholars and are supported via upstreaming through the Maya. In general, the Olmec altar thrones mirror the Maya view of the cosmos as it is portrayed on Hanab Pakal’s famous sarcophagus at Palenque, Chiapas. This paper will focus on the role of transformation within Olmec political ideology. In particular, Olmec thrones display that Olmec rulers validated their right to rule through their ability to transform into Nahau or Uay Spirit Companions (“were-jaguars”). This transformation allowed for their contact with the

supernatural, it enabled their control of natural forces like rain and wind, and it occurred at the center of time and space, i.e. the Axis-Mundi and World Tree of Creation.

Stanley, Erik (Eastern New Mexico University)**[41] *Indigenous Interpretations of the Past***

This paper examines indigenous understandings of the archaeological record through the case study of the Mopan Maya of Belize. Among many traditional Mopan Maya, classic era artifacts such as potsherds and stone points are often attributed to the Cheil or "those of the forest." Mopan believe that the Cheil are magical anthropomorphic beings descended from the unbaptized Maya who fled into the forest to escape European colonization. While the Cheil have played a central role in Maya environmental cosmologies for centuries, in recent decades local ideas about the Cheil have been challenged by both outside/Western institutions, notably archaeology. Through dialogue with archaeology, contemporary indigenous relationships to the past are transformed. Yet, at the same time that archaeology attempts to re-write cultural narratives of the past, excavations of new artifacts can support the present day accounts of and belief in the Cheil within Maya communities. Exploring the changing relationship between the Cheil and the Mopan allows for an understanding of how indigenous conceptions of local pasts are reshaped through engagement with global modernities.

Stansell, Nathan [412] see Harvey, William

Stanton, Christopher (New Mexico State University)**[346] *An Analysis of Projectile Point Agency from the South Diamond Creek Pueblo Site***

This paper presents an analysis of the projectile points recovered from the South Diamond Creek Pueblo (SDCP) site. This project took place over two summers in 2016 and 2017 and involved a salvage excavation of a Classic Mimbres pueblo. The excavation of the site yielded numerous intact projectile points in various contexts. By integrating a Behavioral Archaeology framework, I will examine object agency—how agents and materials interacted in an environment—using the spatial and temporal associations between the context of the projectile points recovered from the SDCP site and the Mimbres peoples. To achieve my research goal, I will discuss the morphology of the SDCP projectile points, their use-life, and the interactions between Mimbres peoples and their surrounding groups within and beyond the Mimbres study area.

Stanton, Thadra**[3] *Back to School: A Review of the Southeast Archeological Center's Focused Efforts in the Fields of Outreach, Education, Engagement and Relevancy***

On-going efforts to increase outreach, education, engagement and relevancy for the Southeast Archeological Center (SEAC) over the past 8 years have resulted in the increased visibility of SEAC, the National Park Service, and archeology. SEAC has worked with educators through the Teacher-Ranger-Teacher program to develop lesson plans. SEAC staff have participated in local and regional events geared towards science or the outdoors. SEAC has also developed Girl Scout Resource Ranger weekends that are focused on archeological resource stewardship. These events along with posters, stickers, bookmarks, traveling exhibit, as well as incorporating outreach into more projects, and other materials have culminated in higher numbers of visitor contacts than SEAC had experienced previously.

Stanton, Travis (University of California Riverside), Dominique Meyer (University of California San Diego), Jose Osorio (INAH), Jeremy Coltman (University of California Riverside) and Karl Taube (University of California Riverside)**[113] *Recent Remote Sensing and Digital Documentation at Chichen Itza, Yucatan, Mexico***

In this poster, we present the results of a program of remote sensing and the digital documentation of the art and architecture of the Maya site of Chichen Itza, Yucatan, Mexico. An aerial lidar survey performed in 2014 has aided in creating a more accurate map of the site. Detailed photogrammetry and ground-based lidar, performed in the area open for tourism, as well as, in the Initial Series Group, has greatly aided in the documentation of carved sculpture and the 3D reconstruction of architectural groups.

Stanyard, Zachary [120] see Adam, Manda

Stanyard, Zachary [371] see Fairbairn, Phoebe

Stark, Barbara (Arizona State Univ)

[76] Social and Geographic Associations of Cotton-Sized Spindle Whorls in South-Central Veracruz, Mexico

The western lower Papaloapan basin in south-central Veracruz was subject to systematic survey and surface collection in several blocks of terrain. An initial analysis of spindle whorls from one survey block showed cotton-sized whorls were relatively abundant during the Classic and Postclassic periods, consonant with documentary records attesting to substantial Postclassic Aztec tribute of cotton and cotton garments (Stark et al. 1998). The region was suited to cotton production, one of the local sources of wealth because cotton could not be grown in many populous highland parts of Mesoamerica, and cotton was a prized fiber for textiles. This study includes all the survey blocks and examines whether socioeconomic or local environmental factors are associated with greater whorl frequencies. High ranking landed families may have had client workers to produce more thread and textiles. Alternatively, more spinning may have occurred where farmers could only produce one crop a year, supplementing their income with labor in spinning and weaving.

Stark, Barbara [307] see Swartz, Bethany

Stark, J.T. [90] see Gonzales, Vidal

Stark, Jonathan (Bandelier National Monument) and Myron Gonzales (Bandelier National Monument)

[85] The Bandelier Preservation Program: Accomplishing the Vanishing Treasures Mission by Encouraging Traditional Building Skills and Descendant Community Involvement in the Preservation Process

Preservation efforts at Bandelier National Monument have followed the Vanishing Treasures core mission for nearly 20 years. Today, the Bandelier Preservation Program maintains this tradition by way of numerous and varied preservation projects. Two projects in particular that adhere to the VT approach are discussed in this paper: the involvement of the Bandelier Preservation Corps in preserving Ancestral Pueblo architecture and the stabilization of Pond Cabin, an early twentieth century log structure that played a role in the development of the first atomic weapon. Initial stabilization of Pond Cabin took place in the fall of 2017 as part of a Vanishing Treasures workshop. The project promoted the use of traditional building skills to educate individuals from multiple organizations and federal agencies in the preservation of log architecture. The Bandelier Preservation Corps began in 2015 and consists of local Pueblo youth who participate in wide-ranging activities structured to promote the transfer of traditional knowledge and skills in the preservation of their Ancestral sites at Bandelier.

Stark, Miriam [27] see Kealhofer, Lisa

Stark, Richard (Versar)

[36] Agave Bloom Stalk Ovens in the Southern Chihuahuan Desert

Fire cracked rock (FCR) and hearth features represent one of the most commonly observed cooking features encountered by archaeologists. This research presents an ethno-archaeological context in which FCR utilization and discard is observed, providing a Middle Range theoretical platform for interpretively linking the material remains and related human behaviors associated with earth oven use. Ecological, social, and artifactual contexts are described for agave bloom-stalk processing

in the Sierra Catorce, San Luis Potosi, in the southernmost lobe of the Chihuahuan Desert. Specific observations indicate patterns of earth oven thermodynamics, FCR midden accretion, caching behavior, archaeological feature descriptions, and related artifact suites. Relevance of this ethno-archaeological case-study is in interpretive potentials, archaeological sampling methodologies, the modeling of FCR midden accretion, and the interpretation of abandoned hearth features. Bulk processing in the described earth ovens is highly seasonal, relating to the ripening of the agave bloom stalks. The described features are non-domestic, situated in relation to the naturally occurring agave clumps. These non-domestic agave bloom-stalk earth ovens are compared with the local use of domestic meat-focused earth ovens in festive contexts, noting that these two types of earth oven sites involve specific and distinctive artifact assemblages.

Starkovich, Britt [48] see Wong, Gillian

Starkovich, Britt (University of Tübingen)

[415] Small Carnivore Use in the Upper Paleolithic and Mesolithic of Kephalari Cave (Peloponnese, Greece): Opportunistic or Optimal?

The Late Pleistocene of southern Greece adheres to many predictions set forth by human behavioral ecology concerning the use of small game in the face of demographic growth, ecological change, and advancements in procurement technologies. In Peloponnese, an increase in small, fast game use accompanied the transition to the Upper Paleolithic. The trend intensified through the Upper Paleolithic, culminating in the use of aquatic species by the Mesolithic. A less well-explored aspect of this shift is the use of small carnivores. Researchers have documented small carnivore species, specifically fox, lynx, martin, badger, and wild cat, at several sites in southern Greece. These taxa are always present, though their economic importance and ubiquity relative to their environmental abundance are not always clear. In this paper, I discuss the use of small carnivores in the Upper Paleolithic and Mesolithic of Kephalari Cave in Peloponnese. I focus in particular on taphonomic evidence that humans exploited the taxa for meat in addition to fur, and explore whether or not their abundance changed throughout the phases of site occupation. In doing so, I discuss the extent to which models from HBE are useful in interpreting rare species that might have importance beyond the subsistence pursuit.

[415] Chair

Stcherbinine, Sean

[328] Geoarchaeology of Three Olcott Sites along the Elwha River, Clallam County, Washington

Olcott sites are characteristically skewed toward lithic artifacts due to the acidic forested environment of western Washington. Site interpretations rely on several lines of evidence including landform type and age, soil formation, post-depositional processes, and vertical artifact distributions. Recent survey and excavations at three Olcott sites in the Elwha River valley produced a robust toposequence data set that is used for understanding landform development and the cultural context of this poorly understood early to middle Holocene occupation. Close-interval shovel testing across a broad area on both sides of the river identified subsurface cultural deposits and helped refine a landform age model for this section of the Elwha River valley. This poster presents how the model was tested during subsequent excavations that exposed artifact-bearing, shallow B horizons of Pleistocene river terraces with the results compared to other regional Olcott sites.

Stcherbinine, Sean [357] see Wilson, Jennifer

Steber, Matthew

[263] Textile Production in the Emerging Hohokam Ballcourt World

The development of the Hohokam regional ballcourt system in the Phoenix basin caused an economic shift during the Colonial period that increased the need for trade goods. Surplus cotton became a valuable commodity for communities situated on heavily irrigated river valleys. This research hypothesizes that the presence of cotton is a good indicator of textile production with the emergence of ballcourts in the Colonial period. Botanical data on cotton ubiquity and standardized spindle whorl measurements provide data for identifying changes in textile production. This research presents data from the recently excavated site of East Pueblo Blanco and comparisons with similar indicators for the presence of cotton across other contemporary sites.

Steele, Laura [257] see Jones, Emily Lena

Steele, Laura (University of New Mexico)

[259] Evidence of Moieties in the Prehistoric Southwest? The Case Study of Sapa'owinge

Meaning is assigned to spaces by the individuals who inhabit them. Individuals give spaces meaning many different ways, including through the placement of objects. This poster focuses on the use of kivas and rooms at an ancestral Tewa site in the Southwestern United States. Using ethno-historical data and zooarchaeological techniques to explore and better define the roles of mammalian and avian fauna, this research highlights the possible development of moieties at Sapa'owinge (LA 306), located in the northern Rio Grande region of New Mexico. Because kivas and rooms are generally assumed by archaeologists to have different functions, they were tested by comparing faunal data. Linear regression analysis was conducted and the fauna from kivas and rooms were evaluated for nestedness. The values indicated a significant relationship between NISP and NTAXA with moderate effect size in room contexts and no relationship between NISP and NTAXA in kivas with a weak effect size. For nestedness, it was clear rooms and kivas were subsets of one another, yet in kivas, specific sets of animals were recovered, implying perhaps kivas are representative of summer and winter moieties at Sapa'owinge. This line of evidence opens the door for larger archaeological discussions regarding space-use prehistorically.

Steele, Teresa [110] see McNeill, Patricia

Steelman, Karen [252] see Brady, Liam

Steering Committee, Arctic Horizons [31] see Anderson, Shelby

Steffen, Anastasia [90] see Civitello, Jamie

Steffen, Anastasia (Valles Caldera National Preserve)

[257] Celebrating an Outlier, and Managing Variation at Valles Caldera

The participants in this symposium have come together to highlight the diverse influences of Ann Felice Ramenofsky's decades in archaeology. Here we share our appreciation of Ramenofsky's clarity of intellect through presentations of research, stories of collaboration, and discussions of her contributions. This paper introduces the session, then considers how direct observation of the archaeological record, coupled with a commitment to capturing variation in that record, has guided navigation of NHPA-driven CRM and federal archaeology at Valles Caldera National Preserve.

[257] Chair

Stein, Diana (Birkbeck, University of London)

[358] Signs of Animal Masters and Associated Rituals in the ancient Near East

What evidence is there for the existence of Animal Masters and their rituals in the ancient Near East? This paper ranges from Mesolithic/Epi-Palaeolithic to Chalcolithic times (ca. 15,000-4000 B.C.) and spans the transition from hunter-gatherer to agricultural societies. It surveys the iconography and material remains from caves, megalithic enclosures, public buildings, houses and burials and reconsiders their interpretation in light of available studies of fauna, flora and residue analysis as well as recent research in the field of neurotheology. I conclude by placing the resulting picture from the ancient Near East within the wider frame of cross-cultural studies on the subject of "Supernatural Gamekeepers."

Stein, Gil [404] see Proctor, Lucas

Stein, Julie (University of Washington)**[312]** *Discussant*

Stein, Martin [75] see Larralde, Signa

Steinbach, Erik (Logan Simpson), Christopher Garraty (Logan Simpson), Gary Huckleberry (Geoarchaeological Consultant, Tucson, Arizona) and J. Andrew Darling (Southwest Heritage Research LLC, Dallas, Texas)**[8]** *Hohokam Water-Harvesting in the Queen Creek Area: Archaeological and Ethnographic Perspectives of Water Management along Ephemeral Drainages in the Southern Arizona Desert*

The Phoenix Basin Hohokam are celebrated for the construction of massive and elaborate canal systems fed by perennial waterways, principally the Salt and Gila rivers. In desert areas, however, along the many ephemeral drainages that crisscross the region, rainfall-harvesting and water-storage technologies largely overshadowed canal irrigation. These technologies permitted the establishment of year-round settlements in the desert interior. Archaeologists with Logan Simpson recently excavated and documented a massive human-constructed reservoir (Sonoqui Reservoir) and an associated intake channel at the Hohokam village site of Sonoqui Ruin, situated in a nonriverine desert environment along an ephemeral drainage, Sonoqui Wash, located about 25 miles southeast of Phoenix. The reservoir's estimated storage capacity of 1,200 cubic meters (317,000 gallons)—among the largest prehistoric reservoirs documented in Arizona—underscores the site inhabitants' ability to successfully harvest rainfall for year-round domestic use. Our investigation hinges on various lines of evidence, including a geomorphologic study of feature logistics and capacity and a comparison with ethnographically documented practices of harvesting and storing water among contemporary O'Odham groups in nonriverine areas in the southern Arizona desert.

Steinbach, Erik [194] see Cureton, Travis

Steinbach, Erik [194] see Garraty, Christopher

Steinhardt, Charlotte**[164]** *Discussant*

Steinmetz, Shawn [19] see Dickson, Catherine

Stelle, Lenville (Illinois State Archaeological Survey)**[252]** *Chair***Stelson, Laura (Penn State University)****[118]** *Following in the Footsteps of the National Geographic Society's Original Katmai Expeditions*

This poster, combined with a virtual reality headset, will present the methods and results of the multi-disciplinary research project "Following in the footsteps of the National Geographic Society's original Katmai expeditions" carried out in partnership with the National Geographic Society (NGS), Explore.org and Katmai National park. The project sought to re-trace the routes of the century-old NGS expeditions which made the area famous and led to the establishment of the National Park at this site. Historic photos and pedestrian survey were used to pinpoint the locations of the associated historic camps; in parallel, a botanical inventory of the route was conducted to continue the expedition's primary research of documenting the post-volcanic succession of vegetation regrowth. In order to generate an interactive product and provide broader audiences with details about the experiences of the original explorers, historic archival materials were combined

with 360° photos and video footage of the sites. I will discuss the process of collecting and combining additional interpretative materials for public outreach both prior to and throughout the project. Conference participants will be invited to view, interact with, and provide feedback on the resulting virtual tour.

Stemp, W. James (Keene State College) and Danielle Macdonald (University of Tulsa)

[365] Diversity and Lithic Microwear: Quantification, Classification, and Standardization

Over the past decade, lithic microwear analysis has witnessed a shift in how data is collected, moving away from optical microscopy towards a more quantifiable practice. The adoption of surface metrology microscopes, including confocal and focus variation, allows for the measurement of surface roughness or texture, thus distinguishing different wear features based on surface measurements rather than verbal descriptions of wear characteristics and photomicrographic evidence. This paper explores how lithic microwear analysts traditionally define categories of wear, the range of wear classification criteria and categorization systems, the levels of variation within these categories, and how our definitions of wear are changing with new quantitative techniques. We explore how variables, such as duration of use, force, and post-depositional processes, change wear characteristics, necessitating a new assessment of diversity within microwear categories. Key to using diversity as a measure of variation of microwear on stone tools from different assemblages or sub-assemblages is the adoption of a consistent classification system for microwear categories. Understanding the processes by which wear categories are defined and the acceptable levels of variation within and between these categories brings us closer to creating a standardized microwear practice.

Stephen, David [125] see Prasciunas, Mary

Stephen, Jesse (Defense POW/MIA Accounting Agency)

[129] Hitting Huggins' Roadblock: Confronting the Challenge of Recovering the Missing from a World War II Battlefield in Oro Province, Papua New Guinea

The complexity of accounting for missing in action personnel is highly dependent on the past—and present—context of the loss. In late 1942, during the Battle of Buna-Gona in New Guinea, United States forces established a roadblock behind forward Japanese positions in an attempt to cut off their supplies. While it would hold for weeks and eventually be named for Captain Meredith M. Huggins (3rd Battalion, 126th Infantry Regiment), the roadblock was exposed and spawned a bitter, drawn-out fight that was exacerbated by an inhospitable environment, inadequate weapons, starvation, and disease and resulted in as many as 67 missing in action Americans following WWII. Today, the difficulty of recovering those lost at Huggins' presents an interrelated set of cultural, historical, scientific, and logistical challenges. This poster presents a multidisciplinary, collaborative approach being forged by DPAA alongside stakeholder groups include local communities in Oro Province and organizations such as the University of Papua New Guinea, the Papua New Guinea government, and the Australian Unrecovered War Casualties—Army. Like the nature of battlefield engagements themselves, the resolution of battlefield-associated cases—such those at Huggins'—requires a steady effort that can be sustained for as long as it is warranted.

[129] Chair

Stephens, Doug [75] see Koeppel, Christopher

Stephens, Douglas (US Forest Service)

[12] Attaining Goals Together: Collaborative Heritage Resource Stewardship and the Forest Service

Passage of federal environmental laws during the 1960's forced otherwise autonomous bureaucracies to accept professionals into their ranks that previously had no place. Public lands agencies like the Forest Service were required to employ archaeologists once the National Historic Preservation Act was enacted. The first to be employed in the new field of Cultural Resource Management were often individuals grappling with making sense of the new environmental and historic preservation laws frequently within an agency culture resenting their presence. Eventually programs were formed and the compliance with historic preservation requirements would become integrated into the agency. Now the Forest Service maintains a database of over 500,000 cultural sites and programs in Tribal Relations recognizing the Federal Government's trust responsibility to Indian Tribes. Today the integration and maturity of the Heritage Program is allowing the Forest

Service to expand the public relevancy and benefits of the resources it manages.

Stephens Reed, Lori (Aztec Ruins National Monument)**[245] *Shades of Meaning: Relating Color to Chacoan Identity, Memory, and Power at the Aztec Great Houses***

The Ancient Puebloan occupation of the Aztec complex in northwest New Mexico spanned a tumultuous two and a half centuries that saw the arrival of Chacoan people and Chacoan ways in the Animas Valley in the late 11th century C.E., followed by the waning influence of Chaco by 1140, and a new era of Aztec-centered power in the post-Chacoan period. Each of the three great houses at Aztec had its own unique history and represents a particular stage in the evolving relationship to Chacoan power in the Middle San Juan region. Over time, leaders at Aztec worked to establish and support Chacoan identity and power, to negotiate new relationships to the Chacoan polity, and ultimately to maintain the memory of a Chacoan past that legitimized their own power. These efforts can be traced through changes in architecture and material items. Our research examines the role color played in establishing, maintaining, altering, and revitalizing Chacoan identity and power at Aztec.

[245] Chair**Stephenson, Keith (USC Institute of Archaeology and Anthropology) and Karen Smith (S. C. Department of Natural Resources)****[168] *Deptford Settlement in South Carolina***

Deptford has been construed as a phase with a time-space-content connotation that incorporates aspects of pottery and adaptation. Recently, we examined regional settlement by considering Deptford phase site distributions and radiometric dates. In this study, we take our analysis a step further by constructing ceramic seriations for sub-regions in which Deptford pottery is well represented in the state. A number of contexts that we examined for this paper have purported mixed assemblages, for example, St. Catherine's pottery with Deptford. Are these actually mixed or are they contemporary? By using ceramic seriation as prior information and powerful analytical tools available in OxCal, we attempt to address this important question.

Steponaitis, Vincas (UNC-Chapel Hill) and Lynne Goldstein (Michigan State University)**[188] *Struggling with Complex Decision-Making in Public Policy***

In the late 1980s and early 1990s, the Society for American Archaeology (SAA) and other archaeological organizations struggled with a variety of public policy decisions and organizational policies that eventually resulted in major public laws on both the state and federal levels (NMAI Act and NAGPRA, for example). The work done at that time also set the stage for SAA positions on a variety of other proposed laws. The purpose of this paper is to outline and analyze the process of decision-making by which the SAA reached the positions it took. In this regard, Keith Kintigh stands out as someone who was not necessarily the public face of SAA, but who carefully negotiated the SAA position with archaeologists, Native Americans, Native American organizations, and congressional representatives. This aspect of Kintigh's work, which required a significant amount of time and focus, is often overlooked, even though this approach can also be seen in his research, and is a hallmark of thoughtful, respectful negotiations.

Sterling, Kathleen (Binghamton University) and Sébastien Lacombe (Binghamton University)**[186] *Why Build When There Are Caves? Investigating the Construction and Use of a Stone Structure in Pleistocene France***

The Late Pleistocene in Western Europe is the origin of the idea of the "caveman," and the majority of research has historically focused on cave sites. In regions of Europe where caves are not present but archaeological evidence is, the assumption is that people used lightweight ephemeral shelters such as tents and lean-tos, and this is sometimes supported through the presence of a few stones arranged in a pattern. The open-air site of Peyre Blanque in the Central French Pyrénées has the potential to change this narrative about Late Pleistocene hunting and gathering peoples. This site, in a region with many caves and rockshelters, was occupied shortly after the Last Glacial Maximum, and features a structure constructed of hundreds of sandstones. The structure presently covers nearly fifty square meters. Excavation and analysis are currently ongoing, but this structure is unlike other stone arrangements in Late Pleistocene Western Europe in its size and organization. The people who occupied Peyre Blanque were not "cavemen," neither literally nor metaphorically, and this

was by choice.

Sternberg, Evan (Office of Contract Archeology, UNM), Alexander Kurota (Office of Contract Archeology, UNM) and Virgil Lueth (New Mexico Bureau of Geology and Mineral Resources)

[413] Utilization of Quartz Crystal Lithics During the El Paso Phase Jornada Mogollon

Over the past several years, the Office of Contract Archeology has conducted fieldwork in the southern Tularosa Basin on White Sands Missile Range. This project has resulted in the documentation and testing of more than 36 sites ranging from the Paleoindian through Jornada Mogollon periods. Lithic raw materials utilized on all of these sites were dominated by local materials. Interestingly, a high proportion of these were found to be crystal quartz, a material not often associated with lithic tool production in the American Southwest. Due to the unusual nature of this material utilization for this region, a more detailed examination was undertaken to better understand the implications. The data indicate an intensification of use for crystal quartz in the Jornada Mogollon period, particularly as groups agglomerated into larger roomblock-complex villages during the El Paso Phase. Potential causes for this are thought to include toolstone availability, and possible ritual functions.

Sternberg, Evan [413] see Kurota, Alexander

Sterner, Katherine (University of Wisconsin-Milwaukee)

[97] Upper Mississippian Stone Tools and Community Organization

This research investigates community organization as an approach to understanding the shift from typologically complex to a simpler lithic technology after circa A.D. 500 in the Prairie Peninsula. I compare the lithic practice of Upper Mississippian groups settled in western Wisconsin (A.D. 1400-1700) at the La Crosse locality to that of groups in eastern Wisconsin (A.D. 1100-1450) at the Koshkonong locality to develop a model for communities in two different geographic and temporal contexts. The data indicate that the Koshkonong tradition was characterized by a tightly knit multi-village community while evidence of such a community unit at La Crosse does not exist. Evidence from microwear analysis indicates that both men and women used lithic tools and that women produced some, if not most of the lithic tools. The decline in formal lithic tool complexity and diversity through time was likely the result of a shift in the gendered division of labor of producing stone tools.

[97] Chair

Sterpone, Osvaldo

[173] La documentación por métodos tradicionales y tecnologías avanzadas

Se presentan los fundamentos de los principios estratigráficos en el proceso de documentación para la conservación de monumentos arqueológicos enfocado al caso de Monte Albán. En el procedimiento de documentación fueron utilizados instrumentos geofísicos que contribuyen a la identificación de los materiales y las fábricas, que permiten la planeación de las investigaciones arqueológicas, además de la planeación para la conservación.

Stevens, Karen [312] see Crothers, George

Stevens, Lora [348] see Schroeder, Sissel

Stevenson, Alexander [368] see Butler, Virginia L.

Stevenson, Christopher (Virginia Commonwealth University)

[316] *Chair*

Stevenson, Christopher [316] see McCoy, Mark

Stewart, Brian (University of Michigan) and Genevieve Dewar (University of Toronto Scarborough)

[32] *Charting Late Pleistocene Social Networking in Southern Africa Using Strontium Isotope Geochemistry*

The roots of long-distance social networking run deeper than Facebook. At some point in the Pleistocene, hunter-gatherers began exchanging 'non-utilitarian' artifacts like beads and other ornaments over hundreds, and sometimes thousands, of kilometers. Among ethnographically documented foragers these networks symbolically link distant groups, acting as social adhesives that enhance fallback opportunities, information availability, and reproductive potential, among other benefits. Charting the evolution of long-distance social networks can thus help determine when, why and how our species began harnessing material culture to mitigate risk. The archaeology of Pleistocene Africa is, as usual, central to this endeavor given our species' anatomical and behavioral origins. This paper presents the preliminary results of strontium isotope analyses of ostrich eggshell beads recovered from late Pleistocene and Holocene contexts in two sharply contrasting southern African environments: the Namaqualand Desert (South Africa) and Maloti-Drakensberg Mountains (Lesotho). Our data demonstrate the existence and persistence of highland and dryland exchange networks, and hold implications for tracing the development of social strategies for long-term survival in the southern African interior.

Stewart, Brian [33] see Dewar, Genevieve

Stewart, Caitlin, Mark Brodbeck (HDRI, Inc), Andrew Darling (Southwest Heritage Research, LLC) and Jennifer Rich (ACS, LTD)

[114] *A GIS-Approach to a Prehistoric Travel Corridor in the Phoenix Area*

This poster presents the preliminary results of a GIS-based approach for the documentation and interpretation of a prehistoric Hohokam travel corridor in the South Mountains of Phoenix, Arizona. Trails, their associated features and co-occurrences of artifacts, when combined with settlement data, provide important clues about intercommunity relationships and communications. Trails connect areas that have different resources and identify routes between task-specific sites and base camps or villages. Mapping and analysis of trail segments and artifacts found in association with trail systems is necessary in order to evaluate processes related to mobility, resource acquisition (both spiritual and physical) and communication. The GIS-based study investigated site AZ T:12:207(ASM), an approximately one-mile section of a prehistoric trail system through the South Mountains connecting prehistoric settlements of the Gila and Salt River Basins. The research explores artifact distribution, feature distribution, points of origin, and destinations of this prehistoric trail system. Additionally, geospatial data from this site, along with associated artifacts and features, are integrated into the larger prehistoric and historic cultural landscape.

Stewart, Carlyn (University of New Mexico)

[118] *Why We Need Public Archaeology Specialists: Beyond Shards and Dinosaurs*

The underlying goal of Public Archaeology is to make archaeology accessible to the public in engaging ways that inspire meaningful connections to the people and places of the past. By presenting archaeological facts and theories in an interactive manner, it is more likely that the information not only sticks, but is also personal, thus inspiring a more active role in preservation. In an innovative effort to explore the applications that Public Archaeology has to offer in the National Park Service, Tonto National Monument and nonprofit organization Archaeology Southwest teamed up to create a unique position entirely devoted to implementing and testing Public Archaeology methods at the monument. The end goal was creating a Public Archaeology strategy to be used in future years. The 2017-2018 season was a valuable "pilot study" into what Public Archaeology-specific positions have to offer the National Park Service. By assessing the successes and challenges of new methods, outreach events, activities, and current interpretation and education programs at the monument it was my goal not only to create a successful strategy for the future, but to set the standard that specialized Public Archaeology positions are valuable assets to the National Park Service.

Stewart, Christina (University of Oklahoma)**[180] An Analysis of Ceramic Imitation and Trade at the Petrified Forest National Park**

The Petrified Forest National Park has a long range of occupation; however, the variety of artifacts present from these occupations makes it difficult to access the relationships early residents had with neighboring communities. Over the last decade, researchers have identified a diverse range of ceramics from across the American Southwest at newly documented sites in the park's boundary expansion. Spanning from the Basketmaker III period (A.D. 500-750) to the Historic periods, researchers identified what appear to be traded ceramics from three regions surrounding the park, in addition to locally produced copies of these distinct regional ceramics. I compare the frequencies of these trade items to locally produced copies to investigate the changing social and economic connections that the residents of the Petrified Forest had with surrounding groups in the American Southwest.

Stiger, Mark**[186] Archaic and Paleoindian Houses in the Southern Rocky Mountains**

A series of archaeological structures ranging in date from Folsom (10,400 RYBP) to Middle Archaic (3000 RYBP) have been excavated in a high mountain valley in central Colorado. These prehistoric residences show temporal changes in architecture and artifact assemblages which hint at variability in social and technical organization. An apparent Folsom community structure/lithic workshop and residences provide contrast to the later simple Archaic structures.

Stinchcomb, Gary [32] see Rogers, Michael

Stiner, Mary (University of Arizona)**[15] Does the Emergence of Paleolithic Body Ornamentation Signal an Unprecedented Aptitude for Symbolling Behavior or Just a New Application?**

Given the collective evidence for the Paleolithic in Eurasia, it is peculiar that the emergence of durable art in archaeological records is taken to reflect a parallel emergence for the capacity of hominins to engage in symbolling behavior of any sort. The ample record of burial practices of during the Middle Paleolithic supports an interpretation of symbolic acts just as strongly as the art record of the Upper Paleolithic, albeit in a very different way. Here lies an important key to understanding hominin cognitive evolution that too often is disregarded, at the expense of addressing useful scientific questions. After reviewing the evidence, I discuss how the directionality and scope of communication (audience) of the two behaviors seems to have differed, and what that difference can (and cannot) mean for framing questions in future research on Neanderthals and modern humans.

Stites, Michael (Bighorn National Forest/University of Wyoming), Price Heiner (Carson National Forest) and Bridget Roth (Coconino National Forest)**[397] The Search for the Primary Source of Kings Canyon/La Poudre Pass Obsidian in Colorado**

During field survey in 2011, archaeologists for the Medicine Bow-Routt National Forest discovered obsidian nodules contained in ancient alluvial gravels of the Miocene North Park formation in Jackson County, Colorado. The Northwest Research Obsidian Studies Laboratory in Corvallis, Oregon, analyzed this obsidian using ED-XRF and determined that it was previously uncharacterized by their lab. It was subsequently named Kings Canyon obsidian, after a local place name near the geologic source. Further discussions with archaeologists in the northern Colorado revealed that the obsidian was previously known from archaeological contexts. In fact, another obsidian lab had named it La Poudre Pass obsidian. Forest Service archaeologists then embarked upon a search for the primary source, which led to the Never Summer Mountains in Rocky Mountain National Park. Geochemical analyses of vitrophyre from Specimen Mountain proved inconclusive. Isotopic dating using the 40Ar/39Ar method on obsidian and fine-grained volcanic rock samples from the Kings Canyon gravels returned ages consistent with the age of the Oligocene Never Summer Igneous complex. These results suggest that the Kings Canyon/La Poudre Pass obsidian may have a broad geographic distribution across north-central Colorado.

Stoddart, Simon (University of Cambridge)

[23] Delicate Nucleation in Etruria

Etruria, the urban landscape of first millennium BC central Italy, is renowned for its powerful stable urban places. This projection of power not only conceals the Rise of Rome, which profoundly affected these urban centres, but also the dynamism of the Etruscan urban landscape in the interstices between the metropoles. This paper will examine the delicate urbanism that occurred in the internal frontiers between the major centres. These centres had a different tempo and a tendency towards the polyfocal that differed greatly from the outwardly presented patterns of Etruscan nucleation. African ethnography and landscape archaeology will be deployed to aid the interpretation of this contrast, a contrast that many classicists have found difficult to understand or conceptualise.

Stodder, Ann (Office of Archaeological Studies, Museum of New Mexico)**[317] Where Do Data Come From? The Legacy and Future of Cultural Resource Management Bioarchaeology**

This paper considers the role of CRM-based bioarchaeologists in bioarchaeology as practice and as a realm of research. Doing bioarchaeology in this context invokes professional challenges and responsibilities that transcend the individual project. Bioarchaeologists on the front lines of engagement with descendant communities, corporate clients, multiple government entities, neighbors, and business owners, have the opportunity to speak directly with people whose initial reactions range from respectful curiosity to moral outrage. The bioarchaeologist is responsible for what may be the one-time-only analysis and the collection of comprehensive data from human remains, not just a set of observations of particular interest. When the client-specified work product is a nontechnical report, or skeletal data tables are deemed uninteresting by principal investigators, the bioarchaeologist is the archivist, retaining the unpublished primary data. Much of the data from decades of salvage and CRM projects, especially small projects, are ignored. As archaeology turns to data mining and increasingly conservative approaches to excavation, and as museums repatriate collections, bioarchaeologists must promote and implement the systematic compilation, curation, and sharing of archival data. These are irreplaceable resources for future research that will utilize the continually developing array of new approaches that characterize the flourishing field of bioarchaeology.

Stoermer, Stephanie (FHWA)**[357] NDDOT's Collaborative Approach to Tribal Involvement during Project Development and Delivery**

The North Dakota Department of Transportation (NDDOT) has been working with regional Tribal Nations since 1998. In 2004, NDDOT and five of these Nations began jointly writing a Section 106 Programmatic Agreement for Tribal Consultation in North Dakota (PA). The PA among NDDOT, the Federal Highway Administration (FHWA) and nine regional Tribal Nations was executed in 2006 and subsequently renewed in 2014. Since that time, NDDOT has worked with up to 17 regional Tribes to address project-specific issues and has also collaborated with Tribes on several issues of mutual interest. An ongoing focus of the collaborative effort known as the North Dakota Tribal Consultation Committee (NDTCC) has been the recordation and evaluation of stone feature sites. As a working group, we agreed upon a recording standard for these types of features in 2011. While National Register eligibility of these features has prompted numerous discussions with State and Federal agencies, this matter currently remains unresolved. Confidentiality of oral histories and access to imparted Tribal knowledge are foremost among the many sensitive issues of concern to Tribes. This paper will discuss various NDDOT projects, implementation of ideals in an imperfect world, and considerations for the future.

[7] Moderator

Stoessel, Luciana [364] see Martinez, Gustavo

Stoj, Kiley (SUNY Cortland) and Karen Schollmeyer (Archaeology Southwest)**[213] Plant Species and Their Uses in Mimbres and Salado Sites in Southwest New Mexico**

Examining climate patterns, archaeobotanical evidence, artistic depictions on pottery, and historic and modern uses of plants provides information on how Mimbres and Salado period farmers used local plant resources and influenced their distribution and availability. This presentation examines differences in archaeological plant remains found in Classic Mimbres (AD 1000-1130) and Cliff Phase Salado (AD 1300-1450+) period sites. An overview of the variations in flora between the upper Gila River basin and the Mimbres Valley provides insights into differences in resource availability. Because many plants that are found at archaeological sites are still present today, modern research and documentation

through ethnography offers perspective on the continuing contemporary uses of these taxa.

Stokes, Robert (Eastern New Mexico University)**[108] *The Effects of Inundation on an Early Fourteenth-Century Adobe Pueblo at Caballo Reservoir, New Mexico***

In late 2016, the U.S. Bureau of Reclamation significantly lowered Caballo Reservoir on the Rio Grande in New Mexico to clean out debris behind the outflow gate. As a result, several submerged prehistoric sites were temporarily exposed on the lakeshore. One of those sites was an early fourteenth-century Jornada Mogollon adobe-walled pueblo. Because Caballo Dam was constructed in the 1930s, few archaeological sites were documented prior to the filling of the reservoir. The site was first recorded during a previous drawdown event in 2002 where the recorders documented its condition. The 2016 drawdown event afforded Reclamation and New Mexico State Parks the unique opportunity to closely study the effects of inundation that occurred at this adobe pueblo between 2002 and 2016. This study also compares our observations to the landmark 1978 National Park Service study of effects of inundation on prehistoric sites in the western United States. We found that wave action during the variable length periods of exposure caused significant erosion damage that rapidly undid the stable conditions experienced by the pueblo while normally under 20 to 30 feet of water. Our observations and conclusions will assist other land managers who oversee cultural resources affected by reservoirs.

[108] Chair**Stoll, Anne and George Stoll****[252] *The Harare Style: Digitally-Enhanced Photography in Pursuit of a San Rock Art Regional Variant, Zimbabwe, Africa***

The painted parietal art of prehistoric San Bushmen of southern Africa has been in the public eye since the 1920s. Iconographic and stylistic differences within the San artistic corpus have been attributed to distinctions of time and space within and among the many centers of image concentration. Rock art found in the ravines of the Brandberg Massif, Namibia, for example, contrasts markedly from San art seen in the Drakensberg or Cederberg Mountains of South Africa, yet the primary defining characteristics prevail. Digital enhancement has increased the repertoire of San images found in understudied Zimbabwe and has prompted a more fine-grained analysis of regional variations. The distinct signatures of two extraordinary concentrations of Zimbabwean prehistoric art are revealed using digital enhancement. The better-known rock art found in the Matopos and environs on the west is contrasted to that known from the greater Harare area on the east and possible explanations explored.

Stoll, George [252] see Stoll, Anne

Stone, David (University College Dublin)**[88] *Fulbright–Creative Ireland Museum Fellowship - Standards, Storage and Dissemination: New Approaches to Archiving, Curation and Data Sharing of Environmental Archaeological Material***

As part of a Fulbright–Creative Ireland Museum Fellowship collaboration with the Smithsonian Institution (Washington DC), research will be conducted to establish best practice for the curation and storage of environmental remains from archaeological investigations and establish codes of practice for digital archiving of ecofact material, addressing pressing issues in archaeological practice in both the Republic of Ireland and Azerbaijan. Archaeological specialists in countries with well-established archaeological protocols, such as Ireland, wish to further explore how best to archive, curate and disseminate knowledge obtained from environmental material to enable high-quality research, while also engaging with depository institutions to establish guidelines and codes of best practice for field archaeologists. New frontiers are opening in the world in countries where no tradition of environmental archaeology currently exists. In Azerbaijan, pioneering environmental archaeological initiatives are beginning to be conducted, but with no governmental or heritage guidelines for ecofacts, the safe storage, curation, and availability of data on environmental findings to international researchers in the future is in doubt. Working with the unparalleled heritage collections, world-leading archaeologists, and museum experts at the Smithsonian Institution provides an outstanding opportunity to establish and subsequently implement, best practice procedures in both Ireland and Azerbaijan Museums.

Stone, Elisabeth (University of Illinois at Urbana-Champaign)**[257] Complex Lives, Simple Stories: Relations of Power Embedded in Museum Interpretation**

Museums are a primary platform by which the public engages the past. Museum interpretation is tied to concrete, well-defined storylines, and tends to avoid the complexity of competing narratives, reinforcing the idea that there can be a single understanding of the past. Where there were vibrant communities rich with human diversity, museums present ill-shorn cavemen in raggedy skins or isolated objets d'art dramatically backlit. Contextualized within our knowledge of the messiness and ambiguity of human lives, these flattened narratives work to reenact, reconstitute, and reinforce colonial relationships with the communities and individuals who made, used, and imbued these objects with meaning, keeping with the long-standing role of museums created for the collection, study, interpretation, and preservation of objects. As museum interpretation moves toward polyvocality, participatory strategies, and power-sharing, the representative role of objects shifts. I examine the pedagogical basis for object-centered and community-centered approaches to historical interpretation, considering the many audiences of informal education. Through understanding ways objects encapsulate the relevance of history for descent, local, and other communities, museum interpreters can work within communities to construct histories rooted in place, people, and meaning.

Stone, Jessica [35] see DiNapoli, Robert J.

Stone, Jessica (University of Oregon), Mike Buckley (University of Manchester) and Scott Fitzpatrick (University of Oregon)**[212] Possible Prehistoric Translocation of Non-human Primates to Remote Oceania**

New archaeological excavation at the Ucheliungs site, located in the Rock Islands region of Palau (northwest tropical Pacific), has yielded evidence of mortuary activity and small-scale marine foraging dating to the earliest period of human settlement in the Palauan archipelago, ca. 3000 BP. The assemblage includes a small number of artifacts consisting of undecorated ceramic sherds and a single carved bone fragment that appears to be a harpoon tip used for fishing. Because this type of artifact has not been identified elsewhere in Palau, Zooarchaeology by Mass Spectrometry (ZooMS) analysis was employed in an effort to identify the bone's taxon and shed light on the construction of early Palauan bone tool and fishing technologies. Preliminary results suggest that the bone belonged to a non-human primate and was likely a member of the Hylobatidae family. This is the first potential evidence for the prehistoric translocation of non-human primates or primate materials to Remote Oceania and raises questions about broader mobility patterns and intra-regional exchange systems in the region prior to European contact. Targeted sequencing of additional hylobatid taxa and associated radiocarbon dates are currently underway to more specifically identify the timing of movement and origin of this unique artifact.

Stone, Pamela (Hampshire College)**[142] Warrior-Women: Strategic Use of Violence by Women Moving towards a Broader Understanding of the Poetics of Violence**

Engaging social theory with bioarchaeological analyses offers provocative ways of re-examining (pre) historic populations. With regards to violence and conflict, the research continues to be driven by androcentric notions that this is a man's arena, and that females, when associated with violence, are only victims. Just as relegating women to rigid positions in domestic spheres in archaeological analyses was criticized to be shortsighted and a culturally constructed idea, the inability to see females as violence perpetrators results in the loss of data that could expand our understanding of females in the past and their relationships with one another and with males. This paper discusses the ways in which anthropologists have defined violence, examines myths of the female warrior alongside archaeological and bioarchaeological evidence of "warrior - women" from a number of cultures, and explores how assumptions of male violence direct research models and consequently miss the impact females may have had in conflict situations. Rendering females less invisible in violence research leads to new interpretations of the poetics and meaning of violence, more nuanced ways of interpreting bioarchaeological evidence, and expands our understanding of the agency, resistance, and the role of women in violent encounters.

Stone, Pamela [142] see Harrod, Ryan

Stoner, Wesley [56] see Arnold, Philip

Stoner, Wesley (University of Arkansas)

[298] Provenance Analysis of Tempering Materials using Quantitative Petrography in the Formative Basin of Mexico

Ceramics sourcing studies in the Basin of Mexico suffer from the interior drainage problem. Sediment erodes from the mountains and mixes as it drains inward toward the lake at the center. Material composition, and the ceramics made from them, grades subtly over space as a result, making provenance analysis difficult. In a prior study, I used semi-quantitative analysis and a multitechnique approach to determine that, the aplastic fraction of Formative period pottery accounts for more geographically patterned compositional variability than the clay fraction (Stoner 2016). The hypothesis that drives the current research is that systematic point counting to derive a quantitative characterization of mineral assemblages on a scale from felsic to mafic composition will enable a clearer comparison to the natural geological variation within the region. I combine the petrographic data with chemical results from neutron activation analysis and laser ablation inductively coupled plasma mass spectrometry to improve sourcing studies of pottery in the region and to add to the tools that ceramic analysts employ for characterizing ancient materials.

[230] Discussant

Stow, Evalyn [127] see May, Alejandra

Stow, Evalyn (Purdue University), Desiree Clark (Purdue University), Jacob Harris (Arizona State University), Curtis Marean (Arizona State University) and Erik Otarola-Castillo (Purdue University)

[128] Quantitative Analysis of Bone Surface Modifications on the Bowser Road Mastodon and Its Implications for the Human Predation of North American Megafauna

Toward the end of the Pleistocene, North America experienced a mass extinction of large mammals, including Proboscideans such as mammoths and mastodons. The role of human predation in these extinctions is widely debated across several scientific disciplines, including Conservation Biology, Paleontology, and Archaeology. A frequently debated topic is the predator-prey dynamic between Pleistocene hunter-gatherers and Proboscideans. Traces of human butchery, such as cut marks and other bone surface modification (BSM), are usually presented as evidence for human/proboscidean predator-prey associations. However, many experts have challenged the validity of butchery evidence observed on several proboscidean assemblages due to the qualitative nature of BSM assessments. This study utilizes new statistical techniques based on 3D-imaging data and 3D Geometric Morphometrics to determine the origin of BSM observed on the skeletal remains of the Bowser Road Mastodon (Middletown, N.Y.). This technique has been shown to have high accuracy in identifying and discriminating types of BSM. This study quantitatively compared BSM from the Bowser Road Mastodon to experimental BSM resulting from butchery, trampling, carnivore gnawing, and agricultural plowing. Results allow us to discriminate between BSM causing agents, contributing to a more accurate account of the interactions between humans and Pleistocene megafauna.

Stowe, Michael [371] see Larson, Griffin

Strait, Madeleine (The Field Museum)

[293] Moderator

Stratford, Dominic (University of the Witwatersrand), Lucinda Backwell (University of the Witwatersrand, Johannesburg), Francesco d'Errico (University of Bordeaux, France), Lyn Wadley (University of the Witwatersrand, Johannesburg) and Emese Bordy (University of Cape Town, South Africa)

[338] New Excavations at Border Cave: Preliminary Reflections on Stratigraphy and Site Formation Processes

The Border Cave rock shelter, formed in Early Jurassic fragmental rocks of the Jozini Formation on the western scarp of the Lebombo Mountains, KwaZulu-Natal, has a long history of archaeological investigation starting with Raymond Dart in 1934. Phases of informal and formal excavations have yielded remarkable archaeological assemblages including five hominin specimens and spanning MIS 4, 5 and 6. BC1 and 2 have unsecure provenances. BC3 and BC4 are claimed to have been excavated from burial contexts, while BC5 was excavated from strata 3WA during Peter Beaumont's extensive excavation of the site in the 1970's. The ages and stratigraphic associations of these specimens have been debated. Beaumont's excavations revealed a long lithostratigraphic sequence documenting perhaps 200,000 years of sedimentation and anthropogenic occupation until the Iron Age. Remarkable preservation of organic matter has provided a wealth of data on the anthropogenic activities and environmental context through the Border Cave sequence, which is divided into BS (Brown Sand) and WA (White Ash) Members. New investigations, started in 2015, aim to develop greater contextual and chronological resolution to this sequence and its rich archaeological record. Here, we present some preliminary geoarchaeological observations of the Border Cave stratigraphy made during these new excavations.

Straub, Clémentine [175] see Crema, Enrico

Straub, Elizabeth [145] see Moore, Christopher

Straus, Lawrence (University of New Mexico)

[403] *From the Mousterian to the Bronze Age: The El Miron Cave Project (Cantabria, Spain), 1996-2018*

El Miron Cave has a long, rich cultural sequence dated by 92 radiocarbon assays >46,000-c.500 BP. This large, strategically located site contains traces of Mousterian, Gravettian, Azilian, Mesolithic and historic uses and evidence of more significant occupations of diverse duration, intensity and function throughout the Solutrean, Magdalenian, Neolithic, Chalcolithic and Bronze ages. A short-term hunting camp during the LGM, the cave held major, repeated, multi-purpose residences in Oldest Dryas. At 18.8cal.kya, a healthy, middle-age woman died, was ritually buried with non-local ochre, and her burial marked by an engraved block. DNA from this human, from salmon and red deer confirm that Cantabrian Spain was a refugium during the LGM from which these species recolonized northern Europe in the Late Glacial. During the Upper Paleolithic humans fished salmon and hunted red deer in the valley below and ibex on the steep, rocky slopes around the cave. Magdalenian levels contain portable art and osseous artifacts that include both regionally distinctive types and items indicating social/trade contacts with SW France, as do exotic flints. El Miron has the oldest evidence of Neolithic adaptations in N. Atlantic Spain (wheat, ceramics, domesticated animals) at 6.5cal.kya. It was also a Copper and Bronze Age "hamlet" and stable.

[144] *Discussant*

Strauss, Andre (University of São Paulo), Domingo Carlos Salazar-Garcia (Grupo de Investigación en Prehistoria IT-622-13 (U), Márcia Arcuri (Federal University of Ouro Preto), Rui Murrieta (University of São Paulo) and Walter Alva (Museo Tumba Reales)

[286] *Radiocarbon Dating and Carbon/Nitrogen Stable Isotope Analysis of Human Skeletons from the Lambayeque Valley, North Peru (Formative to Inca)*

We analyzed 73 human bone/tooth samples from the following archaeological sites of the Lambayeque Valley, North Peru: Huaca Rajada, Huaca Zarpán, Huaca Santa Rosa, Huaca El Pueblo, Huaca El Chorro, Huaca El Triunfo, Huaca Saltur and Huaca Ventarrón. The associated material culture indicates that this sample encompasses a deep and continuous time transect going from the Archaic to the Inca period. Collagen was retrieved from 32% of the samples (>30kDa fraction) indicating not ideal conditions of organic preservations in the Huacas of the region. Carbon and nitrogen stable isotope analysis was performed with this material. Additionally, we chose five samples of collagen from Huaca Ventarrón for radiocarbon dating – the first direct dates on human bones for this iconic site. The results indicate that the temple was used as an interment ground from at least 3700-3568 cal BP to 664-552 cal BP (95.4% confidence interval and not considering the maritime reservoir effect). An isolated partial femur originally described as belonging to the Archaic was shown to be 594-722 cal BP. Skeletons attributed to the Formative, Lambayeque, Chimú and Inca periods were directly dated to 3700-3568 cal BP, 685-562 cal BP, 664-552 cal BP and 1185-1010 cal BP, respectively.

Strawhacker, Colleen [31] see Anderson, Shelby

Strayer, Jessica [383] see Lorenz, Samantha

Streuding, Haley (Coastal Environments, Inc.)

[108] Which Way Is Ashtabula? Recent Archaeological Investigations within Lake Erie Waters of Ashtabula County, Ohio

In 2018, Coastal Environments, Inc., (CEI) conducted a targeted cultural resources survey in the Lake Erie waters of Ashtabula County, Ohio, a study area covering ca. 30 square miles of lake bottom. The project's first phase consisted of a geophysical survey at selected locations within the study area. The second phase involved the selection of ten anomalies for ground truthing, including several high-probability locations for drowned terrestrial sites. This paper discusses the methodology utilized in selecting survey locations, reviews the findings of the investigation, and offers a brief history of several of the identified shipwrecks.

Strezewski, Michael (University of Southern Indiana) and Staffan Peterson (Indiana University)

[155] Magnetometry Survey at the Mann Site: A Rich New Dataset on Hopewell Ceremonialism

The Mann site in southwest Indiana is one of the largest Hopewell ceremonial centers in the Midwest and also one of the least studied. The site, which was occupied between A.D. 200 and 500, consists of flat-topped, conical, and geometric earthworks, similar to those from Hopewell complexes in Ohio and elsewhere. The most unique element of the Mann site is the presence of large quantities of habitation debris on the surface, a fact which sets it apart from contemporary Ohio Hopewell sites. Mann encompasses a huge area, approximately 350 acres, and no controlled surface collection or detailed mapping of the site has ever been undertaken, leaving us with piecemeal information as to the relative locations of earthworks, artifacts, and features. In 2006 and 2017, two large-scale magnetometry surveys were undertaken to better understand the distribution and nature of the features at Mann. The resulting data have provided a wealth of information, indicating numerous geometric post enclosures on top of and adjacent to the largest platform mound. The results also show dense concentrations of habitation-related features that are spatially segregated from the ceremonial area. Many of the features we have identified are thus far unique in the Hopewell world.

Stricklan, Amanda [115] see Oppenheim, Georgia

Stricklan, Amanda, Sarah Hlubik, Rahab Kinyanjui (National Museums of Kenya), David Braun (George Washington University) and Georgia Oppenheim (Wellesley College)

[390] Phytolith Analysis of Site FxJj 20 AB

Controlled fire could have significantly impacted hominin evolution, providing an adaptive release resulting in reduced teeth and gut size, and larger brains. Evidence of hominin controlled fire is sparse in the early Pleistocene archaeological record. These sites are usually in open-air contexts where taphonomic factors can obscure the identification of aspects of combustion that distinguish natural versus anthropogenic fires. Phytoliths can provide a useful proxy for identifying the use of fire in the record. Phytoliths that have been exposed to high temperatures for extended periods of time can be identified through distinct morphological features. Natural grass fires burn quickly and do not reach the temperatures that are typical of hearths, while hearth fires are likely to produce burned phytoliths and contain a high proportion of wood. We focus on phytolith analysis of the 1.5 Ma site, FxJj 20 AB, Koobi Fora, Kenya. Samples from this locality were analyzed using a rapid extraction methodology. Preliminary results indicate a typical grass to wood ratio for an open wooded area, for most of the site. Two squares exhibited an opposite ratio, suggesting wood was brought into the site and burned. This supports other lines of evidence that indicate localized combustion at the site.

Striker, Sarah (Arizona State University)

[176] *The Social Dynamics of Coalescence: Community Life among the Wendat of Southern Ontario ca. 1400-1550 C.E.*

In the fifteenth century C.E., the Ancestral Wendat lived in small, dispersed settlements of a few hundred people. By the mid-sixteenth century their descendants had aggregated into a few large, well-integrated villages of more than a thousand people. This process, described in the archaeological literature as “coalescence” has been the focus of considerable archaeological attention in recent years as archaeologists try to understand the nature of coalescent societies. My proposed research expands on previous work by focusing on the social dynamics of coalescence. I consider coalescence as the product of collective action – sustained cooperative activity among a group of people. I focus on two aspects of these social dynamics: how individual and collective social relationships changed throughout the process and how these relationships may have contributed to coalescence. I examine these questions in the context of four sequentially occupied communities from the Ancestral Wendat sequence using decorative, microscopic, and petrographic data from ceramic pottery and pipes. By understanding these social dynamics, this study will contribute a clearer understanding of how a coalescent community becomes socially cohesive.

Strong, Meghan (Research Associate, Cleveland Museum of Natural History)

[24] *Looking for Light in Ancient Egyptian Nocturnal Rituals*

Given the modern abundance of artificial light, it is often assumed that ancient cultures had the means and desire to illuminate the night. The paucity of artificial lighting devices from ancient Egypt challenges this assumption and has led scholars to conclude that the evidence must be there, but earlier archaeologists have failed to recognize lighting equipment. This presentation will reexamine that viewpoint and incorporate evidence from the rich textual and iconographic record of the New Kingdom (ca. 1550 – 1070 BC). The New Year’s festival serves as a case study for examining the necessity for lighting devices, the relative cost of obtaining a lighting implement, and the significance of employing light in nocturnal rituals. The sensorial impact of artificial light will also be explored and provide new insight into the experience of night in ancient Egypt.

[24] *Chair*

Strong, Meghan [24] see Gonlin, Nan

Stroth, Luke [103] see Otto Mejía, Raquel

Stroth, Luke (University of California, San Diego)

[134] *Chair*

Stroud, Elizabeth (University of Oxford), Amy Bogaard (University of Oxford), Michael Charles (University of Oxford) and Helena Hamerow (University of Oxford)

[102] *Identifying Crop Rotation during the Early Medieval Period in England: Charring Temperature, Contamination and Isotopic Boundaries*

Farming practice changed in Medieval England, allowing a dramatic increase in cereal production. Historical documents describe 13th century agricultural practices as open-field collective farming including three-field crop rotation and use of the heavy plough. Our research investigates how and when such changes took place, using stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotope values to assess crop rotation practices. Wheat, barley, oats and rye form the main crops. Crop rotation – i.e. consistency of growing conditions among species grown in annual rotation – is investigated through inter-species comparison from the same archaeological sequences. Temporal changes are examined via comparison of the same species over time.

The effects of charring on rye and oat grain $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values are unknown. Therefore, we undertook experimentation to assess charring effects, as previously done for wheats and barleys. Furthermore, due to limited Early Medieval archaeobotanical material, some grains exceed the 260°C maximum charring temperature used previously; the new

charring experiments examine the effect of higher temperatures on $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values. However, using grains charred at higher temperatures, coupled with wet soils, introduces additional contamination issues that require appropriate screening before analysis.

Stroud, Elizabeth [102] see Bogaard, Amy

Stuart, David (The University of Texas at Austin)

[79] Proper Names and the Development of Early Writing Systems

The 1980s saw dramatic new insights into the decipherment of ancient Maya writing, much of it spurred by collaborations with my friend and colleague Steve Houston. One of these was the recognition of inscribed "name-tags" on various types of portable objects and monuments, serving to specify the individual ownership of elite things and commodities, and perhaps developed in part to document the complex inter-relations among Maya dynasties by the Early Classic period. More recent discoveries of Preclassic Maya writing at San Bartolo, Guatemala, have added important new evidence to ponder about the origins of writing in the Maya area, and in Mesoamerica in general. These short texts do not "tag" objects, yet they are nonetheless almost exclusively examples of written names, used to identify images in the complex narrative of the mural paintings of the Las Pinturas complex. Houston, myself and others have explored the importance of naming in the advent of script in ancient Mesoamerica, but in this presentation I propose to go much further afield, exploring also the almost universal significance of proper names as key motivations in the development of ancient writing systems in the Near East and Asia.

Stuckey, Sarah [99] see Morrow, Juliet

Stueber, Daniel [249] see Duke, Daron

Stull, Scott (SUNY Cortland)

[310] Castles of Conquest or Factionalism and the Creation of Political Landscapes

Castles play a significant role in the creation of a social and political landscape. The placement and proximity of castles to each other and to other places in the landscape can be markedly different depending on the political circumstances of their creation. The castles of Germany's Altmühlatal will be compared to Trim Castle and similar castles of the Anglo-Norman world to reveal the different political worlds of conquest and factionalism.

Sturm, Camilla [361] see Li, Dongdong

Sturm, Jennie (University of New Mexico), Wetherbee Dorshow (University of New Mexico) and W.H. Wills (University of New Mexico)

[120] Using Remote Sensing to Re-evaluate Prehistoric Land Use in Chaco Canyon, New Mexico

Remote sensing has been used extensively the past several years to study prehistoric land use in Chaco Canyon, New Mexico. Previous land use models for Chaco predict economic activities such as agriculture and water management near some of the major sites within the canyon, and these models have been critical to understanding how land use contributed to the rapid social transformation of Chacoan society. Remote sensing methods, including ground-penetrating radar (GPR), magnetic gradiometry, LiDAR, low-altitude aerial photography, and structure-from-motion photogrammetry, have produced new information about these economic activities, including evidence of buried and remodeled land use features. The results from our remote sensing investigations point to a much more complex land use history than suggested by previous models. This poster highlights some of these recent results and interpretations.

Sturt, Fraser [378] see El Safadi, Crystal

Styles, Bonnie [34] see Neusius, Sarah

Styles, Bonnie (Director Emeritus, Illinois State Museum), Mona Colburn (Adjunct Research Associate, Illinois State Museum) and Sarah Neusius (Retired Professor, Indiana University of Pennsylvania)

[34] Mapping Faunal Data to tDAR Ontologies to Address Data Comparability and Archaic Period Use of Animals in the Interior Eastern United States

With support from a National Science Foundation grant, the Eastern Archaic Faunal Working Group (EAFWG) uploaded faunal datasets for 24 Archaic Period (10,000-3,000 BP) archaeological sites in the Interior Eastern United States into the Digital Archaeological Record (tDAR) to address research questions about the roles of cultural and environmental variability and change in human use of fauna. In order to compare the disparate faunal datasets within and among sites, we established agreed upon ontologies for variables in tDAR and then mapped our datasets to those ontologies. We used or expanded some ontologies developed by the Southwestern Faunal Working Group, and developed new ontologies to accommodate differences, such as in fauna, settlement types and contexts, cultural chronologies, and archaeological sampling and recovery in the Interior East. Mapping disparate datasets to the ontologies allowed us to assess data comparability related to bone preservation and modification, recovery methods, and site contexts and to document relative comparability within and among most sites. Mapping of faunal datasets to the resource use ontology, data integration for comparable datasets, and related analyses reveal differences and changes in resource use, particularly for aquatic resources, that we link to variability and change in cultural practices and environments.

Styring, Amy [102] see Bogaard, Amy

Su, Xin (Harvard University)

[361] Preliminary Exploration of Provenance of Stones and Strategy of Using Stones in Panlongcheng Site during Shang Period

The production of stone tools is a systematic human activity, and the utilization of stone materials is the basis of the entire production. Before conducting research on the entire stone production, we should observe the provenance of stones and the strategy of using these materials. Through the analysis of the lithic facies of stone tools excavated from Panlongcheng Site, combining with the geological survey, we basically determine that the stones should come from the Dabie Mountains in the northern part of Panlongcheng. As for the strategy of using stones, Panlongcheng people fully recognized the characteristics of different stones. They considered the function of stone tools, and then selected appropriate types of stones to make tools. Meanwhile, based on landform, distribution of sites and situation of stone tools, there might be some professional production areas and these stone tools were transported by some certain routes.

Su, Yu-Yin [106] see Chiu, Scarlett

Suarez Ubillus, Mónica (IDARQ) and Iván Ghezzi (IDARQ)

[236] The Cahuacucho Idol of the Casma Culture

In 2015 Suárez reported the discovery in the high parts of Cerro Cahuacucho (Sechin Valley) of a carved algarrobo (*Prosopis* sp.) tree trunk, over 2 m long and 118 kg in weight. It was carved on one side with the representation in profile of 5 felines. Because of this feature, it was named "The Cahuacucho Idol". After a complex rescue process, it was transferred to the National Museum in Lima for conservation and the extraction of samples for high precision radiocarbon dating using wiggle-matching, and then returned to Casma. The results of the analysis of the iconography and other features, as well as the archaeometric research carried out on this representative religious artifact of the Casma culture, allow the reconstruction of an important part of the ideology and paraphernalia in force during the Late Intermediate Period in the Sechin Valley.

Sucec, Rosemary (Intermountain Region - National Park Service)

[5] Moderator

Sugandhi, Namita (Hartwick College)

[399] *Small-Scale Complexities: Tekkalakota and the Archaeology of the Southern Deccan*

This paper introduces the MAST project, a multi-year excavation program in South India that is designed to explore the role of small-scale societies in the development of larger interregional social formations. In particular this project will focus on areas of Iron Age and Early Historic occupation and production at the site Tekkalakota, and on the diachronic articulation of associated ritual places and political monuments which includes Neolithic ashmounds, megalithic features, and early inscriptions associated with the North Indian Mauryan Empire. In doing so, this project will reflect on long-term patterns of monumental construction and local innovation, challenging existing assumptions about the development of social complexity that looks almost exclusively to large-scale urban societies that are politically organized as formal states.

Sugiyama, Nawa [39] see O'Neil, Megan

Sugiyama, Nawa (George Mason University), Tanya Catignani (George Mason University), Ariel Texis (Project Plaza of the Columns Complex) and Saburo Sugiyama (Arizona State University, Aichi Prefectural University)

[81] *Urban Palimpsest Landscapes: Interpreting the Teotihuacan LiDAR Map*

With 54% of the world's population living in urban zones, investigating the nature and impact of urban centers has never been more relevant. Archaeology's unique ability to reconstruct prehistoric urban systems across the long dureé makes the Pre-Columbian metropolis of Teotihuacan (1-550 CE) an outstanding candidate for probing the complex sociopolitical, environmental, and economic circumstances that precipitate urbanization. Project Plaza of the Columns Complex interprets the new Teotihuacan LiDAR map within the framework of palimpsest landscapes; quantifying how prehistoric urban systems leave enduring impacts on the modern landscape. This 2.5 dimensional map covers 165 km² of the Teotihuacan Valley, expanding the reach of Millon's survey map by over 122 km². Not only does this map redefine ancient city limits, it quantifies how the present landscapes trace the contours of their past. Archaeology contributes valuable and influential insights about the continuity between past and present landscapes. The LiDAR data already attests to significant loss of the remaining traces of ancient urban systems. Extensive bedrock mining for the construction of the new international airport has demolished many archaeological features on entire hillsides. Evidence of these lost features are now preserved only as a digital archive on our LiDAR map.

Sugiyama, Saburo (Arizona State University)

[28] *New Data and New Perspectives of the Feathered Serpent Symbolism and Polity at Teotihuacan*

Intensive excavations carried out by the Proyecto Templo de Quetzalcoatl more than 20 years ago suggested that the pyramid symbolized human sacrifice, warfare, and rulership in Teotihuacan. The lack of a royal tomb inside the building indicated that more than 200 warriors were sacrificed in dedication to the monument itself. The recent discovery of the ancient tunnel under the Feathered Serpent Pyramid by Sergio Gomez substantially progressed our understanding of the Teotihuacan state polity and the Feathered Serpent symbolism. In this presentation I provide contextual and diachronic overview of the use and distribution of Feathered Serpent images, including related Venus-Tlaloc icons and discuss how they contained socio-political implications for Mesoamerican people. I also examine the Citadel's architectural layout and the spatial distribution of artifacts referencing the Feathered Serpent in the dedicatory chambers to argue Teotihuacan was controlled by powerful individualistic rulership. This is indicated by the city-wide ceremonial construction programs materializing Mesoamerican worldview in an early stage of the metropolis. Primary excavation data reinforce the hypothesis that the Citadel was the headquarters of ruling entities and military institutions, where state-sponsored sacrificial rituals and occasional accession ceremonies took place and the royal grave was once located.

Sugiyama, Saburo [81] see Sugiyama, Nawa

Sugrañes, Nuria [248] see Gil, Adolfo

Sukau, Dana (Portland State University) and Virginia L. Butler (Portland State University)**[118] Use of Backwards Design to Assess Public Engagement at the Archaeology Roadshow, Portland, Oregon**

Public archaeology has grown in recent decades with increased recognition of the need to garner public support and increase accessibility of archaeology to a range of publics. While public outreach efforts have been increasing, there have been limited reflections on how we measure the effectiveness of our efforts. One approach used in the field of Education is Backwards Design, which focuses on clearly defining goals and methods of assessment for education or public outreach. We applied the Backwards Design framework to the design and implementation of an outreach activity at the Portland State University Archaeology Roadshow in June 2018. The activity's purpose was to encourage visitors to take an active role in their visit to the event through engaging with several presenters hosting booths and activities. We proposed this could be accomplished and the activity assessed by giving visitors a card with several questions they could pose at booths. Presenters marked the visitors' cards, demonstrating their engagement, then visitors returned the question cards and were rewarded with a raffle ticket. A total of 221 cards were distributed, while 52 were returned, a 23.5% participation rate. Our poster reviews the promise and challenge of using Backwards Design in public archaeology.

Sullivan, Alan (University of Cincinnati)**[166] Discussant**

Sullivan, Donald G. [49] see Gilmore, Kevin P.

Sullivan, Franklin [77] see Palace, Michael

Sullivan, Jacob I. [36] see Lawrence, Ken

Sullivan, Kelsey (University of Oregon) and Jaime Awe (Northern Arizona University)**[255] Eccentric Production Techniques and Caching Practices at Xunantunich, Belize**

Though identified at sites throughout Mesoamerica and the Maya Lowlands, eccentric lithics remain poorly understood and understudied. These esoteric artifacts, however, are very important to understanding the ritual expression of the complex ideologies of the ancient Maya. Over 100 years of archaeological research at Xunantunich in the Belize Valley, including ongoing work by the Xunantunich Archaeology and Conservation Project, has revealed prolific dedicatory caches containing eccentric lithics throughout the Late Classic site core. This large corpus of eccentrics makes Xunantunich an ideal center for a comprehensive examination of a range of production techniques and ritual practices at a single center. An investigation of these eccentric caches elucidates strong regional similarities in the manifestations of this pan-Maya caching tradition, as well as local divergences from other sites in the Maya Lowlands. In this paper, we expand on previous research into ritual caches from Xunantunich and focus on a range of complex technological processes associated with the production of these tools. We also present the results of an experimental study into the creation of specific eccentric types. This research explores methods for understanding the production techniques of eccentric lithics, which serves to enhance the study of ancient Maya eccentric lithics.

Sullivan, Lynne [183] see Harle, Michaelyn

Sullivan, Shaun**[37] The Salt Road at MC-6, a Public Work Empowering the Cacique**

Middle Caicos, in the Turks & Caicos islands hosted a protohistoric Chiefdom in the Classic Taino tradition as demonstrated by evidence of regional exchange, key resource control, social stratification, monumental public works, and the use of public ceremonial space that reflected advanced astronomical and calendric knowledge among the elite at a complex site, MC-6. Organization of public labor by an empowered cacique at MC-6 is reflected in the construction of a road, stretching from the edge of ceremonial space in the main plaza to a large deposit of a key resource, salt (hereafter the Salt Road). Control of trade in salt helped energize a regional exchange network that reinforced the social status and authority of the MC-6

cacique, and of associated kin and allies. The Salt Road is considered in the context of its reflection of centralized planning, control of public labor as well as of a key resource, and with regard to societal expenditure of time and energy, material and social gain, associated ceremonialism, and reinforcement of the authority of the cacique and associates.

Sumano Ortega, Kimberly [307] see Muñiz, David

Summers, Rachel (University of Montana), Meradeth Snow (University of Montana) and Michael Searcy (Brigham Young University)

[253] *MtDNA Analysis of the Paquimé (Casas Grandes), Mexico, Population*

This research project investigates the population interred at the archaeological site known as Paquimé (Casas Grandes), Mexico between two time periods known as the Viejo Period (700 - 1200 A.D.) and the Medio Period (1200 - 1450 A.D.). There was a shift in culture during the latter period marked by changes in material culture and the bringing together of larger populations near and within the city center known as Paquimé. Several scholars have suggested that this extraordinary cultural shift is principally due to migrations from other regions (for example: Di Peso 1974; Lekson 1999; Laekson 2015). The research conducted at this archaeological site addresses questions about migration patterns, individual identity, genetic relationships, and mortuary rituals using multiple lines of evidence including molecular data, archaeological data, and historic literature. Through full mitogenome analysis for the preliminary portion of this study, individual interments are examined for their genetic relationships in the greater context of their archaeological situ and understanding of the site at large. This data, when compared to that previously published, aids in our understanding of the past occupation and potential population movement at the site.

Sun, Mingli [299] see Chen, Hong

Sun, Xiaofan [389] see Yang, Shiyu

Sun, Yan (Gettysburg College, PA)

[130] *Bronzes, Mortuary Ritual and the Rise of Political Power in the NE Frontier of Ancient China: A Case Study of Upper Xiajiadian Burials*

This study focuses on manipulation of bronzes of different styles, and mortuary rituals overall, during in the emergence of political power in the northeastern frontier of ancient China. Data are presented on three richly furnished burials M101 at Nanshan'gen and M8501 and M9601 at Xiaoheishigou of the Upper Xiajiadian Culture (c.1000-600 BCE) centered in southeastern Inner Mongolia. Three types of tomb bronzes include imported Zhou capital style vessels, bronze weapons and horse ornaments featured with mixed Zhou and northern frontier style, and distinctive locally made bronzes based on indigenous pottery types. Examinations of the style, assemblage and mortuary use of bronzes indicate that material symbols were intentionally selected to mark prestige and authority of individual elites. This study will demonstrate the vibrant role bronzes played in the increasing complexity of the Upper Xiajiadian societies and the interactions between the Zhou from the Central Plain and frontier communities in Eastern Eurasia.

[130] *Discussant*

Sun, Zhouyong [78] see Ling, Xue

Sundstrom, Linea (Day Star Research)

[190] *Polychrome Perplexities: The Painted Rock Art of the Southern Black Hills*

Infrared, ultraviolet, and D-Stretch imaging has provided a more complete view of a complex set of black and red painted rock from the southern Black Hills of South Dakota. The painted designs include bison, bears, other quadrupeds, humans, net-, web-, and gridlike figures, atlatl darts, hand- and footprints, mythological beings, and nonrepresentational figures. Most individual figures are either red or black, but some are dichromatic. Neither color is consistently superimposed over the other; rather, they appear to be part of a single tradition. Based on superimpositions and subject matter this rock art is

hypothesized to date to the Late Archaic period, approximately 2500 to 1000 years before present. It shows some affiliation with Eastern Woodlands cultures; however, no specific links were found between the pictures and oral literatures.

Sundstrom, Linea [369] see Keyser, James

Sunell, Scott (UCLA) and Christopher Jazwa (University of Nevada, Reno)

[70] *The Development of Sociopolitical Complexity among Chumash Hunter-Gatherer-Fishers on California's Northern Channel Islands*

The Chumash of the Santa Barbara Channel region of southern California are well known among archaeologists for developing complex sociopolitical systems within a hunter-gatherer-fisher subsistence system. This includes the advent of both hereditary high-status leaders and craft specialization in the form of shell bead and stone drill production industries. Chumash territory encompasses California's northern Channel Islands, occupied from the terminal Pleistocene until Spanish missionization in the early 19th century. These islands still contain a well-preserved trans-Holocene record of occupation. We present evidence of craft specialization (i.e., microblades and bead production refuse) and subsistence change (i.e., faunal remains) from Santa Rosa and Santa Cruz Islands, the largest and most intensively occupied of the northern islands, to trace the appearance of complexity among the Chumash. Evidence of changing landscape use and intensification of non-subsistence labor practices is central to understanding the rise of complexity in the region. Ethnohistoric and environmental research paradigms have led to a range of definitions for complexity in the region, an issue that current work still seeks to disentangle. This study will place the appearance of sociopolitical complexity within a global context as a valuable comparative case for other examples of non-agricultural coastal hunter-gatherer-fishers.

Sunell, Scott [116] see Holguin, Brian

Sunseri, Jun [193] see Trujillo, Isabel

Sunseri, Jun (UC Berkeley)

[294] *Accountability as Litmus: The Work of Partnership in Collaborative Archaeology*

The Berkeley-Abiquíú Collaborative Archaeology (BACA) Project strives to serve local interests regarding heritage management and narrative control in a community often relegated to lesser authority by the ongoing processes of settler colonialism. Can the partnership be a legitimate part of a decolonizing toolkit as the community continues their struggle for self-determination? Or, does the inclusion of a non-local academic partner put community leaders at risk through their responsibility to the rest of the families for whom issues of sovereignty may or may not be served by the kinds of work we do? Concepts of permission and care must be up front aspects of these types of engaged scholarship.

[228] *Discussant*

Supernant, Kisha [120] see Wadsworth, William

Supernant, Kisha [161] see Wambold, Dawn

Supernant, Kisha (University of Alberta, Department of Anthropology)

[385] *Open Data, Indigenous Knowledge, and Archaeology: The Need for Community-Driven Open Data Projects*

Over the past 20 years, much archaeological data has been digitized and made available online. With an increasing call for open data and open science models, driven largely by a desire to make research more accessible and reproducible, archaeologists are exploring new ways to make these data available without negative impacts to the archaeological record.

However, when archaeologists work in Indigenous contexts, there are considerations about how broadly knowledge should be shared, especially when it concerns deceased ancestors. Archaeologists have become more attentive to the sensitivities about ancestral remains, but other material objects and site locations can be closely tied to knowledge that needs to stay within the community, lest it cause harm to living members. While some best practices can be outlined, ultimately archaeologists need to allow descendant communities to decide what materials can be shared (if any), how they should be shared, and any protections that need to be in place before data are made available, including legacy and archival data. Drawing on my experiences working with Indigenous communities in Canada, I discuss how they engage with the archaeological data in specific ways, highlighting the need for community-driven projects that are attentive to the needs of each community.

[14] *Discussant*

Surface-Evans, Sarah (Central Michigan University)

[69] *The Entanglement of Health, Race, and Resistance at the Mount Pleasant Indian Industrial Boarding School*

Childhood illness and death at Federal Indian Boarding Schools are one of the most tragic aspects of these failed institutions. Preventable communicable diseases spread like wildfires in the close-quarters and overcrowded conditions of dormitories. Racist policies maintained poor nutrition and hard physical labor also contributed to illness and injury. The experiences of chronic physical trauma denied Native American children of their wellbeing and personhood. Furthermore, the harsh treatment experienced caused psychological injury in what is now recognized as historical trauma. Oral histories, documentary evidence, and archaeological data at the Mount Pleasant Indian Industrial Boarding School show that students here suffered a great deal, however, they were also immensely resilient. In this paper, I will share an individual story of resistance in the face of serious health risk. I will also present how Michigan Tribes are seeking healing from the disastrous consequences of the boarding school.

[69] *Chair*

Surmely, Frédéric [403] see Christensen, Lauren

Surovell, Todd [110] see Zarzycka, Sandra

Surovell, Todd [175] see Brantingham, P. Jeffrey

Surovell, Todd (University of Wyoming)

[249] *The Ages of Stemmed and Fluted Points in the Northwestern Plains and Rocky Mountains*

While the relative and absolute ages of fluted and stemmed points remain unclear in the Great Basin, particularly in the earliest periods of prehistory, to the northeast in Wyoming the archaeological record is unambiguous. Fluted points are consistently older than stemmed points, an observation supported by both absolute and relative dating of multiple localities. In this paper, I review the archaeological evidence for the chronology of stemmed and fluted points in the Northwestern Plains and Rocky Mountains, but ultimately argue that patterns we see in neighboring areas may not be relevant to the culture history of the Great Basin. Therefore, this problem in Great Basin prehistory may be one where sample sizes are not yet sufficient to provide a clear answer.

Susmann, Natalie (Boston University)

[337] *Expanding the Boundaries of Cultic Space: An Investigation of Nature in Greek Cultic Spaces in the Argolid and Messenia (2800–146 BCE)*

The importance of landscape to ancient Greek cultic activity has been long acknowledged. Beliefs and stories about Greek gods and lesser deities were firmly situated in the visible physical world. Despite our acceptance that this was a widespread practice, few modern archaeological studies consider these visual and topographical relationships on a regional scale, and focus on individual sites and particular periods. Recognizing the benefits of a multi-scalar approach, this paper investigates

the natural topographies of multiple Greek sanctuary spaces surveyed within the regions of the Argolid (2400 sq. km) and Messenia (3000 sq. km) (Greek Peloponnese) used between the Bronze Age through Hellenistic period (2800–146 BCE). With careful consideration for each sanctuary's "life history" (Ashmore 2002: 1173), in conjunction with phenomenological data, time-phased GIS analyses (e.g. viewshed and prominence), and 3D modeling, I identify particular cases where the natural landscape should be considered as a functional part of the cultic arena – specifically, to convey sociocultural authority, for asylum and protection, or crowd control. Ultimately, by investigating a wide array of previously unconsidered evidence, and applying a broad geographical and temporal scope, this research will provide a more nuanced picture of the Greek cultic landscape than is currently available.

Sutikna, Thomas [247] see Veatch, Elizabeth

Sutter, Richard (Purdue University - Fort Wayne)

[55] *Horizontality Revisited: Evidence for 3,000 Years of Prehistoric Biocultural Continuity of Fisherfolk at Huanchaco, North Coast of Peru*

The importance and distinctiveness of Peruvian fisherfolk, or pescadores, and their complementary role in coastal valley economies feature prominently in numerous ethnohistoric accounts, while archaeological evidence indicates that large, permanent fishing communities existed for centuries before. What is unclear is the degree to which, if any, these communities remained biologically distinct from other contemporaneous inland agricultural communities. Here we present preliminary dentally derived biodistance results for recently excavated Salinar (400 BC - AD 100) and Viru (AD 100-550) era coastal skeletal populations from Huanchaco, Peru. Comparisons with other skeletal samples from the Moche Valley indicate that the coastal Salinar, Viru, and lower valley Moche era (AD 200 – 750/800) populations show long-standing continuity with one another beginning as early as the early Initial Period (1500 – 1200 BC), and that lower valley Salinar and Viru fishing residents were slightly distinct from contemporaneous middle Moche Valley Salinar and Viru agriculturalists from Cerro Oreja. These results suggest that, despite cultural similarities between middle and lower valley populations, a degree of breeding isolation and differential gene flow from the adjacent highlands existed between them. We consider the implications of these results.

[55] *Chair*

Sutton, Wendy (USDA Forest Service)

[237] *NAGPRA Successes, Challenges, and Emerging Issues: Forest Service Approaches to Post-1990 Discoveries*

The Forest Service manages 193 million acres and over 277,000 recorded sites throughout the United States; NAGPRA has become integral to how we conduct work. Developing POAs with tribes prior to intentional excavations has helped foster increased communication and collaboration; tribal roles in decision making influence how we work with academics and contractors. Providing reburial opportunities has added a meaningful dimension to our repatriations. However, we've often struggled with inadvertent discoveries. They rarely follow the "norm" envisioned by the regulations and many archaeologists and managers are far less comfortable with NAGPRA discovery than with collections requirements. Most of our inadvertent discoveries are made by recreational users and local law enforcement is frequently aware of discoveries before we are, further complicating the process by starting "sideways." Particularly in areas where discoveries are common, there is tribal interest in developing a more fluid disposition process than is laid out by NAGPRA. Another emerging issue is human skeletal materials inadvertently curated in post-1990 collections. After 29 years of working with NAGPRA, it is time to examine what is working well, what could be improved, and how we can better integrate NAGPRA into public education, university programs, and agency training and process.

Swanson, Kelly [109] see Yarlagadda, Karthik

Swanson, Steve [84] see Searcy, Michael

Swanson, Steve [346] see Vorsanger, Andrew

Swantek, Laura (Arizona State University)**[301] Local Actions and Long-Distance Interactions: Challenging the Paradigm for the Emergence of Social Complexity on Cyprus during the Bronze Age**

Complex social networks or social complexity emerges from the actions and interactions of people as they pass information, goods and services. During the Bronze Age in the Mediterranean, particularly on the island of Cyprus, it has been hypothesized that two actions and interactions are particularly important for this process: differential access to metal resources and participation in international trade. This paper explores the role of local actions and far reaching interactions in the emergence of social complexity on Cyprus during the nascent sub-periods of the Bronze Age (2400-1700 cal BC), and the effect of cross-scale interactions on this process. Proxy data for these actions obtained from mortuary contexts is statistically analyzed at the community, region and island-wide scales to determine the distribution of access to metal resources and level of participation in international trade, and the hypothetical network configuration that best describe the social system. When complex social networks like small world or scale free configurations are approximated, differential access and participation are apparent and social complexity is emergent. The results of this research do not support the long-standing models that link metal consumption and long-distance trade to the emergence of social complexity during the Bronze Age on Cyprus.

[301] Chair**Swartz, Bethany (University of Arkansas), Wesley Stoner (University of Arkansas) and Barbara Stark (Arizona State University)****[307] Digitally Augmented Survey of Southern Veracruz Using Open-Source LiDAR Data**

In recent years, the Mexican Instituto Nacional de Estadística y Geografía (INEGI) released a LiDAR-based digital elevation module (DEM) that provides a mechanism to augment the area covered by pedestrian surveys. The DEM is of low resolution (5-m horizontal grid) compared to research-grade LIDAR studies in Mesoamerica, but the southern half of Veracruz is largely deforested and mounded architecture less than 1-m tall can be detected in many cases. The coverage using INEGI's open-source DEM is massive compared to pedestrian surveys and higher-resolution, research-grade LIDAR. In a prior test for a study area in south-central Veracruz, Stark and Stoner (2017) compared remote detection of formal architectural complexes with those identified through pedestrian survey, finding a high concordance between the two survey techniques. We move forward in the current study by describing the distribution and characteristics of centers with monumental architecture identified for the southern Veracruz lowlands (Tuxtla Mountains excluded) on the basis of the INEGI DEM. The results expand information spatially from the three systematic pedestrian surveys in southern Veracruz that have been undertaken in the past.

Sweet, Elizabeth [351] see Bolender, Douglas

Swetnam, Thomas W. [381] see LaValley, S. Joey

Swift, Jillian (Max Planck Institute for the Science of Human History), Samantha Brown (Max Planck Institute for the Science of Human History), Patrick Kirch (University of California, Berkeley), Seth Quintus (University of Hawaii at Manoa) and Patrick Roberts (Max Planck Institute for the Science of Human History)**[34] Potentials and Pitfalls for ZooMS Analysis in the Pacific: A Case Study from Ofu Island (Manu'a Group, American Samoa)**

Zooarchaeological analysis in the Pacific is often limited by the large proportion of small, highly fragmented, non-diagnostic remains recovered from archaeological sites. Recent advances in biomolecular methods, including collagen peptide mass fingerprinting (a.k.a. ZooMS) enable increased taxonomic identifications and refine investigations related to human subsistence and biodiversity. The Samoan archipelago is one of the last island groups to be colonized by Lapita people and, as part of the ancestral Polynesian homeland, figures prominently in discussions of Oceanic migrations, species translocations, subsistence, and culture change. Reanalysis of the non-diagnostic medium mammal assemblage recovered from the To'aga dune site via ZooMS provides new evidence for early commensal introductions and human activities. Stable carbon and nitrogen isotope analysis of newly identified commensal fauna from To'aga and elsewhere on Ofu Island further reveal patterns of human land use and ecosystem transformation throughout the island. This case study demonstrates the potential for technology-based methods to contribute to long-standing questions of species translocations and early subsistence economies across the Pacific. While such methods present exciting new opportunities for zooarchaeological analyses, particularly in collaboration with museums and archived collections, standards and guidelines

for ethical sampling are critical.

Swindell, E. Clay [168] see Bassett, Hayden

Swope, Karen K. (Statistical Research, Inc.) and Carrie J. Gregory (Statistical Research, Inc.)

[189] *Radioactive Mineral Mining in Southeastern Utah: National Register Multiple Property Documentation Form*

Statistical Research, Inc. (SRI), under contract with the BLM and Utah Office of Historic Preservation, developed a historic context for radioactive-mineral-mining-related resource types in the form of a National Register Multiple Property Documentation Form (MPDF). In addition, SRI generated an educational public product to interpret the resources. The purpose of the historic context is to assist agencies and researchers in NRHP eligibility assessments and findings of effect for undertakings across the Richfield Field Office, particularly in the Henry Mountains District. The purpose of the public product is to explain and interpret the resources to the interested public and to foster improved stewardship through knowledge. The Henry Mountains District is unique for being the scene of twentieth-century radioactive-mineral-mining booms. Two events at the turn of the twentieth century resulted in a mining boom targeting radioactive minerals in southeastern Utah. Pierre and Marie Curie isolated radium, and carnotite was found to contain uranium, vanadium, and radium. The industry experienced its biggest boom after World War II, when the Atomic Energy Commission supported renewed mining for radioactive minerals. For 70 years between 1900 and 1970, radioactive-mineral mining in the Henry Mountains District played a pivotal role on the local, national, and global stage.

Sykes, Naomi (University of Exeter)

[351] *Archaeologies of the Norman Conquest*

Despite the long-standing truism in archaeology that the Norman Conquest of England is largely invisible in 'the stuff of everyday life', an abundance of material remains dating to the 11th and 12th centuries has been recovered through excavation and still survives above ground. It is now becoming clear that while some level of continuity was not unusual, the Conquest also initiated and intensified developments in all aspects of society, including culture and identity, economy, diet, art and architecture, portable material culture, manorial and community landscapes, religion and mortuary practice, and the management of animals and the environment. Many of these elements are either inaccessible from documentary evidence alone or have distinct material implications, yet scholars have rarely taken advantage of these wide-ranging archaeological datasets to ask probing questions about the dynamics and impact of the Norman Conquest.

This paper presents the results of our recent research project, funded by the Arts and Humanities Research Council. It will showcase innovative approaches and interpretations from both the humanistic and scientific sides of archaeology that are helping us re-evaluate traditional narratives of the Conquest and better understand this rich period of British and Continental history.

[20] *Chair*

Sykes, Naomi [20] see Larson, Greger

Sykora, Lydia (University of Kansas), Justin Tackney (University of Kansas), R. Kelly Beck (SWCA Environmental Consultants), Dennis H. O'Rourke (University of Kansas) and Jack Broughton (University of Utah)

[323] *Reconstruction of Late Holocene California Tule Elk Populations Using Ancient DNA and Stable Isotopes: An Update on Ongoing Analyses*

Zooarchaeological analyses have for some time suggested that California tule elk (*Cervus elaphus nannodes*) populations were depressed by late Holocene hunters, and more recent preliminary analyses focused on adNA and stable isotopes (carbon, oxygen, and nitrogen) have supported that conclusion. This work indicated a significant decrease over time in genetic diversity, consistent with a declining elk population, but absent changes in stable isotopes that suggested climate change did not play a role. We present here further tests using this approach based on two sites in central California that have produced large samples of archaeological tule elk: the Emeryville Shellmound (CA-ALA-309), located in the San Francisco Bay area, and the King Brown site (CA-SAC-29), located in the Sacramento–San Joaquin River Delta. From a collection of over 80 individual elk from the two sites we derived radiocarbon assays, stable isotopes, and attempted extractions, amplifications, and sequencing of a 172-bp fragment of the mitochondrial D-Loop. This poster provides an

update of our ongoing analyses of these materials.

Szabo, Vicki, Brenna Frasier (St. Mary's University), Michael Buckley (University of Manchester), Thomas McGovern (Hunter College, CUNY) and Ingrid Mainland (University of Highlands and Islands)

[31] Transdisciplinary Analysis of Marine Mammal Use in the Norse North Atlantic and Subarctic

This ongoing project, funded in 2015 by Anna Kerttula and the Arctic Social Sciences Program, uses historical, literary, aDNA, ZooMS, and archaeological data to identify patterns in marine mammal exploitation across the North Atlantic and Subarctic from ca. 800 -1800 CE. With over 230 samples of archaeological whale bone from sites in Orkney, the Faroes, Iceland, Greenland, and Newfoundland, our project has revealed a high number of blue whale remains, along with right whales, grey whales and a range of other species across approximately thirty archaeological sites. New translations of premodern Icelandic historical and natural history texts have revealed specialized knowledge and intensive use of large whale species in periods corresponding with the archaeological evidence. This paper will address the insights gained from transdisciplinary collaboration on reconstructions of premodern marine mammal use, and the complications of aDNA analysis from archaeological assemblages from Norse sites across the North Atlantic. This unconventional transdisciplinary project is one of many supported by Anna Kerttula that addresses critical environmental issues in the premodern and modern Arctic and Subarctic worlds.

Szpak, Paul (Trent University) and Katherine Chiou (University of Alabama)

[102] Stable Isotope Analysis of Charred and Desiccated Plant Remains from the North Coast of Peru

One of the key findings of early work that utilized isotopic analysis of macrobotanical remains was that charred remains seemed to produce reliable isotopic measurements, while uncharred (desiccated) remains did not. This early research contrasted charred remains from the highlands of Peru with uncharred remains from the coast. In this study, we reexamined the notion of the reliability of desiccated remains by measuring the carbon and nitrogen isotope compositions of both charred and desiccated macrobotanical remains from two sites on the north coast of Peru. The results demonstrate no systematic differences in the isotopic compositions recorded in the charred and desiccated remains, calling into question the assumption that only charred remains will produce reliable isotopic measurements. Furthermore, the isotopic compositions themselves suggest the use of fertilizers (seabird guano or camelid dung).

Szremski, Kasia (University of Illinois)

[98] How Much Can I Get for These Choros? New Evidence for Andean Markets from the Chancay Site of Cerro Blanco, Huanangue Valley, Peru

The rich diversity of Andean ethnic and ecologic landscapes meant that exchange was essential to the economy of many prehispanic Andean societies. While exchange can and did take many forms (trade, vertical archipelago, reciprocity, centralized redistribution, etc.) one mechanism that has received relatively little attention is that of the feria or informal market. Using the Chancay as a case study, this paper draws from a growing body of literature (see Dillehay 2013; Mayer 2013, among others) to argue that ferias were a key part of the Andean political economy, particularly during the Late Intermediate Period when political fragmentation in the Andes would have led to inter-ethnic exchange becoming a key factor in facilitating the movements of goods (agricultural, mineral, etc.) between different ecological zones. Using information from colonial period documents together with data from recent excavations at the Chancay administrative center of Cerro Blanco, I argue that ferias connected to camelid caravans were likely a key part of the Chancay political economy, allowing both the circulation of goods between ecological zones and playing a key role in integrating far-flung Chancay settlements.

Szumilewicz, Amy [335] see Shimada, Izumi

Szymanski, Ryan (Bright Hearth LLC)

[404] Paleoecological and Archaeological Evidence for Iron Age Economic and Ecological Transformation in the Highlands of Western Kenya

Until recently, chronologies of food and iron production activities have been poorly resolved in the western Kenyan highlands, and have been informed largely by historical linguistics and only a handful of radiocarbon dates. New

archaeological and microbotanical data are presented that allows reexamination of earlier cultural history models for this region, and provides firmer date ranges for specific food production and iron smelting activities. These data broadly support extant theories of food production for the western highland region, and identify and contextualize transformations of the ecological landscape associated therewith. Further, faunal, iron, and microbotanical evidence is presented that region-wide economic transformation from relatively mobile herding and low-intensity root crop cultivation to more sedentary herding, millet and/or sorghum cultivation, and locally-performed iron smelting characterized the early part of the last millennium BP.

Ta'ala, Sabrina [129] see Esh, Kelley

Tabrett, Amy [128] see Way, Amy

Taché, Karine [168] see Mann, Evan

Tackney, Justin [323] see Sykora, Lydia

Taffere, Abebe [32] see Brandt, Steven

Tainter, Joseph (Utah State University)

[58] Sustainability in Society and Archaeology

The processes that make a society sustainable not evolve over periods of decades, generations, and centuries. These processes are commonly not perceivable in a single lifetime. Sustainability must therefore be a historical science, and archaeology is well placed to contribute to understanding sustainability. Yet factors within society and the field itself inhibit the contribution of archaeology to understanding sustainability. Among these are popular ignorance, professional disinterest, the nature of academic achievement, failure to approach historical study in a comparative framework, and the evolutionary history of the human species.

Taira, Ryan [129] see Cosgriff-Hernandez, Meghan-Tomasita

Takamiya, Hiroto (Kagoshima University), Takeji Toizumi (Waseda University) and Taiji Kurozumi (Natural History Museum and Institute, Chiba)

[33] Coastal Resource Use during the Prehistoric Times in the Amami and Okinawa Archipelagos, Japan

The Ryukyu archipelago, Japan, is located between Kyushu and Taiwan islands, stretching approximately 1200 km. The Amami and Okinawa archipelagos occupy the central part of the Ryukyu archipelago. Astonishingly, *Homo sapiens* settled these islands as early as ca. 30,000 years ago. Based on accumulated archaeological data since around the 1900s, chronology of the region is divided into the Paleolithic (ca. 30,000-10,000 BP), the Shellmidden (ca. 7,000-1,000 BP) and the Gusuku (ca. 1,000-500 BP) periods. While archaeological evidence of coastal resource use during the Paleolithic is scarce, people appeared to collect shellfish from the coast, which is located ca. 4 km away from the site. During the Gusuku period, when subsistence economy was based on agriculture, while people consumed and used coastal resources, faunal remains imply that the importance of coastal resources decreased. Having briefly introduced coastal resource use during the Paleolithic and Gusuku periods, this presentation will focus on the Shellmidden period when people heavily utilized coastal resources, which are mainly available from coral reef environments. The availability of the coral reef resources (plus plant use such as nuts) enabled hunter-gatherer adaptions to the island environment, which is a very rare case in world prehistory.

Takamiya, Hiroto [74] see Yamagiwa, Kaishi

Talachy, Joseph (Governor, Pueblo of Pojoaque)

[311] *The Value of Anthropological Research for the Pueblo of Pojoaque*

Like many of my community, I grew up here, learning about the landscape by living within it and walking over it. Evidences of our long history are found everywhere and I always wanted to know more. Our older members taught us about our land too. But it was difficult to recognize Pojoaque when I read archaeology; I also noticed the dearth of information about Pojoaque. First as Lieutenant Governor and now as Governor I wanted to do more for my people –more opportunities to learn, but most importantly, to participate in the researching of our history. It is only with the hands and minds of Pojoaque community members that we can make sense of our unique ancestral and recent history.

As Governor, I am presented with a complex set of tribal and enterprise concerns every day. Archaeological research and the K'uuyemugh Partnership help balance these concerns because they are about our culture. Ongoing research provides Pojoaque with the foundation for understanding how we came to be and who we are, and what we are becoming.

Talamo, Sahra [195] see Zerboni, Andrea

Taliaferro, Matthew [12] see Morgan, Robert

Tamura, Ellie (Trent University)

[300] *The Temples of the Classical Kingdom of Bagan, Myanmar: The Bundling of Royalty, Religion, and People*

Bagan was Myanmar's political, economic, and cultural centre during the country's Classical period (c. 800-1400 CE). Encompassing an area of 80 kilometers square, this landscape was home to approximately 4,000 brick monuments. These monuments were the result of the Buddhist pursuit of merit-making, the idea that individuals could obtain merit through acts of piety to increase their social status upon rebirth. For the kings of Bagan, this typically took the form of sponsoring the construction and maintenance of religious monuments. This paper explores how these monuments became nodal features in the landscape, bundling together economic, environmental, social, political, and religious systems and bonding the Crown, the Sangha (Buddhist Order), and the commoner population in a variety of enabling and constraining relationships. During the early Bagan period, these monuments mutually benefitted both the Crown and the Sangha as their construction stimulated the economy and encouraged social cohesion. By the mid-14th century, the Crown began to feel stress associated with state-sponsored monuments, so much so that this eventually contributed to the collapse of the empire. Although the Sangha was able to persist, it would never again experience the same potency that it had during this golden age.

Tang, Chung and Maya H. Tang

[141] *Raw Material Procurement and Production Technologies of Turquoise and Nephrite Jade in Prehistoric China*

As gold is for the West, jade has been one of the finest symbolic vehicles in the East since prehistory. In recent years, a large amount of nephrite accessories have been excavated from early Neolithic-Bronze Age archaeological sites in Northeast China, Cis-Baikal, and the Russian Far East, posing important questions regarding possible long-distance exchanges and movements of raw materials, products, and production technologies in Northeast Asia. On the other hand, new archaeological evidence indicates that turquoise came to be regarded as a precious stone independently in the prehistoric communities of the Yellow River basin in Central China since 9,000–8,000 BP. The eastern and central regions of China seemingly had a preference for nephrite jade and turquoise, respectively. Through analyzing geological provenance, production technologies, in situ archaeological contexts, sociocultural contexts, and temporal and spatial distributions of excavated accessories and related artifacts, we aim to better understand the long-distance exchanges and movement of semi-precious stones in early Neolithic to Bronze Age China. Our research will strengthen the study of early history of symbolism and long-distance human interactions in ancient China. This research is supported by the General Research Fund of the Research Grants Council Project No. CUHK14600118.

Tang, Jinqiong [299] see Chen, Hong

Tang, Liya, Xiage Wangdui, Yu Chun and Zhaxi Ciren**[78] New Discovery of Plant Remains in The West of Tibet**

In 2017, one grain and 24 spikelets of barley and other prestigious burial objects were found in the No. 2 tomb which is located at Gepa Serul cemetery, Zanda, Tibet, Chian (the region of the upper reaches of Indus River). Up to now, Gepa Serul cemetery is the earliest known in western Tibet, dating back to 3562-3000 cal. BC by radiocarbon (14C) analyses. The barley remains are scanty, but still meaningful with regard to researching the eastward dispersal of barley. Actually, there are earlier direct radiocarbon dates for archaeobotanical barley grains from Qinghai and Gansu Provinces, China, the Indus Valley in Kashmir, and Pakistan than Gepa Serul. However, the barley of Gepa Serul may have spread from Indus valley due to their close geographical location.

Tang, Maya H. [141] see Tang, Chung

Tankersley, Kenneth (University of Cincinnati)**[44] Stable Carbon Isotope Enrichment of Archaeological Soil Organic Matter from Zea mays**

Although $\delta^{13}\text{C}$ values obtained on Soil Organic Matter (SOM) from archaeological sites have been used as isotopic fingerprints for the identification of ancient maize agricultural fields and the evaluation of the scale of maize production, determining the quantity and rate of ^{13}C enrichment through time largely has been ignored. The focus of this study is to use $\delta^{13}\text{C}$ values obtained on SOM from experimental, ethnobotanical, and ethnohistoric maize agricultural fields to determine the quantity and rate of SOM enrichment from maize and discuss the implications for archaeological interpretations of ancient maize agriculture.

[44] Chair

Tankersley, Kenneth [47] see Lyle, Nichelle

Tantaleán, Henry (Cotsen Institute of Archaeology, UCLA)**[182] Pozuelo: The Earliest Ceramic from Chincha Valley**

Nuestras recientes excavaciones arqueológicas en el valle de Chincha fueron realizadas en el sitio arqueológico de Pozuelo descubierto por Lanning y Wallace en la década de 1960. Desde entonces, Pozuelo ha sido citado como el sitio que contuvo a la cerámica más temprana del valle de Chincha. Sin embargo, la descripción de las excavaciones y del material fue mínimo. Nuestras excavaciones restringidas han corroborado la posición estratigráfica de este tipo de cerámica y su asociación con una ocupación humana. Adicionalmente, hemos podido obtener los primeros fechados absolutos para esta ocupación temprana del valle. De esta manera, en esta ponencia caracterizamos a este tipo de cerámica y realizamos una serie de inferencias con respecto al proceso histórico del valle de Chincha y las posibles correlaciones entre Pozuelo y otros estilos cerámicos contemporáneos en la costa sur y central del Perú.

[182] Chair

Tantaleán, Henry [182] see Gómez, Juliana

Tappan, Katie K. [260] see Gruntorad, Kelsey

Tappan, Katie K., Ian N. Roa (University of Pittsburgh), Gavin Wisner (Northern Arizona University) and Chrissina Burke (Northern Arizona University)**[374] What the Shell? Taphonomic and Cultural Modifications of Freshwater and Marine Shell from the Upper Belize River**

Valley

Zooarchaeological analysis of both freshwater and marine shells from the Upper Belize River Valley is important to interpreting Ancient Maya daily lives. Shell analysis allows us to examine dietary practices and understand economy and trade between Belize Valley sites. This poster presents the results of an analysis of over 42,000 freshwater and 1,200 marine shells recovered from the sites of Baking Pot, Cahal Pech, Lower Dover, and Xunantunich in Western Belize. First, we report the results of taxonomic analyses at all sites, showing proportional differences of shell concentrations within the region. Second, we discuss patterns of taphonomic damage to jute, *Pachychilus* sp., versus culturally worked jute materials. Third, we present the marine shell working process as identified through evidence of shell bead production stages and shell debitage. Combined these analyses provide a holistic review of an often overlooked and typically only quantified category of fauna in Maya zooarchaeology.

Tappen, Martha [57] see Yezzi-Woodley, Katrina

Tate, Alyssa M. [115] see Hundman, Brittany

Tate, Carolyn (Mesoamerican Art History, Texas Tech)**[345] Postcards in the Landscape: Considering Lower Pecos Pictographs as Nahua Pilgrimage Destinations**

Chicomoztoc, the place of seven caves, from which the Nahua ancestors emerged, appears in many central Mexican pictorial manuscripts as a place of origin and one of pilgrimage. Like the mythical Aztlan, its location has not been confirmed; perhaps several such places served different groups of people. However, recent research on the Lower Pecos pictographic tradition (2000 BCE – 400 CE), which spans a section of the US-Mexico border, has linked it iconographically with Huichol and Nahua pictorial and religious traditions. This paper explores two aspects of movement: the journeys depicted in Lower Pecos imagery and the possibility that Nahua groups made spiritually-motivated journeys to the northern frontier of Mesoamerica at times of stress.

Taube, Karl [28] see Coltman, Jeremy

Taube, Karl**[79] The Olmec "Double-Merlon" Motif and the Origins of Color Directional Symbolism in Formative Mesoamerica**

Among the most striking signs of Olmec iconography is the "double-merlon," this being a horizontal form supporting two parallel, upwardly projecting tabs. This presentation examines and discusses where it appears in Olmec imagery during the Middle Formative period (1000-400 b.c.), stressing the importance of context to create an iconographic argument concerning its meaning from one of the most ancient and culturally remote cultures of ancient Mesoamerica. Among the varied bodies of evidence include Middle Formative greenstone carvings, polychrome murals and monumental architecture. In terms of its contextual range, the "double-merlon" is best considered as the Olmec sign for "green." In addition, I note that color directional symbolism was surely present among Formative period cultures, including the Olmec, and directly relates to other major themes, such as directional rain gods and colored forms of maize.

[243] Discussant

Tayles, Nancy (University of Otago), Sian Halcrow (University of Otago), Kate Domett (James Cook University), Louise Shewan (University of Melbourne) and Dougald O'Reilly (Australian National University)

[27] Don't Throw the Baby out with the Bathwater: New Insights into Palaeodemographic Change with the Intensification of Agriculture in Southeast Asia

With the accumulation of bioarchaeological research in mainland Southeast Asia we are beginning to assess the impact that agricultural intensification and associated environmental and social changes had on these societies. Recent work is starting to build up a model of demographic change with increasing population size, and an increase in infectious disease and systemic stress during the late prehistoric period, the so-called Iron Age, largely based on archaeological work in Northeast Thailand. This paper presents a palaeodemographic analysis from this region using several sites that span from the early

Neolithic to the late Iron Age (3,800-1,200BP), comprising over 1,000 individuals. We find a statistically significant increase in infants and young children represented in the Iron Age, an age group often ignored in palaeodemographic statistics. These results indicate a palaeodemographic shift with an increase in mortality and/or fertility. At the same time, we also see evidence for major environmental changes, including larger settlements, modification of waterways and social and economic changes indicating the intensification of wet-rice agriculture, and development of hierarchical social organisation. We present a multi-factorial model, considering the bioarchaeological information within the context of environmental change using archaeological, palaeobotanical, geoarchaeological, and epidemiological evidence to characterise this significant biosocial transition.

Taylor, Amanda (Willamette Cultural Resources Associates) and Stephanie Jolivette (Washington State Department of Archaeology and His)

[312] Dominant Narratives and Gender Equality in Northwest Coast Archaeology

This paper explores Julie Stein's work to challenge dominant narratives of precontact culture history of the Northwest Coast using geoarchaeological evidence. We compare feminist archaeology perspectives on standpoint theory and implicit bias in discussing how and why she arrived at a new approach to shell midden site formation on the San Juan Islands, Washington. By demonstrating that the base levels of shell middens are impacted by groundwater and that middens accumulate at vastly different rates both within and between sites, Stein questioned the narrative that there was an increase in social complexity in the late Holocene in the San Juan Islands. Throughout her career, she established that shell middens require both site and landscape-level geoarchaeological analysis before making broad interpretations of settlement patterns and social complexity. She guided her students towards carefully building new interpretations of the past using multiple forms of geological and archaeological evidence. We consider how Stein's approach impacted our 2005-2010 research on small shell middens and interior island occupations, as well as our experience of gender in conducting archaeology in the Pacific Northwest.

Taylor, Christine [30] see King, Eleanor

Taylor, Evan (University of Massachusetts Amherst)

[301] The Contemporary Archaeology of Old Cities: State Heritage and its Production in Rhodes and Acre

Among the historic urban centers represented on the UNESCO World Heritage List, nearly half are located in states of the Mediterranean Basin. Through the lens of contemporary archaeology, this paper traces how the material fabric of historic urban centers is manipulated to conform to particular ideas and visions for what an "old city" should be. Viewing these material interventions (including conservation, reconstruction, demolitions, and site management) as a process of contemporary site formation draws attention to the everyday grounded practices of power and resistance inaccessible through conventional ethnographic methods.

This paper examines the case studies of Old Town Rhodes (Greece) and the Old City of Acre (Israel). The urban layout and architecture of both cities date to the Crusader and Ottoman periods. Old Town Rhodes was, until the Second World War, a primarily Muslim and Jewish quarter, and the Old City of Acre today is populated primarily by Palestinian Citizens of Israel. The paper summarises a systematic photographic surface survey of interventions on the surfaces of Old Town Rhodes and the Old City of Acre made by both residents and state heritage projects that reflect struggles to materially inscribe the meaning of each city.

Taylor, Geoffrey (UC Berkeley)

[250] What Is a Hill of Beans Really Worth?: Paleoethnobotanical Analysis of Urban Huari Foodways

Preliminary investigation into the use of plants at the site of Huari from the 2017 field season of the Programa Arqueológico Prehistoria Urbana de Huari resulted in new information placing the common bean (*Phaseolus vulgaris*) as a central component of the daily meal for those living in Patipampa in the Middle Horizon (AD 600-1000). Studies have expanded since then to include materials from the 2018 excavation season and further experimental archaeology work to enable finer identification of plant varieties. The intent of this paper is to answer questions about the inhabitants of Patipampa and how food remains reflect their roles within the household, the city, and the political entity of Wari. Are those dwelling in Patipampa architectural complexes farmers, craftspeople, or other types of specialists? What can be gleaned about administrative control of food within the city of Huari? To what degree were foreign foods relied upon, and what does this tell us about Huari's socioeconomic relationships with people in the greater Wari sphere? Did the administrators of the Wari

state strategize to ensure a sustainable food supply for the burgeoning urban population of Huari?

[137] *Moderator*

[250] *Chair*

Taylor, James [388] see Twiss, Katheryn

Taylor, Sean [88] see Smith, Karen

Taylor, William (Max Planck Institute - SHH), Cassidee A. Thornhill (University of Wyoming), Gregory Hodgins (University of Arizona), Emily Jones (University of New Mexico) and Sandra Olsen (University of Kansas)

[391] *New Archaeofaunal Evidence for Early Horse Pastoralism in the Northern Plains*

The introduction of domestic horses into North America by Spanish colonists prompted sweeping transformations to indigenous lifeways in the American West. Nonetheless, due to the incomplete historical record and the scarcity of relevant archaeofaunal data, the chronology and dynamics of this process remain poorly understood. We present a new scientific archaeological study of a young horse burial from Black's Fork, Wyoming. Previous analysis indicated that this site dates to the first half of the 17th century, earlier than most historical models for the adoption of horses by Plains native cultures. Using detailed comparisons with the archaeological record of Eurasia, we argue that the age of the animal, evidence for violent slaughter, the special treatment of the vertebral column, removal of vertebral meat, and the absence of hoof and tail elements are suggestive of pastoral ritual. Cranial injury and severe pathological changes to the skull of this horse suggest its likely confinement in close proximity to other horses. Using ancient DNA, we explore the sex and parentage of this young horse. We present a refined radiocarbon chronology for this specimen, and explore its implications for the emergence of pastoralism and horse empires in the Southwest and Great Plains of North America.

Tebby, Eric (University of Alberta)

[107] *Stitching History and Archaeology: New Investigations into the Chimney Coulee (DjOe-6) Métis Wintering Site*

Our understanding of the Métis experience on the Canadian prairies during the latter half of the 19th-century can be considered fragmentary and is typically understood alongside a colonial narrative. Métis wintering sites were important features in the Canadian west where the role of women cannot be downplayed despite being rarely investigated. Current theoretical frameworks in historical archaeology are aimed to bring out the narratives and daily activities of peoples marginalized by history. Successful investigations into the Chimney Coulee (DjOe-6) Métis wintering site in southwestern Saskatchewan have uncovered remarkable evidence that greatly expands our knowledge of the Métis lived experience at this site. Recorded oral histories surrounding this site are complimented and woven together with new historical research which reveals a comprehensive new perspective. Archaeological finds from a Métis cabin have brought to life the craftwork and daily activities of women. Investigations at this site have strengthened the historical and archaeological evidence known from other wintering sites and highlighted the crucial role that women played in maintaining the day to day functions of the settlement during the waning days of the Canadian fur trade.

Tebby, Eric [161] see Wambold, Dawn

Teel, Sarah (Missouri State University), Leslie Dunaway (Missouri State University) and Billie Follensbee (Missouri State University)

[76] *A Little Bird Told Me: Use-Wear Analysis and Replication Studies as a Means to Identify the Function of Birdstones*

Among the most enigmatic ancient North American artifacts are the objects collectively known as birdstones: Small ground stone objects, usually made of banded slate, that take the generalized form of a simplified bird or a bird's head, sometimes with protruding "popeyes." The vast majority of birdstones are surface finds or were recovered from trash pits; among the few published finds discovered in context, the birdstone was placed in or above a cremation burial, in a manner ambiguous as to purpose. A variety of hypotheses have nevertheless been proposed for the use and meaning of birdstones, including the possibilities that they served as ornamental amulets, totems, or insignia on objects or on people, or as functional objects such as game pieces, corn huskers, atlatl weights, or atlatl handles—but none of these hypotheses has been thoroughly

tested, and scholars have not reached strong consensus on birdstone function. In recent analyses of birdstone collections from throughout North America, however, clear patterns of use-wear have emerged on different types of birdstones. Further experimentation strongly suggests that this use-wear was caused by wrapping with cordage, and ongoing replication studies that explore these use-wear patterns are clarifying the more likely functions of these enigmatic artifacts.

Teeman, Diane (Archaeological Resource Consultants)

[235] *Discussant*

Teeter, Wendy [89] see Hernandez, Stevy

Teixeira, Edilson [320] see Silva, Rosicler

Teles, Marcio Antonio [320] see Silva, Rosicler

Tellez-Nieto, Alba (El Colegio de Michoacán) and Joshua Englehardt (El Colegio de Michoacán)

[307] *¿Bajo el Yugo de Metztitlán? Un Reconocimiento Arqueológico de la Sierra Norte de Hidalgo, México*

La sierra norte de Hidalgo no está bien documentada arqueológicamente, a pesar de su ubicación entre dos esferas culturales mayores del Postclásico: el señorío de Metztitlán y la Huasteca. Este trabajo busca llenar esta laguna del conocimiento, con dos metas principales: identificar la organización sociopolítica de los asentamientos de esta región (principalmente si corresponden a los correlatos arqueológicos de un altepetl); y determinar si la zona tenía alguna filiación con el hueyaltepetl de Metztitlán. En esta ponencia se presentan los resultados preliminares de un recorrido micro-regional de cobertura total, realizado en el municipio de Huazalingo, en el noreste del estado de Hidalgo. Utilizando datos de los seis sitios del Postclásico identificados durante el recorrido, se realizó un análisis de la distribución interna de su arquitectura y se contrastó con los modelos del altepetl existentes. La revisión de fuentes coloniales y el análisis de materiales arqueológicos permiten acercar a una caracterización de la organización interna de la zona, así como las relaciones que mantenía con áreas vecinas. Este estudio representa uno de los primeros trabajos sistemáticos de investigación arqueológica en esta región, así permitiendo alcanzar una comprensión más robusta de esta zona relativamente desconocida y sus dinámicas culturales.

Temple, Daniel [258] see Ham, Allison

Temple, Daniel (George Mason University)

[353] *Questioning Complexity: Amulet Usage and Relational Ontologies in Hunter-Gatherers from Japan and Alaska*

Social complexity is a term that often refers to the evolution of inequality in human populations along socioeconomic scales. This concept is historically traceable to unilineal evolutionary paradigms where reduced complexity is often defined based on othering in comparison to Western industrialized capitalism. This study questions such deterministic views of complexity by contrasting amulet usage in the mortuary practices of two hunter-gatherer populations, one originating from Point Hope, Alaska (ca. 1200-900 BP and 800-400 BP), a second originating from the Atsumi peninsula, Japan (ca. 3300-2500 BP). Along the Atsumi peninsula, amulet usage is found in the graves of approximately 13 percent of adult burials and these individuals consumed greater amounts of marine foods. By contrast, amulet usage is ubiquitous in adult and pre-adult burials from the Ipiutak and Tigara occupations at Point Hope, and appears to be incorporated into these burials through ideations of social maturation and follow the emergence of identities through interactions with the spiritual landscape of Point Hope. These results suggest that there exist alternative layers of complexity found in the ontological and ritual boundaries of cultures that defy traditional definitions and suggest that the ideations surrounding complexity must be critically evaluated.

Tencariu, Felix (Interdisciplinary Research Department – Field Science, Cuza University of Iasi) and Marius Alexianu (Alexandru Ioan Cuza University of Iasi)

[242] *Bridging Some Gaps: Advances of the Ethnoarchaeology of Salt in Romania*

The ethnoarchaeological research conducted for the past 15 years around the generous saliferous resources of the Romanian Sub-Carpathians revealed a surprisingly complex (even if in accelerated dissolution) rural universe generated by salt. In the era of advanced mining and industrialization, refrigeration and globalization, we were overwhelmed by the amount and diversity of data related to salt topics: exploitation techniques and tools, storage and transportation, human and animal mobility, distribution, uses (cooking, conservation, popular medicine), symbolism, toponymy etc. Given the rather discrete archaeological evidence of salt related activities and behaviors of prehistoric populations, establishing rules of transcultural correlates proved to be an enough difficult task. So, it became clearer that the perspective on salt studies must be widened, towards a holistic approach combining methodologies of both natural sciences and humanities – an “anthropology of salt”. This paper sums up the recent advances, challenges but also dead-ends of researches made in the area of the anthropology of salt in Romania, including spatial analysis, archaeometry, experimental archaeology, onomastics, all derived from or reported to the consistent corpus of ethnoarchaeological data. In this way, interdisciplinary approaches, both theoretical and empirical, contribute to understanding the role of salt in the human existence over time.

Terlep, Michael L., Joel Nicholas (Hopi Cultural Preservation Office), Kelley Hays-Gilpin (Museum of Northern Arizona/Northern Arizona University) and Timothy Ward (Millsaps College)

[258] *A Post-Chacoan Cylindrical Vessel from Northern Black Mesa, Arizona*

A recently identified Tusayan Polychrome (A.D. 1125–1290) jar from northern Black Mesa, Arizona, represents the only known Post-Chacoan cylindrical vessel. Identified within the midden of a small late Pueblo II-early Pueblo III period habitation site, the jar circumstantially connects Ancestral Puebloan groups in the Kayenta area to Chaco Canyon and the Chacoan system (or a common origin). In this presentation, we discuss the context of the jar, Hopi interpretations and insights, and ongoing residue analysis leading to two sociocultural considerations. First, we consider the possible connections between the Ancestral Puebloans of western Kayenta and Chaco Canyon, nearly 220 kilometers away. Second, we examine possible beverages the jar may have contained and how that may or may not relate to ritual beverage consumption associated with Chacoan cylindrical vessels and its connections to the Kayenta heartland.

Terrenato, Nicola (University of Michigan)

[23] *Weakness and Precariousness in Central Italian Urbanization*

The urbanization of western central Italy has had a peculiar role in our intellectual history, starting with its most famous fruit, the “eternal” city of Rome. With evident teleology, the narrative about the emergence of the earliest agglomerations in the early first millennium BCE has taken the form of an ascending curve. While there is no denying that this regional phenomenon has produced cities with 3000 years of uninterrupted occupation, recent archaeological and historical research have revealed how precarious the process was in its early stages. At various points in their trajectories, many of these centers were abandoned, moved or shrunk. Even more importantly, they all came together in a slow and hesitant way. It is now clear that they were the result of many distinct elite-led groups settling separately within the same defensible location. Such multifocality remained a long-term trait of these agglomerations, shaping their settlement patterns, their institutions and their sociopolitical life. Arguably, participating elites saw the city as a truce space to mitigate their conflicts and as a vehicle to further their long-range ambitions, but they never fully identified with it. This made all these polities inherently weak and impermanent, even when they lasted for centuries.

Terry, Richard E. [30] see King, Eleanor

Terry, Richard E. (Brigham Young University), Glenna Nielsen-Grimm (Utah Museum of Natural History), Deanne Matheny and Ray Matheny

[420] *Soil Chemical Traces of Ancient Human Activities at Montezuma Village, UT*

Many of the elements associated with foodstuffs and mineral ores were deposited in the surface of soils and floors of ancient dwellings. Phosphorus and certain heavy metals remain chemically sorbed on soil and floor particles. Soil samples were collected from ancient patios of two structures associated with the Basketweaver culture at Montezuma Village in

southeastern Utah. The north structure was a multi room complex. High extractable P concentrations (450 mg/kg) were discovered in the patios on the north and south sides. Phosphorus levels were much lower in the patio floors of the South structure. Highest levels were found at the bottom of a wash located just south of the structure, likely associated with trash disposal. The north and east patios of the structure were shaded from the afternoon and elevated in P in those soils reflected their used in food preparation and consumption.

Tessone, Augusto [364] see Barberena, Ramiro

Testard, Juliette (Paris 1 / UMR 8096 Archéologie des Amériques)

[349] *Mazapan Style Figurines at El Palacio: What Significance for The Early Postclassic Interregional Interactions in Northern Michoacán?*

Recent work conducted in Northern Michoacán by the CEMCA in the Zacapu Basin, 30 km North of the Tarascan core-region, shed light on a specific and poorly defined time period at the region before the Tarascan kingdom: The Early Postclassic. The local phase Palacio ranges from A.D. 900 to 1200±50, and recent field works conducted at the major and eponym site of El Palacio brought to the attention a new set of data. Among it, in radiocarbon dated contexts, the encounter of a series of figurines, known in the literature as Mazapan style, questioned many of hypotheses. Mazapan style figurines have never been observed in this sector of Michoacán before, whereas they constitute a strong and diagnostic marker of Early Postclassic cultural and economic dynamics among different regions of the Mexican highlands. The presence of this corpus at El Palacio becomes therefore critical in the understanding of the interregional cultural and economic connections during the Early Postclassic period. This paper presents the study of the figurine's fragments collection and stress a series of issues concerning their context (ceremonial sector, secondary contexts of refuse) and their interpretation at both local and regional levels.

[349] *Chair*

Tevera, Genius [24] see Chirikure, Shadreck

Texit, Ariel [81] see Sugiyama, Nawa

Thacker, Paul (Wake Forest University)

[403] *Discerning Paleolithic Places Rather Than Pleistocene Palimpsests: Olival Grande and the Early Upper Paleolithic in Central Portugal*

The expansive, open-air archaeological site of Olival Grande contains the earliest, well-dated Upper Paleolithic assemblage known from the Rio Maior vicinity. Fabric analysis, sedimentology, and geochemistry studies detail manifold site burial mechanisms, very slow rates of deposition, and significant post-depositional processes at the hillslope site. This presentation uses data from intra-site spatial patterns, lithic technological organization, and artifact fracture patterns and surfaces to hypothesize a long-term view of forager technological organization and interaction with place. The archaeology of Olival Grande demonstrates interpretive limitations of the palimpsest concept, a designation which in practice often conflates and confounds cultural and geological processes of site formation.

[403] *Chair*

Thakar, Heather (Texas A&M University)

[340] *Moderator*

[340] *Discussant*

[33] Chair

The Eren Lab Graduate Students, [67] see Eren, Metin

Thibault, Theresa [237] see Hicks, Keri

Thibodeau, Alyson (Dickinson College), Amanda Kale (Dickinson College), Alexander Kurota (University of New Mexico Office of Contract Archaeology), Timothy Maxwell (Museum of New Mexico, Office of Archaeological Studies) and Rafael Cruz Antillón (Instituto Nacional de Antropología e Historia)

[413] The Distribution and Provenance of Turquoise from Southern New Mexico, USA and Northern Chihuahua, Mexico

Compared to other regions of the Southwest, little is known about prehispanic turquoise acquisition and exchange in southern New Mexico and adjacent parts of Texas or in Chihuahua, Mexico. Here, we explore the distribution of sites with turquoise in the Tularosa and Hueco Basins as well as in northern Chihuahua. In addition, we use lead and strontium isotopes to investigate the provenance of turquoise artifacts from the Tularosa Basin and Paquimé. In the Tularosa Basin, turquoise from the nearby Orog Grande mining district predominates in assemblages from Jornada Mogollon sites with occupational components related to the Doña Ana (AD 1000-1250) and El Paso (AD 1250-1450) phases. Given the close proximity of these sites to the Orog Grande source, the abundance of raw turquoise and finished ornaments, and other evidence for regional interaction, it is possible that the inhabitants of the Tularosa Basin mined and manufactured turquoise for both personal adornment and trade. To investigate whether or not this trade could have extended far to the south, we also analyzed two turquoise artifacts from Paquimé. Although we were not able to link either artifact to Orog Grande, isotopic measurements indicate that at least one artifact was imported from central Arizona.

Thiel, Homer [208] see Diehl, Michael

Thimlar, Rebekah and Lea Mason-Kohlmeyer

[125] The National Register of Historic Places and the Stations of the Cross Trail - Eligible?

In October of 2016, Pima Community College's Centre for Archaeological Field Training worked with the Sisters of the Immaculate Heart of Mary on a project to determine if the Stations of the Cross trail and Calvary statues on their property were eligible for the National Register of Historic Places. The Calvary statues were constructed in 1952, with the Stations of the Cross added within a few years. Their long history in Tucson speaks to their significance to the Sisters and the community. Research for the project included mapping, photographic documentation, oral interviews, and archival research. This poster examines the research and conclusions of the project and documents the process of determining if a property is eligible.

Thomas, David (American Museum of Nat History)

[66] A Shoshonean Prayerstone Hypothesis: Ritual Cartography of Great Basin Incised Stones

The prayerstone hypothesis, grounded in Southern Paiute oral history, holds that selected incised stone artifacts were votive offerings deliberately emplaced where spiritual power (*puha*) was known to reside, accompanying prayers for personal power and expressing thanks for prayers answered. Proposing significant and long-term linkages between Great Basin incised stones and overarching Shoshonean cosmology, this article explores the prayerstone hypothesis in the context of the 3,500 incised stones documented from the Intermountain West, an assemblage spanning seven states and seven millennia. Employing object itinerary perspectives, it becomes possible to develop ritualized cartographies capable of matching oral Shoshonean traditions with specific geographic indicators. The results demonstrate that many (but not all) such incised stones are consistent with the votive emplacement of prayerstones. Multiple constellations of prayerstone practice operated across the Great Basin for more than 5,000 years and carried forward, without perceptible break, among several (but not all) Numic-speaking populations of the ethnohistoric interval. The diversity and antiquity implied by the prayerstone hypothesis suggest dramatically more complex cultural trajectories than those of Lamb's (1958) widely accepted model of a single, late, and simultaneous Numic spread across the Great Basin.

[365] Discussant

Thomas, David Hurst [380] see Edwards, Alexandra

Thomas, Jayne-Leigh (Indiana University)**[382] Bioarchaeological Ethics and Considerations for the Deceased**

The last few decades have brought changes to archaeology through the establishment of ethics codes, repatriation, and community-based, participatory research. However, established ethical codes are often unfamiliar to researchers and the treatment of human remains continues to be unequal, while scientific justifications for doing bioarchaeological research are still being made. To avoid receiving feedback from local communities or asking permission to do research, many scientists are simply moving their projects to areas where permission is not required and reburial isn't mandated. This not only avoids implementing ethical guidelines and sets a poor example for young professionals and graduate students, but shows blatant disregard for the deceased, their descendants, and the interests of the local community. Temporal or geographic context should not dictate the ethics employed by the researcher, and based on previous efforts of advocacy and international ethics policies we suggest six levels of consideration for scientists intending to develop bioarchaeological research projects.

[293] Discussant

Thomas, Scott [249] see O'Grady, Patrick

Thomas, Suzie (University of Helsinki)**[17] Is It Possible to Please Everyone? Creating an Open Source Finds Database for Finland**

In this paper I present the work of SuALT: the Finnish Archaeological Finds Recording Linked Open Database (Fi: Suomen arkeologisten löytöjen linkitetty avoin tietokanta). SuALT is still in development, but aims to make it easy and reliable for members of the public to record chance archaeological finds that they discover and to browse other records. Inspired by similar 'citizen science' initiatives in other parts of northern Europe where it is legal for avocationals and others to search for archaeological materials, our multidisciplinary team's challenge is to create a user-friendly, meaningful resource that not only "speaks" to other digital heritage databases within Finland and the rest of Europe, but that also responds to the specific needs and conditions of Finnish society. As well as being mindful of Finnish cultural heritage legislation, the team is very aware that there are a number of different communities within Finland, not least the indigenous Sámi minorities, for whom the meanings of their cultural heritage may be at odds with official policy. Our project's aspiration to make cultural heritage open and accessible to all faces challenges not only of whether all data should truly be open, but also on definitions of heritage itself.

[343] Discussant

Thomin, Michael [297] see Grinnan, Nicole

Thompson, Amy [105] see Lacombe, Laura

Thompson, Amy (University of New Mexico)**[113] Linking Landscapes and Resources to Settlement Decisions in Ancient Low-Density Cities in the Southeastern Maya Lowlands**

This paper compares the developmental trajectories of two Classic Period (AD 300 – 800) Maya centers, Ix Kukul'ul and Uxbenká, located in the southern foothills of the Maya Mountains, Toledo District, Belize. High-precision radiocarbon dates and ceramic sequences from household contexts inform the chronological development within these communities. Initial settlement began in the Late Preclassic and settlement densities increased during the Early Classic Period. Followed by significant growth during the Late Classic, Uxbenká was abandoned by AD 830 while households at Ix Kukul'ul persisted for the better part of another century. Human Behavioral Ecology (HBE) theoretical frameworks allow us to evaluate both

ecological and social factors influencing human-decision making in settlement choices, and how these decisions may have changed over time as rulers became more despotic and social inequalities increased. Using the robust settlement chronologies from both sites, settlement location choices are tested against probable suitability factors including distance to trade routes and water, soil qualities and slope, and the size of households.

Thompson, Amy [146] see Pacheco-Cobos, Luis

Thompson, Ashleigh

[294] *Red Lake Ojibwe Food Sovereignty: A Historical and Contemporary Analysis*

Because American Indians suffer from diet-related diseases at higher rates than other ethnic groups, Indigenous organizers are finding ways to improve the health of their communities. One way they are accomplishing this goal is through the promotion of traditional foods their people consumed prior to European colonization, known as Indigenous food sovereignty. The Red Lake Ojibwe tribe has several food sovereignty initiatives, and yet, a holistic food sovereignty project that documents historical and contemporary Red Lake Ojibwe foodways has never been done. Using the historical record, oral histories, and community knowledge, the tribe proposed a project that would address questions such as, what traditional foods are important to the community? How are these foods produced? And why are these foods significant to Red Lake Ojibwe lifeways? By addressing these questions, we provide a framework for Red Lake food sovereignty programs that work to improve the health of the community. More broadly, Indigenous food sovereignty research ties into larger environmental protection movements for Indigenous peoples and society at large. Research that studies connections between humans and traditional food helps tribal communities and wider society better manage land and resources for the betterment of ecological and human health.

Thompson, Charmaine [420] see Janetski, Joel

Thompson, Charmaine

[420] *Ceramic from the Early Components at Nancy Patterson Village*

Nancy Patterson Village (42SA2110) is a large Ancestral Pueblo site in southeastern Utah. The site spans the entire Ancestral Pueblo sequence, although most of the remains come from two relatively short periods when it was a village-sized settlement. Brigham Young University excavated at the site from 1983 through 1986, with a research design that focused on comparing households and public archaeology from the later (Pueblo III) village with similar features from the earlier component, then thought to date to the early AD 900s. Recent reanalysis of the pottery from the early component suggests the chronology was more complex than previously thought. The early village was large in the 900s, but the associated middens began to form in the late 700s, with substantial deposition throughout the Pueblo I and early Pueblo II periods, probably until about AD 1000. Additionally, many of the white wares from the early component appear to have been imported from the south.

Thompson, Christopher

[66] *Refining the Projectile Point Chronology of Western Pennsylvania during the Transitional Period*

Periods and typologies are artificial boxes that archaeologists use to classify cultures and the artifacts that they used, consequently there is a need to re-evaluate old paradigms as new data become available, particularly when these paradigms are internally inconsistent. This paper looks at the Transitional period in western Pennsylvania and analyzes both the semantic division of cultural periods between 2900 and 900 BC the types of projectile points used to define these periods. Current descriptions of the Transitional period adequately describe eastern Pennsylvania but fail to adequately describe the material culture and typology of western Pennsylvania. Data will be synthesized from existing excavations and site reports to compile a database of C14 dates associated with diagnostic projectile points in order to establish an accurate serration of point types. These data will be visually represented on a timeline and a series of maps in order to show spatial, typological, and chronological variation. The paper's ultimate purpose is to create a consistent projectile point chronology that can be used as a framework to accurately date sites within this region on the basis of typology.

Thompson, Jessica [32] see Bertacchi, Alex

Thompson, Jessica [32] see Wright, David

Thompson, Jessica (Yale University), David Wright (Seoul National University), Sarah Ivory (Pennsylvania State University), Jeong-Heon Choi (Korea Basic Science Institute) and Elizabeth Gomani-Chindebvu (Malawi Ministry of Civic Education, Culture, and C)

[247] Archaeological Proxies of Early Modern Human Niche Construction in Northern Malawi

Most archaeological literature dealing with niche construction avoids hunter-gatherer behaviors, in part because they can be difficult to detect archaeologically. As the role of humans in shaping environments over long time scales becomes increasingly apparent, it is critical to develop archaeological proxies for hunter-gatherer impacts. Modern hunter-gatherers engage in niche constructive behaviors intentionally aimed at maintaining or increasing the productivity of their environments, and these may have significant ecological and even geomorphic impacts over the long time scales of human evolution. In some cases, they may also represent behaviors unique to modern *Homo sapiens*. In the lateritic alluvial fan systems of northern Malawi, preservation conditions preclude development of many on-site proxies for human-environment interactions. However, by combining archaeological, geomorphic, and geochronological data from Middle Stone Age archaeological sites with off-site records of vegetation and charcoal from Lake Malawi, we can detect a fundamental shift in human niche constructive behaviors. The advent of anthropogenic burning ~85 thousand years ago altered the complexion of vegetative communities in favor of grasslands and woodlands, and facilitated alluvial fan formation in the northern basin. These impacts, starting in the Late Pleistocene, have had a long-term role in shaping the environments and landscapes of northern Malawi.

Thompson, Kerry (Northern Arizona University)

[150] Held Hostage by a Paradigm

Anyone who has studied southwestern archaeology is familiar with the paradigm that dictates how Navajos are understood in the trajectory of indigenous life written by anthropologists and archaeologists in the academic study of the southwest. The paradigm is this: descendants of migratory Athapaskans, Navajos arrived somewhere along the San Juan River in northwestern New Mexico sometime in the sixteenth century and quickly adapted to life in the arid southwest by becoming prolific cultural borrowers and perpetual recipients of acculturative forces. It isn't as simple as outsiders declaring, and publishing what Navajo origins and culture are and from where they derive. Like other paradigms about indigenous people, there are cultural consequences, legal implications, and political ramifications that arise from research based on unquestioned assumptions and rigid ways of thinking about living people. In this paper I discuss the relative absence of Navajo archaeology in discussions around using oral history in southwestern archaeological studies that began in earnest with the passage of NAGPRA almost thirty years ago.

Thompson, Kevin and Thomas N. Motsinger (PaleoWest Archaeology)

[254] Navajo-Gallup: A View from 100,000 Feet

When PaleoWest Archaeology was awarded the Navajo-Gallup Water Supply Project it was the largest cultural resource project in the U.S. The scope of the project created numerous complexities ranging from varied land ownership, density and diversity of cultural resources, and numerous management issues. With the benefit of hindsight, we identify some productive avenues for future work.

Thompson, Marc [25] see Vredenburg, Judy

Thompson, Robert [129] see Toney, Joshua

Thompson, Victor [9] see Walker, Karen

Thompson, Victor (University of Georgia)**[312] Time and Tempo in Shell Midden Archaeology**

From her dissertation work in the Green River region of western Kentucky to her work along the coast of Washington, Julie K. Stein has engaged with core research problems related to the study of archaeological shell midden sites. One of the key issues that she has addressed is connected to how quickly and in what way do these sites form. Here, I draw inspiration from Stein's work and examine three case studies from the American Southeast. In this work, I address some of the larger theoretical issues and debates linked to the timing and tempo of shell midden and mound formation. One of the core reasons for these debates is that many stems simply from the macroscopic studies of profiles, which in the absence of other data sets (e.g., micro-artifacts, microstratigraphy, zooarchaeological analysis, etc.), provides only gross estimates of time. Thus, different researchers use the same dataset to argue competing interpretations — thus leading to a problem of equifinality. In this paper, I use these case studies to illustrate a variety of methods that can be used to bring resolution to some of these core debates in shell midden archaeology.

Thoms, Alston (Texas A&M University)**[36] Discussant****Thornhill, Cassidee A. (University of Wyoming)****[319] Equus caballus during the Protohistoric: Looking for the Horse in the Archaeological Record**

The introduction of *Equus caballus* (modern horse) into Native American life on the Plains during European-American contact has been associated with major cultural and ecological changes to native lifeways. The horse influenced a variety of cultural practices including the distance at which resources could be exploited, the number of material goods that could be transported, and war practices. Bearing in mind the importance of the horse, the expectation ought to be that horse remains are prevalent in the archaeological record. Despite the impact of the horse on native Plains societies, there is a paucity of horse remains in the archaeological record in Wyoming. This paper examines the distribution of horse remains in Wyoming dating to the Protohistoric. Utilizing computer simulations and a reanalysis of the remains recovered at the Blacks Fork River site (48SW8319), this article provides potential explanations for the low representation of horse remains in the archaeological record.

Thornhill, Cassidee A. [391] see Taylor, William

Thornton, Erin (Washington State University), Kitty Emery (Florida Museum of Natural History) and Camilla Speller (University of British Columbia)**[352] The Environmental and Cultural Context of North American Turkey Domestication**

The turkey (*Meleagris gallopavo*) is the only native vertebrate animal domesticated in North America. As such, the history, timing and process of its domestication is critical to our understanding of past human-animal relationships in the ancient Americas. This paper summarizes recent advancements in reconstructing the history of turkey husbandry in North America. We present original morphometric, isotopic and genetic analyses from turkeys in Mesoamerica and the American Southeast as a means of testing various hypotheses regarding the timing, geographic extent, and diversity of turkey rearing. Drawing upon the work of other scholars studying turkey domestication in the American Southwest, we then consider how region-specific environmental, cultural, and historic factors influenced the emergence, adoption and spread of turkey rearing throughout North America. Based on this comparative assessment, we also provide suggestions for future research on North American turkey domestication.

Thornton, Erin [370] see Phillips, Lori

Thornton, Erin [419] see Speller, Camilla

Thorsen, Michael [386] see Caretta, Nicolas

Throgmorton, Kellam (Binghamton University)

[421] *Landscape Ontologies as Landscape Politics: Chacoan Interventions in Northwestern New Mexico*

Indigenous perspectives and the ontological turn emphasize that Pueblo emergence was a process of relational engagement with particular places on the landscape. Following this relational perspective, no two places could be identical, nor could the resulting social assemblages that arose from them; emergence as a process of self-discovery contributed to the localization of identities and political orientations in the ancient past. Chacoan archaeologists have addressed this issue through the evaluation of material culture traits to determine whether communities in the 10th-12th century northern Southwest were “local emulations” or “Chacoan exports,” concluding that most communities were primarily local manifestations. However, at the metalevel of “spatial doxa,” Chacoan landscapes exhibited priorities and practices at odds with the logic of local emergence. They created a repeated canon of landscape constructs that effectively replicated portions of Chaco Canyon itself at dozens of sites throughout the northern Southwest. Using evidence from a community in northwestern New Mexico, I argue that restructuring local landscapes was a more effective political tool for Chacoans than controlling agricultural production and exchange networks, or replacing local leadership.

Thulman, David (George Washington University) and Brendan Fenerity (University of Arizona)**[51] *Clovis Points Were Likely Knives: An Evaluation of the Evidence***

The Clovis projectile point attached to the end of a spear or dart is an iconic symbol of North America's late Pleistocene hunter, but the point's use is more assumed than demonstrated. We find evidence for the “point-as-projectile” inference equivocal, because that same evidence also supports “point-as-knife”. We present new experimental data that demonstrate that macro-flakes usually ascribed to projectile point impact fractures can be produced simply by dropping a replica Clovis point attached to a handle from waist-height. Additional evidence is reviewed that supports knife-use. Although no firm conclusions are drawn about Clovis point use, this review highlights the need for thoughtful experimental designs that include testing alternative hypotheses.

Thurston, T. L. (SUNY Buffalo)**[310] *Traversing the Great Forest: Work and Mobility in Sweden's Premodern Farmscape***

Most of pre-modem Sweden comprised wooded uplands lying outside more densely populated ‘civilized’ regions. Often collectively called The Great Forest, this territory stretched from south-central to the high north, where Scandinavian, Finnish, and Sami people often lived in close proximity. Agriculture, herding, and forest production in such different physical and social environments produced different paths and projects, whose varied spatial patterns, combined with historic records, shed light on the lived experience of women, men, and children in an otherwise under-documented time and place, illuminating socioeconomic conditions rooted in older traditions yet important in the future trajectory of the greater polity.

Tian, Duo, Jian Ma (PhD), Tongyuan Xi (PhD), Meng Ren (PhD) and Xinyi Liu (PhD)**[78] *Diversity and Unity: Different Crop Consumption in East Tianshan Mountains, Northwest China***

The region of east Tianshan Mountains, located in east edge of Central Asia, has a diverse natural environment that is suitable for a variety of subsistence. The first millennium BC was a period with fluctuating climate and rapid cultural interactions in this region. This study conducted archaeobotanical studies on samples taken from different eco-zones, and refers to historical documents and ethnological materials to explore crop consumption during the first millennium BC. The result reveals barley is suited to the local environment of the eastern Tianshan Mountains, and a fit for local pastoral scheduling. Consequently, naked barley became one of the most popular crops in this region and predominated on the north slope of Tianshan. However, in the southern region, the agricultural system of multi-cropping predominated. That might have been a tactic to reduce risks and maximize the utilization of oases. Overall, continual agro-pastoralism is the most obvious feature of East Tianshan Mountains in the first millennium BC. Under varied environment and social institutions, the proportion of agriculture and pastoralism and the choice of cereal crops in this region are expected to show spatial and temporal variations.

Tichy, James (Texas State University)

[172] Comparing Age-at-Death Profiles from Cemeteries on Sint Eustatius, Dutch Caribbean

On the Caribbean island of Sint Eustatius (Statia), there are several cemeteries dating from the 18th and 19th centuries, primarily utilized during a time of colonization and trade by the European colonial powers, Netherlands, Great Britain and France. Cemeteries with gravestones denoting the names and ages of those buried are all associated with the European inhabitants, while an unmarked cemetery dating to the 18th century investigated during 2018 likely contains the burials of enslaved Africans from a nearby plantation. This project investigates whether differences in social status and ancestry between individuals interred in these cemeteries is reflected in the respective age-at-death profiles. Furthermore, data from a contemporaneous plantation cemetery for enslaved Africans on Barbados is used to expand the comparison to a different cultural context. Comparing the resultant graphs and trends for the ages-at-death across the cemeteries, it appears that there are not significant differences across the cemeteries on Statia and Barbados.

Tié Bi, Galla Guy-Roland [277] see Kienon-Kabore, Timpoko Hélène

Tilden, Doug [217] see Watkins, Tia

Tiley, Shelly (Tiley Research)**[358] Prestige and Predation: Dugong Hunters of the Torres Strait, Australia**

Large animals are particularly prone to human overexploitation for both biological and cultural reasons. Relatively rare and slow to reproduce, these populations are naturally sensitive to predation. For the hunters, evolutionary and cultural forces conspire to make these animals highly desired. This paper describes the response of dugong hunters in the Torres Strait to the increasing rarity of their favored prey and considers the effect of prestige on the choices they make.

Till, Jonathan (Edge of the Cedars State Park Museum)**[313] The Basketmaker III and Pueblo I Periods in Southeastern Utah and the Mesa Verde Region: Did the Twain Ever Meet?**

Most current archaeological narratives for Early Pueblo period occupation in southeastern Utah perpetuate the idea of in-situ cultural development across the span of the Basketmaker III and Pueblo I periods, often with the term “transitional Basketmaker III-Pueblo I.” There is an implied, in-situ cultural evolution packed into this term, which carries an implied demographic history for the region. This presentation examines patterns in material culture and chronology to discuss the implied transition, particularly from the late AD 600s to the middle AD 700s, in southeastern Utah and across the broader Mesa Verde region and Four Corners landscapes.

Tincu, Sorin [88] see Turcanu-Carutiu, Daniela

Ting, Carmen [199] see Zralka, Jaroslaw

Ting, Carmen**[363] Did the Student Become the Master? The Development of the Glaze Technology in Cyprus during the 13th to 17th Centuries AD**

Despite marking the beginning of glazed ware production in Cyprus in the 13th century, the Paphos-Lemba production was a short-lived one and was replaced by other productions in the Famagusta, Lapiethos, and Nicosia region. However, we know very little about the glaze technology of these later productions. Did they continue using the same technology as the early production, indicating the occurrence of direct learning from the Paphos-Lemba craftsmen? Or did the later productions have different technologies, which might reflect the influence from other well-established traditions, since there was a marked increase in the movement of and contact with people from places such as Latin Syria and Venice. This paper seeks to explore the range of technologies characteristic of these later productions, in terms of the glaze composition, the method of glaze application, the method of slip preparation, and the mode of decoration. The resultant data will be first compared with the early local glaze technology, and then with the published data on contemporaneous glaze technology in

the Mediterranean. This will allow us to understand the changes and continuities in glaze technology within the local context, and their link to the broader technological trends and socio-political developments.

[363] *Chair*

Tipon, Nick (Graton Rancheria)

[293] *Discussant*

Tipton, Katherine (Portland State University) and Nikki Mills (Colorado College)

[122] *Student-Driven Case Studies of Private Collector Collaborations: From the San Luis Valley of Colorado to Portland, Oregon*

Because of private land and genuine human curiosity, members of the public often hold considerable archaeological knowledge and cultural resources that professionals in the field have historically overlooked. When these collectors are “responsible, responsive stewards”, language set forth by the SAA Archaeologist-Collector Collaboration Interest Group, they become integral partners in the discipline and can deeply impact our understanding of the past. These two projects uniquely explore ways to incorporate public knowledge and private collections into the professional world of archaeology. The first project centers on establishing a systematic process for collecting and investigating archaeological information on private land and private collections throughout Portland, Oregon. With this database, archaeologists would be able to better find private collections and collaborate with private collectors in their project areas. The second project combines methods of ethnohistory and field methodologies to retro-actively document four new archaeological sites on the Baca National Wildlife Refuge in the San Luis Valley of Colorado with a local private collector. Both of these projects are examples of the growing understanding in the field that knowledge-making happens in many ways and to further our knowledge of the past, we need to engage with the public and work collaboratively.

Tivoli, Angélica [364] see Zangrando, Atilio

Tizzard, Louise [108] see Evans, Amanda

To, Denise

[160] *The Complexities of Managing Global Forensic Archaeology with Differing Archaeological Entities, including CRM Firms, Private NGOs, University Researchers, and Field Schools in the Search for Missing US Servicemen*

The Defense POW/MIA Accounting Agency is a US DoD organization that has the awesome responsibility of conducting and managing world-wide forensic archaeological excavations to recover missing US military servicemen from past conflicts. The DPAA-Lab (which traces back to 1947) has the sole forensic authority to make positive identifications of missing servicemen from past accounting as granted by US Code, Title X. Its forensic archaeology operational tempo is largely-scoped, having processed 204 sites around the globe in the fiscal year 2018. A recent Congressional mandate to increase our optempo required DPAA to look outside our organic capacity to contract some of our archaeological activities to external entities as a force-multiplier. Having only partial decision-making control over which kinds of entities are contracted, the DPAA-Lab must train, manage, oversee (and be responsible for) all agency forensic archaeology activities, including those conducted by external partners that have no previous experience in working within the forensic medico-legal paradigm. The performance results have been disparate and extremely challenging. While the archaeological fundamentals and methods may appear similar, the most challenging differences have been forensic traceability, transparency, and defensibility. The hard lesson for some is that not all archaeologists can transition easily to forensic archaeology.

Tocheri, Matthew M. [247] see Veatch, Elizabeth

Todd, Lawrence [80] see Hofman, Jack

Todd, Lawrence [80] see Reckin, Rachel

Todd, Lawrence (GRSLE) and Rachel Reckin (Okanogan-Wenatchee National Forest)

[327] Archaic Period Obsidian Use in the Greater Yellowstone Ecosystem: The 48PA551 Assemblage in Regional Context

In comparison to other Archaic sites in the eastern portions of the Greater Yellowstone Ecosystem (GYE), the Dead Indian Creek site (48PA551) has an unusually high number of obsidian projectile points (N=29). Geochemical source characterization of 23 of the 48PA551 obsidian points suggests that not only was the use of obsidian by Middle Archaic occupants of the site regionally anomalous in terms of frequency of use, but also in source selection. In this poster, we use a large sample of sourced obsidian from montane sites in the eastern and northern GYE to provide a regional baseline for examination of the 48PA551 assemblage. In the higher elevations of the Absaroka Mountains to the south of 48PA551, Lava Creek Tuff makes up just 2.0% (N=23/1087) of the sourced assemblage of obsidian. In contrast, 56.5% (N=13/23) of the Middle Archaic obsidian points from 48PA551 are sourced to Lava Creek Tuff. This suggests a vital pathway for people across the northern Absarokas and south through the Yellowstone Plateau from Lava Creek Tuff to 48PA551 during the Middle Archaic. It also suggests that cultural and social connections between the northern and southern Absarokas during this period may not have been particularly robust.

Toizumi, Takeji [33] see Takamiya, Hiroto

Tokovinine, Alexandre (The University of Alabama)

[358] Mountain Lords: Divine Game Keepers of the Ancient Maya and their Mesoamerican Context

This paper explores a set of mythical narratives on Classic Maya pottery (550-800 C.E.), which involve Huk Si'ip, the divine keeper of animals, and Itzam Kokaj, the celestial creator of animals. Most of these narratives form part of a larger theogony cycle where the elderly gods of animals, sky, earth, and fire are confronted by a younger generation of deities associated with kingship and agriculture. Moreover, the bulk of the data originates from only two Classic Maya polities. The presentation explores possible reasons for the local importance of these narratives in the context of rivalries between the cities and their supernatural patrons. It also attempts to reconcile the pre-Contact data with Colonial and Modern Maya-area ethnography and with a broader Mesoamerican tradition of supernatural animal guardians.

Tokovinine, Alexandre [410] see Quinn, Rhonda

Toledo, Joseph ("Brophy" Joseph Toledo)

[62] Discussant

Tomas, Helena (University of Zagreb)

[267] Early Bronze Age Burial Structures of the Eastern Adriatic and Their Possible Connections with the Aegean

The paper discusses connections between the eastern Adriatic coast and the Aegean during Early Bronze Age. This is the period when Cetina Culture saw its birth in the hinterland of the eastern Adriatic coast (present day Croatia). The pottery typical of the Cetina Culture subsequently spread to the Italian and northern Adriatic coasts, central Balkan Peninsula, Albania, and the Aegean, whereas the associated features were recognised as far as Sicily and Malta. It is fairly safe to suggest that such a wide radius of pottery dissemination was a product of an economic exchange. Bronze objects discovered in the Cetina tumuli, and the fact that the initial area of the Cetina Culture contained no metal sources, leads us to conclude that metal was obtained through trade, and that the Cetina people may have traded their pottery (or its contents) for metal, possibly from the Laurio mine in Greece. The Cetina culture chronologically coincides with the period of spreading of tumuli in Greece, which may have been a side-effect of contacts between the two areas. The paper explores the similarities of burial structures of the Cetina region and the Aegean, especially of their architectural forms, burial ritual and typical grave goods.

Tomaskova, Silvia (UNC Chapel Hill)**[358] Siberian Indigenous Traditions of Game Keeping and the Supernatural: Historical Continuities and Discontinuities**

Siberian Indigenous communities have been used for centuries as a stand-in for various western categories, mostly as a contrast to civilized, developed or familiar groups. This paper will consider the importance of history when archaeologists contemplate the role of the supernatural and the centrality of game keeping among prehistoric communities. Siberia is an excellent example of a vast region at an arm's length geographically and historically; not well known and therefore useful as a placeholder for imagined religious traditions and human animal relations. Yet we have rich historical travelers' accounts, many dubious ethnographic reports, and some veritable descriptions. Furthermore, during the last two decades indigenous communities in Siberia asserted themselves into these narratives through a range of new, old and invented traditions; many focused on the supernatural and the relationship between humans and animals. I will explore the nature of "historical facts", and suggest ways to think about historical continuities and discontinuities geographically and temporally.

Tomaso, Matthew**[17] Archaeology and the Historical Construction of Community at Feltville / Glenside Park**

This paper examines how concepts of community are constructed retrospectively and also in the present mainly through processes of argumentation and consensus-building and very often in lieu of many substantive facts. The "Deserted Village"s 250+ year history is well-complemented by its landscape archaeology, but has, at times, been weighed-down and side-tracked by assumptions, exaggerations and highly fanciful ideas derived from secondary histories. And yet, these historical fictions have also shed light on empirical facts and have helped to create the modern communities that benefit from the preservation and study of the village. A more prudent approach to understanding the character of historic communities requires recognition of and sensitivity to the intersubjective and largely fictive elements of folk histories that often inspire community identity.

Tomazic, Irine (University of Michigan) and Jordan Dalton (University of Michigan)**[286] Late Horizon Mortuary Traditions at Las Huacas, Chincha: Preliminary Results from a Subterranean Collective Tomb**

Archaeological and osteological analyses of burial features allow archaeologists to explore questions related to an individual's life, activities, social status and potential role in society. This poster presents the analysis of a Late Horizon tomb from the site of Las Huacas in the Chincha Valley of Perú, with an emphasis on human skeletal remains. Las Huacas was a large 105-hectare agricultural centre with a diverse burial tradition: extended inhumations, mummy bundles, secondary burials and subterranean collective tombs. In comparison to three other subterranean tombs found, Tomb 3 presents a different pattern in orientation/position and artifact assemblage. Preliminary analyses of the human bones concluded that Tomb 3 was re-opened multiple times, and used for the burial of 12 individuals of various ages and biological sexes. The analyzed individuals presented evidence of disease, trauma, deformations and possibly activity patterns. The poster proposes questions on the methodology used to connect archaeological and bioarchaeological data for the analysis of mass graves and mortuary treatment and contribute to an understanding of Late Horizon mortuary practices in the Chincha Valley.

Tomczyk, Weronika (Stanford University) and M. Elizabeth Grávalos (University of Illinois – Chicago)**[288] Multifunctional Bone Tool Usage at the Prehispanic Site of Jecosh (Ancash, Peru)**

We present a preliminary analysis of the worked bone assemblage from the prehispanic settlement of Jecosh in the Callejón de Huaylas valley of Ancash, Peru. Inhabitants lived at this hilltop site for nearly two millennia, from the post-Chavín period through the time of Inka conquest of the region (~100BCE-1532CE) with noticeable settlement intensification during Recuay times (100 – 700CE). Within 2400 animal bones excavated from the site's domestic contexts, 60 had at least one worked surface or were transformed into tools. Most bone tools were made from bones of large mammals: camelids or deer, and the most frequently utilized skeletal elements were long bones (especially metapodials) and scapulae. The high metapodial frequency in the bone-tool making process suggest the re-utilization of discarded butchery refuse. Based on macroscopic qualitative and metric analyses, we created a tentative bone tool typology, which revealed a high tool standardization and specialization of production. Some tools were likely used to clean animal skins in the pelt-making process, while others could have been used for lithic, textile, and pottery production. This research suggests a wide range of craft activities pursued at Jecosh and is the first attempt at a bone tool typology in the region.

Tomka, Marybeth (TARL, University of Texas at Austin) and Lauren Bussiere (TARL, University of Texas, Austin)**[89] Planning Research at the Texas Archeological Research Laboratory and Don't Forget Your Cowboy Boots**

The University of Texas at Austin's Texas Archeological Research Laboratory (TARL) is the oldest and largest archaeological repository in Texas, housing many millions of artifacts from more than 8,000 sites in Texas and beyond. Collections at TARL range from massive WPA projects of the 1930s to recent CRM projects, and cover the entire range of Texas prehistory and history. Such massive collections, however, bring with them considerable organizational and accessibility challenges, particularly in a chronically under-resourced institution. Although the TARL collections hold vast amounts of data awaiting study and analysis, accessing these valuable resources can at times be frustrating and time-consuming. Here, TARL's collections staff provides guidance on planning research at TARL, preparing to visit, and making the most of your time at our facility. By opening a dialogue between researchers and staff, we aim to encourage more collections-based research and collaboration.

Tomka, Marybeth [346] see Robinson, David

Toney, Elizabeth [12] see Morgan, Robert

Toney, Joshua, Robert Thompson, Anthony Hewitt and Michael Desilets**[129] History, Archaeology, and the Lost Marines of Guadalcanal**

In 2016 Garcia & Associates conducted forensic archaeological investigations for the Defense POW/MIA Accounting Agency (DPAA) on Guadalcanal, Solomon Islands. Beginning on 7 August 1942 the Battle for Guadalcanal was the first major Allied offensive of World War II in the Pacific. The fight for this South Pacific Island included ground, air, and sea battles to maintain control of the airstrip known as Henderson Field. During the conflict, the ground war transpired from the airstrip to the Matanikau-Point Cruz area as the U.S Marines defended the airfield while simultaneously attempting to expand their foothold on the island. In late September 1942 five Marines from the 1st Battalion, 7th Marine Regiment, were killed while assaulting a Japanese position near Mount Austen. These five Marines were buried in marked field graves. Although the burial location was recorded on a wartime sketch map, the Graves Registration Service was unable to relocate the graves. Decades later a multi-disciplinary team of DPAA historians, analysts, and archaeologists reopened the case conducting archival research, field interviews, and test excavations. Finally, after being lost for more than 73 years, the 2016 archaeological work confirmed the location of the burial site thought to be that of the five Marines.

Toohey, Jason [114] see Cheney, Chelsea

Toohey, Jason [285] see Mrak, Daniel

Toohey, Jason (University of Wyoming) and Patricia Chirinos Ogata (University of California Santa Barbara)**[287] Early Ceremonial Architecture in the Cajamarca Highlands of Peru: A Newly Recorded Circular Court at Callacpuma within the Cajamarca Basin**

This poster presents data on a newly recorded monumental circular court located within the Cajamarca Basin of the northern Peruvian Highlands. Large circular courts, better known from the Initial and Formative Periods of the Andean Central coast and highlands, are very rare or at least not well known for the northern Andes. Recent work has investigated an 18 meter diameter court surrounded by concentric walls of vertical standing stones. Preliminary results indicate that this court dates to the Huacaloma Period (~1000 BC) and that it may have been the location of ritual deposition and action involving the large-scale consumption of food. This court is located near the summit of the 250 hectare multi-component site of Callacpuma located on the northern fringe of the Cajamarca Basin. Here, we contextualized this court within our current understanding of early monumental architecture in the region from sites including Kuntur Wasi, Pacopampa, Layzón, and Huacaloma, as well as the broader tradition of circular courts in the central Andes.

Torpy, James (University of Michigan)**[387] *The Environmental Setting of Cypriot Rural Sanctuaries***

During the first millennium BCE the countryside of Cyprus was marked by a large number of extra-urban sanctuaries. Previous studies have discussed the function of these shrines in demarcating or negotiating political boundaries between the island's city states, and their decline under Ptolemaic and Roman rule. This study seeks to investigate the environmental context of these shrines with an economic focus, as has been done in Greece, and to see whether the persistence of some sites into later periods may be due to associations between cultic practice and landscape use. Data on regional vegetation, geology, pedology, and hydrology will be combined with archaeological and iconographic data from these sites in order to assess whether any significant trends are observable.

Torquato, Melissa [127] see Nihells, Angel

Torquato, Melissa**[127] *The Effects of Climate Change and Risk on the Foraging-Farming Transition in North America***

The evolution of the Homo lineage is characterized by the emergence of numerous biological and cultural traits. One behavioral trait is the transition from foraging to farming. Some scholars suggest that climate change contributed to the emergence of agriculture while others hypothesize that continually increasing foraging risk caused the independent development of agricultural subsistence. No study has examined the connections between climate change and foraging risk or the effects of foraging risk on the foraging-farming transition. This study evaluates the effects of climate change and foraging risk as potential explanations underlying the foraging-farming transition in North America during the Late Archaic period (4500-4000 BP). In this study, my previous research reconstructing the paleoenvironment and assessing dietary variation throughout the transition period is combined with species distribution models, which model the geographic distributions of relevant prey species. This study estimates the availability of prehistoric resources and compares the expected and observed diets to quantify foraging risk. The quantification of foraging risk and the examination of its connection to climate change is a novel approach for studying the foraging-farming transition. These methods offer a more complete understanding of the regional foraging-farming transition and have implications for the global trend towards agriculture.

Torquato, Melissa [365] see Otarola-Castillo, Erik

Torreggiani, Irene (DPhil University of Oxford), Benjamin Acevedo Peralta (University of Costa Rica), Juan Aguilar (Heidelberg University), Deyvis Oporta Fonseca (Universidad de Ciencias y Artes de Chiapas) and Bastiaan van Dalen (University of Oxford)**[412] *Pre-Columbian Adaptation to Fluvial Environments, Chontales, Central Nicaragua: 2018 PRISMA Results***

Alluvial valleys are dynamic environments that continuously change under the influences of flooding and erosive processes caused by climatic and tectonic events. The Roberto Amador site is situated on alluvial deposits, surrounded by a meander of the Mayales River, in the proximity of the city of Juigalpa, Chontales, central Nicaragua. The aim of PRISMA (Proyecto Arqueológico Interdisciplinario Santa Matilde) is to identify major environmental changes at the Roberto Amador site and determine how pre-Columbian populations responded to these impacts. Fluvial and archaeological variations have been investigated through the integration of archaeological, geoarchaeological, archaeobotanical, thermographic and remote sensing techniques. The site has been occupied between 900 - 1100 AD and that the settlement planning is intimately related to the disposition of streams and alluvial areas. Circular stone mounds were built on the highest part of the river meander, while semicircular stone features have been identified along seasonal streams. Furthermore, different occupational phases have been identified along the fluvial terraces. While the upper terrace shows evidence for continuous human occupation, the lowest ones experience periods of temporary abandonment. The recent excavation (2018) of a funeral vessel from the upper terrace, suggests that this area may have been used for funerary purposes.

Torrence, Robin [29] see White, Peter

Torrence, Robin (Australian Museum)

[316] Something About Kutau-Bao: Understanding Dominant Obsidian Sources

After c. 50 years of research using a diverse range of geochemical techniques, patterns of movement for obsidian in the Pacific region, dating from the Pleistocene up to the historic period, have been documented comprehensively. Although there are eight high quality obsidian sources, by far the largest quantity of material transported both locally within Papua New Guinea and over long distances out into the Remote Pacific came from the Kutau-Bao obsidian outcrops on New Britain Island. Even communities adjacent to other obsidian outcrops with good quality stone seemingly preferred to obtain the bulk of their supplies from this single source. What is it about this source that made it so popular through time and across space? In what ways can Kutau-Bao's dominance be accounted for by the nature or timing of volcanic eruptions in the region, raw material properties of the obsidian, and/or social processes involving spirituality, ownership and security? To address these questions, I examine the history of Pacific obsidian use and distribution from a range of different perspectives and attempt to generalise more widely about dominant obsidian sources.

Torres, Jimena [33] see San Román, Manuel J.

Torres, Saul [242] see Archila Montanez, Sonia

Torres, Silvia [252] see Baker, Suzanne

Torres Morales, Genesis, Celeste Gagnon (Wagner College) and Gabriel Prieto (Universidad Nacional de Trujillo)

[286] The Lives and Deaths of Moche Valley Children: What Endocranial Lesions Can Tell Us

Children's lives were mostly largely excluded from bioarchaeology analyses before the 1990s. Since then, a new focus on the bioarchaeology of children has illuminated the importance of the lived experiences of childhood for understanding past societies. In this research, we examined the remains of 270 children who died before they were six years old, who were recovered from four Early Intermediate Period archaeological sites in the Moche Valley. Representing the Salinar and Gallinazo phases are children recovered from Pampa la Cruz and La Iglesia on the coast and Cerro Oreja in the middle valley. Children from these sites are compared to later Middle Moche period children from the Huacas de Moche in the lower valley. Among the most common paleopathological conditions identified was endocranial lesions. Such lesions can be caused by vitamin deficiencies, infection of the meninges, and trauma. The examination of the features of these lesions, their co-occurrence with other paleopathological conditions, and the age, temporal and spatial distributions of pathologies, allows us to propose a diagnosis as well provide us with an insight into the daily struggles of children on the north coast of Peru.

Torres Roldán, Isaac (University of Puerto Rico, Río Piedras Campus), Gelenia Trinidad- Rivera (University of Puerto Rico, Rio Piedras Campus), Coralisse Guadalupe De Jesús (University of Puerto Rico, Rio Piedras Campus) and Kelvin Blanco Peña (University of Puerto Rico, Rio Piedras Campus)

[418] Foreigners Building a Future in Colonial San Juan, 1910

Throughout the centuries, San Juan, the capital of Puerto Rico and a port city, has received an influx of foreigners who have left their footprint within the urban layout. This presentation will address another way of studying the presence of immigrants, within the six neighborhoods of the walled city of San Juan in 1910. Census data is used to locate where they lived and/or their places of business. A database was created to organize information that includes name, age, civil status, sex, color or race, place of birth, type of job, and place of work.

The main goal of this research is the creation of profiles by nationality, paying special attention to trades and professions. The data was transferred to a digital map that permits to distinguish the distribution of foreigners by nationality. With this study, we propose additional lines of research that can incorporate existing data from archaeological projects, a reassessment of foreigners within the city, and their distribution by neighborhood

Torres-Martínez, Jesús Francisco and Manuel Fernandez-Gotz (University of Edinburgh)

[50] Small Finds and Scattered Ashes: "Invisible" Burials in Iron Age Northern Iberia

The Iron Age of northern Iberia is characterised, among other things, by a general scarcity of graves. Only some sites have provided burials that can be archaeologically identified, and in most cases the numbers seem to imply that most of the

population remains “invisible” from the funerary record. New research at the necropolis of Monte Bernorio, one of the largest oppida in the Iberian Peninsula, provides some clues about the rituals involved in the treatment of the dead, which were almost exclusively cremated. Although there are some wealthy burials with material such as daggers, most of the graves seem to have contained only extremely fragmented objects or no objects at all. The practice of the pars pro toto, where only a small portion representing the whole is included in the grave, seems to have been applied to both objects and human remains, meaning that in some cases we can only recover minimal portions of ashes. The results imply, on the one side, that previous research could have missed a large proportion of the existing burials, and on the other, that we need to rethink the very meaning and significance of Iron Age burials in the region.

Torres-Rouff, Christina [55] see Pinder, Danielle

Torvinen, Andrea (Arizona State University)

[81] *Social Identification and Collective Action at La Quemada, Zacatecas, Mexico (500-900 CE)*

According to the collective social identification framework, sustained collective action depends on the degree to which groups of individuals share networks of social interaction (i.e., relational identification) and recognize membership in the same social categories (i.e. categorical identification). This study investigates the interplay of the two modes of identification to establish the potential for collective action through time and across spatial scales within the Epiclassic (600-900 CE) site of La Quemada, Zacatecas, Mexico. Large centers in the northern Mesoamerican frontier shared social categories and were connected via exchange networks, yet La Quemada fell out of the regional system while other polities persisted into the Postclassic. Given that La Quemada was occupied for centuries, we know its residents had the capacity for collective action, so it is hypothesized that a change in how La Quemada residents identified with one another weakened collective identity prior to site abandonment. Material proxies in the form of ceramic categories (i.e., shared styles expressing categorical affiliation) and fabric classes (i.e., shared pastes indicative of relational networks) are used to assess the consistency of social identification at multiple socio-spatial scales within La Quemada and will provide a model for comparing the trajectories of northern frontier polities.

[81] *Chair*

Torvinen, Andrea [81] see Turkon, Paula

Toscano, Lourdes

[173] *Pasado, presente y futuro de la conservación del patrimonio edificado de la región serrana de Yucatán: Kabah, Sayil, Xlapak y Labná*

El sureste mexicano tiene una larga tradición en intervenciones de restauración de edificios monumentales. Estos trabajos se iniciaron desde principios del siglo pasado, con la intención de conservar los majestuosos edificios que se encontraban en pie y que fueron dados a conocer al mundo entero a través de las crónicas de viajeros de otros países, entre los que destaca John L. Stephens y su acompañante Frederick Catherwood. En este documento abordaremos, desde una perspectiva histórica, las intervenciones de restauración realizadas en los sitios de Kabah, Sayil, Xlapak y Labna, localizados en la región serrana de Yucatán. Haremos una síntesis de las principales técnicas utilizadas, así como de la manera en que se han aplicado las normas internacionales de restauración, a partir de la segunda mitad del siglo XX hasta la fecha, y terminaremos con una propuesta para trabajar durante los próximos años en pro de la conservación de este importante legado prehispánico.

Tostevin, Gilbert [115] see Khaksar, Somaye

Tostevin, Gilbert [321] see Cooper, Aspen

Touchin, Jewel [254] see Laurila, Erick

Tourigny, Eric (Newcastle University)**[109] Do All Dogs Go to Heaven? How Pet Cemeteries Document Changing Human-Animal Relationships**

Public pet cemeteries represent a relatively recent phenomenon in western European/North American societies. First appearing in the late 19th century in England, France and the United States, their numbers quickly expanded across these and other countries as people commemorated their non-human friends in new ways. The locations and organisation of these cemeteries as well as gravestone inscriptions are revealing of the changing attitudes towards non-human animals. They tell of the roles pets held in people's lives (i.e., were they treasured friends? or important members of the family?) and their perceived roles in the afterlife (i.e., did they have a place in heaven?). This project describes an archaeological survey of four of Britain's pet cemeteries. These include Britain's oldest public pet cemetery in Hyde Park, its largest in Ilford and two working-class pet cemeteries in northern England. Comparisons are made to contemporary human burial practices in order to identify how animals were treated differently and similarly. The goal is to document changing patterns in animal commemoration and contextualize British society's current relationship with animals while highlighting the importance of these spaces in documenting social history.

[109] Chair

Tourigny, Eric [153] see Welker, Martin

Toussaint, Mark (University of Nevada Las Vegas)**[142] Gendered Trouble: Reconsidering the Role of Females in the Masculinized Spaces of Violence in an Early Bronze Age Population**

Mierzanowice Culture (~2400–1600 BCE) communities in the Central European Early Bronze Age buried their dead in a formalized and gendered manner, in which males and females typically assumed mirror-opposite orientations in their respective graves. Furthermore, the archetypal "warrior" grave—whether simply an idealized presentation of an individual of esteem and influence or a reflection of a role in socially sanctioned violence—is highly masculinized and is usually associated with males. Examples of females buried with weapons, or females buried in the masculine orientation, have typically been regarded as exceptions to the rule. However, the fact that such "exceptions" are presented in a context as idealized and symbolic as the grave and that they have such nuance in the diversity of their forms, begs for the reconsideration of these cases not as exceptions, but as intentional and particular forms of "the rule." This presentation includes new bioarchaeological data and revisits assumptions of the role of females in the socially sanctioned exercise of power—whether violent or political.

Towner, Ronald (Tree-ring Lab, University of Arizona)**[220] The Forests and the Trees: Sourcing Construction Timbers at Aztec Ruins, NM**

Obtaining materials from distant landscapes is a hallmark of the Chacoan world. The movement of nonlocal materials into Chaco Canyon, and around the Chacoan sphere, has fascinated archaeologists for decades. Large construction timbers, in particular, have been subject to intense research because so few trees grow in or near the canyon. At Aztec Ruins, however, some wood resources, including pinyon pine and juniper were available locally. Other species that only grow at higher elevations, including ponderosa pine, Douglas-fir, and spruce, must have been imported from mountain ranges at least 20 km distant. Previous studies have used a variety of techniques to source construction timbers to areas more than 50 km distant from Chaco Canyon itself, but the methods are typically time-consuming and expensive. Here I report our research on possible timber sources used in the Aztec great houses using tree-ring width-based sourcing methods. To date, we have sourced more than 300 beams from Aztec, and have comparable data for great houses both in and outside the canyon. Our results document surprisingly distant timber sources and a dynamic pattern of resource utilization between the 12th and 13th centuries at Aztec East and West Ruins.

[150] Discussant**[220] Chair****Townsend, Cameron (Los Alamos National Laboratory)****[90] Visualizing the Unique: Lidar and Three-Dimensional Modeling as a Preservation Tool for NHPA Compliance**

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of actions carried out on historic properties under their jurisdiction. In the instance of an undertaking that would diminish or remove important characteristics from a historic building, action must be taken to avoid, minimize, or mitigate any potential adverse effects. For federal agencies with aging infrastructure that must support ongoing mission-related work, mitigating adverse effects through documentation and consultation with the State Historic Preservation Officer is often the only available preservation option. Many federal agencies facing this dilemma have especially complex and unique properties, such as highly specialized industrial and scientific facilities, that can be difficult to conceptualize to non-technical audiences. Effectively documenting these unusual facilities requires devising especially creative solutions. This poster highlights the challenges and benefits of documenting a particularly complex historic property from Los Alamos National Laboratory – a 5,000 ton, 41-foot tall, Cold War-era industrial press – using lidar scans, original drawings and manuals, photographs, and a variety of point cloud processing, 3D modeling, and animation software programs.

Townsend, Taylor**[171] An Analysis of Garbanzo Bean Remains at Mission San Luis de Talimali**

Were garbanzo beans grown at San Luis de Talimali or were they imported? Were they able to be cultivated at all in a Floridian climate? Who cooked with the beans- just the wealthy Spanish who imported them or anyone with a garden? What was their dietary importance? Garbanzo beans were a staple of the Spanish diet, and were one of the plants brought to La Florida. San Luis was one of the wealthiest Spanish missions in La Florida and played a crucial role in the success of the Mission system. The farms associated with San Luis produced a majority of foodstuffs for the rest of the province, however, modest archaeobotanical research has been conducted on the site. The results of this research will give a clearer picture of botanical foodways during the Mission Period. This will be done by analyzing flotation samples from multiple contexts of the site for the presence of garbanzo remains. This study will utilize flotation samples in the State of Florida collections, those excavated in Spring 2018 by Florida State University, and a modern comparative ethnobotanical collection to identify the remains. The presence of chickpea will be quantified by variety, temporally, and by feature function.

Toyne, J. Marla [98] see Anzellini, Armando

Trabert, Sarah (University of Oklahoma)**[19] Understanding Ancestral Wichita and French Trade at the Deer Creek (34KA3) Site**

Deer Creek is an eighteenth-century fortified site in Oklahoma that is featured in dozens of publications yet was not excavated until 2016. While archaeologists today acknowledge the site as a Wichita village, others have insisted Deer Creek is a European fort. Historical narratives bereft of archaeological investigation can prove problematic and have minimized the role of Wichita communities in economic relationships. The Deer Creek site was just one of many villages in the region where Indigenous peoples held significant power as they negotiated with European travelers.

Trachman, Rissa (Elon University) and J. Alex Canterbury (Texas A&M University)**[30] Everyday Life in a Maya Center: New Data towards Social, Economic, and Ritual Behavior at the Ancient City of Dos Hombres**

The current research in the Dos Hombres civic ceremonial center utilizes the lens of "everyday life" in order to understand the internal ritual, economic, social, and ideological activities of this ancient city, as well as how it interacted with the surrounding household hinterlands, and the socio-political and economic role this medium-sized city played in the region. Current efforts are focused in the northern plaza, a very public space that likely was a place of commerce, public ritual and sacred space, thereby the prime backdrop for publicly legitimizing authority. Recently excavated data, especially architectural exposures as well as material culture deposits are presented. These new data are rich with information about public activities and architectural programming at the ancient city. In addition, off-mound non-architectural excavations, material culture, and isotope data combined with recent LiDAR are continuing to formulate an understanding of social, economic, and ritual behavior. As a result, the culmination of these data have begun to elucidate various social and economic relationships, both individually and collectively, of the ancient Maya at Dos Hombres and northwestern Belize.

Trachman, Rissa [371] see Conley, Daniel

Tramel, Nichole (Project Archaeology)**[184] Formative Assessment of "Project Archaeology: Investigating Food and Land"**

"Project Archaeology: Investigating Food and Land" is a new education guide that explores the intersections of culture, food, people, and the environment in ancient North America. "Food and Land"'s first regional investigation invites 3rd-5th grade students to examine food systems in the Great Basin by using environmental archaeology inquiry techniques to analyze artifacts at the O'Malley rock shelter site in Lincoln County, Nevada. In the summer of 2018, Project Archaeology debuted "Food and Land" at a peer mentoring workshop designed to introduce Lincoln County teachers to the Project Archaeology national network and support curriculum piloting. A veteran Project Archaeology teacher will join workshop attendees as they pilot the new guide in local 4th & 5th grade classrooms during the fall semester of the 2018-2019 school year. Pre- and post-tests will monitor changes in student understandings of ecosystems, the archaeological research process, and stewardship while teachers will provide real-time user feedback via online file sharing systems. This presentation will discuss the initial findings from the "Food and Land" pilot, including the efficacy of this new piloting model and how students understand history and social studies through the investigation of archaeological data.

Traslaviña, Abel (Vanderbilt University)**[143] Water Social Relations in Transition: Local Populations and Foreign Empires in Tension over Natural Resources in Mid and Lower Lurin Valley, Peru**

After the Spanish arrival in the Andes, the new social, economic, and political organization mainly materialized in two spatial entities: the "reducciones" or specially-designed towns where the Andean population was forcibly resettled, and the "haciendas" or large estates or plantations including a defined domestic space. These entities faced unequal access to certain resources like water, competing for the privilege of accessing these resources. This situation generated tensions not only between local populations but also between those populations and the new Spanish institutions. Based on 17th and 18th-century archival documents and by tracing the material culture, I explore these "water social relations" in order to understand the local experience of the transition from their own rule through the Inca and the Spanish Empires in mid and lower Lurin valley, Peru.

[143] Chair

Travis, Sidney [88] see Nolan, Kevin

Traxler, Loa [105] see Lacombe, Laura

Traxler, Loa (University of New Mexico)**[124] Stories among the Chiricahua Mountains**

In collaboration with the National Park Service Southeast Arizona Group, field research by archaeologists, public historians, and students from the University of New Mexico has focused on ways to augment the interpretive programs within the Chiricahua National Monument and Fort Bowie National Historical Site. Focused broadly on the natural environment and chapters within a complex cultural heritage, recent efforts have explored new approaches to communicating the region's rich history and relationships among surrounding communities. This poster presentation offers examples for future directions in outreach and interpretive narratives and the opportunities for partnership.

[76] Discussant**Treichler, Jack****[189] A Bird's-Eye View: Historic Aircraft Navigation Arrows in Northern Arizona**

Following the invention of the airplane in 1903, the early 20th century saw the rapid development of aviation technology,

both for commercial and recreational purposes. As early pilots struggled to effectively navigate during an era characterized by unruly aircraft and sparse ground support, concrete arrows, beacons, and other navigational aids were constructed to mark the way. In 2018 Cornerstone Environmental identified the remains of a forgotten aircraft navigational aid during an archaeological survey on the Kaibab National Forest in northern Arizona. This paper presents a brief background of the origin of associated arrows, beacons, and other such aids, and explores the function, age, and relation of this marker to other similar features.

Trein, Debora (National Geographic Society), Angelina Locker (The University of Texas at Austin), Stacy Drake (The Field Museum), Manda K. S. Adam (The University of Texas at Austin) and Patricia Neuhoff-Malorzo (The University of Texas at Austin)

[30] They Blinded Me with Science: Methods and Approaches at the Programme for Belize Archaeological Project (PfBAP)

The Programme for Belize Archaeological Project (PfBAP) was established to explore ancient Maya life in a 250,000 acre area of protected forest in northwest Belize, employing a regional perspective grounded in robust field methods. This regionally-oriented approach continues to guide research being conducted at PfB every year since the start of the project in 1992. The long-term continuity and expansive geographic scope of PfBAP has fostered a highly collaborative research environment, allowing dozens of researchers across many disciplines such as archaeology, social anthropology, geography, genetics, biology, physics, and geology to develop complex and multi-faceted narratives of ancient life in this corner of Belize. The purpose of this paper is to highlight a number of the recent approaches employed in research at PfBAP, paying particular consideration to methods and techniques novel to the study of the ancient Maya in Belize. These approaches include but are not limited to sediment micromorphology, bulk elemental analysis, isotopic analysis, ancient DNA, paleopathology, macro- and microbotanical analysis, tomography through muon detection, LiDAR, GIS, magnetometry, and earth resistivity.

Trein, Debora [30] see Hart, Thomas

Tremblay, Roland (Ethnoscop Inc.) and Christian Gates-St-Pierre (Université de Montréal)

[73] Struggling with Radiocarbon Dates at the Dawson Site in Downtown Montréal

In 2016, construction work on Sherbrooke street in downtown Montréal has led to the discovery of late St. Lawrence Iroquoian remains that are part of the Dawson site, an Iroquoian village first discovered in 1859. Two years of excavations, in 2016 and 2017, provided new data representing a welcome addition to the former Dawson collection that was thoroughly analyzed and published in 1972 by James F. Pendegast and Bruce G. Trigger. One major concern brought about by the Dawson site was the possibility of it being the famous village of Hochelaga visited by French explorer Jacques Cartier in 1535. A series of AMS radiocarbon dates suggests that the Dawson is about 150 years older than previously thought based on ceramic typology. Several avenues of explanation are examined to address this apparent discrepancy, including different aging effects on radiocarbon dates, the low degree of resolution in ceramic typologies, as well as aspects of Iroquoian settlement patterns.

Tremblay, Roland [168] see Mann, Evan

Trever, Lisa (Columbia University)

[306] Art, Archaeology, and Archives: Pañamarca at Midcentury

In the modern history of American archaeology, the relationship between art and science has often been an uneasy one. But in northern Peru in the 1950s, archaeologists, artists, and poets enjoyed a remarkably close camaraderie that has seldom been repeated in Andean archaeology. This paper explores episodes in this little-known chapter during the "Post-Tello interregnum," as the period of 1947–57 has been dubbed (Schaedel and Shimada 1982). I focus on the confluence of artistic and scientific interests (and their limits) in the study, illustration, and exhibition of the mural paintings of the ancient Moche center of Pañamarca, both in Peru and at the Art Institute of Chicago. This research demonstrates the great

potential that archival research in Peru, the United States, and Canada can bear for greater understanding of Andean archaeological excavations past and present.

Trever, Lisa [316] see Tripcevich, Nicholas

Triadan, Daniela [309] see Vázquez López, Verónica

Triadan, Daniela (University of Arizona)

[309] *The Origins of Maya Civilization: New Evidence from Ceibal and Sites in the Middle Usumacinta Basin*

The analysis of new LiDAR data has revealed many previously unknown early Middle Preclassic sites in the Middle Usumacinta drainage. The sites are monumental in their extensions and consist of a large rectangular feature or platform oriented slightly east of north, delineated by low mounds and an E-Group in the center of the rectangular construction. The architectural layout of these sites is so consistent that we have called it the Middle Formative Usumacinta (MFU) pattern. Excavations at two of these sites have shown that their constructions date to before 800 BC. They also show some remarkable consistencies in ceramics and building techniques with Ceibal, approximately 180 km to the southeast. They, as well as the early Middle Preclassic constructions at Ceibal, are marked by a planned horizontal monumentality from their inception, and these arrangements show planning and the participation of large groups of people engaged in communal ritual building efforts, who were probably still adhering to a mobile lifestyle. Our data suggest interactions between Ceibal and populations who lived in the middle Usumacinta drainage. These new data indicate radically different processes in the transitions to a sedentary lifestyle and increased social complexity for the early Maya than previously thought.

Trigg, Heather [351] see Ritchey, Melissa

Trigg, Heather (Univ Massachusetts Boston) and Cordelia Snow

[367] *Spanish-Pueblo Interactions in New Mexico's Early Colonial Spanish Households: Negotiations of Knowledge and Power in Practice*

Missions and indigenous villages are commonly investigated contexts of indigenous action in response to early years of Spanish colonialism in the American Southwest. In New Mexico, colonists' households were also a venue for interaction and exchange of information between Pueblos and Spanish. Some models of colonial interactions have suggested that quotidian practices developed along dimensions of gender and ethnicity. However, Spanish New Mexican households, especially in the early colonial period, were contexts where power dynamics were multifaceted and knowledge of the local environment was useful. To explore Spanish New Mexican households, we use the concept of hybridity, a term not typically associated with investigations of colonizers, but one that assumes a more deliberative negotiation of practice. Such an approach with respect to colonizers' homes helps to focus attention on the power that indigenous people had and knowledge colonizers may have valued. In this paper, we explore the material remains of several 17th-century Spanish ranches in northern New Mexico as they illuminate the interactions between Spanish colonists and Pueblo wives, servants, slaves, and laborers. Using architecture and artifacts, we explore ways these ranches were constructed and inhabited and the interplay between Pueblo and Spanish ways of making do.

Trimble, Michael (U.S. Army Corps of Engineers)

[297] *Engaging Veterans in North American Archaeology*

As professional archaeologists who are charged with carrying out meaningful research and long-term collections care, one of our ethical and professional obligations is to inform and engage the public in what we do and why it is interesting and important. Our attempts at this are often uneven, but we recognize the best way to engage the public is by direct participation in our science. The Veterans Curation Program, sponsored by the U.S. Army Corps of Engineers (USACE), is a successful public archaeology program. The premise is simple: Veterans, who want to develop skills to compete in a civilian environment, are systematically schooled in modern curation and collections management, thus assisting the Corps.

Our professional staff teaches them the basics of archaeology, modern cataloging, records management, heritage management, and computer and communication skills. All of this alternative public archaeology not only contributes to the organization of our national patrimony, but more importantly, furnishes skills and confidence to our new civilian workforce.

Tringham, Ruth (Univ of California-Berkeley)**[87] Archaeologists as Early Adopters and Critical Remediations at UC Berkeley's MACTiA**

In this presentation, I revisit the digital training that was carried out by myself and colleagues at the UC Berkeley Multimedia Authoring Center for Teaching in Anthropology (MACTiA). During the period of its existence (1998-2011) the program transformed itself enormously not only in response to changing hardware and software, but also as our own interests and experience in archaeological education and community building grew, along with our changing (and diverse) viewpoints of what "digital education" meant in practice. I regard the experiments that I was able (allowed and enabled) to carry out in teaching digital practice and media literacy through the MACTiA being the backbone of my own intellectual development during this period and more recently. The collaboration between faculty, graduate and undergraduate students in the MACTiA courses was quite unique, and created many diverse ways of developing digital practices. Throughout this diversity and change, however, there are certain features – notably the encouragement of remediation and re-use of media, a "content-first" attitude, and an "education of attention" - that characterize the "MACTiA style" of digital archaeology and continue to affect our practice.

Trinidad-Rivera, Gelenia (University of Puerto Rico - Rio Piedras Campus)**[172] Setting the Table!: Comparative Analysis of Vessel Forms between the Fort Amsterdam and the Brimstone Hill Fortress Collections**

The Dutch Caribbean Island of Saint Eustatius has been a focal point throughout the Lesser Antilles and European economic development of the 17th and 18th century period. Food has always been a reflection of complex social and economic exchange between cultures. It is through dietary patterns that trades between countries can be traced back and current cultural patterns understood. This poster focuses on identifying the types of vessel forms from ceramic sherds recovered from Fort Amsterdam on Saint Eustatius and Brimstone Hill Fortress on Saint Kitts. An examination of everyday life vessels can help reconstruct and compare dietary customs, patterns, and table setting traits between Dutch and British sites. In addition, 17th-18th century cookbooks and still life and genre paintings from England and the Netherlands are used as reference to comprehend how common domestic traits can lead up to significant cultural influences that transcend between cultures through time. Quotidian choices can show how globalization can be found even in the way previous settlements in the Caribbean were setting their tables.

Trinidad-Rivera, Gelenia [418] see Torres Roldán, Isaac

Trioza, Nicholas**[42] Rethinking Prehistoric Hillforts in the Eastern Adriatic from a Human Behavioral Ecology Perspective**

On the Dalmatian Coast of Croatia and stretching for kilometers inland and along the shores of the Eastern Adriatic are massive drystone ramparts and enclosures that litter hilltops. These structures are known as hillforts, are poorly understood, and are colloquially assumed to date to the Iron Age, as there is scant settlement evidence in the area dating to the Eneolithic through the Bronze Age. Nonetheless, prehistoric populations living on the Dalmatian Coast eventually engaged in and experienced differential access to metallurgy exchange networks, which likely contributed to increased social stratification and perhaps conflict. Hillforts have factored into this process somewhat anecdotally, with explanations for their presence leaning towards elite control over the flow of commodity exchange. This paper proposes an alternative approach to shedding light on the emergence of hillforts in Dalmatia using a human behavioral ecology model to explain territoriality as just one of several possible outcomes following changes in resource distribution and predictability.

Tripcevich, Nicholas (UC Berkeley), B. Lee Drake (Anthropology, University of New Mexico), Lisa Trever (Art History and Archaeology, Columbia University), Eric Kansa (The Alexandria Archive Institute/Open Context) and Michael D. Glascock (Missouri University Research Reactor)**[316] Open Obsidian Geochemistry Visualization with an Example from the Andes**

The open science movement is growing in archaeology, and raises fundamental questions about data and who it belongs

to. In this talk, we outline a protocol for sharing data on obsidian sources to facilitate replicable research. While in obsidian sourcing a direct calibration is preferable (e.g., measuring source standards on the same instrument used to measure artifacts), it is nonetheless useful to create a platform for researchers to share their data for comparison with others. To that end, advances in data accessibility via servers and the growth of open-source computing languages such as R make it possible for a repository to not only store data, but also provide an analytical environment data exploration. Here, an example is provided of a dynamic repository framework which allows for a) user-contributed data, b) aggregation of data across multiple researchers, and c) qualitative and quantitative association of new data. We use an example from the Central Andes where forty years of geochemical studies have identified primary obsidian sources and a sizable literature. Archaeological obsidian excavated from sites in the prehispanic Central Andes can inform on long distance exchange and community relationships with regional polities on emergent road networks.

Trípode Bartaquini, Bruno [46] see Bitencourt Mañas, Diego

Tritsch, Michael (The Johns Hopkins University)

[52] *The Monumentalization of Ma'at in the Tomb of Amenemhet: The Role of Text and Image in a System Approach to the Interpretation of Middle Kingdom Tombs*

Receiving little scholarly attention to date, most prior work on the tomb of Amenemhet at Beni Hasan has either focused on the translation of the titles and autobiography inscribed in and around the door jamb or on the description of the tomb scenes and accompanying decorations. To gain a more comprehensive understanding of this richly decorated structure, this analysis uses a system approach, taking into account the interrelationships among the various parts of the tomb. This integrated methodology recognizes that each of its components contributes to the comprehensive symbolism, message, and purpose originally intended, allowing a more complete and detailed picture to emerge that recognizes subtleties previously overlooked. In particular, the autobiography helps to guide and elaborate upon the interpretation of the images, clarifying and at times even changing the scholarly analysis. Through a careful study of all aspects of the tomb, Amenemhet as a man who upheld ma'at and dispelled chaos emerges as the dominant theme, evident in all of his actions that are portrayed. With this understanding, it then follows that the purpose of the tomb is to guarantee the owner entrance into the hereafter by monumentalizing his association with ma'at.

Trivedi, Mudit (University of Chicago)

[399] *The Hazards of High Resolution? Social Change, Site Structure and New Chronometric Concerns from Indor, North India*

How do high resolution chronologies change our interpretations of the archaeological record? What impact can and should they have on our analysis and our understandings of site-structure, social process and the narratives by which we account for our evidence? This paper provides one case study of considering the hazards and prospects of high resolution Bayesian chronometric models which poses new questions to site formation studies, household archaeology and the archaeology of religion. This paper draws upon the results of an extended project directed at an archaeological investigation of religious conversion to Islam in South Asia in the second millennium CE. The project combined extensive regional survey, excavations and architectural documentation focused upon the site and valley of Indor, located in the region of Mewat on the borders of Rajasthan, North India. A suite of 36 AMS radiocarbon determinations (conducted at the IUAC, Delhi) has allowed for a regional chronology which allows across different datasets for decadal, generational (25 years) and wider levels of control. The paper contributes to the following areas of emergent interest in Bayesian chronometry: the interpretation of structural life-spans, the consideration of age-depths models and defining the relationship between stratigraphic and dated events.

[399] *Chair*

Troncoso, Andres [315] see Hayashida, Frances

Tropper, Peter [39] see Maldonado, Blanca

Trousdale, William B. [399] see Allen, Mitchell

Troutman, Michele (Binghamton University)

[94] Understanding Early Archaic Stone Tool Production Practices: A Pilot Study

Through Funk's (1993) research into the Upper Susquehanna Valley Region in New York, several important Early Archaic (10,000-8,000BP) archaeological sites were uncovered from Wells Bridge, New York. One of these Early Archaic sites named the Johnsen #3 site contains multiple Kirk horizon occupations in stratified deposits. Early Archaic sites are still rare in the Northeast; thus, the Northeastern Early Archaic is based on the cultural historical taxa developed in southeastern sites (such as Broyles, 1971; Coe, 1964; Chapman 1980). However, there is considerable variation within the Early Archaic (Kirk occupation) sites in the Northeast and Great Lakes regions (Bursey, 2012). The analysis of the Johnsen #3 collection will focus on the communities of practice among the flintknappers who occupied this site. My overall goal is to examine the social mechanisms for the lithic technological system of the Early Archaic. This pilot study will present the results of a lithic attribute analysis, collecting data on the following attributes: characteristics of dorsal scars, thickness, platform preparation, and platform angle. These attributes will be statistically tested using PCA analysis. The patterns revealed from the analysis will extend our understanding of the maintenance of tradition and changes within the community occupying this site.

Troy, Aras (George Mason University) and László Paja (University of Szeged)

[126] Identifying Differences in Funerary Practice from the Distribution of Fracture and Warping Found on Cremated Human Remains at a Bronze Age Cemetery

Research at the Békés - Jégvermi kert (Békés 103) site and similar sites in the Lower Körös River region of Hungary have yielded evidence that the Middle Bronze Age peoples of the region did not undergo substantial social stratification, despite evidence to the contrary from contemporary sites. Stratification of social systems can be identified in both material culture and human remains, particularly in mortuary practices. The burials at the Békés 103 cemetery reveal different mortuary rites, but the majority of graves are characterized as urn cremation, where ceramic vessels were buried in shallow graves. Bone remains from five single urn burials were analyzed for identifying characteristics of heat-induced fractures and structural disturbance associated with heating, such as warping. The types of fractures and modifications were recorded and separated into four categories grouped by association with possible evidence of the pre-incineration status of the body. The sample largely provided evidence of uniformity between burials, supporting the conclusion that the individuals were cremated in a similar pre-incineration state. The results of our study add to previous research identifying factors relating to the social composition of the Great Hungarian Plain during the Middle Bronze Age.

Trujillo, Isabel and Jun Sunseri (University of California-Berkeley)

[193] The Pueblo de Abiquíú Library and Cultural Center as Leader in Genízaro Archaeological Investigations

The Berkeley-Abiquíú Collaborative Archaeology (BACA) Project has been in partnership with the Merced del Pueblo de Abiquíú and the Pueblo de Abiquíú Library and Cultural Center for several years now. Recruiting assistance from a non-local academic partner, Abiquíú leaders created not only an opportunity for testing the utility of archaeology for achieving community goals, but also to fulfill the mandate of intergenerational knowledge transfer that is core to the partnership mission. The intersectionalities of storytelling, cultural revival, and control of heritage resources reframe how an archaeological partnership can serve local interests.

Trujillo, Isabel [294] see Sunseri, Jun

Trusler, Kate (University of Missouri)

[337] Around the Watering Hole: An In-Depth Analysis of Pompeii's Fountains

Drinkable water and the strategies used to get it are at the heart of every sustainable society, and Roman Pompeii is no exception. Pompeii's remarkable water distribution system shapes the very character of the city from its network of water towers to its overflowing fountains. By the 1st century CE the Aqua Augusta, or Serino Aqueduct as it is known today, dramatically altered the urban development of Pompeii and served to provide water to many poorer citizens who, prior to this, would have had little to no access to potable water. In the summer of 2018, the authors conducted fieldwork in order to investigate the fountain and water tower system found at Pompeii. Results include updated and more accurate

measurements pertaining to the overall volume and construction of the fountains, detailed accounts of the wear patterns found on the fountain surfaces and proposed explanations for their presence, and layouts of the stone "supports" that surround many of the basins.

[337] *Chair*

Trusler, Kate [387] see Bernstetter, Jessica

Tryon, Christian [47] see Quirin, Carley

Tsesmeli, Evangelia (NM State Land Office) and David Eck (NM State Land Office)

[117] *Does Mastication Damage Cultural Resources? A New Mexico Perspective*

Mastication refers to the mechanical thinning of tree cover such as piñon-juniper woodlands and mixed conifer forests in order to reduce fuels and fire hazards, prevent erosion and improve understory development. Mastication utilizes heavy machinery to shred standing vegetation and may involve significant ground disturbance. Though mastication is a cost-effective treatment, its effects on existing soils, vegetation, and wildlife species are variable and depend on several factors, including the type of machinery used, soil composition, and existence of surface or buried deposits. To better understand the effects of mastication on cultural resources we randomly selected areas within several thinning projects and noted the location and characteristics of selected artifacts before and after treatments. The results of this investigation will communicate to interested parties the consequences of such treatment.

Tsesmeli, Evangelia [213] see Whitley, Catrina

Tsoraki, Christina [416] see Li, Weiya

Tsosie, Rebecca

[294] *Bioarchaeology and Genome Justice: What Are the Implications for Indigenous Peoples?*

This paper examines the theme of "discovery," used in relation to Indigenous lands and peoples to designate the respective claims of Indigenous peoples and the European peoples that colonized North America. In particular, I look at the domain of "bioarchaeology" and the construct of "genome justice" to explore how DNA science attempts to create narratives of identity, belonging and continuous possession of Native lands. "Ancient DNA" has been one of the most contested categories of scientific study for Native remains from North America under contemporary laws regulating repatriation and ethical study of Native human remains. This paper evaluates the interests of contemporary tribal governments in the data and scientific narratives that emerge from such studies.

[75] *Discussant*

Tsosie, William [84] see Schaafsma, Polly

Tsosie, William

[150] *Discussant*

Tsujimori, Tatsuki (Tohoku University)

[141] *Geological Knowledge about Jadeite Jade (Jadeitite) for the Study of Jadeitite Artifacts*

Jadeite jade (jadeitite) is an important material for archeological objects from the middle Jōmon period (~5000–3500 BCE)

through the Kofun period (250–710 CE) in Japan. During the last two decades, in the field of geological science, studies of jadeite worldwide have brought new knowledge about its origin, formation, and regional characteristics. Multiple trace-elements and stable isotope characterization for jadeite becomes increasingly important to understand the geological process of jadeite formation in past subduction zones, where an oceanic plate dives beneath a continental plate. Moreover, a large amount of data via in-situ analytical techniques and new experimental data has begun to allow to a statistical-mechanical analysis. All new descriptions and U-Pb geochronology using zircon in jadeite have a great potential to revisit source materials of jadeite artifacts in Japanese archaeological cultures. In this paper, we will give a perspective overview on an interdisciplinary approach for the study of jadeite artifacts.

Tsukamoto, Kenichiro [280] see Miller, J. Reed

Tsukamoto, Kenichiro (Department of Anthropology, University of California, Riverside)

[409] *Archaeological Applications of Airborne LiDAR at the Maya Archaeological Site of El Palmar, Mexico*

Airborne Light Detection and Ranging (LiDAR) survey has changed our perspectives on ancient Maya urbanism. In 2017, we conducted airborne lidar mapping at the Classic Maya city of El Palmar, located in southeastern Campeche, Mexico, covering a total area of 94 km². Results show monumental architecture, possible marketplaces, causeways, vast intensive agricultural lands (raised fields), and terraces. These were verified in the field, during the summer of 2018, confirming these were not LiDAR's "raster artifacts", rather urban features. In addition, we also detected chert lithic workshops and two new stelae. Both textual and material data suggest that the El Palmar dynasty had broad social, political, and economic networks with other dynasties during the Classic period (AD 400-820).

[409] *Chair*

Tsurumi, Eisei (The University of Tokyo), César Sara (Pontificia Universidad Católica del Perú) and Carlos Morales (Universidad Nacional Mayor de San Marcos)

[181] *The Outside of the Illuminated Temple: Chamber Constructions in the Early Monumental Architecture in the Andes, Kotosh (Huanuco) and Mosquito (Tembladera)*

Through the recent excavations at Kotosh, Tsurumi and Sara successfully reconstructed the whole architectural complex of the late Archaic Period. It is composed of complicatedly connected platforms and supposedly each of the platforms was made for the purpose of supporting "temple" constructions placed on them. In the Mosquito Plain located in an inland coastal basin known as Tembladera area, Tsurumi and Morales have identified many architectural complexes of the late Archaic Period. In the case of a monumental architecture named Platform Z1, the researchers discovered a chamber with a hearth on the central and topmost location of the platform. Kotosh and Mosquito are similar in the sense that they form irregularly formed masses composed of platforms, winding corridors, and narrow staircases. These architectural features were laid out like a labyrinth through which one can reach the chamber. On the other hand, in many cases of sites on the coastal plains, the platforms adopted well-ordered rectangular forms associated with straight and wide principal staircases. In addition, the chambers with hearths are not always arranged in the core of architectural complexes. We will analyze the structure of space among these monumental complexes focusing on the locations of chamber constructions in them.

Tsurumi, Eisei [306] see Matsumoto, Yuichi

Tu'tsi, Trent [254] see Koyiyumptewa, Stewart

Tucker, Carrie

[227] *Discussant*

Tucker, Sydney [172] see Wile, Kim

Tucker, Sydney (Washington University in St. Louis)

[172] *Dating the Dead: A Temporal and Demographic Analysis of an Unmarked Cemetery on Sint Eustatius, Dutch Caribbean*

Recent investigation of an unmarked historical cemetery located between Fort Amsterdam and a nearby historical plantation on Sint Eustatius in the Caribbean raises several questions. Arguably the most fundamental question involves who is buried in the cemetery: if it was used to inter soldiers from the Dutch fort or enslaved Africans from the nearby sugar plantation. Identifying the cemetery's temporal context and demographic composition is an important first step in answering this question. This inquiry used artifacts from the grave fill and coffins to provide date ranges for specific burials and estimate an overall time period for the cemetery. Datable artifacts recovered from these burials, such as glass bottle fragments, European ceramic sherds, copper tacks, coffin nails, and clay pipes, were analyzed to date each of the burials. Demographic analysis of the burials revealed that males and females are present and ages range from infancy to middle aged adults which is consistent with a village population, not military personnel. Furthermore, the temporal analysis dates the nearby burials to the 18th century, aligning closely with the active dates of the nearby Godet plantation. This analysis suggests that the burials are enslaved Africans from the Godet plantation.

Tuggle, Myra Jean

[29] *Farms with a View: The Evolution of Agriculture at Kealakekua, Hawai'i*

Above the 400 foot sea cliff at Kealakekua Bay on the leeward Kona coast of Hawai'i are the remnants of extensive pre-Contact Hawaiian agricultural infrastructure. Inventory survey and data recovery on 100-plus acres at the top of the sea cliff provided an opportunity to examine a relatively large and archaeologically intact area of what has become known as the Kona Field System. The investigations suggest the field system evolved in the 16th and 17th centuries as an elaboration of early localized, frontier gardening efforts in a difficult environment of shallow soils and exposed bedrock. The work was undertaken as compliance-driven projects but with Steve Athens' encouragement and philosophy of research first, offers an alternative perspective on a long-standing topic of Hawaiian archaeology.

Tull, Stephen

[292] *Discussant*

Tumelaire, Jacob (IAC, LLC), Samuel H. Fisher (SRI, Inc.) and Francis Smiley (Northern Arizona University)

[187] *Clovis in the Petrified Forest*

This paper presents the results of research at the Rainbow Forest locality and the Blue Mesa site, two early Paleoamerican occupations in Petrified Forest National Park. Rainbow Forest and Blue Mesa are likely Clovis occupations and present the problem of identifying Clovis-era sites in a region in which site surface assemblages have been collected by human occupants for literally 13,000 years. Clovis points are extremely rare on such sites and investigators must rely on the suite of non-projectile-point Clovis diagnostics: blades, bifaces, overshot flaking, and core morphology. The Rainbow Forest locality encompasses over 800,000 m² of surface artifact deposits that include 22 discrete Clovis activity loci. The Blue Mesa site, roughly 20 km to the north, was discovered using a predictive model based on environmental conditions at Rainbow Forest and consists of two spatially distinct Clovis activity areas around the periphery of a playa. The collected surface assemblages were examined using a suite of morphological, statistical, and comparative analyses to identify probable Clovis loci. This research demonstrates the value of GIS-based predictive modeling and the utility of analytical methods focused on other-than-projectile-point assemblage characteristics to distinguish Clovis cultural deposits in the absence of fluted projectile points.

Tune, Jesse (Department of Anthropology, Fort Lewis College)

[313] Characterizing Paleoindian Landscapes of Southeastern Utah

The earliest occupations of the greater Bears Ears area are represented by fluted, unfluted lanceolate, and stemmed projectile point technologies indicative of the Paleoindian period. Historically, this period has not been the focus of discussions pertaining to regional archaeological records. As such, we currently have a limited understanding of how people used the greater Bears Ears landscape at the end of the Pleistocene. The regional Paleoindian record is reviewed here to assess the nature of initial human occupation of the area. Site distribution data, toolstone selection, and lithic technological organization are used to characterize the archaeological signature of these early peoples. Results indicate that as early as Clovis times (ca. 13,000 BP) hunter-gatherer groups were familiar with the distribution of lithic sources and habitually make use of local materials. Moreover, the presence of Late Paleoindian Plains and Great Basin-related biface technologies suggests that by ca. 10,000 BP, southeastern Utah was part of established inter-regional land-use strategies.

Tung, Tiffiny A. [183] see Krause, Maya B.

Tung, Tiffiny A. (Vanderbilt University, Department of Anthropology) and Natasha P. Vang (Vanderbilt University, Department of Anthropology)

[250] Eating and Empires: Stable Isotope Analysis to Reconstruct Diet and Foodways in the Wari Heartland

Dietary patterns within a community can reveal insights into how communities were organized and how social class or gender roles could shape who had access to which foods. In this study, we use stable isotope analysis of archaeological humans and fauna from three Wari sites in the imperial heartland (Conchopata, Qasa Pampa, and Huari) to explore those issues. We analyze $\delta^{13}\text{C}$ from 93 human dental carbonate samples to examine childhood diet and whether it differed between boys and girls, and we explore the spatial patterning of childhood diets within and between sites. Additionally, we present preliminary $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values from human bone collagen ($n=18$), which are compared to previously published results, to document adult diets and whether they differed between the sexes and between sites. Animal dental carbonates ($n=15$) and animal bone collagen ($n=21$) are also examined to aid in reconstructing the Wari menu and Wari diets. Results show that $\delta^{13}\text{C}$ from human dental carbonates range from -12.2 to .3‰, a wide range that may reflect the differential access to carbon enriched foods, such as maize, within the heartland. Bone collagen $\delta^{13}\text{C}$ ranges from -19.1 to -8.7‰ and $\delta^{15}\text{N}$ ranges from 6.6 to 10.8‰.

Turcanu-Carutiu, Daniela, Rodica-Mariana Ion (ICECHIM, Group of Evaluation and Conservation), Alessandro Ravotto (Institut Català d'Argueologia Clàssica [ICAC]), Sorin Tincu (Corvin's Castle, Museum of Archeology) and Virginica Schroder ("Ovidius" University of Constanta, Romania)

[88] Ancient and Medieval Monuments from Romania and Spain as a Testimony of Transcontinental Links—Cultural and Scientific Aspects

The synergic approach to preserving and restoring chalk stone, artefacts, mosaics, and fresco surfaces, which belong to the cultural heritage, with archeomaterials brings novelty through transdisciplinarity. Applied research is needed to save some of the most important pieces of art and archeology belonging to the national cultural heritage and requiring high-level professional interventions, aligned with international standards. Heritage objects of great value are: painted frescos from the Hypogeum tomb in Constanta, the Roman mosaic of Constanta, metopes carved in stone in the form of bass reeds from the Museum of Adamclisi, the limestone components from the cave churches of Basarabi, painted frescos located in Loggia Mathia in the Corvin Castle, archeological pieces from Hunedoara and romans murals from Spain. These ancient and medieval monuments from Romania expose connections to Asia, Europe and the American continents. Stone and fresco surfaces are continuously exposed to physical, chemical and biological degradation. Some petrographic and bio-physico-chemical analyses of wall samples are presented in this paper, putting into evidence the status of degradation and the possible solution for its conservation. Innovative restoration solutions will be sought by material compatibility with the original.

Turkon, Paula (Ithaca College), Sturt Manning (Cornell University Tree-Ring Laboratory), Carol Griggs (Cornell University Tree-Ring Laboratory), Andrea Torvinen (Arizona State University) and Ben Nelson (Arizona State University)

[81] The Contribution of Tree-Ring Studies to Archaeological Research in Northwestern Mesoamerica

Despite more than fifty years of excellent archaeological research in Northwestern Mesoamerica, progress has been impeded by a lack of precise chronological controls to understand site developments and pinpoint the direction of political influence and cultural change. To address this longstanding impediment, this paper reports on a rich, yet previously untapped, source of chronological data, to demonstrate how dendrochronological tree-ring analysis can inform cultural interpretation at different scales. On a site-level scale, we present an example from the site of La Quemada, Zacatecas, to demonstrate how dendrochronological data can inform and refine building and site construction sequences, as well as the development of ceramic chronologies. On a regional scale, we demonstrate how, combined with radiocarbon analysis, tree-ring data can elucidate broad-scale chronological relationships between the Malpaso Valley, Chalchihuites, and El Córupo regions. Although all were occupied during the Epiclassic period (A.D. 500-900), difficulties of chronological control make directionality of influence difficult to discern.

Turley, Cameron (The Graduate Center, CUNY) and Aká Bendtsen (Ilisimatusarfik [University of Greenland])

[31] Community-Based and Collaborative Archaeology in South Greenland: Past, Present, Future

Archaeologists are increasingly engaging in community-based and collaborative approaches to develop frameworks for co-production of knowledge and its dissemination. Encouraging collaborative frameworks and community engagement has been a key element of the NSF Arctic Social Sciences Program under Anna Kerttula's leadership. These efforts offer correctives to disenfranchising research praxes, make archaeologists accountable to their subjects, and reposition those subjects as active producers of their narratives. Destabilizing the privileged position of Western academics results in a more ethical, nuanced, and, arguably, more relevant archaeology. In 2017, the Greenland National Museum and Archives issued an open letter to foreign researchers exhorting them to consider designing community-based, collaborative projects. In 2018, the Arctic Horizons Final Report specifically recommended expanded community engagement and financial support for promoting Indigenous scholarship. North Atlantic Biocultural Organisation archaeologists and their research partners have taken these recommendations seriously for over a decade. In this paper, authors Turley, City University of New York, and Bendtsen, Ilisimatusarfik (University of Greenland), first discuss the general impact of these projects. Then, they present the experience and preliminary results from the first phase of their community-based, collaborative PhD and MA projects at Alluitsoq, a former Moravian mission site in South Greenland.

[138] Discussant

Turnbow, Christopher (New Mexico Gas Company)

[391] Casa Crecida: A Buried Eighteenth Century Spanish Colonial Site in Bernalillo, New Mexico

The Casa Crecida site (LA 114201) represents the remains of a mid to late eighteenth century Spanish Colonial habitation in what is now Bernalillo, New Mexico. Situated on the terrace of the Rio Grande, the site appears to have been abandoned during a major flood around the A.D. 1820s. This poster presents the results of geophysical survey and data recovery investigations carried out in anticipation of natural gas pipeline construction. This research revealed a remarkably well preserved cultural midden buried below 40 cm of alluvial overburden. Investigations suggest the presence of a substantial rancho or small community center that participated in intensive sheep herding and farming activities.

Turner, Andrew D. (University of Cambridge)

[243] The Flower World in Central Mexico After the Collapse of Teotihuacan, AD 600-900

During the tumultuous Epiclassic period (AD 600-900), several smaller polities in Central Mexico and the Gulf Coast rose to prominence in the wake of the collapsed metropolis of Teotihuacan. Although this period is often characterized by rampant militarism, wide-ranging economic activities, and eclectic monumental art programs that incorporate foreign styles, few studies have considered the role that religious ideology played in these phenomena. Flower World imagery is prevalent in the monumental and portable artwork of Cacaxtla, Xochicalco, Teotenango, and other Epiclassic polities. While beliefs pertaining to a solar paradise inhabited by the souls of deceased warriors were inherited from Teotihuacan, Epiclassic elites adapted and modified aspects of the Flower World complex to suit new political and economic strategies. The Epiclassic Flower World complex valorized warfare and linked elites through shared ritual practice, identity, and exchange of exotic prestige goods.

[243] *Chair*

Turner, Bethany (Georgia State University)

[185] *Isotopes and the Body Politic: Estimating Residential Origins at the Imperial Inka site of Patallacta, Peru*

In just under a century, the Inka subjugated twelve million people across the Central Andes. As part of their governing strategies, Inca administrators relocated individuals and even entire communities throughout the empire for myriad purposes; this practice often produced constructed communities defined by individuals' socioeconomic roles in the state. Reconstructing the demographic composition of populations at Inka sites is therefore critical to better understanding how different subjects were affected by Inka imperialism: estimating who was moved, from where, to where, and why can provide insights into how individual bodies were transformed by imperial mandates.

This study presents oxygen ($\delta^{18}\text{O}$), strontium (87Sr/86Sr), and lead (208Pb/204Pb) isotope values in tooth enamel and bone from human remains (N=81) interred at the imperial site of Patallacta, in the Sacred Valley of the southern Peruvian highlands. Results suggest that most of the Patallacta sample were local to the southern Peruvian highlands; however, some individuals appear to have been from the coast, and one individual was likely from the highland altiplano. These results differ significantly from the nearby site of Machu Picchu, underscoring the complex nature of Inka subject communities and the important contribution of isotope bioarchaeology to elucidating lived experiences within ancient empires.

Turner, Bethany [206] see Schaefer, Benjamin

Turner, Grace (The Antiquities, Monuments & Museum Corporation)

[37] *Discussant*

Turner, Michelle (Binghamton University)

[245] *The Archaeology of Color in the Southwest*

Color plays a central role in the work of many archaeologists. We use it to establish cultural affiliation and seriation, to analyze artifacts, and to interpret sites. We type pottery, source glass, and identify lithic materials based largely on their colors. Yet the use and meaning of color have not been widely and systematically examined in archaeological thought and theory. Drawing on archaeological examples, as well as ethnographic literature and theoretical contributions from art history and anthropology, I will introduce this symposium with a general consideration of the archaeology of color. Ongoing research has advanced our understanding of the technologies, resources and chemical processes involved in color production, but color is much more than just a set of technological choices. Nor is it merely an aesthetic experience; color is also used to signal social identity, carry political messages, convey knowledge, confer prestige, connect to places and landscapes, and establish systems of ritual symbolism. As an introduction to this symposium on color in Southwest archaeology, this paper offers an overview of theoretical, ethnographic, scientific and methodological approaches to the study of color and its role in the lives of people in the past.

[245] *Chair*

Turner, Michelle [245] see Stephens Reed, Lori

Turner, Thomas [174] see Besser, Alexi

Turrietta, John (Martin Luther King Junior Elementary)

[184] *Archaeology and Literacy: Students Journey across the American Southwest*

Every year my fifth grade students trace a wagon train from Iowa to California across the American Southwest by reading *Sallie Fox: The Story of a Pioneer Girl*. Drawn from real events and contemporary diaries, Sallie Fox encounters a new

landscape through the eyes of a young girl moving to a new life in the West. She records the landmarks, the rivers, and wildlife along her journey. As Sallie travels, my students learn the history of each place she passes. On the Colorado River, American Indian people attack the wagon train; the class discusses the event from multiple points of view. A field trip to El Morro National Monument completes the study and students experience an important historical event. I begin the year with a survey of their perceptions of primary sources and archaeological sites and conclude with the same questions. The goal is to bring an abstract idea of history into the realm of reality and the concrete.

Tushingham, Shannon (Washington State University)

[33] Archaeology and Behavioral Ecology of Maritime Hunter-Gatherers of the Northeast Pacific Rim

Human-behavioral ecology (HBE) provides a powerful framework for understanding human adaptations under differing environmental and socio-economic circumstances. In this paper I summarize influential HBE models and approaches as they have been applied to understanding the behavior and development of Northern California and Pacific Northwest Coast hunting, gathering, and fishing communities, as well as comment on the challenges of HBE approaches in the region, the dynamic nature of coastal environments, and current and future case studies with a focus on models that enhance our understanding of the evolution of mass harvesting techniques, human-fishery dynamics, sedentism, and storage.

Tushingham, Shannon [211] see Damitio, William

Tuwaletstiwa, Phillip

[342] Discussant

Twiss, Katheryn (Stony Brook University), James Taylor (York University), Justine Issavi (Stanford University), Scott Haddow (Koc University) and Camilla Mazzucato (Stanford University)

[388] Assessing Inequality at Neolithic Çatalhöyük, Anatolia

We use a wide variety of data sets in order to explore inequality at Neolithic Çatalhöyük in central Anatolia. Our goal is to shed light not just on variations in wealth but also on other forms of potential social differentiation in this immense early farming settlement. We assess architectural, mortuary, artifactual, and ecofactual data with an eye to both synchronic variation and to potential changes through time in the levels or forms of social or economic inequality. In doing so, we contribute to currently thriving discussions about the origins and pervasiveness of inequality worldwide and about the extent of social and economic differentiation in early agropastoral cultures (e.g., Current Anthropology 51[1], Kohler et al. 2017, Kohler and Smith eds. 2018).

Two Bears, Davina (Dartmouth College Charles Eastman Fellow)

[150] Researching My Heritage: The Old Leupp Boarding School Historic Site and Navajo Survivance

My research documents the history of the Old Leupp Boarding School (OLBS), a Navajo federal Indian boarding school in operation from 1909-1942, as it explores Diné (Navajo) survivance within the context of this school. Aside from documenting the history of this school, which has never been done before, I consider the questions, and begin to partially answer, how my Diné ancestors flexed their agency within a particular federal Indian boarding school, how they utilized their Diné foundations to meet the challenges imposed upon them by a settler society, and what were and are the positive stories of Native survivance achieved within the OLBS. In keeping with Navajo culture, I use non-destructive research methods including archival records, historic photographs, and oral history interviews with Navajo elders, who attended the OLBS in the past, to investigate and document the lives of Navajo children and history of the OLBS. My research is from a Diné perspective and contributes to: 1) postcolonial anthropology and resistance under colonial conditions; 2) Navajo Studies and survivance within a particular federal Indian boarding school, the Leupp Boarding School; and 3) the documentation of a significant historic archaeological heritage site to the Diné people.

[59] Discussant

Tykot, Robert H. [111] see Maxwell, Ashley

Tykot, Robert H. (U. of South Florida)

- [316] *The Importance of Identifying Specific Obsidian Subsources on Sardinia to Interpreting Long-Distance Trade in the Neolithic Central Mediterranean*

For the Central Mediterranean island of Sardinia, studies have shown that the usage of obsidian from specific subsources changed over time. Human selection may have been based on their accessibility, physical properties of the raw material, and the size and quantity available. In addition, socioeconomic factors, lithic technology, and usage needs affected their production practices, which varied geographically and changed over time from the Early Neolithic to the Bronze Age (ca. 5700-1500 BC). Production and widespread distribution was rapidly established in the Early Neolithic, and beyond Sardinia dwindled away after 3000 BC. Analyses of thousands of artifacts from many sites in Corsica, the Tuscan Archipelago, and mainland sites in Italy and southern France clearly show an extensive distribution overall of Sardinian obsidian, reaching more than 750 km away in Spain, but with significant differences not only in their percentage of the overall lithic assemblage but in the subsources that were utilized. The extensive data now available allows assessments of variables including changes over time in territorial control of source localities with the development of complex societies; in the distance and frequency of maritime transport; in the production technology used and involvement of specialists; and in contextual characterization and lithic usage.

- [132] *Discussant*

Tys, Dries (Brussels Free University VUB) and Barbora Wouters (Centre for Urban Network Evolutions, Aarhus University)

- [351] *Towns under the Microscope: Revising Historical Narratives on the Development of Medieval Towns and their Markets in Northwestern Europe*

The central markets of medieval towns in Northwestern Europe, and more specifically the Low Countries, are considered to be the theatres of late medieval urban identity. They are often associated with the origins of these towns, or at least their glory as merchant towns in the past. In reality, these emblematic places exhibit complex biographies in which selected memories were attributed to them in different historical contexts.

Geoarchaeological methods, such as micromorphology and geochemistry, have a strong potential to contribute new datasets to the study of complex sites. They offer a way to bypass the constant re-evaluation of the same material and written evidence. However, only in the last decade have they become more common in the study of towns in the Low Countries and Scandinavia, important regions for early medieval urbanisation.

Through the combined application of geoarchaeological data and historical writings, we will revise a number of existing narratives on town and market formation. We aim to reconstruct their biographies in order to discuss how their development did not follow set, teleological patterns. On the contrary, this paper shows how different strategies by different actors shaped this space.

Uc Gonzalez, Eunice [396] see Russell, Bradley

Uchida, Junko (Institute of History and Philology, Academia Sinica), Yoshiyuki Iizuka (Institute of Earth Sciences, Academia Sinica), Yosuke Higuchi (Ashiya-kama no Sato Workshop [Fukuoka]), Mamoru Hirokawa (Senoku Hakuko-kan Museum [Kyoto]) and Zhanwei Yue (Institute of Archeology, Chinese Academy of Social

- [299] *Experimental Study of Bronze Casting Molds for Reproduction of the Ancient Chinese Bronze*

To understand ancient casting technology in China, the non-destructive SEM-EDS technique was applied to casting molds from Anyang. Their grain sizes were various but some of the molds showed a layered structure with fine decorations. The finest layers composed of very fine mineral particles which is comparable to the loess from Anyang area. It indicates that the grain sizes were intentionally controlled. Simultaneously, a series of manufacturing experiments with artificial fine mineral particles (named as Granite Powders) were conducted for reproduction of bronze casting molds. The particles were sieved and elutriated from silicate sands, and the size of the particles was sorted similarly to those found in the Yinxu molds. Those powders enable shaping and carving of the mold and transfer of decoration from model. From surface observations of the unearthed molds from Xiaotun site of Yinxu, a possible bonding technique between the molds is recognized. This should be a fundamental issue for restoring the Yinxu Bronzes technology which applied a composite mold technology to produce characteristic three-dimensional shapes. Further experiments attempted for bonding materials with

the granite powders.

Ugalde, Paula (School of Anthropology, University of Arizona), Vance Holliday (School of Anthropology, University of Arizona), Calogero Santoro (Universidad de Tarapaca) and Jay Quade (Department of Geosciences, University of Arizona)

[312] Formation Processes of Late Pleistocene Archaeological Sites in the Atacama Desert

We investigated site formation and modification of surficial and shallow Paleoindian sites (ca. 13-11 cal. ka) located in the hyperarid core of the Atacama Desert. Sites occur primarily on inactive Pleistocene to Pliocene alluvial terraces, in and beneath desert pavements, a sparsely studied context for archaeological sites. Our research reveals that desert pavements in the region are poorly developed: clast densities in pavements average ~30% and clast size averages 5-7 mm, independent of surface age. This is far less than densities >70% in mature pavements in other deserts. Differences between terraces of different ages are seen, however, in clast color and the progressive loss of bar and swale topography. Subsurface disturbance of vesicular and gypsic horizons by late Pleistocene human activity is extensive and slow to "heal". The highest density of archaeological materials, particularly lithic artifacts, is on the surface, indicating that larger and heavier artifacts are being pushed upwards, possibly due to earthquakes, whereas lighter materials such as microflakes, plus features such as posts and fireplaces remained in situ. We believe that the uniquely arid and salt-rich conditions of the Atacama slow and inhibit the process of both pavement formation and healing.

Ullah, Isaac (San Diego State University)

[148] Moderator

[148] Discussant

Ullinger, Jaime [126] see Cruz, Heleinna

Umbelino, Claudia [88] see Goncalves, Celia

Umberger, Emily (University of Arizona)

[28] Quetzalcoatl in Late Aztec Sculptures

Quetzalcoatl (Feathered Serpent) is often characterized as a wind god, but in Aztec sculptures, the traits of the wind god Ehecatl, principally the buccal mouth mask, are not found mixed with feathered serpent imagery. The mix is found in pictorial manuscripts, and alluded to in written sources. In late Aztec times, feathered serpent images are associated with the rulers Ahuitzotl and Motecuhzoma and refer to the legendary Toltec ruler, Topiltzin Quetzalcoatl (Our Lord Quetzalcoatl), the prototype of Aztec Rulership. If there is any natural association, it seems to be with water, notably the great flood of 1499 in the reign of Ahuitzotl.

Umberger, Emily [304] see Aguilera, Elizabeth

Ur, Jason (Harvard University)

[200] Forced Migration in the Assyrian Empire, on the Periphery and in the Heartland

Premodern states could and did reorganize the spatial demography of their domains. In the ancient Near East, the kings of the Assyrian Empire (ca. 900-600 BC) made grandiose claims in propagandistic inscriptions to have relocated entire kingdoms, and many thousands of persons, with their realm. The research of Bradley Parker demonstrated the spatial effects of these policies along the northern fringe of the empire, revealing them to have been more than just boasts. Because of political instability within the Republic of Iraq, these landscape questions have been impossible to address in the former imperial core. With the stability and openness of the autonomous Kurdistan Region in northern Iraq, Parker's demographic models are now being tested in the Assyrian Heartland by the Erbil Plain Archaeological Survey. Results since

2012 show a complex combination of top-down imperial landscape transformation and bottom-up local changes.

Urban, Patricia (Kenyon College)

[256] *Discussant*

Urban, Tommy [187] see Bustos, David

Ure, Scott (Brigham Young University)

[420] *Lasers and Pixels: Using Terrestrial LiDAR and Photogrammetry to Record Rock Art at the Polychrome Site in Montezuma Canyon*

LiDAR scanning and photogrammetry are quickly becoming extremely useful tools for archaeologists. This is especially the case for documenting complex rock art panels that can be difficult to fully represent using traditional techniques constrained to 2D formats. In contrast, terrestrial LiDAR and photogrammetry provide a coverage, quality, and precision that traditional methods are mostly unable to achieve. This paper discusses the methods and results from both terrestrial LiDAR scanning and photogrammetry of a series of rock art panels situated on a cliff face at the Polychrome Site in Montezuma Canyon, Utah. Conclusions from this project show that these technologies are extremely useful for capturing rock art details. Data captured from LiDAR and photogrammetry can be used to generate digital models that can be processed for a variety of uses including detailed visualization, modeling, replication, and publication both in print and in online formats. As methods and technologies improve, they will prove to be some of the better technologies for documenting rock art.

Ure, Scott [420] see Yoder, David

Uribe, Mauricio [102] see Santana Sagredo, Francisca

Uribe, Mauricio

[355] *Circulación de Cerámica en Tiempos del Inca: Aportes del Norte de Chile*

A mediados de 1970 surgió la conocida discusión si el dominio incaico en el norte de Chile había sido directo o indirecto, a partir de la aplicación que se hizo del modelo sobre la “verticalidad” andina de John Murra. De acuerdo con esta propuesta, la situación se dirimía en términos de que cuán abundante era la materialidad del Inca en los territorios conquistados, especialmente arquitectónica y cerámica, y cuánto ésta se atenía al estilo original del Cusco. De acuerdo con las incipientes investigaciones de aquella época, predominó y mantiene cierta vigencia la hipótesis de la ausencia de una conquista propiamente tal y que más bien se trató de un dominio indirecto sobre la base del sistema ecológico previamente implantado por grupos altiplánicos en tierras bajas. Aprovechamos este simposio para discutir estos planteamientos a través una síntesis y actualización de nuestros estudios cerámicos en el norte de Chile, aportando con nuevos datos composicionales, tecnológicos, estilísticos, funcionales y cronológicos sobre la expansión del Tawantinsuyo en las tierras altas y bajas del centro sur andino.

Urquhart, Kyle and Wesley Stoner (University of Arkansas, Fayetteville)

[409] *Automated Detection of Gridded Canal Networks in Veracruz, Mexico*

The ancient peoples of Classic Period Veracruz employed a suite of strategies for agricultural intensification aimed at increasing agricultural yields and managing seasonal rainfall. One common strategy involved the construction of gridded canal networks with alternating raised field platforms which drained water in the wet season and retained it in the dry season using check-dams. Many of these gridded canal networks are clearly visible in high resolution satellite imagery, especially when using products of the near infrared bands. This paper outlines a method to automate detection and mapping of these features using Object Based Image Analysis (OBIA) through the software eCognition. A simple GIS model using slope, distance to streams or water sources, and vegetation indices is first constructed to narrow the search area.

This is followed by a simple rule-based segmentation and classification process that aims to identify relatively regular and homogeneous patterns of alternating brighter and darker near infrared reflectance. The results show that the method serves as a statistically significant predictor of the location of gridded canals in Veracruz, and qualitatively the method serves as an effective mapping technique that may be of utility in other regions with similar features.

Urquizú, Mónica [100] see Rodas, Ricardo

Uzzle, Stephen (University of Arizona)

[346] *Reevaluating Mobility and Sedentism in Classic Mimbres and Salado Villages in Southwest New Mexico*

Fourteenth century Salado villages in southwest New Mexico show interesting contrasts with earlier villages from the Classic Mimbres period (AD 1000-1130). One of the most intriguing differences is the evidence that Salado period villagers may have employed a land-use strategy relying on more frequent mobility between villages and at larger spatial scales in comparison to Classic Mimbres period residents of the same areas. Researchers in the 1990s suggested "short-term sedentism" characterized Salado period sites, but had limited comparative data available. This study reexamines evidence for mobility and sedentism in the Classic Mimbres and Salado periods using architectural data from numerous excavations in the Mimbres region, including recent work on Salado villages. A Salado period land use strategy employing greater mobility may also have allowed more resilient use of farmland and other resources.

Vacca, Kirsten (University of California, Berkeley)

[179] *Queer Feminist Science in Hawaiian Archaeology*

Queer theory is an important tool for critically analyzing ideas about the past that are normalized and reproduced to the detriment of descendant populations. This approach is particularly relevant when investigating the social structures that governed daily life in the past. Historically, academic work in Hawai'i tends toward interpretations of the household that are homogenous and static, reflecting the colonial past more than Hawaiian history. Issues with these interpretations include the diminishment of the roles women played in Hawaiian communities. Queer theory shifts the currently accepted paradigm, providing a new approach to analyzing Hawaiian household data. I engage with queer theory in this paper to interrogate the structures of power that perpetuate colonial patriarchal interpretations. Queer feminist science approaches are relevant to this endeavor both in questioning the actions we assume are deviant in the past and reorienting ourselves to considering instead what Kanaka Maoli (Native Hawaiians) defined as deviance. This paper addresses these themes through the investigation of material remains from southeast Maui. The examination of architectural features and artifacts excavated from seven kauhale house complexes compared against historical and archaeological literature brings to the forefront practices that refuse to align with perpetuated assumptions about the Hawaiian past.

Vadala, Jeffrey (Human Relations Area Files)

[100] *Archaeological Actor-Network Theory: Case Study at Cerro Maya (Cerros, Belize)*

This study uses a modified actor-network approach to examine and characterize the human and nonhuman relationships that produced and shaped ancient Maya caches and the corresponding ritual events wherein they were buried. This contrasts with archaeological approaches that have generally focused on defining essential properties of artifacts to define or clarify typologies or to determine their symbolic meaning. These approaches have determined that caches marked the beginning of structure use (or final construction phases), were related to Maya cosmological beliefs of sacred space, and likely served ideological functions during ritual. Although extremely important insights, these traditional approaches have obscured the fact that, among the Maya, caches were experienced as a durational process of social life and were always contextualized and affected by social relationships, human-object relationship and interaction with the landscape. In this study Bruno Latour's (2005) actor-network theory (or ANT) is used to infer, model, and characterize the relationships between materials, objects, places, groups of people, intentions and actions. Latour's extremely flexible actor-network approach allows the researchers to map relationships as durational networks that contain social relationships, and human-object relationships all within the context of the landscape.

Vaiglova, Petra

[102] *The Nitrogen Challenge at Çatalhöyük*

Stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotopic values of archaeobotanical remains from the Neolithic site of Çatalhöyük have presented us with a series of challenges for interpreting ancient crop management systems in a complex environment. An exceptionally wide range of $\delta^{15}\text{N}$ values (0 to 18‰) obtained from charred domestic and wild plant species preserved across the Neolithic sequence raise the question of whether the plants were grown in soils with strikingly different biogeochemical properties or whether the variable values were the result of post-depositional processes. Fourier Transform Infrared Spectrometry (FTIR) was carried out in order to investigate whether nitrate contamination may have been responsible for the elevated $\delta^{15}\text{N}$ values, but the results showed that the samples did not contain the characteristic nitrate peak on the infrared spectrum. The discussion will present a tentative interpretation of ancient crop cultivation strategies developed in a landscape characterized (according to the latest geoarchaeological model) as an anabranching channel system, which offered the farmers opportunities for cultivating a range of wetter and drier soils. In addition, the implications of properly understanding the plant isotope data will be discussed in relation to better interpreting the nature of human and animal diets at the site.

[102] Chair

Vail, Gabrielle [76] see Splitstoser, Jeffrey

Vail, Gabrielle (UNC-Chapel Hill)

[304] Animal Manifestations of the Creator Deities in the Maya Codices and the Popol Vuh

Scholars have long recognized that certain Mesoamerican deities appear in animal as well as anthropomorphic form. The Maya creator Itzamna, for example, has aspects corresponding to a bird, a turtle, and an alligator, while the aged "God L" may be linked to the opossum in its anthropomorphic form (Pawah-Ooch), and to the owl. This paper examines figures named with the "pawah" (or "itzam") prefix in the Postclassic Maya codices, best known for its relationship to an aged deity with a human-like appearance. This figure plays an important role in yearbearer ceremonies in the Madrid Codex, whereas related beings (named with the same prefix) also include turtles, crocodilians, and opossums. Similar patterning appears in the Popol Vuh, an early colonial manuscript from the K'iche' region of highland Guatemala, where the aged male creator (Xpiyacoc) has associations with turtles (the "coc" in his name likely means 'turtle') and opossums (under the name Hunahpu Uch), and one of his sons (Xbalanque) has a special relationship with jaguars (balan) and deer (que). We explore a series of almanacs from the Madrid Codex, as well as contemporary Atiteco rituals, to provide a deeper understanding of "animal" actors in Maya hunting and yearbearer ceremonies.

[76] Chair

Valade, Stephan (El Campanario Archaeological Project Attendee), J. Eduardo Eche Vega (Universidad Nacional de Trujillo) and Jose L. Peña (University of South Florida)

[288] Pottery Production and Social Complexity: Ceramic Paste Analysis at the Site of El Campanario, Huarmey Valley, Peru

The analysis of ceramic pastes can be used to study exchange networks, social identities, and technologies. The variations in the composition of ceramic pastes are related to the selection of clay, and non-plastic materials from ancient ceramists. The choice of these procurement areas is often influenced by technological traditions, social complexities, vessels' functions, and ceramists' preferences. The excavation conducted at an adobe platform at the site of El Campanario allowed the recovery of various types of materials including pottery sherds. This platform was probably used for public events, in which ceramic vessels were an important component of social interactions. The presence of both polychrome and Casma style ceramics indicates that various styles of pottery were used during public activities on the adobe platform. The analysis of ceramics paste was conducted using a digital microscope to observe the paste of both types of pottery to identify variations in paste composition. This analysis will provide insights into the context in which ceramic vessels were produced at the site of El Campanario.

Valcarce, Ramon, Alia Vazquez-Martinez (University of Santiago de Compostela) and Carlos Rodriguez-Rellan (University of Santiago de Compostela)

[252] Drawing the Line: Recent Approaches to the Recording of Galician Petroglyphs (NW Spain)

Research on the open-air rock art of Galicia has been going on for more than a century. During this time, one aspect that has experienced much change is the recording of the carved panels, starting with techniques that involved direct contact

with the rock's surface and resulted in a more or less adequate rendering of the depictions, and giving way to a combination of plastic sheets and artificial lights. In the last decade, the introduction of photogrammetry and image processing tools have revolutionized the recording of rock art, avoiding the risks of direct contact with the petroglyphs themselves and allowing more detailed cataloguing of the images. In this paper, we compare the results of the different recording techniques applied over a period of nearly 40 years to several rock art sites to show how the diverse methods achieved increasingly more accurate records that are changing our perspective regarding Galician rock art.

Valcárcel Rojas, Roberto (Faculty of Archaeology, Leiden University) and Lourdes Pérez (CISAT, Holguín)

[159] *Indians and Africans: Food, Ethnicity and Status in Early Colonial Cuba*

During the first half of the sixteenth century the Spanish colonial project in the Greater Antilles was based on the intensive exploitation of Indians and Africans, who saw the transformation of all aspects of their existence, including the food issue. Using historical and archaeological data, this article discusses, referring specifically to the island of Cuba, how the colonizers organized the feeding of the laborer population. It also analyzes to what extent the legal status of the workers and their ethnic origin influenced their living conditions and their food practices.

Valdes, Alejandro [375] see Rangel, David

Valdes Herrera, Alejandro (INAH Michoacán) and José Luis Punzo Díaz (INAH Michoacán)

[39] *Characterization Using Raman Spectroscopy of Amazonite and Turquoise of Tomb II, Tingambato, Michoacán, México*

The archaeological site of Tingambato is located in the state of Michoacán, in a transitional zone between the highlands and the lowlands of the Balsas River. This geographical location allowed a long distance interchange of prestige goods used in different ritual context. Evidence of that, are the archaeological artifacts found in the tombs, especially the Tomb II. Inside it, an individual female burial was found with a funerary attire conformed by marine shells from the Pacific Ocean and Caribbean Sea, and blue-green stones. For this paper we will present the characterization of the lapidary minerals, carried out using noninvasive archaeometric analyses, identifying a majority of amazonite microclines and low presence of turquoise, green quartz, caolinite and malaquite. The use of Raman spectrometry helped us in the identification of raw materials, but the use of experimental analysis and Scanning Electron Microscopy (SEM) allows us not only know the raw materials, but also the technological gestures used for the elaboration of the objects found in Tingambato site.

Valdez, Francisco (IRD / France - Ecuador)

[181] *Early Ceremonial Hearth Use in the Upper Amazon: Santa Anna–La Florida, Palanda, Ecuador*

One of the outstanding traits of the Mayo Chinchipe – Marañón culture is the spiral architecture that appears on the mound terraces of at least two major sites of the upper Amazon. In one of them, the vortex of the spiral was a ceremonial hearth that contained a votive cache in its base. The offerings found within were probably status symbols of a former officiant. The care taken in the construction of the hearth implies its importance. The hearth seems to have been an altar, or a cleansing feature, located in the center of a structure that could have been called a temple. Although no organic remains were clearly identified among the ashes, we can assume that the hearth served as a privileged medium for communication between the forces of the cosmological / ideological universe. Other hearths have been found in others contexts on the site and a comparison of the features and their characteristics suggests the special function it performed in Santa Ana-La Florida some 4000 years ago.

[339] *Chair*

Valdez, Fred [30] see Hart, Thomas

Valdez, Fred (University of Texas At Austin)

[30] *Chair*

Valdez, Jr., Fred [63] see Locker, Angelina

Vallejo Caliz, Daniel [100] see Hutson, Scott

Vallo, Darwin [254] see Garcia, Damian

Valppu, Seppo [104] see Mather, David

Van Alst, Emily (Indiana University)

[252] *Heñáka Wačhípi: Re-examining the Elk Dance to Understand Lakota Women's Sacred Roles in Ceremony through Rock Art*

Historically, researchers have interpreted rock art based on ethno-historical accounts of ceremonies as male-created and male-oriented experiences and spaces. This has led to researchers ignoring traditional women's roles in the creation of rock art as well as women's interaction with rock art spaces. I examine how Lakota women of the North American High Plains created and experienced ceremonial imagery at rock art sites specifically focusing on elk iconography. These sites containing elk ceremonial imagery are widespread throughout the plains but the current focus of the project is on sites in Montana, South Dakota and Wyoming. The project synthesizes ethnography of Lakota individuals, both men and women, with more traditional archaeological methods to analyze the elk images and interpret them through an indigenous perspective.

Van Alstyne, Benjamin (UNLV)

[151] *Examining the Architectural Technology at Lava Ridge Ruin, Arizona*

One component of the archaeological record that can shed light on human behavior is architectural remains. Architectural studies in archaeology have mostly focused on evaluating the mechanical properties of construction materials, the amount of labor, time, and materials needed for construction, and room function to make inferences about the social context within which buildings were planned, constructed, and used. The present study builds on previous research, to investigate pueblo construction and use by the Virgin Puebloan people who lived on the westernmost edge of the Colorado Plateau. Specifically, this study focuses on Lava Ridge Ruin, a late Pueblo II/early Pueblo III period habitation site located on the southern Shivwits Plateau, Arizona. This study evaluates (a) the materials and methods needed for pueblo construction; (b) the labor requirements of its construction; (c) the season during which construction most likely occurred; (d) the function of the pueblo rooms; and (e) the implications of these data for understanding the inhabitants' degree of sedentism and the nature of their social organization. To investigate these issues, this study utilizes a multi-pronged approach and relies on data obtained from the archaeological record, ethnographic sources, experimental science-based research, and the use of Building Information Modeling software.

Van Alstyne, Benjamin [151] see Willis, William

van Dalen, Bastiaan [412] see Torreggiani, Irene

Van Der Linde, Sjoerd (Studio Louter)

[92] *Putting the Soul into Archaeology—Integrating Interpretation into Practice*

This paper calls for a creative, interpretive archaeology that does not take reports for agencies or other archaeologists as its end goal but instead speaks to a far wider range of audiences through the development and presentation narratives that will engage and inspire people. I argue that this can be achieved by implementing "Emotion Design"—an interpretive design methodology that makes a clear distinction between 'information', 'message', 'emotion,' and 'media' to develop a concept in the form of an engaging story, supported by all stakeholders, that has the power to move and engage visitors. By drawing

upon several award-winning case studies in the sphere of museology and site interpretation by Dutch design agency 'Studio Louter', I will argue how a meaningful connection to the past can only be achieved by evoking the emotions of the visitor in constant relation to a clearly developed core interpretive message. This paper builds on previous insights that were published as part of the special volume 'Interpreting & Presenting Archaeology' of SAA Advances in Archaeological Practice (volume 6.3).

van Dijk, Kaz [412] see Gill, Lucy

Van Dyke, Ruth (Binghamton University)

[83] *Migrants, Materials, and the South Texas Past*

I direct a historical archaeological project in the Alsatian community of Castroville, Texas. Members of the local heritage society, who sponsor the project, are descendants of economic migrants brought from Alsace to Texas in the 1840s during the aftermath of Texas' break from Mexico. Today, Castroville residents seek to revitalize and celebrate their Alsatian past. Our excavation of an Alsatian immigrant's house has given the archaeologists a detailed material window into the town's complicated 175-year history – a history that involves class differences, and Indigenous and Hispanic residents. Meanwhile, the heritage society has transformed the stone house into a stage on which to tell the story of valiant pioneer ancestors who prevailed despite the hardships of life on a savage frontier. Materials, with their abilities to evoke nostalgia, play a starring role in this drama. In this paper, I contemplate some issues raised by the project, including: How does self-identification with a European past fit into a contemporary Texas that seems hostile to today's immigrants? What roles might materials' particular valences play in creating different kinds of narratives about the past? Is there a way for us to deploy these particular archaeological materials in support of social justice?

[342] *Moderator*

[342] *Discussant*

Van Etten, Heidi (University of Wyoming), Chase Mahan (University of Wyoming) and Marieka Arksey (Office of the Wyoming State Archaeologist)

[89] *Keeping Track of it All: Building a Repository Database from the Ground Up*

The Office of the Wyoming State Archaeologist (OWSA) and the Wyoming State Historic Preservation Office are shifting towards digital-only submissions for professional archaeological projects through new and interconnected database-and-web-interface systems going live in 2018/19. This poster focuses on the detailed process of creating and instituting a new database from the ground-up. The WyoARCH project includes a curation application, developed by OWSA and the Wyoming Geographic Information Science Center, which will better manage the University of Wyoming Archaeological Repository (UWAR), transforming decades worth of archaeological information from an outdated database and invigorates it. Making this platform more manageable as well as approachable for a variety of entities requires great attention to detail, patience, and time. Discussed here are the hurdles, lessons learned, and ways we are moving forward with the project.

Van Etten, Heidi [329] see Rittenour, Tammy

Van Gerven, Dennis [253] see Sirak, Kendra

Van Gijn, Annelou (Leiden University), Annemieke Verbaas (Leiden University), Nicholas Groat and Loe Jacobs (Leiden University)

[95] *The Life History of Early Celtic Vessels: An Experimental Approach towards Exploring the Inferential Limits of Interpreting Pottery Function*

In the context of the BEFIM project ("Meanings and Functions of Mediterranean Imports in Early Central Europe") the life history of (drinking) vessels from the Early Celtic hillfort settlements of Heuneburg and Vix-Mont Lassoix was examined, studying the way of production and use. We set up an extensive experimental program of dozens of experiments to explore the way this pottery was made and used. The participation of an experienced potter allowed us to reproduce exact replicas

of the archaeological vessels and investigate in detail the traces of production and the effect of temper, baking temperature and so forth on the development of production traces and use wear. Especially variations in temper strongly affected the characteristics of the use wear traces from the preparation of different products. The effect of alcohol production, including fermentation, on the pottery surface was explored. We also tested the effect of different gestures of preparing and consuming food and drink, storage and handling. Last, we studied the effect of post-depositional processes on the traces of production and use. The traces we observed on the experimental vessels, using an integrated low and high power approach, formed the basis for our interpretation of the archaeological pottery.

Van Gijn, Annelou [416] see Li, Weiya

Van Ham-Meert, Alicia [363] see Degryse, Patrick

Van Hoose, Jonathan (US Army Corps of Engineers / University of New Mexico) and Lance Lundquist (US Army Corps of Engineers)

[241] *An Experimental Study on the Effects of Periodic Inundation on Surface Artifact Assemblages*

Thousands of archaeological sites are subject to periodic inundation and wave action due to the operation of more than 600 dams owned by the U.S. Army Corps of Engineers (Corps) nationwide. We used experimental archaeology to study the effects inundation was having on surface artifact assemblages. Specifically, in 2008 archaeologists with the Corps Albuquerque District undertook an experimental study on these effects in association with a temporary alteration of the timing and release of flows at Cochiti Lake on the Rio Grande in New Mexico. Corps archaeologists placed 432 aluminum disks of varying sizes, simulating ceramic sherds and large and small chipped-stone flakes, in known locations within the elevation range for expected lake level fluctuations. Over a five-year period, these artifacts were periodically relocated and their positions recorded, allowing a precise record of the movement of individual artifacts across the landscape as lake levels rose and fell. We correlated this movement data with daily lake level and weather records and found differences in artifact movement based on artifact size, duration, and depth of inundation, with particularly strong impacts occurring with inundation at shallow depths. This paper presents our methods, findings, and management recommendations.

Van Horn, Mark [388] see Skinner, Jane

van Keulen, Fred [172] see McKeown, Ashley

Van Pletzen-Vos, Liezl [402] see Reynard, Jerome

Van Tilburg, Jo Anne [312] see Sherwood, Sarah

Van Vlack, Hannah (Los Alamos National Laboratory)

[90] Chair

Van Voorhis, Laura (University of Florida), Ellen Lofaro (The University of Tennessee), Neill Wallis (Florida Museum of Natural History) and Donna Ruhl (Florida Museum of Natural History)

[362] *Bioarchaeology Legacy Collections: Varying Perspectives, Perceptions, and Challenges*

Legacy collections can prove quite valuable in research, but may bring with them additional ethical and legal concerns and challenges. Known for the intricate wooden effigy carvings on a mortuary platform above a charnel pond, the site of Fort Center, 8GL13, also contains more than 24 earthworks dating from 800 BCE to 1700 CE. This paper explores the human skeletal individuals collected from the Fort Center site in Glades County, Florida in the 1960s and 1970s as well as the need for on-going NAGPRA compliance. Passed in 1990, NAGPRA is federal legislation that provides a legal pathway for Native

Americans to repatriate the remains and funerary objects of their ancestors. The history of Fort Center post-excavation, a complicated journey involving multiple institutions and many paperwork trails, plays a significant role in bioarchaeological legacy collections assessment for compiling this history, documentation and associations with the entire collection. Both institutional and tribal requirements and needs are an integral part of these special legacy collections story. Continued sensitivity and a willingness to consider other perspectives are important parts of this process.

Van West, Carla (SRI Foundation)

[25] Tree-Rings Tales from Tijeras Pueblo

This paper describes how Linda Cordell, working with colleagues, including me, used building timbers to (1) date room construction and village occupation at Tijeras Pueblo, (2) understand villager's choices about wood use, (3) describe changing climate conditions associated with the village's occupation, and (4) propose the source areas for the village's immigrant population. Her ability to accomplish this depended on dendrochronology—the science of dating and studying the annual rings of trees. Linda understood that trees were potentially vast repositories of ancient stories; here I share what she was able to learn from the woody archives of Tijeras Pueblo.

[246] Discussant

Van Zandt, Tineke (Pima Community College), Helen O'Brien (Pima Community College) and Timothy Watkins (Bureau of Land Management)

[125] What Can We See from Here? Hilltop Sites Northwest of Prescott, Arizona and Their Local and Regional Connections

The Burro Creek/Pine Creek archaeological survey northwest of Prescott, Arizona involved partnerships between Pima Community College and the BLM and private landowners in the area from 2003 to the present. When the survey began, the region was poorly known and only two sites had been recorded within the survey area, both located on prominent hilltops with associated masonry structures. These and other hilltop sites in the region were understood to be part of a network of similar sites with line of sight connections among them, but the broader context in which those sites were built and used was unknown. Survey of over 12,000 acres has located 170 sites including another hilltop site on State Trust land, showing that these hilltop sites were not isolated but were surrounded by contemporaneous smaller sites. This poster explores the line of sight connections among the hilltop sites in the Burro Creek/Pine Creek survey area and others in the local network. It also examines the nature of the smaller residential sites where the builders and users of the hilltop sites lived.

Vance, Ashley (University of Illinois at Chicago)

[47] The Sacred Shells Speak: Sclerochronology and Oxygen Stable Isotopes in *S. crassisquama* (*princeps*)

This project broadly examines shell ring growth patterns in the Pacific bivalve *S. crassisquama* (*princeps*). *Spondylus* shells were incorporated into pre-Columbian Inca (and greater Andean) ceremonial and ritualistic practices consistently until Spanish colonization. Existing paleoecological and archaeomalacology approaches have relied on oxygen isotopic geochemistry to ascertain small-scale environmental conditions recorded in annual calcium carbonate growth ring patterns. These isotopic signatures have been compiled to form sclerochronologies for certain long-living mollusk species. This project seeks to situate this shell ring approach in the Andes, and to apply oxygen isotopic geochemistry and sclerochronology-building to the Andean *S. crassisquama* (which occupies coastal Ecuador and Peru).

Vance, Emma (University of Montana), Ethan Ryan (University of Montana) and Anna Prentiss (University of Montana)

[327] Connecting Lithic Technology to Socio-economic Organization at Site 48PA551

The well-known Middle Archaic site, 48PA551, in northwestern Wyoming, was originally described as a single McKean Complex occupation. New data from 2018 now suggests the possibility of two occupations. This provides the opportunity to consider the connection between the organization of lithic technology and mobility/subsistence organization between the two occupation periods. Current data imply a high degree residential stability and likely use of logistical mobility during the

early occupation followed by a shift to a much less stable residential pattern in the latter occupation. Lithic assemblages excavated in 2018 can provide detailed insight into technological decision-making associated with these alternative organizational scenarios. Thus, this poster explores new insights into Middle Archaic/McKean Complex socio-economic, drawing data from analyses of tool manufacture, use, and transport patterns for a variety of raw material sources.

[327] *Chair*

Vance, Emma [327] see Kaviani, Kelsi

Vance, Meghann (Northern Arizona University)

[187] *Questioning Clovis in Southeast Utah: Late in the Game or Transitional?*

This presentation provides a summary of what is currently known for the Lime Ridge Clovis site, as well as more recent data on Clovis sites, or components thereof, from Glen Canyon National Recreation Area, Utah. The data are fleeting, but suggest a trend comparable to the adjacent Nevada and Arizona regions for diminished size and boldness in blade manufacture, knapping style, and the resulting tools, which raises the question of at which point do we no longer call these Clovis. Included are discussions of raw stone material sources, potential diagnostics in the absence of finished points, knapping technology, including approaches to fluting points, and patterns of landscape use. The combined data potentially suggest a migration to upland locations within the Glen Canyon region at the end of the Clovis era, and a population sustained long enough in that location to have certain knapping characteristics show with regularity into succeeding periods, but direct dating is still needed to verify.

VanderVeen, James (IU South Bend)

[215] *The Danger in Dehumanizing the Dead*

The various undead or reanimated humans in world folklore (e.g., zombies, vampires) are examples of using supernatural explanations to account for misunderstood or inconceivable phenomena found in the natural world. Such creatures and what they represent are used as analogies even in the present day by scientists, the news media, and popular culture for the same purpose. But audiences may not read the comparisons as intended (illustrations for clarification) and rather see the explanations of monsters as actual equivalencies. This becomes problematic when a news report speaks of 'vampire burial' or a 'zombie skeleton' and reinforces the popular belief that maybe corpses can walk again. The sensational or exaggerated reports on burials that seem to deviate from the norm have the unintended consequence of reinforcing stereotypes and misconceptions about the living. Movies and comics that depict these monsters throughout history with great verisimilitude strip away the diversity of modern populations. Although the goal of the authors may have been to employ folklore to help audiences better conceptualize their stories (real or not), the result is often a reification of oversimplified and even dangerous ideas about modern people.

VanDerwarker, Amber [158] see Bardolph, Dana

Vandiver, Pamela [389] see Klesner, Catherine

Vang, Natasha P. [250] see Tung, Tiffiny A.

Vang, Natasha P. [286] see Snyder, Thomas

Vanosdall, Wesley, Ryann Seifers (University of Wyoming) and Rick Weathermon (University of Wyoming)

[382] *The Body at the Washtub: A Bioarchaeological Reconstruction of Identity from a Purported 1849ers Oregon Trails Burial at Camp Guernsey, WY*

In late spring 2018, a team of anthropology students and faculty from the University of Wyoming, with support from the Wyoming Military at Camp Guernsey Training Base, recovered a historical burial from an eroding cutbank near Emigrant's Washtub Spring. Members of the Oregon-California Trails Association marked the location based on interpretations of 19th-century diary entries from later Oregon Trails travelers. These diaries described the location of the grave of Dr. McDermott, died June 21, 1849 at 28 years of age, from Fairfield, Iowa. As the burial was exhumed, questions arose as to whether these remains were McDermott or another unknown traveler. Given that the markers were placed in the mid-20th century and later, and knowing there were other Oregon Trails burials in the area, we wondered if there was a misattribution of identity for this grave. In this study, we make use of stable isotope and osteological analyses to compare the historical narratives about McDermott's burial to the information garnered from the geographical location, and the biological and material remains. This osteobiographical approach presents an opportunity to explore our understanding of accepted history and the different identities attached to this individual in life and in death.

VanPool, Christine and Todd VanPool

[245] The Multivalence of Black in Casas Grandes Iconography

Color symbolism was undoubtedly important to the Medio period (AD 1200–1450) Casas Grandes folks. Red, black, and white designs decorate their pottery, but excavations at Paquimé reveal that the Medio Period farmers used a variety of mineral pigments for painted murals and/or for makeup and body paint. They also conducted rituals with colorful scarlet and military macaws, which Charles Di Peso thought were related to water making ceremonies that used red/green symbolism. It consequently seems likely that such color symbolism is reflected in other contexts such as pottery where the entire range of color could not be reflected. Our analysis uses naturalistic images to evaluate what colors might be represented by black designs and what characteristics might be used to differentiate between the colors. For example, some double headed macaw effigies appear to depict scarlet macaws (painted with red heads) and military macaws (which have their green heads portrayed using black), suggesting that sometimes black paint can be read as green. Other times, black appears to really reflect black. Further, black can be used to denote different textures. Black speckling on the front of quail indicates downy feathers, whereas checkerboards and grids indicate scales.

[296] Chair

VanPool, Christine [296] see VanPool, Todd

VanPool, Todd [245] see VanPool, Christine

VanPool, Todd (University of Missouri)

[296] Medio Period Borderland Dynamics at 76 Draw

The New Mexico/Chihuahua border was also a borderland between AD 1200 and 1450 where the contemporaneous Casas Grandes, Salado, and El Paso phase cultures overlapped. The excavation of 76 Draw, a Medio period site on the northern periphery of the Casas Grandes region, is designed to evaluate the relationship among these cultures. Were different communities/households affiliated with each culture? Or were traits from each culture blended through cultural syncretism? Likewise, was the border between the cultures porous and largely informal, or more rigid and clearly defined? We evaluate these borderland dynamics at 76 Draw using ceramic type analysis and geochemical provenience analysis of obsidian. Both data sources reflect types/sources from the Salado and Casas Grandes regions. However, the ceramic assemblage has a greater proportion of Casas Grandes polychromes when compared to nearby Salado and El Paso phase settlements. Further, the obsidian from sources in the Casas Grandes region reflects direct procurement of unreduced cobbles whereas obsidian from outside the region reflects the acquisition of previously reduced obsidian through trade or discard from visitors. Our analysis indicates direct, community-level cultural integration with the Casas Grandes culture, but trading relationships with surrounding Salado and El Paso phase communities across a well-defined border.

[296] Chair

VanValkenburgh, Nathaniel (Brown University)

[77] Here's Looking at You: the Ethics and Politics of UAV-based vs. Satellite-based Archaeological Survey in the Andes

The collection of geographically extensive archaeological datasets from satellite imagery and sensors mounted on piloted

aircraft and UAVs is transforming how archaeologists study the past, enabling us to map sites in difficult terrain, at new levels of detail, and explore social and political transformations at the scale of large regions. Yet the forms of vision engendered by satellite archaeology all too often seek to perform what Donna Haraway calls the “god-trick of seeing everything from nowhere,” masking the conditions of possibility by which digital data are collected, misrepresenting their completeness, and offering little consideration of their practical impact on non-archaeologists. Drawing on feminist critiques of geographic visualization, I explore the ethics and politics of distinct forms of aerial vision, contrasting UAV-based and satellite-based survey through a case study from Peru’s Chachapoyas region, where our work has incorporated both satellite imagery and LiDAR, hyperspectral imagery, RGB photographs and thermal imagery collected using UAV-mounted sensors.

[143] *Discussant*

[77] *Chair*

Varalli, Alessandra [195] see Sparacello, Vitale

Vargas, Juan Pablo [314] see González, Lissandra

Varien, Mark [86] see Coffey, Grant

Varien, Mark (Crow Canyon Archaeological Center)

[313] *Discussant*

Varney, R. A. (PaleoResearch Institute, Inc.) and Linda Scott Cummings (PaleoResearch Institute, Inc.)

[262] *Taking the Lab to the Field: Examinations at Etzanoa, Kansas*

Taking scientific lab analyses into the field requires special equipment and planning. PaleoResearch arrived with our mobile field lab to support the archaeological field work. Remote analysis of pollen, phytoliths, seeds, charcoal, and protein residues all are possible, as are the more commonly employed portable XRF and even FTIR analyses. Protein residue analysis of a projectile point from Etzanoa yielded a positive reaction to turkey antiserum, indicating that people living at Etzanoa at or near the time of contact hunted turkeys. Survey at Etzanoa involved the local community, providing an opportunity to engage them in use of scientific equipment, such as use of portable XRF to discriminate between lead and other metal objects recovered. Lead balls from the battle were among the objects recovered. A night of presentations at a local community center included XRF analysis of local collections to further engage residents in the discovery of their local history and prehistory.

Varney, R. A. [397] see Scott Cummings, Linda

Vasilev, Ivan (Balkan Heritage Foundation)

[157] *Funding Archaeology and Heritage Conservation in Postcommunist Bulgaria and Beyond*

On 10 November 1989, Todor Zhivkov, the communist leader of Bulgaria, was ousted, bringing the fall of the one-party regime and Bulgaria's transition to democracy. With the collapse of the communist regime, funding for archaeological research and conservation was dramatically altered and significantly diminished. In 2007, Bulgaria joined the EU but due to the lack of national policies and corruption, the EU funding generally failed to address the real needs for quality research and preservation of Bulgaria's cultural heritage. In response to these changes, entrepreneurial initiatives sprouted. Among them was the creation of Balkan Heritage Foundation (BHF), an independent non-governmental organization that uses funding from field schools to support archaeological endeavors throughout the Balkans. Over the past decade, the BHF has developed a successful model for symbiosis between educational projects (i.e. field schools) and ongoing heritage projects (research and conservation) through the collaboration of students and universities from all over the world, with local heritage specialists, communities and municipalities in benefit of cultural heritage.

Vasquez Pazmino, Josefina (University of Florida)**[331] Imperial Space Appropriation and Colonialism during the 16th Century in the Ecuadorian Andes**

The Inka Empire began its process of conquest and colonialism in 1420 in ancient Ecuador. The Inkas reproduced their own social spaces for the public, the sacred, and the economic over local spaces. However, such Inka layers of transformation were suddenly truncated by the Spanish arrival at around 1530, which again brought different kinds of populations that imprinted new contours onto the history of these spaces. This paper documents what occurred to Inka spaces after Spanish appropriation during the 16th century, using Colta Lake valley's material culture and monumental features to support the study case within the Chimborazo region.

[350] Chair

Vasquez Pazmino, Josefina [350] see Delgado Espinoza, Florencio

Vaughn, Kate [258] see Aragon, Leslie

Vavrsek, Jessica [73] see Abel, Timothy

Vawser, Anne (National Park Service)**[385] Why We Should Reassess How We Define Sensitive Archaeological Data and How We Share It**

We all want to be published and want our archeological research to be relevant, useful, and available to other archeologists, but in this digital age, it may be too easy to share, and too easy for sensitive site location information to end up in places that could cause irreparable harm to the archeology that we are so passionate about. We tend to write our reports for an archeological audience, including all kinds of useful information about where we found those wonderful artifacts and unique features. We often don't think about where these reports might end up when we write them: A thesis submitted to the university library that is scanned and made available through the libraries database; a technical report submitted to a government archive that decides they need to make all their documents public, even a paper copy sent to a colleague who passes away and leaves his library to relatives who, not knowing what to do with the material, donate it to the local library. Now is probably the time to rethink how we write reports, what we make available, to who, and in what format, for the sake of preserving the past.

Vazquez De Arthur, Andrea (Columbia University)**[54] Wari Bats? An Iconographic Analysis of Some Very Curious Zoomorphic Figures on Middle Horizon Andean Pottery**

For ancient civilizations with no form of writing, proper iconographic interpretation is an important tool for accessing the past. This is certainly true of ancient Andean civilizations, especially the Wari who produced some of the most captivating visual imagery of their time. However, Wari depictions of supernatural composite figures are so stylized that correct identification of the sources for their zoomorphic characters is very difficult. All too often, ambiguous figures are identified out of hand as either some type of feline or bird, considerably limiting our perspective on Wari artistic expression. Through careful iconographic analysis, I propose that the bat may have been a very prominent animal in the Wari pantheon. Some of the stranger zoomorphic characters on Wari pottery have so far eluded interpretation, despite being prominently depicted on ceremonial vessels excavated from such prestigious Middle Horizon sites as Conchopata and Pachacamac. Few, if any, references to bat imagery are made in the literature on Wari visual culture, therefore the identification of certain zoomorphic traits as pertaining to bats has the potential to significantly alter how Wari imagery is viewed and interpreted.

Vázquez López, Verónica (University of Calgary) and Daniela Triadan (The University of Arizona)**[309] Aguada Fénix: An Early Middle Preclassic Monumental Site in the Middle Usumacinta Region**

The site of Aguada Fénix, located on the San Pedro River in northeastern Tabasco, Mexico, was recently discovered by the

Middle Usumacinta Archaeological Project through LiDAR mapping. The site layout corresponds to what the project has defined as the Middle Formative Usumacinta Pattern (MFU), which consists of a large north-south oriented rectangular platform or feature, delineated by low structures, and a central E-Group. Aguada Félix is the largest of these sites and may have served as a central place in the Middle Usumacinta drainage during the early Middle Preclassic. It features a monumental rectangular platform with a large E-Group at its center, and several causeways that lead towards it from the west, as well as pairs of ramps and causeways on its northern and southern ends, and is surrounded by large man-made reservoirs. The construction system of the monumental platform resembles some of the building techniques used at the Olmec center of La Venta. Nevertheless, the recovered ceramics suggest that the site was built during the early Middle Preclassic (ca. 1000-700 BC) and point towards an intense interaction between the local population and the central and southern Maya lowlands.

Vázquez López, Verónica [410] see Reese-Taylor, Kathryn

Vázquez Vallín, Lorena [243] see González López, Angel

Vazquez-Martinez, Alia [252] see Valcarce, Ramon

Veatch, Elizabeth (Emory University), Thomas Sutikna (University of Wollongong), E. Wahyu Sapomo (Arkenas), Jatmiko (Arkenas) and Matthew M. Tocheri (Lakehead University)

[247] Testing Theoretical Approaches for Inferring Hominin Behavior at Liang Bua (Flores, Indonesia)

Recent debates in anthropology surround the utility of human behavioral ecological (HBE) approaches for inferring archaeological phenomena. Criticisms of popular HBE approaches, including optimal foraging theory (OFT), challenge the assumption that humans will always maximize their behavior. Thus, these models may fail to account for 'maladaptive' and/or non-optimal aspects of human behavior. Alternative approaches include niche construction theory (NCT), in which organisms are not passive participants in their ecological circumstances, but actively modify and engage with their environments. For humans, this advanced capacity for engineering the ecosystem explains many critical events throughout our evolutionary history, including the Broad-Spectrum Revolution, agricultural origins, and climate change. The zooarchaeological record at Liang Bua (Flores, Indonesia) offers a rare opportunity to explore the utility of both OFT and NCT as theoretical tools for interpreting the behaviors of *Homo floresiensis*, modern human hunter-gatherers, and agricultural modern humans at the same site. OFT was used to generate test predictions about patterns of small prey acquisition, and we test these using taphonomic data. The results suggest that NCT and OFT are complementary approaches to understanding hominin behavior, and that each theoretical method can be used to examine change during different time scales at Liang Bua.

Veech, Andrew (National Park Service)

[16] American Periphery, Sonoran Heartland: Recent Archaeological Explorations of Organ Pipe Cactus National Monument

Organ Pipe Cactus National Monument (ORPI) is a vast, rugged, and remote unit of the U.S. National Park System situated in the heart of Arizona's Sonoran Desert. Measuring 1,338.25 km² (517.7 mi²), the park encompasses an area half the size of the state of Rhode Island. ORPI's 48.3 km (30 mi) long southern boundary constitutes a portion of the 3,201 km (1,989 mi) long international border between the United States and Mexico, and as a border park, ORPI suffers considerable impacts to its natural and cultural resources.

Since 2012, archaeologists with the National Park Service's Intermountain Region Archaeology Program have conducted a series of field investigations across ORPI, reassessing previously recorded archaeological sites disturbed by recent border-related activities and surveying previously unexamined areas of the park. Cumulatively, these investigations have contributed to a deeper understanding of precontact Native American lifeways within the Sonoran Desert.

[16] Chair

Vehik, Susan (University of Oklahoma)

[207] A Fourteenth-Century Southern Plains Star Chart

In 1978 excavations in the first of four houses at the Uncas site (34KA172) produced several pieces of a burned clay panel carrying multiple fingertip impressions. Uncas is a late fourteenth-century site north of Ponca City, Oklahoma and south of Arkansas City, Kansas overlooking the Arkansas River. Several pieces of this panel were reassembled at that time, and the impressions seemed to be in a pattern, but the exact pattern was unclear. No suggestions were made as to what the panel represented or what its purpose was. The Uncas collections were reanalyzed in 2015 and attempts were once again made to reassemble the panel. With recent archaeological interest in belief systems the possibility was recognized that this panel might be a star chart. Further consultation with amateur astronomers reinforced this idea. The purpose of this poster is to demonstrate the close similarity between the pattern of fingertip impressions and a specific arrangement of the Pleiades, Hyades, and other nearby stars. Also discussed are possible purposes for the chart.

Veit, Richard**[17] Searching for the "Lighthouse Fort and the Refugee Town" on Sandy Hook, Public Archaeology at a Storied Historical Site**

Since 1764 the Sandy Hook Lighthouse has guarded the treacherous approaches to New York Harbor. During the American Revolution Continental forces unsuccessfully tried to deny the British control of the lighthouse. British troops and partisans captured Sandy Hook early in the war and, despite repeated raids by Continental forces, retained control of the sandy peninsula until the end of the conflict. Indeed, the British fortified the lighthouse and Loyalists, many of African descent, constructed a Refugee Town near the lighthouse which served as a base of operations for raiding parties along the Jersey shore. Monmouth University's 2016 archaeological field school was a cooperative endeavor between a private university and the National Park Service, designed to investigate the lighthouse property while providing local residents with an opportunity to participate in archaeological fieldwork at a significant local historic site. The project resulted in an improved understanding of the site and built local interest in regional archaeology.

Velasco, Matthew (Cornell University) and Sadie Weber (Harvard University)**[315] Lessons from Chavín for the Chullpa Horizon / The Cayman Keeps Giving: Interregional Interaction at Chavín de Huántar**

John Rick's long-term research program at Chavín de Huántar has revolutionized our understanding of the monumental center and its development through time. Inspired by his theoretical commitments and methodological rigor, this paper reflects on the relationship between monuments, power, and authority in a late prehispanic context far removed from Chavín: the "chullpa phenomenon" of the Late Intermediate Period (AD 1100-1450). Following the collapse of Middle Horizon states, peoples across the south-central Andes reconstituted authority in the mummified bodies of their ancestors, burying them in accessible above-ground sepulchers. At a regional level, the proliferation of chullpas has been interpreted as evidence of both broad cultural integration and political fragmentation. What insights can site-specific analysis of chullpa architecture and chronology provide into the social and temporal dynamics of these mortuary practices? Recent research in the Colca Valley (southern Peru) shows how one large cemetery was continually built across four centuries. Architectural and stylistic continuity in mortuary practice, however, stands at odds with other bioarchaeological evidence of changing social identities. Careful attention to chronology and construction, exemplified by John Rick and colleagues, is paving the way toward a richer accounting of political and religious transformations in the ancient Andes.

Velasco Alban, Janny (Universidad Andina Simón Bolívar) and Estanislao Pazmiño (University of Lethbridge)**[320] Monumentality and Social Complexity in the Ecuadorian Upper Amazon: Mound Builders in the Upano Valley, Ecuador**

The Upper Amazon frequently was conceived as a transitional area where social development was limited for the scarce resources and the harsh environmental conditions. In the last decades studies in the ceja de selva, pie de monte and the upper Amazon reveal that this region hosted an intense cultural development. Wide discussions in the academic forums contribute with new data to understand the emergence of complexity in this area. Precisely, the Upano Valley, in the upper Amazon of Ecuador, present archaeological evidence of a unique systematic space organization and landscaping strategies. Between 400 BC and 400 AD the valley was drastically modified by Upano culture, demonstrating that, the region can support the development of complex, densely populated, and highly organized settlements. This paper discuss the emergence of a complex socio-political system and the tangible effects of the landscape modification in the upper Amazon of Ecuador.

Velásquez, Antolín [103] see Barrios, Edy

Velazquez, Adrián [192] see Martínez, Estela

Velázquez-Mora, Jaime Andrés [409] see Winemiller, Terance

Veleminská, Jana (Charles University, Prague, Czech Republic), Jan Dupej (Charles University, Prague, Czech Republic), Jaroslav Bružek (Charles University, Prague, Czech Republic), Lumír Poláček (Institute of Archaeology, Brno, Czech Republic) and Petr Velemínský (National Museum, Prague, Czech Republic)

[386] *Asymmetry of Cranial Surface in Relation to Social Stratification in Great Moravia (Early Medieval Period, Mikulčice, Czech Republic, 9th–10th Century)*

According to the archaeological and written sources Great Moravian Medieval society was highly socially stratified. Recorded differences in facial cranial morphology were partly interpreted as a result of different masticatory load, and thus of different dietary habits in various socioeconomic classes. In this study we present a detailed analysis of cranial morphology and asymmetry using exocranial surfaces in Medieval and contemporary comparative samples (cranial CT images of 200 adult individuals). The Medieval sample was grouped by the localization of the graves (castle and sub-castle) or presence of grave goods ("elite" and "non-elite" graves). The entire cranial surface was analyzed using 3D methods of geometric morphometrics and multivariate statistics. Bilateral asymmetry was visualised using colour coded maps and maps of significance. Because the Great Moravian population relied for nourishment on a hard, grittier subsistence diet, we expected (1) that both the higher and lower socioeconomic classes would exhibit higher levels of asymmetry than the comparative contemporary sample. (2) higher asymmetry of splanchnocranum than neurocranium; (3) increased animal protein intake (and so greater facial asymmetry) in higher socioeconomic classes requiring heavy masticator load. According to preliminary results these hypotheses were confirmed. Supported by the project GACR 17-01878S.

Velemínský, Petr [386] see Veleminská, Jana

Vélez Álvarez, Zoë (University of Puerto Rico, Río Piedras Campus)

[418] *An Archaeological Approach to the Tobacco Industry in Puerto Rico*

During the early 20th century, agriculture was one of the most important industries in the economy of Puerto Rico. The production of crops such as sugar cane, coffee, tobacco and minor fruits (mostly plants like plantain, tubers, rice and corn). Traditionally, archaeological research in the Caribbean, especially in Puerto Rico has mainly focused on sugar cane and coffee production, while very little attention has been given to tobacco. This case study can be used as an example of a successful study of a generation of tobacco producers in Aguas Buenas, Puerto Rico; using oral history, population census and cadastre and property data. The combination of these sources is used to write narratives about who were these tobacco workers, household composition, gender roles, material culture, spatial distribution and the changes to land usage within a small farm.

Vellanoweth, Rene [48] see Ceniceros-Rodríguez, Santos

Vellanoweth, Rene, Amira Ainis (Department of Anthropology, University of Oregon), Santos Ceniceros-Rodríguez (Department of Anthropology, California State University), Jessica Rodriguez (Department of Anthropology, California State University) and Paul Collins (Department of Vertebrate Zoology, Santa Barbara Museum)

[240] *Using Barn Owl (*Tyto alba*) Pellets to Build Environmental Profiles: A 1,500-Year-Old Record from Barn Owl Cave, Santa Barbara Island, California, USA*

Archaeology has a long history of applying proxy data to reconstruct past environmental conditions. Archaeological deposits, however, represent an anthropocentric view of the past, one biased by human selection and decision-making.

This research focuses on excavation and analysis of owl-generated, non-cultural deposits in Barn Owl Cave, located on the northeast coast of Santa Barbara Island. The goals of our research are twofold: 1) to understand predator (owls) and prey (mice, lizards, and seabirds) availability and dynamics through time; and 2) to use these data as proxies for reconstructing wet/dry cycles potentially linked to broader oceanographic conditions. Our results suggest that periodic prey switching is linked to wet/dry cycles and changes in relative sea surface temperature. The relative abundance of mice, lizards, and passerines from components dated to the Medieval Climate Anomaly (dry) and the Little Ice Age (wet) confirm these anomalies affected the terrestrial biota of the island. These data contribute to regional climatic and environmental reconstructions used to interpret the archaeological record and document local island extinctions of at least three breeding avifauna, which were likely caused by historic introduction of domestic animals and subsequent overgrazing.

Vellanoweth, Rene [323] see Lopez, Escee

Velsko, Irina [20] see Dimopoulos, Evangelos

Venter, Jan A. [368] see Brooke, Christopher

Venter, Marcie (Murray State University)

[158] Matacanela in Its Regional and Cultural Context

In this presentation I synthesize recent studies that the Matacanela Archaeological Project has produced as a way of situating the presentations in this session within their broader temporal and spatial contexts, both with the Tuxtla and the broader Gulf lowlands. One notable aspect of Matacanela's settlement history was its resilience from its Middle Formative Olmec occupation, through the Formative-to-Classic transition—a feature that differentiates it from several other Gulf lowland settlements, both within the volcanically active western Tuxtla and beyond. That resilience continued through the Late Classic period. I review some of the creative strategies that occupants at the center employed as they negotiated and contributed to transforming physical, political, demographic, and economic landscapes, and introduce others that will be elaborated upon by individual session participants. Moreover, I examine evidence from Matacanela, which straddles a geographical boundary between the western Tuxtla uplands and Eastern Olman, that speaks to the ways that Matacanela's geographical boundary position is also reflected in different cultural interaction networks during both the Formative and Classic periods.

[158] Chair

Venter, Marcie [158] see Becerra, Gibránn

Vepretskiy, Sergey [384] see Beliaev, Dmitri

Verbaas, Annemieke [95] see Van Gijn, Annelou

Verdugo, Cristina (University of California, Santa Cruz), James Brady (California State University, Los Angeles) and Lars Fehren-Schmitz (University of California, Santa Cruz)

[360] Exploring Dental Modification Practices at Midnight Terror Cave, Belize

Dental modification in Mesoamerica dates to the Early Preclassic Period and persisted into the 16th century. Investigations have suggested a number of possible explanations, generally aesthetic or ritual, for the practice. There is little consensus in the field. A total of 1194 teeth were recovered from Midnight Terror Cave (MTC), Belize, providing a large sample to critically examine previous hypotheses. Of the 339 incisors collected, 103 are modified (30%) using twelve different modification styles from Romero's (1970) classification system. Several of the previous suggestions, that dental modification is a display of local family or kinship affiliation have, heretofore, been largely untestable. Paleogenetic analysis was conducted on a number of the MTC modified teeth in order to ascertain sex and mitochondrial haplotypes for sampled individuals. With these data it is possible to better address issues of family or lineage affiliation, as well as sex.

Veres, Matthew (University of Georgia), Suzanne Pilaar Birch (University of Georgia), Jack Williams (University of Wisconsin-Madison), Eric Grimm (University of Minnesota) and Russ Graham (Pennsylvania State University)

[48] Using the Neotoma Paleoecology Database for Specimen Level Stable Isotope Data

The Neotoma Database (neotomadb.org) functions as an interdisciplinary, open access database for the paleoecology community. Primary data types include proxies such as pollen, vertebrate remains, diatoms, and middens. As stable isotope data become ever more ubiquitous in our study of the past, a new repository within Neotoma has been created, allowing for the integration of this data with existing types. Neotoma serves as a hub for storing and accessing diverse types of data and offers an unparalleled opportunity for visualizing the intersection of multiple strands for paleoecological reconstruction from the macroscopic to microscopic and biogeochemical scales. To date, one of the limiting factors in stable isotope studies for our understanding of variability across not only spatial but also long-term temporal scales has not been lack of data but rather a lack of exchange and integration. In addition to the launch and initial population of the stable isotope repository, issues that exist as challenges for the future, including establishing best practices and standardization in recording/reporting, monitoring data quality, linking datasets, and increasing accessibility while protecting sensitive information will be discussed.

Vernon, Kenneth (University of Utah), Peter Yaworsky (University of Utah) and Brian Codding (University of Utah)

[35] Decomposing Habitat Suitability With Theory-Driven Machine-Learning

Archaeological applications of ideal distribution models have advanced beyond the study of straightforward settlement decisions to address a variety of important but difficult anthropological questions. To aid in these investigations, we demonstrate a method for (i) decomposing habitat suitability into its ecological components and (ii) showing how their relative contributions to settlement change through time. This method relies on the maximum entropy approach to species distribution modeling from ecology coupled with the prey-choice model from behavioral ecology. We use the extensive record of subsistence and settlement provided by the distribution of archaeological sites within the Grand Staircase-Escalante National Monument to test predictions.

Vernon, Kenneth [35] see Codding, Brian

Vernon, Kenneth [128] see Yaworsky, Peter

Versaggi, Nina [297] see Miroff, Laurie

Versaggi, Nina (Binghamton University [SUNY]) and Brian Grills (Public Archaeology Facility, Binghamton University)

[357] The Stratton Mill Creek Site: Deciphering a Landscape Feature in the Upper Susquehanna River Valley

The Public Archaeology Facility at Binghamton University has conducted CRM on transportation projects in New York State for over 50 years. Our archaeological investigations have discovered a full range of sites from the ubiquitous (lithic scatters, historic sheet middens) to the extraordinary (deeply stratified sites, ritual blade production areas). All have contributed new information to our knowledge of the past. This paper will focus on an example of the extraordinary – a large precontact ditch feature filled with artifacts and burned debris – and its potential to document a previously unknown ritual landscape along the Susquehanna River in Broome County, New York. This discovery during a NYSDOT project and the consultations involved in its interpretation have produced multiple (sometimes contradictory) opinions about its function. The undisputed conclusion is that this feature adds a new dimension to the commonly accepted precontact context, promotes future debates, and will contribute to a sparse database on such features in the Susquehanna Watershed. In this time of challenges to the Section 106 process and questioning the value of archaeology, it is important to broadcast how transportation archaeology adds valuable information not already known to the history of peoples long gone and those still living.

Verstraete, Emma (University of Illinois at Urbana Champaign)**[215] Ancient Egyptian Curses and Bog Bodies: The Role of Pseudoarchaeology in Tumblr's Subculture**

Current digital tools and social media provide a near constant stream of data. While the trustworthiness of this data may be suspect, communication mediums such as internet memes and Tumblr blog posts saturate common search results. Social media networks such as Tumblr rely on self-policing of content, allowing reductionist and incorrect ideas about archaeology and history to travel around the globe in seconds. Recent examples of pseudo-archaeology memes include questions like "should you lick the science?" (in the case of archaeology, you shouldn't since it 'might be human bone'). Social media can spread the news of archaeological discoveries more quickly than ever before, but the results are often reduced to witty quotes and references to the Ancient Aliens TV series. Other posts jokingly question the difference between archaeology and grave robbing, reaching back to harmful stereotypes of a profession that currently seeks to apply science and ethics to its research. This paper will present a discussion on the mechanics of Tumblr's unique ecosystem and subculture while presenting a variety of pseudo-archaeology and ancient history memes. Efforts to promote outreach and stop the spread of misinformation in the Tumblr network and suggestions to further promote archaeology will also be discussed.

Veth, Peter (The University of Western Australia)**[305] Kimberley Visions: Antiquity of Rock Art Style Provinces of Northern Australia**

Early figurative rock art from northern Australia contains large animal outline figures as well as monochrome anthropomorphic depictions. The latter often have extraordinary detail in accoutrements, headdresses, weaponry and associated material culture. They likely depict ceremonial and collective strategies shared over large areas and expected at the tail end of the arid phase of the LGM and until the re-set of the Indonesian Australian Summer Monsoon. The static and then dynamic phases in red/mulberry pigment anthropomorphs from both the Kimberley and Arnhem Land regions date to the terminal Pleistocene, when the two regions were connected by the now-drowned Bonaparte Basin; indeed, as much as 50% of the inscribed landmass was probably lost with post-LGM sea level rise. Intensive recording programs from multiple sites in both regions show that certain themes, artefacts and style conventions are shared while others differ markedly. This could be expected given the significant distance between the areas, likely different languages and clear differences in resource catchments and local climate. Nevertheless, these two cognate areas of the early non-Pama-Ngungan language family both show similar directionality in style during what I label the terminal Pleistocene Proliferation event (PE1) and early Holocene Proliferation Event 2 (PE2).

Veth, Peter [305] see Dortch, Joseph

Vianello, Andrea (University of South Florida)**[278] The Late Introduction of Metals in Southern Italy: Studies from Sicily and Calabria**

Metallurgy arrived quite late in Calabria, Sicily and Malta compared other regions, including the same Italian peninsula. Current hypotheses include an allogenous origin of metallurgy, brought by Aegean merchants, and an indigenous origin due to the presence of mines. The delicate state of many metals has prevented destructive analyses, but it has been possible to use a non-invasive pXRF to analyze the chemical composition of the surface of several metals in multiple spots. We have comparable data for the region regarding composite materials (made of different alloys) and alloys in use between the Copper Age and the Early Bronze Age. There is consistency in the data between Calabria and Sicily, and a significant level of complexity in the alloys. The results suggest that metallurgy was introduced from the Italian peninsula, but only after several centuries during which metals were not adopted. There are local mines, certainly in use at least in Calabria, but very little evidence that metals were used locally. Metals were therefore known to exist and potentially were accessible, but deliberately ignored. Since most early metals in the region are weapons, this may provide a clue to the processes that delayed the adoption of metallurgy.

[132] Moderator**Vidal Aldana, Cinthya (UNAM), Emmanuel Gómez (ENAH), Hugo Sánchez (UNAM), Alfonso Grave (INAH Sinaloa) and Jorge Blancas (UNAM)****[373] Archaeology of Culiacán Valley: An Integral Approach**

Culiacán valley is located in central Sinaloa. It is well known in archaeological literature because of the excellent quality of its pottery. Nevertheless, archaeological knowledge is limited due to the lack of continuity in research during last seventy

years. This work presents a new perspective on the region through integral research carried out by the Culiacán Archaeological Project of UNAM. The aim is to update regional archeology with the results of recent surveys and the application of new technologies available for archaeological research, starting from the theoretical framework of landscape archeology.

Vidal-Guzmán, Cuauhtémoc (The George Washington University), Victor Salazar Chavez (The George Washington University) and Jeffrey Blomster (The George Washington University)

[394] Building Social Complexity: Differences in Bedrock Use at Early Formative Etlatongo in the Mixteca Alta of Oaxaca

Construction materials such as earthen fills have frequently been an afterthought for many archaeologists interested in understanding past social relations in Mesoamerica. In this paper we reconcile this situation by assessing how the relationship between humans and materials, in regard to the use of construction fills, may have played out a significant role during the creation of novel social interactions that on the one hand fostered a sense of communitas, while on the other created venues in which social differences were expressed. We examine the differential use of elaborate construction fills made out of the natural beds in the region in domestic and public architecture at the late Early Formative site of Etlatongo in the Mixteca Alta of Oaxaca. We interpret these differences through the lens of indigenous ontologies to argue that relationships between humans and other-than-human things were an essential component of the multilayered techniques of power that were at play during early stages of political complexity. We compare Etlatongo with other contemporary sites in Oaxaca in order to underline the particularities of the way social relations were linked to construction materials at the site.

Vidal-Montero, Estefanía (Department of Anthropology, University of Chicago)

[64] From Mud to Brick, or the Transformative Possibilities of Assembling Architecture

This paper considers the often-overlooked practice of building, in order to rethink the role of architecture as a mere container of sociality, a proxy for domestic stability or the precondition of social complexity. By focusing on the building of a wall in the site of Ramaditas, a 2,000-year-old site in the Atacama Desert, this work seeks to question traditional assumptions about the origins of settled life by interrogating the taxonomies and traditional categorizations that have been mobilized to understand the “Neolithic” process. Rather than approaching this phenomenon as a universal event that involved the revolutionary shift in modes of production, the transformation of nature into culture, or the domestication of landscapes, I offer a version that focuses on the architectural assembling of a mudbrick wall, rendering its construction as a transformative action that signals how things or artifacts are always in a state of becoming and always open to new interventions. I argue that by paying attention to the material transformation of mud—and the social practices set in motion by this act—we may arrive at a more capacious understanding of architecture and the communities involved in its production.

Vierra, Bradley (Statistical Research Inc)

[26] Drought and the Transition from Foraging to Farming in the American Southwest

The American Southwest is an arid landscape that has experienced dynamic shifts in climate between dry and wet periods. Researchers have traditionally focused on the effects of drought conditions on farming communities. They often suggested that these extreme conditions dictated the regional displacement of populations, and more recently have emphasized the importance of mobility in understanding past land use strategies. By contrast, this paper will focus on the effects of drought on foraging groups, and how drought conditions have played a significant role in the transition from foraging to farming. Examples from the Tucson Basin, Colorado Plateau and northern Rio Grande will illustrate the different ways that foragers coped with living during these dry periods, and how their responses relate to an increased dependence on the cultivation of maize. In fact, each region is characterized by a separate historical trajectory which would eventually create the foundation for later agricultural societies.

Villalobos, César (UNAM/IIA)

[16] Los que viven donde sopla el verdadero viento: Bahía Tepoca, Sonora, Archaeology of the Coast in the Gulf of California

The archaeology of the middle coast of the Gulf of California offers an opportunity to document and investigate processes of human mobility that highlight a deep relationship between humans, sea and desert. The area defined as Bahía Tepoca confirms a cultural significance in this regard, especially for being one of the areas with access to the shore and the

availability of natural resources off the shore and inland. This paper, throughout a regional analysis in which 74 archaeological sites were recently recorded, provides insights not only on cultural history, but also proposes a better understanding of the cultural processes that occurred in the past. As a whole, the actions reported here provide preliminary information on the cultural affiliation and temporality of the social groups that inhabited this region, particularly the Trincheras Culture and prehistoric Seri groups. The presence of diagnostic materials and radiocarbon dates, contributes to a better understanding of technologies, interaction and cultural mobility over time. In conclusion, it is argued that the shore sites represent a node of differential interaction between humans, sea and desert.

Villalobos, César [369] see Diaz-Andreu, Margarita

Villalpando, Elisa (Instituto Nacional de Antropología e Historia, Sonora) and James Watson (Arizona State Museum - University of Arizona)

[16] Early Mortuary Traditions in the Arizona-Sonora Borderlands

The earliest settled villages in the Borderlands region of the Sonoran Desert are largely associated with the protracted transition from foraging to farming and the foundation of Formative period archaeological cultures in the region. Mortuary practices associated with the Early Agricultural (EA) period (2100 B.C.-A.D. 50) principally focused on inhumation burial but culminate with the introduction and eventual dominance of cremation burial. EA communities, spread across southern Arizona and northern Sonora, often placed the deceased in flexed positions in houses, pre-existing pits, or small groups with limited funerary objects. There is also a significant variability inherent in these patterns such as extended positions and multiple burials, indicating a great deal of individual expression in mortuary rituals. We argue that these traditions downplay vertical social distinctions and instead reflect horizontal distinctions based on achieved community role and gender. These commonalities end with the eventual adoption of cremation and begin to diverge near the modern border in subsequent archaeological traditions. The transition to cremation-based rituals is a major shift in the cosmology of death and formed the basis for mortuary rituals among the Hohokam tradition in southern Arizona and the Trincheras tradition in northern Sonora.

Villarreal Catanach, Samuel (Pueblo of Pojoaque)

[311] Bringing Together Accounts of the Pueblo of Pojoaque

Until recently, widely accessible published works concerning the Pueblo of Pojoaque, its people, culture, and history, have come by way of mostly non-Native academics and other researchers. While highly valuable for understanding this Tewa community's past, they often carry the inherent biases of their authors or leave out the perspectives of Pojoaque people entirely. In this presentation, Samuel Villarreal Catanach, a member of the Pueblo of Pojoaque, will discuss how bringing together these documents and account by non-Pojoaques with the stories and knowledge held by the people of the community itself and other Tewas is helping to reaffirm long held beliefs and to raise new questions about Pojoaque's past and where it could be headed in the future. Further, he will talk about how the inclusion of the Tewa language in this research is adding an essential layer needed in the overall cultural and language revitalization efforts currently underway there.

Villasenor Iribar, Eunice (Arizona State University), Christopher Morehart (Arizona State University) and Andrés Mejía (Pennsylvania State University)

[373] The Distribution and Characterization of Agricultural Terraces on Cerro de la Mesa Ahumada, Mexico

This poster presents preliminary results of ancient landscape modifications on Cerro de la Mesa Ahumada, a medium sized mountain between the northern Basin of Mexico and the southern Mezquital. Humans have used the hill at least since the Epiclassic period (ca. 600-900 CE) for human occupation, farming, or ranching. Terrace systems are located throughout the hillslopes. Documenting the extent, distribution, and chronology of the terraces is essential to understand the connections between anthropogenic landscapes, agricultural production, and demography. We present several lines of data to better refine our understanding of the terraces: (1) GIS maps made using satellite data; (2) topographic data collected with total stations; (3) GPS data from fieldwalking; (4) topographic data produced using drones; and (5) excavation data. These combined lines of data allow us to propose preliminary interpretations of form, function, distribution, and chronology of the terraces and their role in the ancient economic systems of the hills' inhabitants.

Vining, Benjamin [64] see Price, Seth

Vining, Benjamin (University of Arkansas, Fayetteville) and Seth Price (University of Arkansas, Fayetteville)

- [64] *Marginality and Opportunity in the Deserts of Chicama, Peru: Perspectives from Integrated Archaeology, Remote Sensing, and Paleoclimatic Analysis*

Broad regions of Peru's coastal desert are now highly adverse marginal environments, yet archaeological evidence indicate these settings often were used extensively in the past. Using a time-series analysis of Sentinel 1 and 2 remote sensing data, we document surface and groundwater resources that developed in the normally hyperarid desert margins of the Chicama Valley after anomalous rainfall driven by the 2016 – 2017 el Niño. Surveys suggest archaeological sites in these regions principally date to the Formative/Cupisnique and Late Intermediate periods, and reveal various strategies for capitalizing on these water resources. We relate these patterns to high-resolution paleoclimatic proxies from Laguna Pumacocha and Nevado Quelccaya, both of which suggest that the utilization of Chicama's desert margins coincides with subperiods of increased pluvial and/or ENSO activity. Rather than being entirely marginal, Chicama's desert edges may have provided buffers against the short- to intermediate-term effects of el Niño disasters, mitigating catastrophic losses. They further appear to have been productive regions during periods of sustained moisture increases. These data are input into Agent-based decision-making simulations, to evaluate the effects the use of Chicama's desert margins may have had on community structure, group action, and cultural transformations.

Violaris, Yiannis [387] see Herrmann, Nicholas

Vionis, Athanasios [363] see Ting, Carmen

Vitale, Adam

- [261] *Social and Physical Landscape of Lithic Procurement in the Jemez Mountains, New Mexico*

The goal of this research project is to better understand the role that societal organization, namely the institution of Spanish colonialism, played in shaping Jemez lithic procurement and reduction strategies across the Jemez Mountains from 1300–1700 AD. Previous work (Liebmann 2017) using X-ray fluorescence to source lithic debitage from 31 ancestral Jemez sites, found that changes in the usage of specific obsidian sources seems to correspond with periods of colonial rule. Using a least-cost path analysis (LCPA) of the landscape, as well as a macroscopic attribute analysis of the lithic debitage (N=2222), I hope to uncover how the use of particular obsidian sources (indexed by ubiquity and percentage), is affected by Spanish colonial status (indexed by chronology of the sites) and the travel costs of obsidian procurement (calculated through LCPA). This analysis of lithic and topographic data will detail Jemez lithic resource procurement and reduction strategies, as well as outline differences that could be associated with changes in colonial rule.

Vivian, Richard

- [190] *Polly - Rock Art - and Understanding Chaco*

Polly's long and productive anthropological career has been characterized by her use of art as a means to better interpret the social and organizational characteristics of several prehistoric and historic societies in the American Southwest. Her research has ranged geographically from the northern Southwest to northern Mexico and temporally from the Archaic to the early Historic. One of the many subjects she has dealt with in her work - using rock art to better define Chacoan political and social organization - is critical in that most archaeologists never cite rock art in their interpretive schemes for Chaco. Polly's conclusions are summarized and their relevance for better understanding Chaco is discussed.

Vizcarra Zanabria, Miguel [290] see Reid, David

Voelker, Judy (Northern Kentucky University)

- [27] *Rethinking Household/Community Based Production – Broadening the Conversation*

The Thailand Archaeometallurgy Project (TAP) has focused on the Khao Wong Prachan Valley, central Thailand in efforts to better understand the origins of metallurgy in Southeast Asia. TAP has excavated three culturally and technologically

related copper production and habitation sites in this valley: Non Pa Wai (NPW), Nil Kham Haeng (NKH), and Non Mak La (NML). While much project effort has centered on understanding the metallurgical components and contexts at these sites less understood is the presence of other local craft production activities. The examination of small finds also provides insight into the organization of production at these sites. This paper first summarizes evidence for on-site craft production at TAP sites and then focuses on the spatial organization for non-metallurgical craft activities at the site of Non Mak La. The paper concludes with a short discussion of the theoretical framework of household/community based craft production and its implications for understanding craft production in Thai prehistory.

Vogel, Melissa (Clemson University)

[236] *Discussant*

Vogel-Teeter, Lindsey (Pueblo Grande Museum)

[93] *Discussant*

von Arnim, Yann [347] see Manfio, Stefania

Von Baeyer, Madelynn (Harvard University)

[404] *Seeds of Complexity: An Archaeobotanical Study of Incipient Social Complexity at Late Chalcolithic Çadır Höyük, Turkey*

The Late Chalcolithic (LC: 4250–3000 B.C.E.) is an understudied period of Anatolian prehistory even though the roots of Anatolian social complexity lie in this period. Çadır Höyük, a mounded site on the north central Anatolian plateau has yielded over 460 m² of excavated LC remains. This period witnessed rapid cultural and environmental change providing an opportunity to examine how populations react using archaeobotany since plants have a direct relationship with the environment and plant use can be controlled at both the household and state level.

This study presents analyzed data from 60 archaeobotanical samples that illuminates how the population at Çadır modified agricultural and fuel use practices between 3500 and 3000 B.C.E. Results reveal that prior to 3200 B.C.E., plant use was stricter and more controlled and animals were routinely provisioned with fodder. After 3200 B.C.E., plant use norms became less strict and the environmental change caused a shift towards provisioning animals through pasturing. By shifting emphasis from agriculture to agropastoralism after 3200 B.C.E., the population at Çadır was able to weather environmental and cultural changes.

von der Meden, Jessica [32] see Schoville, Benjamin

von Nagy, Christopher [222] see Pohl, Mary

Von Nicolai, Caroline

[23] *Rhythms of Settlement Aggregation and Disintegration in Iron Age Bavaria*

In many parts of Temperate Europe, the first aggregated and fortified urban settlements developed in the Early Iron Age. However, many of these settlements disappeared after a few generations. After a period of decentralization lasting at least two centuries, another episode of settlement aggregation took place in Temperate Europe in the second half of the third and the second century BC. It led to the development of large but unfortified settlements. These sites are often called 'centers of production and distribution'. This process culminated in the development of the fortified oppida during the second half of the second century BC, of which many can be considered urban. Yet again, many of these settlements were abandoned in the first century BC following the Roman Conquest, especially those located in the Eastern parts of Temperate Europe. A database assembling several thousand sites from Iron Age Bavaria in combination with a Geographical Information System permits to study these rhythms of settlement aggregation and disintegration from a broad chronological and geographical perspective. Using this data, the aim of this paper is also to discuss and to question the reasons that have been put forward in the past to explain these processes.

Vorsanger, Andrew (Terracon) and Steve Swanson (Environmental Planning Group, LLC)

[346] *Footprints of the Ancestors: A 1,000-Year-Old Hohokam Trackway in the La Plaza Site, Tempe, Arizona*

In 2016, archaeologists with Environmental Planning Group, LLC, conducted excavations at a portion of the La Plaza site near the Arizona State University campus in Tempe, Arizona, for a HUD-funded veterans' housing project. Exposures near a large canal revealed a short prehistoric trackway segment associated with the Hohokam archaeological culture, ancestral to the O'odham people and dating to approximately AD 1000. This presentation will discuss the prehistoric context of features surrounding the trackway, as well as its placement in the immense La Plaza site. We will describe the techniques leading to its discovery and successful excavation. We'll discuss the collaboration of multiple stakeholders to ensure preservation and public interpretation of the trackway, and methods that we used to preserve and successfully extract the trackway intact for subsequent display. Preservation of the prehistoric trackway was a lucky combination of natural processes burying the trackway and subsequent urban development sealing the trackway until excavation in 2016. The trackway provides a visual and tactile link to past residents of Arizona.

Vranich, Alexei [233] see Berquist, Stephen

Vranich, Alexei (UC Berkeley)

[233] *Imperial Remodeling: Hatuncancha and Later Inca Construction*

Though generations of scholars have mapped nearly all the standing architecture of the imperial and colonial city of Cusco, nevertheless, the site remains caught in the hypothetical moment of its apogee prior to its destruction during the Great Inca Revolt. A recent intensive survey of the central portion of the city provides nuanced data that permits a diachronic perspective on its changing form. With these results, we proposed a transformation of the central portion of the city as the result of dynastic changes and changing fortunes of an expansive empire.

[233] *Chair*

Vredenburg, Judy (Education Coordinator) and Marc Thompson

[25] *Interpretive Strata at Tijeras Pueblo*

Tijeras Pueblo Archaeological Site offers a variety of integrated resources that encourage appreciation of and respect for traditional pueblo lifeways past and present. Informative strata comprise a self-guided trail, museum exhibits, a pueblo garden and native plant identification. Educational programming includes site tours, classroom visits, lectures, workshops and demonstrations, docents available four days a week May through October, off-season open museum days, and an archaeology day camp in summer.

Vyazov, Leonid (Kazan Federal University), Carlos Cordova (Oklahoma State University), Mikhail Blinnikov (St. Cloud State University), Elena Ponomarenko (University of Ottawa) and Ayrat Situdikov (Kazan Federal University)

[320] *Concealed Evidence of Early Human-Environment Interactions in Sedimentary Archives of Small Rivers in the Forest-Steppe Belt of Eurasia*

The results of on-site archaeological investigations alone are not enough to reconstruct landscape histories, because they provide incomplete information on past environments. In contrast, off-site sedimentary archives can provide information on the interaction of natural and human processes that modify the landscape. Our initial research on the sedimentary archives in small river valleys in the forest-steppe zone of the Mid-Volga region provides information on the sequential development of the landscape throughout the Holocene. Our regional investigation includes several fluvial settings. The first setting occurs in the lower reaches of a tributary of the Sura River, where evidence of three occupation surfaces are interbedded with levee and overbank deposits. The second setting occurs in the Kiremet River, a low-gradient meadow stream exposed by channel incision, where evidence of five occupations exists in its stratigraphic sequence. The third setting occurs in a deep, narrow tributary valley of the Sviyaga River, with a substantial sedimentary record associated with ore mining. The sequences of events interpreted from the sedimentation, soil formation, and evidence of fire reveal complicated relations between climatic changes and different forms of land use change by post-Neolithic peoples. In this paper, we discuss some

preliminary results and our methodological strategies.

Wa, Ye (Cotsen Institute of Archaeology, UCLA)

[214] *Discussant*

Wade, Mariah

[106] *Peering into the Glass and What Can It Tell about the Iron Age and the Romans in Northwest Portugal*

Previous analyses of glass sherds from the Cidade de Bagunte, Vila do Conde, Portugal, indicate those glass fragments might have been produced in the Syro-Palestinian region. This paper discusses the results of glass samples from several hillfort settlements and sites connected with the Roman town of Bracara Augusta, Braga, Portugal, analyzed using LA-ICP-MS.

[106] *Chair*

Wade, Samantha [362] see De Boer, Deanna

Wadley, Lyn [338] see Stratford, Dominic

Wadsworth, William (University of Alberta) and Kisha Supernant (University of Alberta)

[120] *Little Cabins on the Prairie: Preliminary Results from Geophysical Exploration and Archaeological Survey of the Chimney Coulee Métis Wintering Site, Canada*

Applications of remote sensing in historical archaeology have typically been surveys designed to locate large structures and have been less focused on the identification of ephemeral structural remains resulting from short-term occupation sites. Our research uses remote sensing methods, specifically ground-penetrating radar (GPR) and magnetic gradiometry, to delineate structural remains (wood cabin foundations and chimneys) at mid-19th century Métis wintering site of Chimney Coulee (DjOe-6), near Eastend, Saskatchewan, Canada. The results of these surveys were compared to data from current and previous archaeological research at the site and were assessed for their utility. Both geophysical techniques provided useful information contributing to site interpretations; however, GPR was found to be the most useful in delineating cabin structural remains. Supported by ground-truthed data, preliminary results show that the geophysical surveys were successful at locating two to three Métis cabins. Future surveys should incorporate a wider range of geophysical techniques to better understand archaeological sites. Finally, this survey is one of the first geophysical investigations related to the Métis in Canada, and has demonstrated the utility of remote sensing in surveying small targets at historical archaeology sites.

Wake, Thomas (Cotsen Institute of Archaeology at UCLA)

[398] *Mortuary Feasting at Sitio Drago, Panama and Elsewhere in Lower Central America*

The archaeological materials recovered from a central burial mound at Sitio Drago, Panama are diverse and include many well-preserved vertebrate and invertebrate faunal remains. I examine these materials in context with the artifacts recovered in direct association with four coral slab tombs located at the heart of the site and then compare the observed patterns with local and regional burial patterns and information concerning ritual behavior associated with the dead. Various regional similarities are noted and discussed in terms of a broader circum-Talamancan interaction sphere.

[398] *Chair*

Walden, John [113] see Shaw-Müller, Kyle

Walden, John [280] see Qiu, Yijia

Walden, John (University of Pittsburgh), Claire Ebert (Northern Arizona University), Julie Hoggarth (Baylor University), Shane Montgomery (Cornerstone Environmental Consulting) and Jaime Awe (Northern Arizona University)

[373] Assessing Classic Maya Intermediate Elite Political Strategies through Multivariate Statistical Manipulation of Settlement Pattern Data

Intermediate elites played pivotal roles in the politics of ancient complex societies across the world. In the Classic period (AD 250-900/1000) Maya lowlands, intermediate elites acted as intercessors between apical rulers and commoners. These intermediate elites and the political strategies they employed, however, have rarely taken center stage in reconstructions of Maya politics. This poster evaluates the role of intermediate elites who occupied the middle level of the settlement hierarchy of the Belize River Valley of west-central Belize. Multivariate statistical analyses of previously recorded architectural and environmental variables (n=28) identified five types of settlement groups. Groups 2 and 3 were associated with intermediate elites, with Group 2 being large specialized elite centers with ballcourts, causeways, terminus groups and multiple plazas. In contrast, Group 3 were smaller residential and ceremonial groups focused around a single plaza. Investigation of patterned variability in the middle tier of the system indicates four primary intermediate political elite strategies used to gain and maintain power and authority: 1) apical elite emulation, 2) shielding client-commoners, 3) apical elite compliancy, and 4) the management of frontier zones. Elucidating the variability in intermediate elite decision-making provides a new avenue for understanding political landscapes, and the dynamics of integration.

Waldo, Brian (California State University, Los Angeles)

[360] An Assessment of Water Resources at Chichen Itza

Water has long been recognized as a critical but scarce resource in the Yucatan. At Chichen Itza, water resources have not received the attention they deserve. Traditionally, because of the focus on the Sacred Cenote, the Cenote Xtoloc became by default the profane cenote. Clearly, such a simplistic and culture-bound dichotomy tells us little. Guillermo de Anda's investigation of the Cenote Holtun and Cenote Kanjuyum fundamentally expanded and changed our appreciation of water and cenotes. The goal of the Gran Acuifero Maya project is to study the site of Chichen Itza in relation to its subterranean water resources. Utilizing recent advancements in Geographic Information Systems, this paper is a preliminary attempt to identify and illustrate a far ampler view of the resources available. In addition, this paper will show the polity's formal appropriation of these features through the construction of sacbeob, or formalized paths, connecting them to the site core.

Walker, Cameron (Florida State University) and Tanya Peres (Florida State University)

[171] Looking beyond the Mission: Insights from a Multicomponent Site

I will present an analysis of historic material recovered during the systematic auger survey conducted within the ravine and the excavation of a 20th century tenant house located on the San Luis site. There will be discussion regarding the cultural material contents from these two locations, as well as comparing them to all other previously excavated 19th and 20th material currently housed within the collections at this multicomponent site. The goal behind this poster is to obtain an understanding of the landscape history of San Luis, which will be done through a combination of oral sources, historical documents, and mapping of the locations of diagnostic artifacts, small finds, and large clusters of antebellum and postbellum material. Focus during the analysis of this material and historical resources will be placed on gathering an understanding of the inhabitants of this site and attempting to understand their changing status and economic position overtime and how that can be potentially tied to the landscape of San Luis. Ultimately, this analysis will highlight the importance of incorporating perspectives of enslaved populations, and the related plantation, along with lower economic classes during the 20th century.

Walker, Chester P. [134] see Brown, David

Walker, Danny (University of Wyoming) and Rachael Shimek (University of Wyoming)

[329] Small Mammals from the Hell Gap Site, Wyoming and their Paleoecological Significance

Limited small mammal remains were recovered from Hell Gap during the early 1960s. Based on these remains, a lowering of "life zones" was proposed at Hell Gap around c.a. 10,800 yrs B.P. In 1997, the Early Holocene small mammal population of the Hell Gap site Locality One was reinvestigated. Flotation samples were collected by five centimeter intervals within defined stratigraphic units. Small mammal remains were also collected during archaeological excavations in 1996-1998. Since 1998, additional small mammal remains continued to be collected during excavations and have been recently examined. While the small mammal sample from the site continues to be sparse compared with medium or large mammals, these small mammals remain critical for paleoenvironmental reconstructions of this early Holocene period.

Walker, Debra (University of Florida)

[227] *Discussant*

Walker, Debra S. [330] see Milley, David

Walker, Debra S. [410] see Reese-Taylor, Kathryn

Walker, Emiliano (Pima Community College), Christian Mathews (Pima Community College) and Jeffrey Jones (Tierra-ROW)

[125] *Pima Community College Excavation at the Dairy Site, AZ AA:12:285 (ASM)*

The Dairy Site, AZ AA:12:285 (ASM), was first recorded in 1982 in Tucson, Arizona and in the three decades since, many investigations have been conducted. The boundaries of the site have been ever-growing, now extend well beyond the 1982 limits, and thus far are not well defined. From January 30, 2018- April 4, 2018 Tierra Right of Way Services conducted archaeological excavations at the site. The purpose of the excavation was to collect and record any cultural resources before a proposed development project utilized the land. As part of the project, students and staff from Pima Community College's Centre for Archaeological Field Training (PCCAC) worked one day a week to excavate several features. Although still waiting for results of ceramic analysis and radio-carbon dating, preliminary results suggest the site was inhabited as early as the Agua Caliente phase of the early ceramic period (C.E. 50-450) through the beginning of the Hohokam era. This poster will focus on the data recovery efforts participated in and the features excavated by personnel from PCCAC.

Walker, Emiliano [125] see Eckerstrom, Kyle

Walker, Karen (Florida Museum of Natural History), William Marquardt (Florida Museum of Natural History), Victor Thompson (University of Georgia), Michael Savarese (Florida Gulf Coast University) and Chris Walser (College of Idaho)

[9] *The Under-represented Mullet in SW Florida's Archaeological Assemblages*

Mullets (*Mugil* spp.), especially the striped mullet (*Mugil cephalus*), because of their predictable mass-schooling behavior, are obvious candidates as having been surplus food for the socio-politically complex, Calusa fisher-gatherer-hunters. Moreover, López de Velasco, writing in about 1570, stated that there was in southwest Florida waters a "great fishery of mullet [licias], which [the Indians] catch in nets as in Spain." And yet, mullet remains have not been recorded as particularly abundant in the region's analyzed archaeological faunal assemblages. Reasons for this situation are explored through a re-examination of Pineland, Mound Key, and other curated assemblages with an eye toward skeletal and/or preservation bias, sampling bias, analyst limitations, and temporal patterning. Results indicate that all of these contribute to a general under-representation of archaeological mullet. Also indicated is that assemblages dating to the height of Calusa complexity have higher numbers of mullet remains, compared to earlier time periods. This suggests possible intensification in terms of fishing techniques, improved storage and processing, or both.

Walker, Karen [34] see Lulewicz, Isabelle

Walker, Renee [34] see Neusius, Sarah

Walker, William (New Mexico State University)

[318] *Life Histories Thick and Thin: Scaling and Four Dimensions of Artifact Variability*

Life history analysis offers a means for organizing activities through time that tracks the interactions of one or more objects. These objects both human and nonhuman make up the stuff of ongoing cultures and their archaeological remains. We record these lives using four types of measures: object frequencies, object associations, object locations, and objects' physical properties (e.g., hardness, constituent elements, colors, lengths). A long-term challenge for behavioralism has been to work at more expansive scales than the behavioral interactions that form particular artifact life histories. How can we conceptualize addressing larger macro scale societal issues that implicate thousands of life histories? In this paper, I explore that challenge by unpacking *cadenas*, macroscale objects, conceived by behavioralists as units of analysis consisting of entire object histories rather than their particular parts (e.g., production behaviors, use behaviors, reuse behaviors, discard behaviors). How do we identify their interactions with other *cadenas*? How do we model their performance characteristics? How do we distinguish the life histories of composite physical objects such as kivas and pueblo buildings from *cadenas*? These are some of the questions I address using data from the late prehistoric villages of southern New Mexico and Northern Mexico.

Walker, William [413] see Berryman, Stanley

Wallace, Euan P. [91] see Pinta, Elie

Wallace, Henry (Desert Archaeology Inc) and Aaron Wright (Archaeology Southwest)

[84] *Horizon Events: Hohokam Ritual Relations with the Distant and Phenomenal*

For well over a millennium, Hohokam communities in the southern Southwest dwelled in a terrain of perennial river valleys fringed by a horizon of jagged mountains. Villages and livelihoods were nestled on the valley floors near the rivers, leaving the uplands as an uninhabited periphery between the everyday experience and the phenomenally distant. These uplands were the realm of large animals and evergreens, and the interface between the terrestrial and the celestial—clouds and rain, lightning and thunder. This reach—beyond and above the village—was not unfamiliar, only untrammeled, and ritualism was an arena in which people continually negotiated their relationship with the distant places defining their horizon. This paper explores the range and social scale of ritual practices in which Hohokam communities engaged the outer reach of their landscape. The structure and composition of these practices attest to a relationship that was reflexively and cyclically constitutive, with people giving and taking while coming and going. Communities became woven into the landscape as people left pieces of themselves on the fringe and brought elements of the distant and phenomenal into the center.

Wallander, Amanda (Colorado State University), Paul Woodruff (Cultural Resources Manager, Wright-Patterson Air Force) and Erwin Roemer (Air Force Civil Engineer Center, WPAFB Office)

[75] *Mitigating Cumulative Impacts to Historic Resources at Wright-Patterson Air Force Base*

The guiding principles of NHPA Section 106 mitigation stipulate that the value (not necessarily monetary value) of the proposed action should provide a “public benefit” that is greater or equal to the total value lost when a historic property is intentionally or inadvertently destroyed. To that end, some evidence suggests that creative mitigation has a greater tangible public benefit than the standard approaches to mitigation. How then do we identify mitigation options that provide real worth for the American public while also meeting the mission needs of an active military installation? In the case of Wright-Patterson Air Force Base (WAFB), whose built environment embodies nationally significant events in military and aviation history, a creative mitigation plan was developed to address the cumulative effect of demolishing over 50 historic buildings. This plan outlined a creative mitigation strategy that compensates for the cumulative loss of history by incorporating a blend of documentation, salvage, and interpretation; outreach and education; as well as partnering with public and private entities that offer unique opportunities to preserve not only the physical history, but also the heritage and legacy of WAFB.

Waller, Kyle [185] see Rakita, Gordon

Waller, Kyle (University of Missouri), Adrienne Offenbecker (University of Calgary) and Gordon Rakita (University of North Florida)

[296] *Subadult Growth Velocity at Paquime, Chihuahua, Mexico*

Patterns of growth attainment are sensitive bioarchaeological indicators of sub-adult health. Growth velocity can be used to identify periods of stunting, and corresponding periods of rapid catch-up growth. In this study, we use femoral length to examine sub-adult growth at the prehispanic site of Paquimé. We conduct two analyses. First, we compare growth to modern growth curves, to identify periods of growth faltering. We then compare the results to Mimbres and Puebloan growth curves to identify patterns of stress unique to Paquimé. The results suggest that Paquiménos adolescents consistently experienced growth stunting, and that this pattern is marked after approximately 7 years of age. While our sample sizes for metric analyses are small, this pattern of stunting appears to be distinct from patterns of growth seen elsewhere in the Southwest. We discuss our results in the context of Paquimé social and ritual organization.

Wallis, Neill [168] see Williamson, Kylie

Wallis, Neill (Florida Museum of Natural History) and John Krigbaum (University of Florida)

[185] *Movement and Animacy of Bodies in Pre-Columbian Florida*

Pre-Columbian Florida burial mounds exhibit multiple modes of burial, including extended, flexed, mixed (and mass) bundles, skull only, and cremation, as well as emplaced objects in various conditions and configurations. These different forms often occur within a single mound, and have been explained mostly in terms of changing mortuary traditions and reflections of individual social identity and status. However, relational ontologies drawn from Indigenous experience and hinted at in ethnohistorical descriptions emphasize notions of animacy and personhood that transcend social identities of the deceased in life and extend to both human remains and mound accoutrements. Animacy/personhood is recognized in beings with particular qualities and may manifest in both human and other-than-human bodies. Here we consider various bodies' capacity for movement, which is a primary index of animacy that helps explain past mortuary practices. From this perspective we examine Middle and Late Woodland (ca. AD 200 to 800) mounds in northern Florida, and the relationship between modes of burial and histories of movement revealed by isotopic analysis of human bone and sourcing studies of pottery.

Wallis, Neill [298] see Duke, C. Trevor

Wallman, Diane (University of South Florida), Heidi Miller (University of South Florida) and Douglas Armstrong (Syracuse University)

[34] *Stable Isotope Analysis of Human and Animal Remains from Trent's Plantation, Barbados, 17th through 19th Centuries*

Geochemical studies of stable isotopes on archaeological skeletal material offer information on human and animal diet, mobility and migration, exchange, and climate. Here, we apply stable isotope studies to human and animal remains recovered from archaeological excavations at Trent's Plantation in Barbados. Trent's Plantation was one of the earliest sugar estates on the island of the Barbados, and operated from the 17th through 19th centuries. The faunal materials recovered include primarily domestic mammals, birds, mollusks and land crab. Analysis also identified two human teeth from enslaved laborer occupation deposits. In this paper, we present the results of stable isotope ($\delta^{18}\text{O}$, $\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $^{87}\text{Sr}/^{86}\text{Sr}$) analysis of bone collagen,apatite, and tooth enamel from the small sample of human teeth, and from a cross-section of the mammals identified at the site, including pig, sheep/goat and dog. These analyses provide insight into the geographical origins and diets of the two individuals who lived and labored as enslaved people on the site. In addition, isotopic study of the faunal remains offer baseline data to compare with the human samples, and convey information regarding animal diet, economic exchange, species biogeography and climate.

Wallman, Diane [295] see Fogle, Kevin

Walls, Lauren [128] see Gregory, Danny

Walls, Matthew (University of Calgary)

[251] *Site Damage and the Perception of Change in Northwest Greenland*

Archaeological sites in the Qaanaaq region of Northwest Greenland are under a variety of threats related to climate change. In addition to processes observed in other arctic contexts (increased coastal erosion and melting permafrost), the area has seen a dramatic surge in landslides caused by increased precipitation. Assessing damage to cultural heritage and prioritizing mitigation is complicated by access constraints and a lack of systematic survey. In this paper we present initial observations from collaborative work that involved visiting and surveying sites with Elders and hunters who identified them as significant locations under threat. Impacted sites are places where community members or their recent ancestors lived, and remain locations that are actively used as a part of hunting or other activities on the land. We will present some of the patterns of damage observed as a part of this work, and will also discuss the multi-layered reasons they remain relevant and a subject of concern to the community. In particular, we will highlight the continued role that archaeological sites play in how the Inughuit community apprehends and responds to the complexity of environmental changes underway in Northwest Greenland.

[138] *Discussant*

Walser, Chris [9] see Walker, Karen

Walsh, Justin (Chapman University) and Alice Gorman (Flinders University)

[157] *Archaeology in a Vacuum: Obstacles to and Solutions for Developing a Real Space Archaeology*

The practice of archaeology in outer space seems as far “outside the box” as it is possible for the discipline to go. There are major challenges to carrying out field research in off-Earth contexts – among them, remoteness, hostile conditions, cost, and the demonstrable bias of space agencies against the social sciences. Developments in the field have therefore come in fits and starts. The year 2019 marks the 50th anniversary of the Apollo 11 moon landing and the twentieth anniversary of the first space archaeology endeavor, Beth O’Leary’s Lunar Legacy Project. Her team identified and described the 106 objects left behind at Tranquility Base by the crew of Apollo 11. The initiation of the International Space Station Archaeological Project by the authors in late 2015 marked another step towards implementing archaeological approaches to studying human life in space. We have developed a series of strategies to surmount the obstacles presented by doing space archaeology. These include photoethnography, training a future crew member to carry out a survey by proxy, interviews of past crew members, and study of artifacts returned to Earth from the International Space Station. This paper will describe our strategies and results to date.

[177] *Discussant*

Walsh, Matthew, Samantha Reiter (The National Museum of Denmark), Pernille Ladegaard-Pedersen (The National Museum of Denmark), Marie-Louise Schjellerup Jørkov (Copenhagen University) and Karin M. Frei (The National Museum of Denmark)

[386] *Tales of Bronze Age People: A Transdisciplinary Look at the Mobility of Persons, Materials and Ideas in Nordic Bronze Age Denmark*

Tales of Bronze Age People is a three-year (2018-2021) interdisciplinary research project supported by a Carlsberg Foundation Semper Ardens grant (CF18-0005) led by Karin Margarita Frei, Research Professor in Archaeometry at the National Museum of Denmark. The project investigates the dynamic ways in which people navigated social lives in the Early Nordic Bronze Age. The research explores mobility and cultural transmission at multiple scales and across landscapes. This project expands the ongoing Tales of Bronze Age Women project (CF15-0878) and combines state-of-the-art biogeochemical, biomolecular, and anthropological and archaeological investigations. Current research foci range from isotope analyses (e.g. $^{87}\text{Sr}/^{86}\text{Sr}$) of human remains from both inhumation and cremation graves, to osteological analyses, as well as to systematic collection and collation of data for statistical and cladistics analyses, all with a focus on basing interpretations on multiple frames of reference from an anthropological archaeology perspective aimed at illuminating aspects of individual lives in the past. This poster highlights the results and current research of the Tales of Bronze Age Women/ People projects and presents ongoing contributions to transdisciplinary approaches to interpreting archaeological

materials through integrated natural and social sciences methodologies and methods.

Walsh, Rory (University of Oregon)**[156] Mahan Political Economy: Evidence from Ceramic Geochemistry**

Emerging data from the Mahan cultures of South Korea are fundamentally changing our understanding of this complex society and its relationship with Korea's early states. Using INAA data on ceramic geochemistry, patterns of production traditions and trade relationships reveal a political economy based largely on local production but incorporating production of more prestigious wares at a distance from major settlements, as well as the collection of pottery originating from other regions. As historical narratives have depicted Mahan as an advanced but decentralized society, this kind of evidence is crucial to interpretations of the internal function of individual Mahan polities, and the nature of their alliance with other cultures falling under the broad label of Mahan. This study will thoroughly interrogate the notion of Mahan-ness and the ramifications for Korean state formation.

Walter, Richard**[36] Late Paleoindian Earth Ovens in the Texas Big Bend**

Over the last eight years, the Center for Big Bend Studies (CBBS) has investigated a number of Late Paleoindian thermal features in the Big Bend region of Texas. Excavation of these features and attendant laboratory analyses have provided new insights regarding hot rock cooking by these early hunter/gatherers. This presentation will provide a summary of the findings from these features including data from various analyses.

Walter, Richard [354] see Greig, Karen

Walter, Tamra, Joe Rogers (Texas Tech University) and Valentina Martinez (Florida Atlantic University)**[88] Preserving the Faith: Archaeological Investigations at Mission San Lorenzo (41RE1), Camp Wood, Texas**

The Franciscan mission of San Lorenzo, established in 1762, survived for 6 years as an unsanctioned mission before closing its doors in 1768. Since its abandonment, the site has suffered from both the ravages of time and human interference. Today, the mission is located in the small community of Camp Wood, Texas where it has long been an important part of local history and efforts are currently underway to help preserve, interpret, and re-vitalize the site. Specifically, recent excavations focused on recovering information about the site's built environment with particular attention paid to mission layout and construction styles. While some foundations are still intact, subsequent events including fires, the construction of a 19th century military camp, and well-intentioned attempts to reconstruct the mission in the mid-20th century have greatly impacted the integrity of the site. The identification of each of these events and their subsequent effects as well as careful mapping and recording of architectural features are providing insight into the mission's current state of preservation and future needs. Moreover, archaeological, historical, and geographical lines of evidence have also been used to create a timeline of events and a more complete image of the mission plan.

Walton, David (Lake-Sumter State College)**[116] Obsidian Tool Functions at Early Formative Altica, Mexico**

In central Mexican archaeology, tool functions have often been assumed for lithic artifacts based on material types and tool forms, which are classified broadly with labels such as bifaces, scrapers, blades, and flakes. Integrating the method of use-wear analysis derived through experimental archaeology is the most effective way to improve our understanding of tool functions in future studies. This poster draws on my experience with over 300 experiments involving obsidian tools and 30 materials in order to classify tool functions for 300 artifact specimens from Early Formative (1250-850 cal. BC) contexts at Altica, Mexico. Altica is the earliest recorded farming settlement in the Teotihuacan Valley and the only Formative site located within a day's walk to the Otumba obsidian source. Excavations at Altica indicate a domestic economy that involved large quantities of simple percussion flakes and percussion blades, and high frequencies of woodworking use-wear patterns observed on these specimens may reflect household craft specialization. Other activities that were accomplished with obsidian tools at Altica included: hunting small game; slicing maize and soft plants; butchering animals and slicing meat; extracting fibers and producing pulque from maguey plants; crafting tools made of bone; cutting stone; and shaping clay,

likely for ceramic production.

Walton, Lauren (Plateau Archaeological Investigations), Brandon McIntosh (Plateau Archaeological Investigations), Dusty Pilkington (Central Washington University) and David Harder (Plateau Archaeological Investigations)

[66] *Cobbling Together the Story of the Sinlahekin Valley: Prehistoric Land-Use Patterns in North Central Washington State*

The prehistory of the Sinlahekin Valley in north central Washington State is not well known. The archaeological record suggests the valley has attracted human occupants since the terminal Pleistocene. Various riparian, lacustrine, and mixed conifer ecosystems with the high elevation of surrounding mountain peaks have provided access to multifarious floral and faunal resources in antiquity, and supports agricultural productivity into the modern period. Scores of archaeological sites, both prehistoric and historic, have been recorded within the valley, but these data have yet to be sufficiently synthesized to provide a detailed understanding of land-use patterns across time. In this paper, we contribute to the cultural history of the Sinlahekin Valley by comparing prehistoric lithic assemblages. Comparing material and artifact type heterogeneity and relative spatial distribution patterns provides an understanding of how the valley was utilized during prehistory, highlighting the importance of local and non-local lithic raw materials, how these resources were utilized, and the natural contexts of these behaviors. The results of this study carry implications for a greater understanding of Columbia Plateau culture history, a comprehensive understanding of the human history of the valley, and provides greater cultural context for land management in the Sinlahekin Wildlife Area.

[66] *Chair*

Wambold, Dawn (University of Alberta), Eric Tebby (University of Alberta) and Kisha Supernant (University of Alberta)

[161] *Beading a Nation, Beading a People: The Role of Métis Women's Beadwork in Crafting Culture*

The embodied act of crafting can bring into being a physical representation of relations and ways of being in the world. In 1945, ethnologist John C. Ewers reported that the Sioux word for the Métis in Canada translates as "the flower beadwork people". With influences from their First Nations and settler ancestors, Métis beadwork has come to be recognized as a stylistically distinct artwork of its own and a means through which Métis women craft their relations to their kin, both human and non-human. Archaeological evidence of beadworking activities may be regarded as one of the diagnostic features of potential Métis sites. In this paper, we explore how the beadwork of Métis women has contributed to the crafting of Métis culture and how it demonstrates the complex web of relations through time and space that help define the Métis Nation, past and present. We trace the development of beadwork as a craft and the concurrent rise of the Métis Nation within the context of the 18th and 19th century Canadian fur trade. The subsequent coalescence of a distinct Métis beadwork style continues to be practiced by contemporary Métis beaders and artists, echoing ancestral relations and connecting past and present.

Wang, Chunxue, Jiaqi Wang (School of Archaeology, Jilin University), Lingyu An (School of Archaeology, Jilin University), Yuying Ren (School of Archaeology, Jilin University) and Quanjia Chen (School of Archaeology, Jilin University)

[299] *Experimental Study of Ostrich Eggshell Beads Collected from Shuidonggou (SDG) Site, China*

Ostrich eggshell beads and fragments collected from the Shuidonggou (SDG) site reflect primordial art and a kind of symbolic behavior of modern humans. Based on stratigraphic data and OSL dating, these ostrich eggshell beads date to the Early Holocene (less than 10 ka BP). Two different prehistoric manufacturing pathways are usually used in the manufacture of ostrich eggshell beads in Upper Paleolithic. In Pathway 1, blanks are drilled prior to being trimmed to rough discs. Statistical analysis of the characteristics of ostrich eggshell beads indicate that Pathway 1 was used to make the SDG beads, which exhibit great potential for the study of the origin of primordial art and the development of ancient cultures. They also provide important data for studying behavioral options adopted by hominids in SDG area, and bear important implications for the origin of modern humans in East Asia.

Wang, Chunxue [389] see Wang, Jiaqi

Wang, Fen [361] see Wang, Yifan

Wang, Hong [27] see Carter, Alison K.

Wang, Jiaqi [299] see Wang, Chunxue

Wang, Jiaqi (School of Archaeology, Jilin University), Chunxue Wang (School of Archaeology, Jilin University), Shaowu Lv (Key Laboratory for Molecular Enzymology & Engineering), Lixin Wang (School of Archaeology, Jilin University) and Quanchao Zhang (School of Archaeology, Jilin University)

[389] Identification of Adhesive on Bone-Handled Microblades from the Houtaomuga Site in Northeast China

With the emergence and progress of composite tools in the Upper Paleolithic, the adhesive became one of the most widely used materials by early human societies. However, the precise composition identification of adhesive in archaeological remains is a real analytical challenge, because the adhesive mainly consists of organic materials that are susceptible to decay during burial process. Of particular interest is to know which animal/plant species were being exploited for glue manufacturing. The Houtaomuga site, located in northeast China, provides favorable conditions for the preservation of organic residues. A few bone-handled microblades were collected from this site, with some gray adhesive exposed in the groove of bone handle. In this study, we scraped micro adhesive samples of bone-handled microblades, and we have carried out FTIR (Fourier Transform Infrared Spectroscopy) and proteomics analysis to determine the protein components and precise origins. The identified from tandem mass spectra of doubly protonated tryptic peptides match most closely to known horse collagen markers, suggesting the adhesive was an animal glue made from horse. These results reveal the diverse utilizations of cattle in the Houtaomuga site, which provided not only meat and hides, but also parts for manufacturing adhesive.

Wang, Lixin [389] see Wang, Jiaqi

Wang, Liying [175] see Marwick, Ben

Wang, Li-ying and Ben Marwick (University of Washington)

[127] Investigating Craft Specialization and Pottery Standardization Using Geometric Morphometry of Vessel Shapes from Iron Age Northeast Taiwan

Changes in craft production over time can indicate shifts in past social structures. However, traditional typological and linear measurements of vessels are limited because they can be insensitive to subtle variations resulting from changes in craft specialization. To overcome this limitation, we measured craft specialization using standardization of pottery shapes to identify changes in pottery production. Using the R programming language, we applied reproducible geometric morphometric methods to study pottery shapes from Kiwulan, a large multi-component Iron Age site in northeast Taiwan, to investigate changes resulting from foreign contact with European and Chinese groups. We found significant differences in shape and shape standardization that indicate changes in pottery production resulting from foreign contact. We interpret this as increasing craft specialization and changes in social organization. Our case study, which includes an openly available research compendium of R code suitable for use with any other assemblage, will help to expand the use of shape-based quantitative methods to questions about craft specialization and standardization in prehistoric ceramic technologies.

Wang, Shujing (ISAW, New York University)

[267] Mortuary Practices, Production and Exchanges in the Borderland: A Case Study from the Bukhara Oasis (Uzbekistan)

This paper investigates potteries excavated from the Late Iron Age kurgan burials (i.e., burials with an aboveground mound)

at the fringes of the Bukhara oasis in present-day central Uzbekistan. Connecting the intensively farmed river oasis and the desert steppe, the border of Bukhara oasis as a frontier zone was also an arena in which complex social and economic interactions between pastoral and agricultural populations took place. The rich funerary ensemble located at this borderland includes more than 1000 kurgan burials, the major burial goods from which are wheel-made potteries. Combining a scrutiny of the burial contexts, especially the related mortuary practices, the chronological and the pXRF-based compositional analyses of these potteries, this paper seeks to explore the regional production, exchanges, consumptions and local cultural sequence in the Bukhara region. Through this examination, this paper aims to bring the discussion of mobile pastoralists away from models of mass migration and long-distance exchange but to emphasize their interaction and integration with local agricultural communities in the borderland of the oasis.

Wang, Yifan (Shandong University), Yu Dong (Shandong University), Fen Wang (Shandong University) and Fengshi Luan

[361] *Animal Resources Utilization and Management at the Late Neolithic Dinggong Site, China: Evidences from Stable Isotope Analysis*

The long-term excavations at Dinggong, a late Neolithic site in northern China (c. 2600-2000 cal. BC), have uncovered extensive human and faunal remains with clear contextual information. We carried out stable carbon and nitrogen isotope analysis of faunal remains to investigate the animal resources utilization and management of this site. By integrating the results of stable isotope analysis and morphological measurements, we found diverse management strategies for pigs or potentially co-existence of domestic pig and wild boars. Meanwhile, the results of this study show that some livestock (such as dog and pig) were similar to ancient humans that mainly consumed C4 food (millets), which suggested that animal husbandry and crop cultivation were closely integrated. The difference of food structure among different kinds of animals may be related to domestication states, natural habitats and feeding strategies. This study also demonstrates that beyond its applicability for palaeodietary reconstruction and animal domestication, stable isotopic analysis of archaeological animal remains has important implications for understanding the relationship between humans, animals and plants in an archaeological context.

Wang, Zhanghua [242] see Shao, Lei

Wang, Zhen [361] see Li, Yue

Wangdui, Xiage [78] see Tang, Liya

Wann, Kevin (Murray State University), Lacy Risner (Murray State University) and Marcie Venter (Murray State University)

[158] *An Examination of Middle Formative through Early Classic Ceramic Attributes from Stratified Contexts at Matacanela, Veracruz*

This study compares Middle Formative through Early Classic period ceramic attributes, including temper size, type, and abundance, from stratified deposits at Matacanela Site in Veracruz, Mexico to other contemporaneous sites located in the Tuxtla Mountains and riverine bottomlands in the southern Gulf Lowlands. Specifically, the study compares data from excavated deposits at Teotepec, located within the western Tuxtla uplands, and San Lorenzo within the Coatzacoalcos Basin. On the basis of obsidian source distributions, it has been hypothesized that Matacanela was located along a boundary between these two geographically different areas. This paper attempts to discern if Matacanela's location along a geographical boundary is reflected also in the technological choices that potters were making—whether geographical and other exchange networks were also reflected in ceramics. Lastly, we hypothesize other potential sources of divergence between sites.

Wanstead, Chelsea and Melinda Rogers (Department of Anthropology, Texas State University)

[172] *Identifying Genogeographic Affiliation of Burials from an 18th Century Cemetery on Sint Eustatius, Dutch Caribbean*

During the 18th century, Sint Eustatius (Statia) was the home to colonial Europeans, including Dutch, British and French, as well as enslaved and freed individuals of African descent.

This research explores the genogeographic affiliation of individuals from an unmarked 18th century cemetery located close to both a Dutch military and trading fort and a sugar plantation. It has long been unclear whether the individuals interred in the cemetery were soldiers from the Dutch fort or individuals of African descent who lived and worked on the plantation. The goal of this research is to determine if there is one or more genogeographic group buried in the cemetery. Ancestry was estimated for burials with the cranium and/or dentition present using statistical analysis of craniofacial and dental morphology. Most of these burials closely classify with reference samples of African descent, suggesting that this cemetery was used by enslaved Africans from the nearby plantation.

Ward, Christine (Espinoza Consulting Services)

[245] Bright Spots in a Drab Landscape: Color Use and Symbolism in the Jornada Region

"Color" often evokes thoughts of vibrancy, boldness, and distinctiveness. With no denigration or judgement of the area intended, a casual visitor to the Jornada region may not be left with such impressions. Miles of exposed sands, stark mountains, and sparse vegetation do not immediately bring images of bright and unique coloration to mind. A more intimate and perceptive relationship with the landscape, however, reveals the sometimes-fleeting moments of brilliance that abound. Mountains, lacking the thick or even moderate-density of vegetation of other regions, show off their constituent elements; sunrises and sunsets reflect off these mountains and desert floors; the sky, so often barren of clouds, provides a vivid backdrop against the earthen landscape, and the flowering of plants in the immediate aftermath of rare precipitation all add vibrancy and boldness. In this paper, I explore how Formative period populations in this region might have envisioned, selected for, made, and used color to reflect and emphasize these moments of vibrancy, stress the import of relationships, and symbolize their world in their material culture.

Ward, Grace [99] see Grooms, Seth

Ward, Jerome (Pacific Palynology)

[29] Kanaloa: Lessons from Paleoecology of a Once Common Lowland Forest Species in Hawai'i

During the late 1980s and early 1990's paleoenvironmental investigations at wetland sites in coastal lowlands of O'ahu and Mau'i revealed a very common unknown mimosoid pollen type occurring during pre-Polynesian times. Following Polynesian arrival in the islands around AD 1000, sediment profiles consistently documented the abrupt decline and disappearance of lowland native forest elements, including the unknown mimosoid type, within a matter of several hundred years. The forest was mostly replaced by successional taxa, including grasses, cheno-ams, and ferns. While most of the fossil pollen types could be botanically ascribed using a reference collection of modern pollen, the fossil mimosoid type, lacking a botanically described counterpart, remained elusive. In 1992 the serendipitous discovery of a new mimosoid legume, surviving on a sea-stack separated from the main island of Kaho'olawe was reported and subsequently named *Kanaloa kahoolawensis*. Using single grain microscopy technique, pollen obtained from flowers of one of the surviving Kanaloa specimens showed that its characters aligned perfectly with the fossil mimosoid type. This paper explores the paleoecology of Kanaloa in Hawai'i with interesting implications for Hawaiian vegetation history and conservation biology.

Ward, Naomi [116] see Ricketts, Macy

Ward, Naomi (University of Wyoming), Macy Ricketts (University of Wyoming), Rachael Shimek (University of Wyoming), Mary Lou Larson (University of Wyoming) and Marcel Kornfeld (University of Wyoming)

[329] Genetic Analysis of Microbial Community Structure in Soils from the Hell Gap Witness Block

Paleomicrobiology is probably best known as an approach that yields anthropological findings connected to human health and disease, such as long-term records of oral microbiomes recovered from ancient dental calculus. However, the tools of microbial ecology have been tested for their potential to address other anthropological questions and aid in paleoclimatic reconstruction and dating. The latter category includes an experimental approach (Trophic Group Method) that assumes the physiological properties of present-day bacteria in buried paleosols can serve as indicators of climate aridity at the time of soil formation. The method was first systematically tested on samples collected from the Hell Gap Witness Block (Grund et al., 2014; Viable paleosol microorganisms, paleoclimatic reconstruction, and relative dating in archaeology: a test case from Hell Gap, Wyoming, USA; J. Archaeological Science 46:217-228). This intriguing study prompted us to explore alternative paleomicrobial methods that directly analyze cellular macromolecules without prior bacterial cultivation to better understand the relationship between extant bacteria and past climate. We will report on microbial community structure in a

Hell Gap soil column collected from the north wall of the Witness Block in 2018. Community composition is being determined through high-throughput DNA sequencing of biomarker genes for bacteria and fungi.

Ward, Sheila [30] see Brokaw, Nicholas

Ward, Timothy [258] see Terlep, Michael L.

Warden, Robert (Center for Heritage Conservation, Texas A&M) and Benjamin Baaske (Texas A&M University)

[63] *Towards a Museum Quality Artifact: 3D Documentation of Maya Artifacts from Blue Creek, Nojol Nah, Tz'unun, and Xno'ha in Belize*

Large collections of culturally significant material are often at a heightened risk of destruction simply due to their collective proximity. Organizations and individuals have begun to recognize the vulnerability of the artifact. The artifact is not something that can be easily copied and reprinted. Artifacts often possess a highly complex matrix of 3-dimensional and material qualities. The Blue Creek Archaeological Project recovers and documents immense amounts these highly complex artifacts. Digital archaeological techniques such as photography, photogrammetry, laser scanning, structured light scanning, etc. have emerged as favorable solutions to the problem of the mortal artifact. The Center for Heritage Conservation has worked closely with the project to apply these techniques and build a digital archive of recovered artifacts. This collection raises issues of proper visualization and dissemination of culturally sensitive to broader audiences.

Warden, Robert [63] see Austin, Kevin

Wardle, Joseph

[26] *Variation in the Configuration of the Middle Snake River and its Relationship to Prehistoric Fishing Site Locations*

The configuration of the various elements of a river system can have significant impacts on the availability, abundance, and nutritional profitability of aquatic organisms utilized as food by groups of human foragers. These factors may have influenced where and when Late Archaic foragers decided to fish along the Middle Snake River in southern Idaho during the transition to increased use of fish (beginning approximately 1500 B.P.). Previous work has established a relationship between physiographic features of the Middle Snake River channel and the presence of fishing sites. To expand on this, it is important to question two assumptions: 1) that the category of "fishing site" is useful and defensible; and 2) that the configuration of the Middle Snake River was static over the period when archaeological evidence suggests increased use of fish. This study assesses the argument that archaeological site location, regardless of evidence for fishing, should be influenced by physiographic features of pre-dam channels and how those features could have changed over time.

Ware, John

[308] *Beyond the Household: The Evolution of Nonresidential Organizations During the Southwest Neolithic*

The basic building blocks of human communities are residential groups held together by ties of kinship. As communities increase in number and size during the Neolithic, residential kinship groups persist, of course, but new institutions may emerge that draw their members from multiple residential groups. These "nonresidential groups" may affirm existing principles of kinship in new ways (lineages, clans, sections, moieties), or newly formed groups may cut across kinship boundaries in favor of common interest or special purpose (associations or sodalities). For whatever principle or purpose they originally formed, however, all nonresidential groups have an important latent function: "Because they are made up of persons who are not organized due to mutual residence, they unify persons who belong to different residential groups" (Service 1963:xxii). The archaeological delineation of residential kinship groups is comparatively straightforward since households often fill standardized architectural containers (structures with sleeping, heating, and cooking features, storage facilities, etc.). Nonresidential groups can be much harder to detect, and in recent years archaeologists have mostly stopped trying. This paper counters recent trends by addressing the archaeological recognition of nonresidential groups among the Pueblo peoples of the northern Southwest.

Ware, Roselyn [302] see Allaby, Robin

Warinner, Christina [253] see Lindo, John

Warnasch, Scott [121] see Watson, Monet

Warner, Jacob (Louisiana State University), Elizabeth Cruzado Carranza (Louisiana State University) and Mary Avila (Universidad Nacional Mayor de San Marcos)

[289] *Political Economy at a Casma Valley Middle Horizon Center: Evidence from Pan de Azúcar de Nivín, Peru*

Since 2017 the Proyecto de Investigación Arqueológico Nivín seeks to clarify the cultural affiliation of the groups that occupied the middle Casma Valley, Peru. Architectural and ceramic features demonstrate the influence of both Wari and Casma cultural traditions at Pan de Azúcar de Nivín (PAN), a site occupied AD 950-1150. While the Wari Empire expanded from the southern highlands of Peru in the Middle Horizon Period, the Casma polity and ceramic tradition emerged along the north-central coast during this time as well. However, there is little research into the political economy of the Casma Valley during the Middle Horizon. Exactly how and why did PAN grow as part of a complex polity; which were the cultural affiliations of the groups that occupied PAN, and how did political economy and subsistence patterns materialize archaeologically? We reconstruct the economic focus of the site using macrofaunal, macrobotanical, and marine shells in conjunction with architectural and ceramic evidence recovered from the 2017 field activities. We approximate the original function of the site within the broader political economy of the Middle Horizon in the Casma Valley, involving other areas of the valley and wider trade networks.

Warner, John [64] see Huntington, Yumi

Warner-Smith, Alanna

[69] *Commingle Stories, Embodied Inequalities: An Historical Bioarchaeology of the Huntington Irish*

The George S. Huntington anatomical collection is comprised of the skeletal remains of some 3600 immigrants and U.S.-born individuals. These persons—who are now collectively named for the doctor who collected them—were gathered from institutions, hospitals, and almshouses around New York City between 1893 and 1921. They were dissected as part of anatomical instruction at New York's College of Physicians and Surgeons and subsequently became part of the doctor's comparative skeletal collection. These skeletal remains provide insights into health and inequality in the nineteenth century. By treating the laboratory space in which they are currently stored as a mortuary site, I excavate and articulate these individuals' various traces—archival, skeletal, and material. This historical bioarchaeological approach allows for the examination of the ways in which the treatment of these individuals in life and in death sheds light on the effects of inequalities over the life course. Such insights have important implications for how we conceptualize poverty, for how we define ethical practices in archaeology, and for our understandings of long-term histories of inequality embodied in immigrant bodies.

Warren, Kea (Arizona State University)

[373] *Ceramic Evidence for Immigration among Households at Calixtlahuaca in the Toluca Valley*

Calixtlahuaca is a Middle-to-Late Postclassic (A.D. 1130-1530) Mesoamerican site located in the Toluca Valley of Central Mexico. While originally a Matlazinca settlement, the site was conquered by the Aztec Empire, and documentary evidence suggests subsequent Mexica immigration to the region. I use the site to examine immigration patterns based on the Aztec-style ceramics found within household contexts. This poster uses attribute level data of ceramics to address the differences between imported Basin of Mexico ceramics as opposed to local imitations, in order to assess whether the pottery was imported from the Basin of Mexico, made by Aztec craftsmen who immigrated to Calixtlahuaca, or if the imitations were produced by local craftsmen in an attempt to copy the Aztec style. In turn, this will help address the larger question of what groups of people were sent out by the Empire to establish a presence in conquered areas.

Warren, Matthew (University of Texas at San Antonio)

- [355] *Aryballos, Bowls, and Bolas: Examining the Distribution of Provincial Inka-Style Pottery in the Threatened Borderland Region of the Valles Cruceños*

As the violent threat posed by the marauding Chiriguanos emerged in the terminal decades of Tawantinsuyu, the Inkas and their local allies made a concerted push to turn the southeastern imperial frontier into a strategically fortified zone and enhance their ability to repel the lowland invaders. Within the vulnerable valles cruceños, this led to the establishment of numerous fortresses and the development of the tampu site of Pulquina Arriba into a small administrative center. Despite the efforts to consolidate their hold over the region through such infrastructural investments, the Inkas seem to have disseminated relatively little of their imperial-style material culture across the valles cruceños. This represented a notable contrast to the patterns observed among Inka settlements in adjacent territories, even those similarly at risk from the hostile incursions of the Chiriguanos. In this talk, I will (1) discuss the characteristics and contexts of such ceramics recovered within the Pulquina Arriba area, (2) review the broader spatial distribution of Inka-style pottery across the valles cruceños, and (3) consider the implications these local and regional patterns have for our understanding of the targeted use of imperial material culture in the embattled southeastern borderland region of Tawantinsuyu.

Warren, Stephen (University of Iowa)

- [162] *Visualizing Diaspora: Fort Ancient and Shawnee Migrations in Early America*

Soon after the De Soto Expedition (1539-1542), Fort Ancient peoples from the Middle Ohio Valley abandoned their summer villages. For twenty generations, village life in this region had been both egalitarian and stable. Through a close reading of archaeological sources, including laser ablation testing of late Fort Ancient ceramics, we now know much more about migration out of the Middle Ohio Valley. Reading these sources alongside archival data helps explain why this region became a vacant quarter in the proto-historic period. Thousands of people in diaspora abandoned their homelands and adopted altogether new approaches to economic and cultural survival. By 1755, British colonizers were astounded at the Shawnees' capacity for travel and reinvention, labeling them "the greatest travelers in America." Through Community-Engaged Scholarship (CES), we created a database of Fort Ancient and Shawnee villages sites scattered across North America. In partnership with the Shawnee Tribe, we have tracked Shawnee migrations from the Fort Ancient Culture (+/- 1,000 A.D.) to 1871, the year of their forced removal from Kansas to modern-day Oklahoma. Close analysis of specific geographic and temporal contexts across this span of time reveals a general shift from entanglement to disentanglement well before the American Revolution.

Warrick, Gary

- [73] *Discussant*

Warrick, Gary [109] see Glencross, Bonnie

Washburn, Dorothy

- [243] *Flower World Concepts in Hopi Katsina Song Texts*

This paper explores the idea that the Flower World references the moral imperatives that need to be followed to live the corn lifeway. The Flower World describes the perfect life where people live communally, sharing and caring for each other, and, in turn, the rains come and all life is perpetuated. I explore how this idea is embedded in the words, phrases and grammatical constructions in the texts of katsina songs of the Hopi, a Uto-Aztec speaking people living in northeastern Arizona. Song texts are a particularly appropriate source for further understanding of the concept of the Flower World since Uto-Aztec speakers equate flowers with song, both of which connote the beauty of the perfect world.

Washburn, Eden (University of California Santa Cruz), Bebel Ibarra (Tulane University), Vicky Oelze (University of California Santa Cruz) and Lars Fehren-Schmitz (University of California Santa Cruz)

- [55] *Strontium Isotopes and Human Migration at the Archaeological Site of Marcajirca, Peru*

The archaeological site of Marcajirca, located in the Puccha River Valley, atop a steep ridge at 3800 masl, provides an interesting context in which to examine changes in human mobility patterns through time on both a regional and local scale. Extensive radiocarbon dating of both archaeological and human skeletal material place occupation of the site between AD 1040 and 1640. This time range allows us to address questions surrounding temporal changes in human mobility and population dynamics during the Late Intermediate Period and Inca occupation. This region, between the Andean plateau and the Amazonian rainforest, is characterized by diverse geological formations of differing ages, which makes the application of $^{87}\text{Sr}/^{86}\text{Sr}$ ideal to trace patterns of movement over long and short distances. Here we present new $^{87}\text{Sr}/^{86}\text{Sr}$ data measured from 58 individuals buried at Marcajirca. In addition, this study provides the first in-depth examination of baseline $^{87}\text{Sr}/^{86}\text{Sr}$ geological values for the region by analyzing a combination of modern plant (n=18) and faunal (n=22) samples to generate an expected local and non-local range of bio-available strontium ratios.

Waters, Gifford**[367] *The Spanish Missions of La Florida: Archaeologies and Histories of Contact, Colonization, and Resistance***

The nearly 200 years of Spanish mission activity in La Florida had profound impacts on the lives of both the Native Americans and Spanish. Missions were places of new contact, culture change, cultural continuity, religious instruction, and the locations of exchange and introduction of new foods, materials, and ideas. This presentation examines the decades of historical and archaeological research on the Spanish mission system of La Florida, from its beginnings in the 16th century to its ultimate demise in the 18th century, in an effort to place the missions in the larger colonial landscape of the colonial Southeast. Combining historical and archaeological data can help inform how the Spanish missions functioned less as a force of colonization of Spanish Florida and more as a means to attempt to control the frontier and borderlands. Research has also informed on issues of contact and exchange, acceptance and resistance, and the active role Native American groups had in negotiating their place in the new colonial sphere in La Florida.

Waters, Michael [48] see Keene, Joshua

Waters, Nikki [69] see Roquemore, Katie

Watkins, Christopher [246] see Rice, Glen

Watkins, Joe (Archaeological and Cultural Education Consultants)**[1] *Discussant*****Watkins, Rachel (American University)****[60] *Discussant*****Watkins, Tia (University College London), Jaime Awe (Northern Arizona University) and Doug Tilden****[217] *Tunnel Vision: Results from the 2018 Investigations of Structure A7 at Xunantunich, Belize***

Despite nearly a century of archaeological investigation, the ceremonial center of Xunantunich, Belize has yielded little insight on the center's earliest occupants and the architectural growth of the site through time. Previous research indicated that Xunantunich was initially settled as a small village during the Preclassic period (~1000 BC-AD 250), with rapid growth in the epicenter beginning around AD 600 after a three hundred year gap in occupation during the Early Classic. This occupational gap is often used to question the timing of the center's appearance on the Classic period political landscape of the eastern Maya lowlands. During the 2018 field season, the Xunantunich Archaeology and Conservation Project, in collaboration with the Belize Valley Archaeological Reconnaissance Project, carried out investigations of Structure A7 in the Xunantunich site core. The initial analyses of architectural data and cultural remains from this investigation indicate continuous occupation and monumental construction at the site from the Preclassic through the end of the Classic periods. These results provide a framework for exploring the role of the site as a major political power in the eastern Maya lowlands.

perhaps as early as the beginning of the Classic period.

Watkins, Timothy [125] see Van Zandt, Tineke

Watrall, Ethan (Michigan State University)

[87] Building Capacity and Communities of Practice in Digital Heritage and Archaeology

As digital methods have become ubiquitous and critical in archaeology and heritage, the challenge of teaching those methods has become more complex. More importantly, we're being faced with an equally important challenge - how do we build and foster communities in which scholars are connected through a shared perspective on both the methods and the thoughtful application of those methods. It is within this context that this paper will explore an approach developed at Michigan State University that speaks to both teaching (and learning) digital methods and the development of communities of practice in which those methods are relevant. The approach itself is informed by the activities of three separate initiatives: The Cultural Heritage Informatics Graduate Fellowship Program, the MSU Department of Anthropology Digital Heritage Fieldschool, and the National Endowment for the Humanities funded Institute for Digital Archaeology Method & Practice. Ultimately, the goal of this talk is not just to discuss the Michigan State University approach, but to suggest a suite of best practices that could be adapted and adopted in a wide variety of institutional, professional, or scholarly settings.

Watson, Adam [153] see George, Richard

Watson, Caroline (Wake Forest University), Jacob Daunais (Wake Forest University) and Eric E. Jones (Wake Forest University)

[11] Settlement Ecology of 19th and Early 20th Century Farmsteads in Madison County, NY

This pilot research is using archaeology to examine the role of agriculture, particularly dairy farming, in the formation of historic and modern rural spaces and landscapes in the United States. Our larger goal is to describe and explain what rural is and how it was constructed by and has influenced people throughout the nineteenth and twentieth centuries. Given the current economic concerns and challenges in the rural United States and the role its inhabitants and their ideologies are cited as having in recent political and social trends (warranted or not), we feel that an anthropological and archaeological explanation of the formation of rural American culture is of vital importance. In this work, we employ GIS and discriminant function analysis to describe the spatial patterning of a sample of nineteenth and early twentieth-century Euro-American farmsteads from Madison County, NY in relation to various environmental and cultural landscape features. This includes an examination of changes over time in general settlement patterns and in particular family landholdings. Our results are contextualized in earlier Haudenosaunee settlement patterns in this area; in the social, political, and economic climates of American society during the period of interest; and in modern settlement and socioeconomic patterns.

Watson, James [16] see Villalpando, Elisa

Watson, James [202] see García-Moreno, Cristina

Watson, Jessica [312] see Bovy, Kristine

Watson, Jessica (University at Albany)

[319] Diversity and Use of Ducks and Loons at the Hornblower II Site, MA

Recent evaluation of avifauna from the Hornblower II site on Martha's Vineyard has revealed a rich diversity of birds, including Red-breasted loon (*Gavia stellata*), Common loon (*G. immer*), and various dabbling and diving ducks (Anatidae). The majority of the identified assemblage is represented by Anseriformes (70.6%) and Gaviiformes (17.6%), with very few gulls (4.2%), birds of prey (0.46%), and no Galliformes. This assemblage contrasts sharply with nearby sites, where birds are less frequently recovered and ducks constitute a much smaller portion of the collection. Many of these species are

found on the nearby Squibnocket Pond, where indigenous hunters may have captured ducks at night with torches and canoes as described in early Contact accounts (e.g. Denys 1908: 435-436). This paper will explore patterns of duck hunting and use at Hornblower II based on archaeological data and ethnohistoric accounts to understand their importance during the Middle and Late Woodland eras.

Watson, Monet (Seton Hall University), Rhonda Quinn (Seton Hall University; Rutgers University) and Scott Warnasch (SCWarnasch LLC)

[121] *The Geochemical Profile of the Woman in the Iron Coffin, a Mid-19th C. Burial in Queens, New York City*

Illegal construction excavation in Queens (NYC) unearthed a mid-19th C. iron coffin and exposed the burial interred within. Known as the Woman in the Iron Coffin, the well-preserved burial was a young adult female of African ancestry who died of small pox. Here we provide stable isotopic ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$, $87\text{Sr}/86\text{Sr}$, $206\text{Pb}/207\text{Pb}$) and elemental (Pb, As) concentration analyses of a second premolar and one strand of hair to provide information about the woman's mobility, diet and health during childhood and near the time of death. Compared to established $\delta^{18}\text{O}$, $87\text{Sr}/86\text{Sr}$, and $206\text{Pb}/207\text{Pb}$ isoscapes of the US, we interpret her geographic location during the time of tooth formation as local to the NYC region. The woman's dietary isotopic values ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) are similar to those of modern residents of NYC and to contemporary free Black communities from Mid-Atlantic states. Lead concentrations are high, suggesting close proximity to mid-19th C. wealth goods and also indicative of lead-caused health problems. We discuss how this geochemical profile bolsters archival-based interpretations of the identity of the Woman in the Iron Coffin and reveals aspects of her life as a free Black woman in Queens.

Watson, Patty Jo [312] see Levy, Janet

Watson, Sara (University of California, Davis), Marika Low (University of Wollongong) and Alex Mackay (University of Wollongong)

[277] *Patterns in Robberg Tool Manufacture and Discard at the Open-Air Locality of Uitspankraal 9 Western Cape, South Africa*

Robberg technology is found across southern Africa, but currently is known primarily from cave and rock shelter contexts. This study characterizes the nature of the assemblage from a discrete cluster of Robberg artifacts at the open-air locality of Uitspankraal 9 (UPK9) in the Doring River catchment of the Cederberg Mountains. UPK9 is situated on the banks of the Doring River and 4 km from a silcrete source at Swartvlei. Previous research on rock shelter sites in the catchment has noted that distance to the Doring River exerts considerable influence on the size, reduction intensity, and raw material composition of Robberg assemblages. From this, it has been proposed that groups in the area manufactured artifacts – notably cores and small blades – at the river before transporting them into other parts of the catchment. The UPK9 assemblage allows us to test aspects of this proposition by examining the character of at-source (hornfels) and near-source (silcrete) Robberg artifacts, as well as the raw material composition of the assemblage. We compare the results of our analysis with available data from the rock shelter sites Putslaagte 8, Klipfonteinrand and Mertenhof to explore local-scale technological organization before situating the assemblage within the broader Robberg technocomplex.

Watson, Sarah, Joshua Schnell (Brown University), Shanti Morell-Hart (McMaster University) and Andrew Scherer (Brown University)

[96] *Health Care in the Marketplace: Exploring Medicinal Plants and Practices at Piedras Negras*

Botanical residues recovered from the proposed marketplace area of Piedras Negras have revealed rich information about healing and medicinal activities of Classic Period inhabitants. Excavations in this sector yielded a high quantity of identifiable plant remains in the same contexts as human dental remains showing evidence of antemortem extraction. The characteristics of the recovered archaeobotanical and bioarchaeological remains, in combination with a high documented density of sweatbath structures, yield new insights into marketplace activities apart from the trade of durable goods. Our combined evidence indicates that medicinal practices were occurring within the marketplace area and that medicinal plants—and likely services—were a key part of the economic transactions within this sector of the site. With the aid of ethnohistory, we are able to posit healthcare qualities associated with the plant remains, as well as medicinal practices associated with dental care. However, we complicate basic understandings of “healing” with a critical look at how some medicinal plants may have been ritually invoked, even when never directly ingested or applied. The results of this study have greatly changed our understanding of the marketplace at Piedras Negras and likely elsewhere in the Maya area.

Watt, David [251] see Britt, Tad

Watts Malouchos, Elizabeth [168] see Buchanan, Meghan

Way, Amy (The University of Sydney) and Amy Tabrett (The University of Sydney)

[128] *New Simulation Tools for the Design and Assessment of Subsurface Testing Programs: Dig It Design It and Dig It Check It*

There is a general awareness among archaeologists that the intensity of a sampling program, i.e. the number of pits, their size and their spacing, has a strong bearing on discovery rates. However, rarely is the effect of this relationship explicitly assessed due to the difficulty of running the required mathematical models. This poster presents two simulation models: Dig It Design It and Dig It Check It which allow the archaeologist to easily design and assess subsurface testing programs using statistical modelling. Both models are available online, are very easy to use, and no mathematical knowledge is required to run them. These models have the potential to dramatically increase the use of statistically defensible sampling programs within the archaeological community, to improve site discovery rates, and to improve interpretations based on subsurface sampling by revealing the capabilities and limitations inherent in any subsurface sampling strategy.

Wayman, Joseph (Independent Researcher)

[95] *Experiment to Investigate the Effect of Animal Trampling on Flat Objects*

Researchers have found bifaces situated on edge at Acheulean sites in what are felt to be undisturbed sediments, and have posited that they were placed this way by early humans, offering a clue to the use of the devices. Opposing this, it has been argued that animal trampling of such objects will turn them on edge, challenging the idea that they were placed that way purposefully. Using benchtop devices, experiments are undertaken in an attempt to demonstrate this turning-on-edge effect. The author argues that if such effect exists, it could have been exploited by early human hunters setting bifaces in the ground as traps, and would have acted to keep the devices in the edge up, dangerous, animal damaging armed mode.

Weathermon, Rick [382] see Vanasdall, Wesley

Weaver, Brendan J. M. [170] see Ernst, Marlieke

Weaver, Eric [381] see McCrackan, Jennifer

Weaver, Kobi (LSU) and Heather McKillop (LSU)

[373] *Analysis of Marine Sediment by Chemical Signatures to Discover Evidence of Ancient Maya Activities at Site 74, Paynes Creek Salt Works, Belize*

This poster examines multi-element chemical analysis on sediment at the underwater Site 74 in Paynes Creek Salt Works, Belize. Site 74 was once an ancient Maya salt work. Due to sea-level rise, sea water and mangrove peat now cover the site. Sediment from the site was exported under permit to the Louisiana State University Laboratory for inductively coupled plasma- atomic emission spectroscopy testing (ICP-AES). ICP-AES measured the amount of 20 elements in the sediment. Maps showing variation in the elemental concentrations across the site were made. The study of rapidly-abandoned sites as well as ethnohistorical and ethnoarchaeological theory and methodologies were used to interpret the results. These tests were used to investigate how Site 74 was used, what activities took place, how the buildings were constructed and the spatial layout of the saltwork. This research builds towards a larger investigation of structure and usage of ancient Maya Salt Works in coastal Belize.

Webb, Dallin [186] see Morgan, Christopher

Webb, Dallin

- [222] *Cooperative Foraging Strategies and Technological Investment in the Western Great Basin: An Investigation of Archaeological Remains from the Winnemucca Lake Caves*

This research investigates evidence for the intensity and development of cooperative foraging strategies and investment in cordage and lithic technologies through time in the western Great Basin. It specifically addresses (1) when the region's inhabitants invested in cordage technology used to create cooperation-oriented nets; (2) when the region's inhabitants invested in flaked-stone technology used for individual, active-search hunting; and (3) when nets occur in archaeological deposits. I therefore develop a methodology geared toward assessing diachronic changes in frequency and type of different cordage and flaked-stone technologies in the Winnemucca Lake Caves over the course of the Holocene (10,300–150 cal B.P.). The results of this study indicate that investments in cordage, netting, and flaked-stone technologies were greater during the Middle Archaic than during any earlier or later time period. Investment in these technologies increased during the Middle Archaic alongside growing human populations and ameliorating environmental conditions, suggesting that these factors may have played a role in the development of increased cooperation and technological investment during the western Great Basin's Middle Archaic Period.

Weber, Aimee [368] see Holliday, Vance

Weber, Sadie [64] see Young, Michelle

Weber, Sadie [315] see Velasco, Matthew

Webster, David (Penn State University)

- [79] *Demographic Scale of an Early Classic Maya Regional Conflict*

Recent projects in the Buenavista region, some 25 km to the east at Tikal, reveal a landscape of probable Early Classic conflict. What seem to be large defensive features are positioned on a frontier between El Zozt and the Tikal polity. Despite the impressive size of these features, which are still poorly dated, the contending populations of the two regions were probably very small. If so, they provide insights into the conduct, organization, and leadership of Maya war.

Webster, Laurie [76] see Gearty, Erin

Webster, Laurie (University of Arizona) and Erin Gearty (National Park Service)

- [313] *Perishable Insights into the Cultural Boundaries of Basketmaker II: Collections Research from the Cedar Mesa Perishables Project*

Recent research by the Cedar Mesa Perishables Project has documented more than 1500 textiles, baskets, wood, hide, and feather artifacts dating to the Basketmaker II period in southeastern Utah. Using data derived from sandals and other clothing articles, decorated baskets, human hair artifacts, hunting paraphernalia, and other perishable industries, we explore variability as well as shared attributes in Basketmaker II social, subsistence, ritual, and mortuary practices. Our study area includes the Colorado River on the west to the Abajo Mountains on the east, and surrounding areas in between. This important documentation of large and diverse perishable collections generates a more nuanced understanding of the Basketmaker II cultural landscape of the Four Corners region.

Weeks, Lloyd [352] see Roberts, James

Wei, Qiaowei

- [242] *Made Locally or Long-Distance Transportation? New Evidence on Ceramic Vessels from Salt Production Sites of Late Shang Period in North Shandong*

Questions about the salt production in Ancient China have been examining the function, typology, and chronology of a certain type of ceramic vessel, the Kuixingqi (Helmet-shaped vessel). Instead of examining typology of Kuixingqi vessels from salt workshops at North Shandong region, dated to 1000 BC, I will begin by looking at how those Kuixingqi vessels made and transported into the salt workshops, if those vessels are not made locally. I present the findings of the ceramic petrographic analysis conducted on Kuixingqi vessels, of which I present the ceramic material components by the low res microscope. This analysis will give us better understanding of how ceramic vessels are made for salt workshops, and what is the baseline for salt workshop management of the production process.

Wei, Shanshan

- [130] *A Study of Flexed Burials in the Central Lake Region of Yunnan: from Neolithic to Bronze Age*

The flexed burial is a distinct burial style that has prevailed in various regions of China since ancient time. Scholarly interest in flexed burials in the Central Lake region (Lake Dian and adjacent lands) of Yunnan began after discovery of a grave in 1955 during the excavation of the ancient necropolis at Shizhaishan. This topic became researched extensively after more flexed skeletal remains were found in ancient settlements and burial sites in the Central Lake region. Quantitatively, flexed burials account for a small proportion of burials in the entire Central Lake region, but this unique mortuary style appears to have conveyed special meanings and therefore deserves further investigation. Incorporating relevant archaeological materials from areas surrounding Yunnan, this project explores the reasons that led to the presence of flexed burials in the Central Lake region during the Neolithic era and Bronze Age, and discusses the evolution of this unique burial custom over time.

Weibe, Olivia [390] see Biddle, George

Weinberg, Camille (University of Texas at Austin), Jo Osborn (University of Michigan) and Kelita Pérez (Pontificia Universidad Católica del Perú)

- [182] *The View from the North: Topará and Early Horizon Commoner Lifeways at Jahuay, Quebrada Topará, Peru*

Just north of the Chincha Valley, the village site Jahuay at the mouth of the Topará valley offers an opportunity to investigate non-elite lifeways, and specifically the Topará cultural tradition, in the Chincha region during the terminal Early Horizon Period (approximately 250-1 BCE). This paper presents new results from the 2018 Jahuay excavations, which expanded on 2017 excavations that sought to re-examine the site following Edward Lanning's 1953 investigations that defined the Topará ceramic seriation. In this paper, we describe Topará cobblestone architecture and mortuary remains from Jahuay, and we discuss the abundant material evidence that these littoral villagers depended on both maritime and agricultural subsistence products. Finally, we consider the implications of Jahuay's location between the Chincha and Cañete Valleys and seek to contextualize the site within what we understand about the Early Horizon sociopolitical landscape of the Chincha region.

Weinberg, Camille [182] see Larios, Jennifer

Weiner, Robert (University of Colorado Boulder)

- [24] *Night and Darkness in Chaco Canyon*

Chaco Canyon, an ancient monumental center in the Four Corners (ca. AD 800-1200), has long been a locus of charged nighttime activity. Visitors today are awed by the clear, dark, and vast night skies, and archaeoastronomical research at Chaco has revealed an extensive settlement design reflecting celestial movements. Investigating nighttime at Chaco requires a multidisciplinary approach that combines archaeology, ethnography, sensory studies, psychology, and cross-cultural research. I employ these methods to consider the role of darkness within Chacoan architecture; nighttime activities and the temporality of gatherings governed by moonlight; and commemorations of transitional moments between day and night. Special attention is given to a theme in Navajo oral traditions of female individuals in ancient Chacoan society who were restricted from setting foot in sunlight. I consider this motif from mythographic, ethnological, and archaeological

perspectives. Combining data and imagination, the study of night reveals not only novel aspects of the archaeology of Chaco, but a domain of experience shared by humans worldwide.

Weiner, Robert [81] see Shepard, Lindsay

Weinrich, Kendra [310] see Williams, Leslie

Weinstein, Richard [108] see Evans, Amanda

Weintraub, Neil [12] see Reid, Connie

Weir, Donald (Commonwealth Heritage Group)

[139] *Discussant*

Weir, William (University of Cincinnati)

[301] *The Development of Plain and Monochrome Wares in Protohistoric Bronze Age Cyprus*

This paper will explore the development of the locally produced Plain and Monochrome ware pottery at the Protohistoric Bronze Age (1700-1200 BC) sites of Episkopi-Phaneromeni and Episkopi-Bamboula in Southwestern Cyprus. The Protohistoric Bronze Age is a dynamic time for pottery production on Cyprus. It is characterized by the emergence of new fine wares, the steady increase in pottery trade, and new methods of pottery production. These developments are intimately linked to changing eating and drinking practices throughout the period. Two mechanisms of development that indicate different responses to changing practices of consumers will be shown, one from the earlier Red Polished tradition and another from the new Plain Ware tradition. With evidence spanning nearly 500 years, several questions will be addressed: how do the local producers at these sites respond to changes over time, what social and economic implications does this have for producers and consumers, and how can similarities and differences between pottery producing communities be used to illustrate the local tastes, behaviors, and practices of their consumers?

Weis, Kaitlyn N. [325] see Carmody, Stephen B.

Weismantel, Mary (Northwestern University)

[179] *Ungendering Sex in Moche Ceramics*

Moche ceramic art (Peru, first millennium) is a corpus of veristic images including explicit depictions of sex acts and human genitalia. Because anatomical sex is so visible in these artifacts, the temptation to collapse sex and gender is strong – but what if we begin, instead, by resisting this impulse? In my work with the Moche ‘sex pots’, I have tried to resist relying on ‘common sense facts’ including the sex/gender binary and heterosexual definitions of reproduction, looking instead for meaning that emerges from the corpus itself. This approach requires a high tolerance for ambiguity, and can be disappointing for those hoping for a clear-cut feminist, queer or trans political message. The results, however, include deeper insights into indigenous notions of embodiment, individuality and collectivity, which, I will argue, may include a collective ‘interior’ self and an individualized surface appearance, in contrast to the typical modern Western notion of a hidden interior ‘true’ individual self and a ‘false’ surface presented to others. Another result, of course, is a much richer appreciation for the deliberate deployment of gender ambiguity in the ancient Americas.

Weiss, Michael (Cornell University)

[196] *The Agricultural Lexicon of Western Indo-European: Crop Names*

The first speakers of Indo-European languages who entered Europe brought with them a fairly coherent agro-technological package. This is clear from the significant agreements that can be shown to exist in the lexicon describing the ard and its subparts among the Western Indo-European languages. Additionally, the absence of substratal words in this lexical field suggests that the bearers of Indo-European speech did not adopt much technology from the agricultural peoples already in place throughout Europe. In this talk I will examine the lexicon for crop names in the Western Indo-European languages. Archaeological evidence suggests that the speakers of PIE were familiar with 'barley' and 'wheat', yet no single lexical item referring to a specific species of grain can be reconstructed for the highest node of PIE. In light of this situation it is worthwhile to examine the lexicon for specific crop names in the Western Indo-European languages. What innovations can we identify? To what extent can these innovations be attributed to the sub-nodes Proto-Italo-Celtic or Proto-Western Indo-European? To what extent can these innovative names be attributed to substratal influence?

Weitzel, Elic (University of Connecticut)

[35] *Crop Management and Domestication in Eastern North America Inspired Both Cooperative Niche Construction and Territorial Competition*

Much recent research has emphasized the importance of both within-group cooperation and between-group competition in the human past. We hypothesize that the shift from foraging to food production in Eastern North America provided novel ecological conditions which impacted human sociality in the region, shaping patterns of cooperation and competition. We predict that 1) successful exploitation of the Eastern Agricultural Complex required an elevated degree of cooperation leading to site aggregation, and 2) continued human population growth and aggregation inspired a shift from cooperative to competitive settlement pattern dynamics, driving declines in site suitability. Our results demonstrate that there was a shift from randomly-distributed sites in relatively lower-quality locations to significantly clustered sites in higher-quality locations coincident with crop management and domestication in the Middle and Late Holocene, but that site quality declined after the adoption of the full crop complex in the Late Holocene. As predicted, these results indicate that niche construction in the form of managing and domesticating plants strengthened a preexisting Allee effect and led to greater within-group cooperation, but was also related to the rise of territorial between-group competition in the region which forced people into less suitable habitats in the Late Holocene.

[35] Chair

Weitzel, Elic [35] see Munro, Natalie

Welch, David (Int'l Archaeological Research Institute), Judith McNeill (Int'l Archaeological Research Institute), Naoki Higa (Higa Archaeological Research Office), Alexandra Garrigue (ARCGEO) and Taku Mukai (ARCGEO)

[29] *Historical and Archaeological Investigations in the Mountain Forests of Okinawa, Japan*

Today the mountainous interior of the northern portion of Okinawa, covered by dense forests, remains sparsely populated or uninhabited. Archaeological surveys have found very little in the way of prehistoric or early historical remains, but widespread evidence of human use during the nineteenth and early twentieth centuries. American and Japanese researchers have together undertaken research of archival documents, historical maps and reports, and records of oral history interviews with informants who used these areas prior to and during World War II. Based on this background material, we have identified previous cultural activities, their probable locations, and the types of archaeological sites that might be expected, such as charcoal kilns, indigo cultivation terraces and dye vats, camphor processing stations, rice and taro pondfields, and hamlets and farmsteads. Archaeological surveys have been conducted of several watersheds, utilizing this information to locate sites and verify the presence or absence of probable sites identified in the background research. The research has documented historical forestry use and the settlement and pursuit of economic opportunities by displaced samurai class families after the abolition of the Ryukyu monarchy by the Japanese government in 1879.

Welch, John (Simon Fraser University)

[341] Moderator

Weldy, Megan [94] see Sisneros, Brianne

Welker, Martin (Penn State University)**[153] Pioneering Poultry: A Morphometric Investigation of Domestic Chickens (*Gallus gallus*) in Preindustrial North America**

Chicken bones are common in many historic faunal assemblages. Historic accounts indicate that domestic chickens introduced to North America by European colonists did well and multiplied quickly, but provide little information on the origins, characteristics, or roles poultry played in the North American colonies. A morphometric dataset generated from a sample of skeletons attributed to known heritage breeds provide an opportunity to evaluate the skeletal similarity between archaeological samples and breeds associated with egg and/or meat production. Using morphometric data collected on chicken bones from 18th and 19th century contexts in North America this analysis investigates the role of chickens in preindustrial North America.

[153] Discussant**[153] Chair**

Welker, Martin [153] see Jones, Eric

Wellman, Hannah (University of Oregon), Rita Austin (University of Oklahoma), Nihan Kilic (University of Oklahoma), Madonna Moss (University of Oregon) and Courtney Hofman (University of Oklahoma)**[34] Ancient Mitogenomes from Oregon Sea Otters (*Enhydra lutris*): Genetic and Archaeological Contributions to the Historical Ecology of an Extirpated Population**

The sea otter (*Enhydra lutris*) was nearly driven to extinction on the Pacific Coast in the 19th century due to the commercial maritime fur trade. Despite successful reintroduction efforts in North America, the Oregon sea otter population remains locally extirpated and endangered. Prior studies have used precontact and modern sea otter phenotypic and genetic analyses to compare ancient Oregon and modern California and Alaska otters, suggesting sea otter groupings vary along the Northwest Coast. To further address the complex and environmentally important issue of the historical ecology of Northwest Coast sea otters we expand upon previous genetic studies by generating complete mitogenomes from ancient Oregon sea otters and present new data on their mitogenome diversity compared to modern otters from Japan to California. Preliminary analysis of sea otters from two archaeological sites in northern Oregon suggests this ancient population is more closely related to modern Alaska sea otters than the modern California sea otters. By applying genetic analyses to zooarchaeological remains we contribute to the historical ecology of sea otters in Oregon and demonstrate the relevance of archaeological remains to conservation biology decisions for species at risk as part of interdisciplinary projects.

Wells, E. Christian (University of South Florida), Claire Novotny (Kenyon College) and Anna Novotny (Texas Tech University)**[81] Violence and Veneration at the Edges: Mortuary Traditions and Social Order along the Northern and Southern Frontiers of Mesoamerica**

The northern and southern frontiers of Mesoamerica are about 2000 km apart and are separated by an incredible diversity of peoples and environments. Yet, these frontier spaces appear to be developmentally similar in many ways during the period ca. AD 500-1000, including the scale and complexity of social forms, the types of regional interactions among multiple ethnic groups, and the prominent use of human skeletal material to mark ritual displays in living spaces and ceremonial centers. This presentation compares both areas, focusing on northwest Mexico and northwest Honduras, to consider how the multiethnic character of these frontier settings may have been conducive to the development of mortuary practices that emphasized a particular mix of violence and veneration for negotiating interethnic social dynamics. To what extent did different communities deploy imagistic (involving sensory arousal) and doctrinal (involving patterned repetition) modes of mortuary religiosity to structure social relations? What might the activation of these alternate modes of religiosity tell us about attempts to resolve ethnic conflict? We address these questions using bio/archaeological data from northwest Mexico published by Ben Nelson and colleagues along with new mortuary data from northwest Honduras.

[256] Discussant

Wells, E. Christian [160] see Eck, Christopher

Wells, Greta [63] see Luzzadder-Beach, Sheryl

Wells, Joshua J. [77] see DeMuth, Robert

Wells, Joshua J. (Indiana University South Bend), Robert DeMuth (Indiana University Bloomington), Stephen Yerka (University of Tennessee Knoxville), Eric Kansa (Open Context) and Sarah Whitcher Kansa (Alexandria Archive Institute)

[87] *Geographic Information Just Wants to Be Free: Capacity-Building in the Ethical and Practical Uses of Free and Open Source GIS Software and Open Geospatial Data Standards within the Digital Index of North American Archaeology (DINAA)*

The Digital Index of North American Archaeology (DINAA) is the largest compilation of completely free and open information about archaeological site descriptions and serves as an index to an ever-growing network of primary data and publications resulting from investigations at those archaeological sites. DINAA is an archaeological informatics project committed to the principles of unrestricted access to scientific and cultural data about the human past, as well as deliberate acceptance of the concomitant responsibilities for information security and facilitated reuse that openness entails. Many security and reuse concerns about archaeological site information, such as the data published and indexed through DINAA, fall into the realm of geographic information issues. DINAA uses and promotes open data standards for geographic data development and communication. DINAA also promotes and supports the use of free and open source software geographic information system applications for consumption and reuse of our geographic data. These choices are made with the ethical expectation that they should in the long run result in a project with greater impact on capacity building and knowledge mobilization among the community of DINAA users and contributors, by making the barriers to community involvement as low as possible.

[344] *Moderator*

Wells, Rebecca (TRC), Matthew Leister (Museum of Southwestern Biology, University of New Mexico), Sandra Brantley (Museum of Southwestern Biology, University of New Mexico) and Kenneth Brown (TRC)

[357] *Spiders and Mud Daubers at LA112420, an Early Developmental Pithouse in Sandoval County, NM*

Mud dauber nests are uncommon in archaeological contexts, but when preserved, are usually present as a result of having been burned in structures or other sheltered features. Approximately 70 nests have been examined from sites in the Midwest, Texas, Oklahoma, and New Mexico, a few of which contained charred spiders and wasp pupae. It is not possible to definitively determine the season of an archaeological feature by the presence of open or closed cells alone since the nests may occur year round. However, mud daubers reproduce throughout the spring and summer, and since spiders are usually consumed by wasp larvae within three weeks of being provisioned, their short-lived presence yields information about the seasonality of the site settlement. Furthermore, charred spiders can provide accurate AMS dates, as demonstrated at an Early Developmental (Basketmaker III) pithouse in central New Mexico. This paper describes the context of a burned spider-packed nest discovered at LA 112420 in terms of environmental inferences and how this information relates to site abandonment at LA 112420.

Wen, Rui (Northwest University)

[78] *The Interaction of Aesthetics and Technology between East and West, from the Perspective of Glass Beads from Xinjiang, China*

Xinjiang is located in the crossroads of the Silk Road and connected the Central Asia, South Asia and central China. During the 2nd to 1st millennia BC, glass beads were transferred from the West Asia and South Asia to central China through the Tianshan corridor and southern edge oasis corridor of the Taklimakan Desert. However, central China glass beads had also spread west since the late 1st millennium BC. These glass beads present diverse appearance and manufacture processes in most sites of Xinjiang. The diversity of the aesthetics and technology of the glass beads reflect cultural communication across the Eurasian continent. This paper will discuss the interaction of material culture based on chemical composition and

manufacturing technique analysis for glass beads.

[78] *Chair*

Wen, Yadi (The Chinese University of Hong Kong)

[361] *Chaîne Opératoire in Jade Study*

Since Wu Da-cheng's Catalogue of Ancient Jades in the Qing Period, research of Chinese jades has largely focused on analyses of their social and ritual significances. In latter half of the 20th century, excavations in Liangzhu, Hongshan, and Xinglongwa culture sites discovered many prehistoric jades. These important discoveries gradually shifted ancient jade studies to an archaeological approach, focusing on the settlement and burial contexts of the jades.

The use of the Chaîne Opératoire (French for "operational sequence") method in lithic studies has provided us a new research perspective and direction in the study of jades. This method pays attention to the full life history of the jades, from production to consumption and abandonment, which is treated as a dynamic and continuous process. Furthermore, it allows us to analyze the social and cognitive dimensions of the jade users through comparisons of the jades' production technologies and use wear.

This paper applies the chaîne opératoire method to study jades by analyzing related settlements and lapidary workshops, especially the latter.

Wendel, Martha [404] see Allen, Susan

Wendrich, Willeke (UCLA)

[87] *Digital Archaeology Mentorship: Best Practices in a Rapidly Changing Field*

Digital archaeology comprises everything from obtaining digital data, to data analysis, representation, and preservation. It is a complex field that is in constant flux, due to the ever changing landscape of available commercial, home grown and open access resources. Training and mentorship are of vital importance for students, but also for the archaeological community as a whole. Mentoring should focus on the principles that underlie digital archaeology: workflow, integration of different information sources and sustainability. The most important goal of training is to create an understanding of why and how applications should adhere to a minimum of basic standards that enable those principles and how to apply these technologies in the archaeological practice. Based on understanding such fundamentals archaeologists will be able to find a medium between being intimidated by technology, or being enthusiastically naïve aficionados of costly experiments.

[13] *Discussant*

Wendt, Carl (Cal State University - Fullerton)

[158] *Discussant*

Wendt, Carl [405] see Saucedo, Alfredo

Werkheiser, Marion

[4] *Moderator*

[377] *Discussant*

Werlein, Amanda (University of Missouri, Columbia), Joan Coltrain (University of Utah), Jeffrey R. Ferguson (University of Missouri Research Reactor), Virginie Renson (University of Missouri Research Reactor) and Karen Schollmeyer (Archaeology Southwest)

[419] Determining Regional Hunting Patterns and Possible Domestication of Turkeys in the Mesa Verde area of the American Southwest

Strontium and oxygen analyses of archaeological bone samples are frequently used to map human mobility. In this work, these isotopic signatures are analyzed to investigate archaeofaunal material dating to 750-1280 AD in the Mesa Verde area to determine the origins of these resources. While the project contains an overall scope of analyzing rabbits, turkey, and deer, this paper focuses on the turkey bones. Baseline isotopic signatures have been determined from rodent and modern plant samples for the surrounding geologies, and the baselines provide an isotopic map for determining the provenance of turkey bones collected from select sites. These primary strontium isotope results, combined with the complementary carbon and oxygen isotope analysis geologic background data, are used to reconstruct resource acquisition and determine whether the turkeys were wild or domesticated and whether the turkeys were possibly exchanged within the region.

Wernecke, D. Clark (The Gault School of Archaeological Research)**[326] Crossing the Line: The Incised Stones of the Gault Archaeological Site**

Previous publication has dealt with the discovery of incised stones at the Gault Archaeological Site and the artifacts of early Paleoindian age. To date, the project has identified 146 stones with incised lines and designs on them from provenienced collections, unprovenienced collections and collections in private hands. The artifacts are on both limestone tabular cobbles and pebbles and the cortex of chert flakes. This presentation will give some background on the site and our identification methodology as well as summarize the data from the stones not previously reported focusing on those with good provenience.

Werner, Patrick and Carrie Dennett**[191] Collaborating with Fred Lange on Nicaraguan Themes**

Collaborating with Fred Lange has yielded interesting results. The focus of my interest has been the contact period, and information to clarify that time. Fred tirelessly provided materials and answered my incessant enquiries. *Vínculos*, vols 13, 1-2, helped enormously. Obtaining a complete copy of Walter Lehmann's *Zentral Amerika* proved invaluable to identify ethnic groups with place names. The disassembly and reassembly of the Cerrato *tasación* of 1548, when used in conjunction with Lehmann's sources, allowed for a reconstruction of contact period western Nicaragua in surprising detail. Some of the problems Lehmann wrote about were clarified by the exacting work of Cerrato in his *tasación*. Lehmann did not have the *tasación* when he wrote his *Zentral Amerika*, and more exacting information of the size, location, and subsistence economy all became clear with the materials supplied by Fred. Discussing disconnects between the abrupt drop in Indian populations and the lack of boats to transport Indians resulted in our paper on new views of slave exportation in the 16th century. What is found in the ground and what is found in old documents cannot, in the end, be in conflict.

Werness-Rude, Maline [410] see Spencer, Kaylee

Wernke, Steven (Vanderbilt University)**[77] Seeing Like a Neural Network? Possibilities and Predicaments of Automated Virtual Archaeological Prospection**

What might it mean to see like a neural network over vast areas of ancient landscapes? Rapid advances in computer vision—especially approaches using Convolutional Neural Networks (CNNs)—have made automated archaeological site and feature detection from satellite and aerial imagery over very large areas an achievable prospect. Such automated prospections will dwarf pedestrian survey coverage, opening new possibilities for understanding past political landscapes. But with the promise of such big archaeology come several predicaments. Most obviously, machine learning-based virtual prospection will necessarily focus on sites with surficially visible—mostly architectural—remains, and will tend toward the upper tiers of settlement hierarchies. Such unavoidable sample bias may tend analytical framings toward top-down framings (seeing like a state) and occlude local variation. Second, all CNN-based automated prospection systems require large, human-generated training datasets, raising ethical and intellectual issues of authorship. Third, CNN-based computer vision systems are ultimately black boxes—how a CNN learns to identify objects cannot be known with any precision, raising fundamental epistemological problems. These promises and predicaments are explored through an emerging project involving the generation of large training datasets through brute force virtual survey and their deployment in a CNN-based prospection in the Andean region.

Werra, Dagmara [110] see Parish, Ryan

Wescott, Konnie (Argonne National Laboratory)

[282] *Discussant*

Wesp, Julie (American University) and John K. Millhauser (North Carolina State University)

[238] *The Intersections of Race, Class, and Labor in New Spain: Archaeological, Bioarchaeological, and Ethnohistoric Perspectives from the Basin of Mexico*

This paper brings together archaeological, bioarchaeological, and ethnohistoric data to highlight how daily life was transformed in New Spain. In particular, we focus on labor as an avenue for understanding the complex relationships and negotiations between working individuals and the emerging colonial structures of power that attempted to prevent or prohibit certain individuals from engaging in particular kinds of work. We attempt to show how these interactions occurred not just within urban spaces, but extended to other more rural areas of the Basin of Mexico. Examples range from the life history of an Afro-descendant person who served in the home of a wealthy Spaniard to indigenous communities in the countryside whose labor was protected from foreign rivals by law. The combination of data from material culture, the bodies of individuals engaging in work, and the written documentary sources allows us to explore this topic at both the individual and community level and emphasize a more complex, yet possibly more accurate, interpretation of how race and class influenced labor.

West, Catherine F. [31] see Fitzhugh, Ben

West, Catherine F. (Boston University) and Ben Fitzhugh (University of Washington)

[33] *Human Behavioral Ecology and the Complexities of Arctic Foodways*

In this paper we will examine whether Arctic and Subarctic coasts have unique characteristics in the context of human behavioral ecology (HBE). We start with a review of the variability in maritime adaptations around the circumpolar north, and then examine efforts to apply HBE models in the North Pacific Ocean. Paleodemography and climate reconstructions for this region suggest people experienced changes in resource availability through time, yet the zooarchaeological record demonstrates remarkable continuity. Therefore, we ask: how can we use behavioral ecological models to explain why this might be? We argue that the behavior of the seasons, people, and animals in northern maritime environments is such that the zooarchaeological correlates used to test HBE models are distinctive and must be assessed before these models can be accurately applied.

West, Catherine F. [415] see Yeshurun, Reuven

West, Stephen (UNM), Michael W. Graves (University of New Mexico) and Katherine Peck (University of New Mexico)

[408] *Surveyed with LiDAR: Identifying Lo'i Pondfields in Windward Kohala, Hawai'i Island*

This project is a demonstration of GIS methods for identifying irrigated agricultural complexes in the heavily vegetated drainage of Halawa Gulch, windward Kohala. Through use of GIS tools on a LiDAR data set I created slope interpolation and elevational profile graphs of potential agricultural sites. In some cases these could be verified using historical maps and archaeological survey reports. The goal is to create a database of known and hypothesized sites with locational, areal, and archival data to aid future research. These LiDAR identification methods are described and evaluated here. They form a part of a larger research project on the development of traditional Hawaiian agriculture and role of "Chiefly Complexes" that are briefly discussed.

Westfall, Tom

[343] *Discussant*

Weston, Timothy (Kansas Historical Society)

[292] *Discussant*

Weyer, Simon (The College of Wooster) and Olivia Navarro-Farr (The College of Wooster)

[8] *A Cross-Cultural Study of Ancient Beer Production at Hochdorf, Hierakonpolis, and Cerro Baúl*

This poster focuses on a cross-cultural examination of the processes of beer making and the links between social status and this class of alcoholic beverage in three unique ancient cultures: The Celts at Hochdorf in Southwest Germany, the predynastic Egyptians at Hierakonpolis, and the Wari at Cerro Baúl in Peru. Together, these constitute rather diverse contexts for ancient brewing processes which enhance our understanding of the complexities of the production and consumption of fermenting beverages in antiquity. Additionally, we discuss the difficulties associated with the ephemeral nature of botanical remains and the ways in which the process of brewing beer can be teased out of the archaeological record by using macrobotanical flotation, residue analyses via mass spectrometry, ethnoarchaeological research, and experimental archaeology. To conduct this research, we employ a variety of existing studies deriving from archaeological and ethnoarchaeological data on beer brewing from each of these contexts.

Whalen, Michael [36] see Minnis, Paul

Wheelbarger, Linda (San Juan College)

[203] *Point Pueblo and Surrounding Middle San Juan River Valley Great House or Great Kiva Communities*

Geographically, the Middle San Juan River Valley, a well-watered area of northwestern New Mexico, is situated between the more famous Ancestral Pueblo culture areas of Mesa Verde and Chaco. After a brief review of known Middle San Juan great house or great kiva communities, this paper will focus on Point Pueblo. Field school excavations have been held by San Juan College, located in Farmington, New Mexico, for the last 13 years at Point Pueblo. A great kiva was constructed with Type II Chacoan style masonry and two sections of great house rooms exhibit local Middle San Juan vernacular compound-veneer walls. At least four kivas were constructed within the eastern great house section, one immediately north of an arc of rooms, two adjacent kivas at the eastern edge, and one at the northern edge. Point Pueblo is in a dramatic location, overlooking the San Juan River Valley immediately to the north. Red Mesa ceramics indicate extensive social interaction and network connection with early Bonito phase Chaco/Cibola people and Mesa Verde ceramics indicate extensive social interaction and network connection with late Mesa Verde people. Additionally, White Mountain Red Ware ceramics indicate extensive social interaction and network connection with the Zuni people.

Wheeler, Ryan (Robert S. Peabody Institute of Archaeology), Bonnie Newsom (Department of Anthropology, University of Maine) and Chris Sockalexis (Cultural and Historic Preservation Department)

[136] *Sacred Places and Contested Spaces in Maine: the Long Shadow of Colonialist Science in the Light of Repatriation*

The Nevin site in Maine has become a contested space as Wabanaki people, seeking to repatriate their ancestors, confront archaeologists who adhere to the antiquated postulates of their predecessors. From 1912-1920, Warren K. Moorehead of Phillips Academy's archaeology department, focused field work on Maine's so-called "Red Paint" cemeteries. Moorehead acknowledged the antiquity of the cemeteries, but saw the people as members of a "lost civilization," culturally distinct from later Indigenous groups. Douglas Byers succeeded Moorehead and excavated graves at the Nevin site from 1936-1940. Despite radiocarbon dates and a better understanding of the Archaic period, Byers could not bring himself to attribute Nevin's lavish grave goods to an early era. The confusion sowed by Moorehead and Byers have influenced archaeologists and museum personnel who resist Wabanaki efforts to repatriate their ancestors under contemporary legislation. Despite the lack of robust research on in-migration, prevailing ideas about the Late Archaic in Maine envision a population replacement by immigrants from the south. This hypothesis opposes claims of cultural connectedness by contemporary Wabanaki peoples. Here, we explore the archaeological legacy associated with the Nevin cemetery and challenge archaeologists to confront the remnants of colonialist science that permeate repatriation.

Whelan, Carly [110] see Hull, Bryna

Whelan, Carly (California State University, Chico)

- [116] *An Acorn in the Hand Is Worth Two in the Granary: The Effect of Decay Rates on Food Storage Preferences in Prehistoric California*

Though food storage is a crucial tool for avoiding subsistence shortfall in environments with seasonal resource disparities, it is costly relative to immediate consumption. Food stores are vulnerable to theft by animals and other people, and are susceptible to incremental loss from vermin and mold. To compensate for these anticipated losses, people must collect, process, and store more food than required to meet their consumption needs during the storage period. The ability of resources to preserve should, therefore, be an important factor influencing the decision of which ones to store. I present a model that takes into account the decay rates of resources to evaluate which foods should be preferred for storage periods of various lengths. I apply the model to prehistoric California to explain why some species of acorns were preferred for storage over others. Because decay rates have not been empirically derived for acorns, the model uses approximations based on anecdotal information about acorn storage ability and post-harvest loss estimates of grains stored with traditional techniques. To improve data inputs for the model, I have started a series of acorn storage experiments. I present the preliminary results of these experiments here.

Whelton, Helen [209] see Blong, John

Whisenhunt, Mary [263] see Hard, Robert

Whisenhunt, Mary (University of Texas at San Antonio), John Roney (Colinas Cultural Resource Consulting) and Robert Hard (University of Texas at San Antonio)

- [263] *Archaeological Survey in Arizona's Upper Gila River Valley: 2014 - 2018*

Southeastern Arizona's upper Gila River Valley is an understudied area that includes both large, aggregated prehistoric sites and small rock ring, pithouse, and pueblo sites from the Early Agricultural to Salado periods. University of Texas at San Antonio Field School surveys conducted from 2014 – 2018 have identified and recorded approximately 50 sites located in a variety of environmental settings, including terraces along the mainstem of the Gila River, floodplain, side drainages, and higher-elevation locations. While a geospatial information system site probability model underpins the survey's judgmental aspect, local informant knowledge was critical in identifying many of the sites, particularly those occupied during the Ceramic period. Site location, density, size, and persistence over time will be analyzed in relation to environmental zones and the distribution of arable land along the Gila River. Spatial and temporal patterns are compared to those of the Upper Gila's Red Rock Valley in New Mexico. Most of the sites in the research area remain vulnerable to pothunting and agricultural land modification, heightening the need for continued survey work and strong local partnerships to identify and preserve these important sites.

Whistler, Emily [174] see Elliott Smith, Emma

Whitaker, Adie [357] see Gmoser, Glenn

Whitaker, Steven [368] see Braje, Todd

White, A. J. [348] see Schroeder, Sissel

White, John (Center for the Study of the First Americans) and Ted Goebel (Center for the Study of the First Americans)

- [10] *Least-Cost-Path Analysis as a Predictive Device for Conveyance and Mobility Patterns: The Case of Walker Road Obsidian*

The geochemical sourcing of artifacts manufactured on volcanic materials has often been used as a proxy for levels of landscape learning and mobility among Paleoindian peoples. Moreover, when traced to known sources, the distribution of volcanic materials has informed studies of specific conveyance patterns. The Walker Road site in the Nenana valley of central Alaska has yielded tools manufactured on obsidian sourced to Wiki Peak, located in northern Wrangell-St. Elias National Park, and the as-yet unidentified A' (or Ringling) source which is presumed to be somewhere in the Copper River drainage. The presence of these southern Alaskan obsidians at Walker Road suggests either long-distance seasonal procurement or established trade networks connecting the Nenana valley to the uppermost Tanana River basin and possibly the Copper River basin. We use a GIS-based least-cost-path analysis to identify the most probable route or routes used by Paleoindian peoples to transport obsidian from these sources to Walker Road. We use the Ringling site as a proxy for the location of the A' source and incorporate geologic estimates of Glacial Lake Ahtna's shorelines as well as regional ice coverage in the Wrangell Mountains and Alaska Range.

White, Jonathan

[301] *Regional Connections and Variations in the Archaeology of Healing and Disability: The Temples of Asclepius*

Asclepius was worshiped as the god of healing throughout the Mediterranean from c. 500 BCE to 400 CE. Temples to the god "Asclepieia" have been found across the region, from Epidaurus in Greece, to Pergamon in Asia Minor, to Tiber Island in Rome. In antiquity, asclepieia were renowned as places where the sick could have their ills treated or cured, and where disability could be averted or reversed. Asclepieia are also credited as the forerunners of hospitals and medical clinics, and excavations of various asclepieia have offered insight into not only into the god's cult, but also the hopes and fears of the sick and disabled in the Hellenistic and Roman worlds. This paper examines architectural remains, material culture and limited textual evidence from major asclepieia – Rome, Epidaurus, Athens, and Pergamon – to discuss how the cult of Asclepius was realized in different geographic and temporal contexts. The archaeology also reveals how asclepieia performed their communal and secular obligations: providing care to those society considered sick, disabled, or incomplete. While some of the care provided at the asclepieia was just a spiritual placebo, the idea that these temples served as early medical clinics has been exaggerated only slightly.

White, Joyce (Univ of Pennsylvania Museum)

[27] *Explaining Prehistoric Thailand's 2000 Year Resilient Growth Economy and Peaceful Society: A Bottom-up Approach*

After decades of archaeologists interpreting Thailand's metal age development using top down approaches drawn from 1980s archaeological theory, it has become evident they do not work for this region. During the course of interpreting metal assemblages from Ban Chiang and related sites in northeast Thailand, alternative perspectives emerged for how to more aptly interpret the resilient peaceful prehistoric societies dating from approximately 2100 B.C.–A.D. 300. A model is proposed applying "Ricardo's Law of Comparative Advantage" that focuses on "Regional Reciprocal Exchange Networks". These exchange networks existed from the pre-metal period through the metal age and underpinned heterarchical political and economic systems whereby goods and valuables were exchanged among decentralized networks of communities. In this kind of economy, communities invest in product specialization in order to engage in the regional exchange network and gain access to products they either cannot produce, cannot produce at sufficient quantities to meet local needs and demand, or choose not to produce because they see their efforts are better spent in producing other products to exchange for desired goods made in other villages or regions. Community agency and investment promoted peaceful conflict resolution as well as regional economic growth for over two millennia.

White, Peter (University of Sydney), Robin Torrence (Australian Museum) and Vince Neall (Massey University)

[29] *The Best Gifts Come in Small Packages? Coring Volcanic Landscapes in New Britain*

A volcanic environment built up by characterised and well dated airfall tephras is paradise for landscape archaeology because in any excavation the cultural material is placed accurately in time. Shouldn't this setting also be ideal for environmental data? With expertise provided by Steve Athens, we tried to recover a long-term record in the Willaumez Peninsula on New Britain, Papua New Guinea, a long way from his usual field sites. A beautiful, but nearly inaccessible, crater lake proved an insuperable challenge due to the depths and coarseness of the volcanic sediments. Adopting a slightly altered research question, our activity shifted to a somewhat less intractable sequence of peats and tephras. On the final day of Steve's visit, coring under difficult conditions produced a short but tantalizing record with exciting implications for early forest management. We offer this paper as a tribute to Steve's outstanding creativity, expertise, flexibility and collegiality.

White, William (University of California, Berkeley)

- [385] *How Do We Keep "bro-ing" Away from Open Access Archaeology?: Open Access, Cultural Appropriation, and Archaeology*

"Bro-ing" is a market research practice pioneered by Nike and reported by Naomi Klein (2000:75) where designers bring prototypes to inner-city neighborhoods to gauge reactions to new styles and products. This practice also creates buzz that can be used to sell those products to the same communities.

Open access archaeology helps make archaeological data available to larger research communities. While this is commendable, much of our work in the United States is generated from research conducted on indigenous, descendant, or non-European American communities, many of which have histories of negative interactions with anthropologists and archaeologists. This paper explores protocols for preventing cultural knowledge from disproportionately benefitting archaeologists and keeping cultural knowledge from being used in ways that do not benefit descendant and indigenous communities. It also addresses ways open access archaeology advocates can keep from contributing to "bro-ing" in archaeological research; that is, capitalizing on research trends to insert themselves into non-European American communities in order to present their own cultural knowledge back to them in a more authoritative format.

Whitehead, William (SWCA Environmental Consultants)

- [96] *Medicinal Plant Use in Southeast New Mexico: Botanical, Ethnobotanical and Archaeological Evidence*

Medicinal Plant use for Southeastern New Mexico is presented, covering major plant types, uses, and ecology. In collaboration with a botanist, who specializes in New Mexico flora, we present data on 331 plant species. The process of knowledge production will be addressed, as all of this information is taken from historic ethnographic accounts, botanical, and archaeological literature sources. The majority of the information in this work is from the Mescalero Apache, however other cultural groups are also included. A seasonal, geographic, and ecological analysis is given, showing when, where and for how long plants would be available in the environment. This has implications for human mobility, settlement, and the depth of knowledge traditional medicine practitioners are required to have, while also highlighting the disruptive nature of land exclusion has had on native populations.

Whiting, Duston (Discussant)

- [341] *Discussant*

Whitley, Catrina (Office of Archaeological Studies, Museum of NM) and Evangelia Tsesmeli (NM State Land Office)

- [213] *Architecture and Ritual Abandonment Sequences at the BaahKu Archaeological Site, Taos Valley, NM*

This poster presents the variation of architectural features and abandonment processes excavated and interpreted from BaahKu (LA 37627), in Taos Valley, New Mexico. Recent discoveries indicate intra-site variation in both construction and indicating contact and exchange with communities in the greater northern Rio Grande Valley and possibly beyond. This research presents a comparison between two pithouses in close proximity to each other, an atypical trait for the Taos Valley, through their life history (pre-construction through abandonment). We will also present a greater geographic architectural analysis for the Taos Valley through time.

Whitley, David (ASM Affiliates, Inc.)

- [369] *Ritual Space and Ritual Place in California Rock Art*

Larry Loendorf has always emphasized that rock art research is nothing if it is not also archaeology. Much of his research has accordingly considered the importance of the (dirt) archaeological context of rock art sites, and what this can tell us about the art. In the spirit of this concern, the archaeological contexts of three different corpora of California rock art (Coso Range, Southern Sierra, and Chumash region) are considered in terms of the distinctions between ritual spaces versus ritual places, and what this implies about ritual and political power across this portion of the far west. As these examples demonstrate, while the origin of the art may in each case appear similar, the landscape context of the art and its relationship to the remainder of the archaeological record provides important clues to its larger social and political function.

[369] *Chair*

Whitley, Thomas (Sonoma State University)

[305] *Time and the Landscape: Visualizations of Murujuga and Beyond.*

Developing 3D photorealistic visualizations of the landscapes of Murujuga going back nearly 125,000 years has been an objective of research since late 2015. Certain challenges have been met in relation to increasing the accuracy and resolution of bathymetric and topographic data, and in dealing with the complexity of hydrodynamic effects on currently submerged landforms. We still remain far from finding definitive paleo-terrain and climatic datasets. However, we are moving into a framework where we can start to build virtual and immersive models of past landscapes, and to interpret the locations and distribution of rock art, or settlement sites, in appropriate temporal contexts. Several examples of recent and on-going visualizations, both in Murujuga and also in other portions of Northern Australia, are presented here to demonstrate potential interpretive opportunities into land-use, migration, and maritime economies. As we look to the future, we are also concerned about how climate change and sea level rise will affect some of the significant sites in this region.

Whitley, Tom [305] see Dortch, Joseph

Whitlock, Allison (New York University)

[232] *Modeling Early Medieval Agricultural Practices through Archaeobotany*

Medieval landscape archaeologists have described the Middle Saxon (650-850 AD) and Late Saxon (850-1100 AD) periods in England as times of increased agricultural production and economic expansion, but archaeobotanical analyses are not often integrated with these studies. Archaeobotanists have developed several methods of linking ecological properties of identified plants to past agricultural practices. Examples of agricultural practices inferred through archaeobotany include manuring, sowing season, and plowing. These models utilize comparisons of archaeobotanical assemblages to modern plant community observations (phytosociology) or analyze known growing conditions of weed species present in the archaeobotanical assemblage (autecology).

This paper will apply both phytosociological and autecological models to samples from a database of Saxon archaeobotanical reports for England. The aim is to assess whether model selection causes different interpretations of agricultural practices for the same data. This research will also consider whether these models can address archaeobotanical preservation challenges that cause underrepresentation of some seeds. By directly comparing interpretations generated from one dataset via different models, this paper will provide insight into how to interpret past agricultural practices from archaeobotanical data and the significance of archaeobotanical data to understanding increased Saxon agricultural production.

Whitlock, Bethany (Brown University)

[287] *On the Frontiers of Empire: Inka Hegemony in Chachapoyas, Peru*

Previous studies on the Inka conquest of Chachapoyas (AD 1470) have largely focused on an epic conflict between the invading Inka empire and warlike Chachapoya natives. Little attention has been directed towards understanding the processes by which the region was incorporated into the empire – how the landscape became naturalized as Inka, and how its inhabitants were transformed into Inka subjects. Past understandings of the Inka occupation of Chachapoyas have generally presented a picture of a minimal imperial footprint, coupled with significant population decline and reorganization. More recent work in the region has, however, suggested that the Inka invested significantly more in the region than initially supposed. Here, I focus on one settlement cluster – principally the sites of La Fila and Llaucán – located in the Utcubamba Valley, Chachapoyas – that displays clear evidence of Inka presence. Through a consideration of architectural and ceramic data from these sites, I examine how Inka rule was enacted, emplaced and experienced in this frontier region. Ultimately, I will consider how the materiality of Inka rule in these small communities can contribute to our understanding of the micropolitics of empire and the ways in which Inka hegemony was established and maintained in Chachapoyas.

Whitman, John [74] see Crawford, Gary

Whitmore, Katie [317] see Buzon, Michele

Whitney, Kristina (National Park Service - Chiricahua National Monument)

[124] *Creating Context: How Developing Local Relationships Enriches Archaeological Knowledge*

While the Chiricahua Mountains are a part of the Sky Islands, Fort Bowie NHS and Chiricahua NM are not islands unto themselves--their rich archaeological past exists within the broader context of the landscape. In an area that has received little study compared to the rest of the American Southwest, it has been imperative for the NPS to develop and strengthen local relationships between private landowners and other land management agencies so that the bigger picture can become more clear. This poster explores some of this recently shared knowledge and developed context from within the northern portion of the Chiricahua Mountains.

[124] Chair

Whitney, Kristina [124] see Huston, Ann

Whitney, Makayla [41] see Roldan, Jonathan

Whitney-Hul, Wolfgang [125] see Fye, Margaret

Whitridge, Peter (Memorial University of Newfoundland) and Mari Kleist (Scott Polar Research Institute, University of Cambridge)

[185] *Necrontology: Housing the Dead in Precontact Labrador and Greenland*

Conventional treatment of the dead varied substantially across the Inuit world. Bodies might be deposited in carefully constructed cairns next to settlements or more simply exposed on the land or sea ice. It also varied locally depending on understandings of the afterlife, how individuals were conceptualized in death, the circumstances of death, and the deceased's relationships to the living, as appears to have been the case in precontact Labrador and Greenland. Although a boulder pile overlying a simple crypt is the most widespread form of mortuary treatment, distinctly house-like cairn morphologies occur, some are associated with detached caches of mortuary offerings, and their placement on the landscape varied substantially. Many are clustered in cemeteries close to settlements, but some are idiosyncratically situated on elevated outcrops or next to isolated ponds. If the manner of disposal of the dead speaks to an ontology of death and the afterlife – a “necrontology” - as archaeologists conventionally assume, then the Inuit version was clearly complex.

Whitson, Erin (Binghamton University SUNY) and Maxwell Forton (Binghamton University SUNY)

[421] “For the Benefit and Enjoyment of the People”: A Critical Examination of American Park-space

“For the Benefit and Enjoyment of the People”. Teddy Roosevelt’s words speak to the legacy of park-land narratives as unrestricted spaces open to all. Beneath this public veneer are contested landscapes founded in social division and inequality. With the origins of the National Parks, we look at how such spaces were initially unavailable to segments of the urbanized American public. Next, we discuss the creation of city parks and how theses, like their National counterparts, reinforced and legitimized the American socioeconomic status quo. Using case studies from the West and St. Louis, we show that park landscapes are rooted in ideas of restriction as much as they are in narratives of inclusion. This restriction extends to the present, in how we continue to use such spaces, and in narratives archaeologists and park staff use to describe National Parks. Cherished as virgin wilderness, these subjectively constructed landscapes spin exclusionary histories. To maintain the myth of untouched wilderness, indigenous subjects are turned into romanticized objects, while simultaneously marginalizing the voices of historic-period peoples. The result is that complex narratives are often sacrificed for spoon-fed myths. Though subtle, critically examining park-spaces allows us to address colonialistic legacies that continue to haunt Americans today.

Whittaker, John (Grinnell College)

[343] *Discussant*

Whittemore, Anna (Vanderbilt University), Maya B. Krause (Vanderbilt University), Tiffiny A. Tung (Vanderbilt University) and Steve Kosiba (University of Minnesota)

[286] *In the Heart of the Inca: An Osteobiography at Huanacauri (Cusco, Peru)*

This study takes an osteobiographical approach to describe the archaeological significance and life history of the only known individual buried within Huanacauri (Cusco, Peru), one of the most sacred sites in the Inca Empire (ca. 1400-1533 CE). Given the significant location of the burial—in the center of the place the Incas perceived as the foundation of Cusco—an osteobiography is an ideal method to identify the biocultural characteristics of this individual, and interpret whether and how these characteristics may have warranted special burial. Through gross skeletal analysis of age, sex, pathological lesions, dental health, and indicators of physical activity, this study generates a holistic picture of an individual social life during the height of Inca power. Our analyses show that this secondary burial is an adult male (40-55 years old), who was interred in a restricted-access space that contained a gold figurine, a carved stone column, and a textile floor covering. This skeleton exhibits no markers of infectious or developmental diseases or trauma, and only minor signs of osteoarthritis on several vertebrae. Comparing the bioarchaeological data from Huanacauri to an earlier population from the nearby settlement of Matagua, the study uncovers notable differences in trauma.

Whittington, Stephen (National Mining Hall of Fame & Museum)

[394] *Spatial Analysis of an Ancient Mixtec Capital in Oaxaca*

Chiyo Cahnu, a Mixtec mountaintop capital, is unusual in relation to the archaeology of Oaxaca because it is larger than normal for Postclassic settlements and apparently was inhabited for a short length of time. Mapping a one square kilometer area of the capital using powerful GPS devices between 2013 and 2017 revealed about 370 building sites, almost 2,400 agricultural and residential terraces, and ancient roads constructed on the steep slopes of Cerro Amole. The building sites range in complexity from single rooms to compounds with temples and dozens of rooms surrounding patios. The ball court is 45 meters long, making it one of the largest structures of its kind in Oaxaca. The capital is depicted on the famous Mapa de Teozacoalco, a document painted by a Mixtec artist and explained by a Spanish colonial administrator around 1580. Interpretation of images on the Mapa and in related pre-Hispanic and early colonial codices suggests that the principal occupation of the capital occurred over a period of only 236 years (AD 1085-1321) during the Postclassic period, yet the ceramic chronology does not support this interpretation. How can the historic and archaeological records be reconciled?

[235] *Discussant*

Whittlesey, Stephanie (Standing Reed Books) and Jefferson Reid (Emeritus Distinguished Professor, University of Ar)

[245] *Subjective Color in Mimbres Black-on-white Pottery*

Subjective color is a well-known phenomenon in the psychology of perception. It results when certain patterns of dark and light are spun at a particular speed, which the viewer perceives as solid colors or rainbow effects. Experiments indicate that this phenomenon occurs when Mimbres Black-on-white vessels of certain designs are spun. I propose that the subjective-color phenomenon was used by shamans to induce trance states or related purposes. It is notable that the rainbow effects of certain designs and related color phenomena may represent water, the effect of light sparkling on water, and similar symbolic effects. It may be just one of many symbols in the ancient Southwestern religious ideologies, which appear to have been focused on bringing rain and agricultural fertility.

Wholey, Heather (West Chester University)

[133] *Archaeology on Sheppard's Island: Predictive Modeling and Heritage Preservation in Delaware's Inter-Tidal Zone*

The Delaware Bay is the second largest estuary along the U.S. Atlantic coast and is experiencing some of the gravest effects from sea level rise. Most of the estuarine shoreline is fringed by salt marshes that have been developing for over 2,000 years but are now being lost at a rate of up to an acre/day. The trend suggests that most of the Delaware Bay wetlands may convert to open water and that this will occur at a variable rate. A multi-disciplinary pilot project bringing together archaeology and coastal geomorphology to assess these threats has been implemented to 1) conduct paleo-landscape reconstructions at selected sites through sediment coring; 2) document coastal archaeological resources within the Delaware estuary through systematic archaeological survey; and, 3) refine predictive models for the discovery of archaeological sites and the impacts of sea level rise on those resources. The inter-tidal zone of the Delaware estuary has been understudied archaeologically, but results thus far suggest that this area is archaeologically rich, is on the front-line for experiencing adverse effects from sea level rise, and serves as a harbinger for the impacts of environmental changes on cultural resources along the estuary.

Wichlacz, Caitlin (Arizona State University)

[194] Refining Perspectives on Salado Polychrome Ceramics at Las Colinas Mound 8

As time passes, fewer and fewer of us retain an intimate knowledge of the site of Las Colinas and the excavations that took place there in the 1960s and 1980s. Published artifact data for the site do not accommodate certain research interests, including inquiry into Salado polychrome ceramics, a significant ceramic category present mostly in the platform mound area. In this paper I present results from ongoing work with the Las Colinas archival materials and collections that aims to improve the resolution and completeness of our view of the site. I present the results of a completed typological reanalysis of Salado polychromes recovered during the 1980s excavations and consider the broader implications of the chronological and technological patterns that emerge. Other ceramic and feature data are marshaled to situate the Salado ceramics within a broader context and allow for new perspectives on what people and things were doing in the platform mound area.

Wicker, Nancy (University of Mississippi)

[310] Broken Edges: Investigating Jewelry Damage by Violence and Fatigue

Many Scandinavian Migration Period gold bracteate pendants of the 5th and 6th centuries show evidence of pre- or post-depositional damage. Impressions of broken edges of the jewelry were made with polyvinyl siloxane (PVS), and the impressions were then analyzed as part of a larger project to analyze fatigue fractures of gold as a dental material. Attempts are made to ascertain which pendants broke due to metal fatigue from long-term wear and which were mutilated as the result of violence.

Wilcox, Timothy (Stanford University)

[150] Diné le'saa litsxo bik'ah dash chá'ii dajii la: Navajo Gobernador Polychrome Pottery

Gobernador Polychrome is a Navajo ceramic practice whose development was hastened by participation in the Pueblo Revolt. It represents a visible change in Navajo ceramic technology and a window into their social history. My discussions, in this paper are not aligned with Navajo Archaeology's theme of "Origins" and the diffusion of styles is not in the context of the "Rapid Acculturation" narrative. My research uses a communities of practice and technological style framework to inform questions about the nature of interactions between Navajo and Pueblo people during the Revolt Era by examining proposed Puebloan influences. My research revealed a range of technological styles such as, form, design structure, surface treatment, and firing regimes, embedded within the production that support both independent and Pueblo technological styles. My research also shows a wider range of pigment types and I have documented evidence of organic paint and white slipped shoulder and neck fields, which contradict the accepted definitions of the type. Design structure and vessel form analysis suggest an Eastern Pueblo influence, especially from the Tewa, while my analysis of firing attributes, indicate an independent development of a novel, yet consistent, firing regime and design motifs that are distinctly Diné.

Wile, Kim, Sydney Tucker and Alexis Baide (Texas State University)

[172] Mortuary Patterns of a 18th Century Cemetery on Sint Eustatius

Little is known about the mortuary patterns of enslaved and freed Africans during the 18th to early 19th century on the Dutch Caribbean island of Sint Eustatius. Excavation and analysis of burials from a small 18th century cemetery provides information about the lives of the interred individuals, who are likely of African ancestry. Mortuary patterns can help assess health, status, and societal norms of these people. This study uses data from the burial excavations and analysis of the recovered human remains and artifacts to explore mortuary patterns in the cemetery. The study also includes information

comparing the Sint Eustatius cemetery data with other contemporary Caribbean and non-Caribbean cemeteries. These comparisons will effectively show variation in daily life, status and societal norms for individuals of African ancestry who lived under different 18th century European colonial powers.

Wiley, Kevin (New York University) and Joseph Schuldenrein (Geoarcheology Research Associates)**[99] Buried Landscapes: GIS 3D Modeling of Geoarchaeological Data**

Geoarchaeological coring provides deep and continuous samples of subsurface soils and sediments. Through analysis, dating, and interpretation of these data, we model land and site formation processes from the Late Quaternary to the near-present. GIS 3D modeling enables us to reconstruct and visualize buried landscapes and assess areas of archaeological sensitivity. Using a series of 3D animations, we present results from recent cultural resource management projects in the Eastern United States.

Wilfong, Faith (The University of Iowa) and Matthew E. Hill (Associate Professor at the University of Iowa)**[80] Missing Metapodials: New Analysis of the Protohistoric Period Fauna from the Scott County Pueblo Site in Western Kansas**

The Dismal River Aspect sites, located within Lake Scott State Park in western Kansas, represent long-term settlement of the area during the AD 1500s-1700s by a mixture of Puebloan migrants and local Apache groups. This study uses faunal material from the protohistoric period to begin to understand the nature and timing of the occupation at the Scott County Pueblo site. We report on a recent taphonomic analysis of the faunal material from the site to help us infer site function (e.g., camps, long-term residence, or processing locality) and to determine seasonality of occupation. We then attempt to establish which cultural tradition (Puebloan or Plains) most influenced Dismal River Aspect foodways and cuisine. A key goal of this research is to evaluate the existing contradictory hypotheses that suggest the differences in faunal use at the site are due to the differing cultural traditions of the site occupants.

Wilken, Dennis [310] see Zori, Davide

Wilkie, Laurie (University of California Berkeley)**[69] Discussant****Wilkins, Jayne (University of Cape Town), Benjamin Schoville (University of Queensland), Robyn Pickering (University of Cape Town), Luke Gliganic (University of Innsbruck) and Benjamin Collins (University of Manitoba)****[32] Investigating Human Origins in the Kalahari Basin: New Results from Ga-Mohana Hill North Rockshelter**

Investigations of the southern African Middle Stone Age archaeological record are transforming our understanding of Homo sapiens origins and evolution, however, the intensity of research on coastal and near-coastal Middle Stone Age (MSA) records has outweighed that on the deep interior record. The North of Kuruman Palaeoarchaeology Project was initiated to help correct for this bias. Here, we report new results from excavations at the Middle Stone Age site of Ga-Mohana Hill North Rockshelter (GHN), near Kuruman, South Africa in the southern Kalahari Basin. We show that the deposits are in good context with minimal disturbance based on stratigraphy, artifact density distribution, and fabric analyses. Optically stimulated luminescence analysis is providing high-resolution age estimates for the archaeological deposits. Uranium-series dating of extensive carbonate deposits in the area is producing a record of palaeohydrological dynamics and past environments. Ongoing excavations at GHN are generating a diachronic record of MSA human-environment interaction in the Kalahari Basin that will allow us to assess the competing hypotheses about the origins and evolution of H. sapiens.

Wilkins, Jayne [32] see Schoville, Benjamin

Wilkins, Jayne [277] see Blackwood, Alexander

Wilkinson, Darryl (University of Cambridge)

[18] Neither Up nor Down? The Late Intermediate Period Occupation of the Andes-Amazonia Frontier in Southern Peru

This paper will examine the Late Intermediate Period (LIP) occupation of the eastern Andean piedmont (1200-3000 masl) in the Province of La Convención, Peru. Based on data obtained from recent archaeological survey and excavations, it will focus mainly on the distinctive spatial patterns of the LIP settlements in the Amaybamba Valley; an ecologically transitional space lying between the Andean and Amazonian regions. This discussion will include 1) the organization of residential structures within the village sites, and the extent to which artifactual evidence for labor activities can be seen to correspond to particular architectural units and clusters—and 2), the overall LIP settlement pattern within the local landscape, with particular attention to mortuary sites. It will be argued that in certain respects, the Amaybamba Valley had distinctive features that set it apart from other contemporary groups in the piedmont (e.g. in the Vilcabamba and Apurímac drainages). In general, substantial internal diversity appears to have typified the LIP occupation of the piedmont regions, and there were also notable contrasts between LIP groups in eastern slopes versus the highlands proper. The paper will conclude with some discussion as to how some of these variations might have come about.

Wilkinson, Keith [388] see Gill, Jayson

Willermet, Cathy [192] see Ragsdale, Corey

Willhite, Brenton (University of Missouri)

[213] A Stylistic Approach to Abrupt Ceramic Change in Salinas Province, New Mexico

The sudden emergence of Tabira Black-on-white and Tabira Polychrome pottery during the late 16th to early 17th century in the southern portion of Salinas Province, central New Mexico after hundreds of years of production of Chupadero Black-on-white has been the topic of archaeological inquiry for decades. Competing models for the relationship between the pottery types have been suggested. Some researchers have highlighted the many stylistic differences between the types, most notably the emphasis of representational motifs among Tabira specimens, and have argued that the types represent two distinct, dichotomous ceramic traditions. Others, however, see some of the differences between the types as the result of exceptionally conservative, yet present change in Chupadero Black-on-white style through hundreds of years of production. Here I discuss the preliminary results of a design analysis of Chupadero Black-on-white and Tabira Black-on-white/Polychromatic pottery. Ultimately, I argue that the data favor models of subtle, gradual Chupadero Black-on-white change, with a sudden burst of stylistic change around the turn of the 17th century.

Williams, Aaron [223] see Freeman, Andrea

Williams, Charlotte

[331] Shipwrecked Heritage of the Old and New World: Owning and Owning up to the 'Midas Touch' of the Colonial Past

The archaeological past rarely maps perfectly to the borders of current nation states, leaving stakeholder groups to constantly renegotiate boundaries. Located in international water and hosting assemblages from a variety of transitory groups, shipwrecks of the 'Columbian Exchange' have prompted Spain's former colonies to re-order ownership boundaries by claiming that artifacts are not located in their geopolitical borders, but in their intangible pasts. Stakeholders from Peru to Colombia have argued that material such as coins constitute both a protected national resource and a manifestation of indigenous labor, a view that is increasingly granted legitimacy with the acknowledgement of intangible history, but is not so reflected in legal structures that determine the objects' fates. This paper analyzes the legal trends from the results of 37 shipwreck disputes, tracking the most common ownership outcomes of colonial ships that are brought to court. From private hands to national museums, these different ownerships demonstrate a 'Midas Touch' of colonialism, in which Spain's contact with gold turns all gold to Spanish. In granting greater legal protection to historical ties to the nation state rather than archaeological links to a former colony, current management schemes disadvantage a co-custodianship that could

potentially protect sites.

Williams, Daniel (Ohio University)**[302] Diverse Genetic Resources Facilitated Chenopodium Domestication**

The prehistoric domesticate *C. berlandieri* var. *jonesianum* is well documented in the archaeobotanical record of eastern North America from ca. 3,800 BP to European contact when it fell out of use. The seed morphology of the domesticate resembles other new world *Chenopodium* domesticates (*C. quinoa* and *C. berlandieri* subsp. *nuttalliae*) and is distinct from its progenitor and extant wild relatives. Although the relationships among extant North American chenopods are unclear, their morphology provides insights into the diversity of genetic resources available to early agriculturalists. Seed samples were collected from domesticated chenopods and their wild relatives. Seeds were photographed whole and in bisection with a digital optical microscope to capture morphological detail. Seed morphology was compared using linear measurements and 2D morphometrics with principal components analysis in R. Polymorphism is highly variable within wild *C. berlandieri* vars. Variation across the species demonstrates diversity, a prerequisite for domestication. Morphological anomalies may suggest prehistoric conspecific crop-weed introgression. In early agricultural contexts, directional pressure on isolated populations may have driven rapid phenotype changes. Modern breeding methods may be able to duplicate morphology observed in domesticates by using seed morphology as a criterion for selection, a step toward re-domesticating the lost crop.

Williams, Jack [48] see Veres, Matthew

Williams, John (PaleoWest) and Sarah Simeonoff (PaleoWest)**[254] Flaked Stone Artifacts from the San Juan and Cutter Laterals of the Navajo-Gallup Water Supply Project**

This paper presents the results of a lithic analysis of several archaeological sites subjected to data recovery efforts by PaleoWest within the San Juan Lateral and Cutter Lateral of the Navajo Gallup Water Supply Project (NGWSP). Three broad reduction strategies were identified within the assemblages, which fall chronologically and culturally between the Early Archaic and Protohistoric Navajo. Assemblages yielding large artifact sample sizes were subjected to detailed lithic analyses. Raw material analysis, including edxrf results from obsidian, indicate that nonlocal and semi-local raw materials were preferred during the Early–Middle Archaic periods, and during the Protohistoric Navajo period, whereas Late Archaic populations made much greater use of local and semi-local raw materials. Raw material selection, combined with other aspects of the lithic operational sequence, suggest increased residential mobility during the Early–Middle Archaic periods, and again during the Protohistoric Navajo period, whereas lower mobility and increased sedentism are suggested for Late Archaic occupations.

Williams, Justin and Matthew Landt (Alpine Archaeological Consultants, Inc.)**[207] Raw Material Use through the Archaic at the Aught-Six Site: Northwestern Colorado**

Here we examine the data from a cultural resource management excavation of the Aught-Six site in northwestern Colorado. We utilize an expedited version of Minimum Analytical Nodule Analysis (MANA) to address the changes in lithic raw material use and acquisition during a 2,000 year period of the Middle Archaic (6400–4450 cal B.P.). We assign individual artifacts to their respective analytical nodules during a standard lithic analysis focused on stone tool reduction trajectories. We combine the traditional lithic analysis with nodule analysis to build a complete picture of the raw material use throughout these periods. Practically, because the results of our expedient MANA analysis mirror that of more traditional MANA analyses we suggest that MANA can be done on a tight cultural resource management schedule, while being profitable. Additionally, we highlight chronometric and cultural changes in raw material acquisition and use from the settled, basin-house dwelling foragers of the Middle Settled Archaic before 6000 cal B.P., to more classically mobile foragers of the Middle Transitional Period after 5500 cal B.P.). We suggest that nodule analysis pairs well with traditional lithic analyses while highlighting overall prehistoric patterns of time and effort in raw material acquisition and hunter-gatherer mobility.

Williams, Katharine [85] see Shaum, Katherine

Williams, Katharine (University of New Mexico), Angelyn Bass (University of New Mexico) and Douglas Porter (University of Vermont)

[380] *Mineralogical and Micromorphological Analysis of Gypsum Washes at Casa Grande National Monument*

The great house at Casa Grande National Monument, Arizona, occupied circa 1350-1450 CE, is a four-story Hohokam structure made of puddled earth. All of the interior surfaces are finished similarly with individual clay (illite and palygorskite) and gypsum washes. Together, these two fine-finish materials give the walls a uniquely consistent red color and sheen. The gypsum washes on the interior wall surfaces of the great house have been characterized via scanning electron microscopy (SEM) and x-ray diffraction (XRD). This paper explores the mineralogical, micromorphological, and geochemical data gathered during the course of a plaster conservation project at the monument in order to elaborate on the technology and methods involved in the production of the gypsum washes. Specific attention is paid to the weathering processes and the solubilization and precipitation mechanics of gypsum and carbonate materials. An operational chain for the gypsum washes is suggested. The archaeological gypsum samples are supplemented with experimental data on gypsum processed in different ways.

Williams, Katharine [380] see Porter, Douglas

Williams, Leslie (Department of Anthropology, Beloit College) and Kendra Weinrich (Department of Anthropology, The Ohio State University)

[310] *Daily Lives in Early Medieval Bavaria: Degenerative Joint Disease in the Carolingian Altenerding, Germany*

This project investigates lived experience in early medieval Germany by examining degenerative joint disease (DJD) in human skeletal remains from Altenerding, Germany. A 2008 excavation at the Petersbergl site unearthed 128 burials from a 9th century cemetery associated with the Carolingian court at Altenerding. Osteological analyses conducted in 2011 and 2018 individuated 116 individuals from single and intermingled graves. Methods from the Global History of Health Project were used to assess DJD at the major joint complexes and in the vertebral column, recording presence and severity of arthritic changes to the joint surfaces. DJD was common across all joint systems, especially the vertebrae, where prevalence surpassed 73% (63/86).

To examine differential DJD prevalence between males and females, biological sex was estimated using features of the cranium and pelvis (males = 30; females = 31). Significantly more males (90%) than females (67.7%) had at least one body joint affected by DJD (Chi-Square, $p < 0.05$); though not statistically significant, this pattern also held for vertebral DJD. While recognizing the complex relationship between activity patterns and DJD, as well as that between sex and gender, these results suggest differential activity patterns between men and women in Carolingian Bavaria.

Williams, Nancy (University of Tulsa), Miriam Belmaker and Danielle MacDonald

[116] *Squeaky Clean: An Experiment to Test the Usefulness of Cleaning Agents on Silicon Dental Impression Molds*

As surface texture analysis has become more popular in archaeology, various materials were adapted to gather data left by use and dental-wear. Silicon-based dental impression materials, such as President® Jet by Coltène Whaledent, are used to make negative molds of wear patterns. These techniques have been applied to examining the dental microwear of teeth found in the archaeological record and are a useful tool in understanding past diets, vegetation and paleo-environments. Good images of dental wear patterns are captured using silicon impression materials. However, while we can clean the actual artifact, researchers are still confronted with the build-up of dust and finger grease on their silicon samples. For the most part, researchers work around these dirty little anomalies by cutting away the dust and grease from the images, but that can potentially lose valuable data. Using a modern collection of *Odocoileus virginianus* teeth, dental molds, from President® Jet regular body, were created to test the effectiveness of five different cleaning products: compressed air, water, alcohol, regular dish soap and laboratory soap. Molds were tested to see the effectiveness of the cleaning agent on dust and finger grease and to determine if the cleaning solution altered the molding material.

Williams, Patrick Ryan (Chicago Field Museum)

[200] *The Role of Institutions in Imperial Formations in the Andes*

Bradley Parker was first and foremost a student of empire. As an Assyriologist and a budding Andeanist, he was enthralled with understanding the rise and persistence of empire from a comparative approach, and at the time of his death was building an inspirational model to understand imperial expansion from the ground up. Our discussions lead me to question the role of institutions in imperial legacies. In this paper, I explore how Andean institutions were critical to the first imperial formations, and how the persistence of those institutions even after political collapse of empire was fundamental to the establishment of future imperial formations in the Andes. I start by examining Wari, a first generation empire that both Bradley and I have used as a basis for understanding the genesis of Andean expansive states. New research on Wari has been critical in understanding how institutions served the state in both incorporating and maintaining connections with distant regions under imperial influence. I then examine the histories of several Inca institutions that were essential to the establishment and maintenance of the empire, and argue that it was through institutional antecedents, especially those adopted and developed by Wari, that Inca imperialism was ultimately so successful.

Williams, Patrick Ryan [290] see Bowen, Corey

Williams, Patrick Ryan [290] see Henkin, Joshua

Williams, Sloan [206] see Schaefer, Benjamin

Williams, Stephen [329] see Grund, Brigid

Williams, Veronica (CONICET- UBA) and Calogero Santoro (IAI. Universidad de Tarapaca)**[355] *Did Skilled Local Potters Emulate Inka Polychrome Ceramic Style and Pottery Paste? Code Declassification Through Instrumental Neutron Activation Analysis (INAA)***

Based on Instrumental Neutron Activation Analysis (INAA), we tried to decode Inka polychrome ceramics from northern Chile valleys, traditionally assumed of having been introduced by the Inka State from the Lake Titicaca region (more than 500 km away). The results show that these conspicuous Inka vessels were not imported to the region, on the contrary they were made with local raw material, crafted by skilled artisans that imitated Inka iconographic style. In this context it can be suggested that the Inka officials encouraged local artisans to replicate State pottery standard as part of mit'a requirement and that these vessels were later consumed by local elites friendly with the State. Alternatively, but less likely, local potters made these vessels for local elite that were using Inka prestige goods to gain and strengthen their political power in their local communities. These results show, also, the input of archaeometry analysis and petrography to shed light on the impact of the Inka State among prehistoric polities of northern Chile.

Williamson, Kylie [126] see Danella, Erika

Williamson, Kylie (University of Florida), George Kamenov (University of Florida), Neill Wallis (Florida Museum of Natural History) and John Krigbaum (University of Florida)**[168] *Geochemical Analysis of Cremated Bone from River Styx***

River Styx, a Middle Woodland (ca. AD 100-300) ceremonial center located in North Central Florida, is currently the only known site in prehistoric Florida where cremation was the sole form of deposition of human remains. Previous analysis of material remains from the site indicate extra-local connections up into the Ohio Hopewell and Great Lakes regions. To explore these connections further, we utilize tools of geochemistry on well preserved fragments of recovered cremated bone. Recent advancements in strontium isotope studies have demonstrated that calcined bone retains *in vivo* signatures and therefore allows for potential analysis of residential mobility. We use a new approach, based on trace element data, to assess postmortem diagenesis in the bone samples. Using multi-collector inductively coupled plasma mass spectrometry (MC-ICP-MS) we determined an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.70981 (± 0.0005) in cremated bones from multiple individuals ($n=22$). At present, these data are consistent with $^{87}\text{Sr}/^{86}\text{Sr}$ values determined for contemporary sites in the

region using non-cremated bone, and our results suggest largely local status of the study individuals buried at River Styx.

Williamson, Ronald (Archaeological Services Inc.) and Peter Ramsden (McMaster University)**[73] Time, Space and Ceramic Attributes: The Ontario Iroquoian Case**

Ontario Iroquoian chronology has been largely based on observed or inferred changes in the frequency of rim sherd types or attributes through time. Such observations include the increasing development of collars, decreasing complexity in collar motif, decreasing frequency of horizontals and changes to the location of their placement and decreasing neck decoration through time, to name a few. The frequencies of some of these attributes also vary from region to region, and between communities within regions, producing a complex three-dimensional picture. In recent years detailed site-wide ceramic data have been collected from hundreds of Iroquoian sites in south-central Ontario, including many aligned in sequences along drainages. Moreover, for the first time there are hundreds of radiocarbon dates to help in placing sites in chronological sequences. Considering these recent developments, this paper re-examines ceramic attribute frequencies to test the extent to which ceramic attributes may be chronologically sensitive locally, regionally, or more broadly across Ontario Iroquoia.

Willian, James and Winston Hurst**[313] Now You See It: Ethnohistoric Archaeology in the Bluff, Utah, Area**

The archaeology of protohistoric-historic native groups in the southeast Utah can be challenging. Surface evidence for Navajo, Ute, and Paiute camps, particularly earlier ones, are oftentimes minimal and go unrecognized, either literally or in terms of significance. Alliance and kinship ties between these cultures further complicate the picture, as the presumed correlation between certain feature types and culture is not absolute. Recent archaeological work in the greater Bluff, Utah, area, reveals an ever more detailed picture of ethnohistoric occupation and life ways in the region. At the heart of this effort was the multiyear Comb Ridge Heritage Initiative (CRHI) project. Among various research priorities, the CRHI emphasized recognition and documentation of ethnohistoric sites, providing a springboard for ongoing research. A crucial step forward in revealing the extent of Ute occupation in the area, was the first ever identification of tipi rings in southeast Utah. While historic tipi use was known for the area, the conventional view was that tipi rings were absent. Additional sites with tipi rings continue to be recognized in the greater Bluff area, indicative of a broad Ute presence on this landscape, a presence that has been chronically underrepresented in the archaeological record.

Willika, Jasmine [22] see Smith, Claire

Willis, Kathy [412] see Harvey, William

Willis, Mark (Flinders University) and Myles Miller (Versar, Inc.)**[369] What Lies Beneath: The Application of 3D Image Enhancements to Explore Relationships between Rock Art and Rock Surfaces**

The creation of rock art imagery often involved more than pigments, incisions, and peckings. The natural form of the rock influenced, completed, and enhanced pictographic and petroglyphic shapes and often informed the placement of certain designs. Presenting the complex interactions of natural and human-made elements in rock art has long been a challenge for rock art researchers. We explore a new 3D enhancement technique that helps demonstrate this interaction with examples from Western North America.

Willis, Mark D. [134] see Brown, David

Willis, William (University of Nevada Las Vegas)**[151] Specialized Production Sites among the Virgin Branch Puebloan People? New Findings in Shivwits Plateau**

Archaeology on the Parashant National Monument

During the summer of 2018, the University of Nevada, Las Vegas Shivwits Research Project conducted an archaeological survey and documentation project on the remote southern end of the Shivwits Plateau. This region has seen little anthropological research since it was first explored by archaeologists in the early to mid-20th century. Our study specifically focuses on settlement patterns and landscape usage in hopes of better understanding the role and function of small one to two room sites in the area. Traditionally these sites have been referred to in the survey literature as "field houses;" however, whether they are or not is currently unknown. While many of the locations for these small sites documented during this survey were in areas adjacent to land suitable for agriculture, many others were found in locations where agriculture would not have been optimal. Furthermore, evidence for specialized activities, such as hide processing and rituals, has been found at several of these small sites. Our paper presents the variation in the assemblages documented at these sites and discusses their implications for Virgin Branch archaeology.

[151] *Chair*

Willis, William [151] see Harry, Karen

Willison, Megan (University of Connecticut) and Kevin McBride (University of Connecticut)[145] *Domesticity, Trade, and Warfare: An Analysis of Three Early 17th Century Indigenous Domestic Sites in Southern New England*

One of the most iconic moments of the Pequot War was the massacre at Mystic Fort, an event which occurred on May 26, 1637 and took the lives of hundreds of Pequot men, women, and children. Immediately following the massacre, the English retreated back to their ships and were followed by returning Pequot warriors. Throughout the process of documenting this retreat route, to later be called the Battle of the English Withdrawal, Kevin McBride, in collaboration with researchers from the Mashantucket Pequot Museum and Research Center and local metal detectorists, discovered multiple seventeenth century Pequot domestic sites. These sites represent the "largest assemblage of early seventeenth century indigenous sites associated with a single Native group ever identified in southern New England" (McBride et al. 2016:20) and are dated, based upon their material signature, to between 1611 (the arrival of the Dutch) and 1637 (the conclusion of the Pequot War of 1636-1637). This paper will discuss the diagnostic artifacts recovered from each site thus far and the spatial organization of these artifacts. This research has implications for better understanding early 17th century indigenous settlement patterns and early trade interactions in southern New England.

Wills, Chip (University of New Mexico)[189] *Archaeology of the Wetherill Trading Post in Chaco Canyon*

The Wetherill Trading Post and homestead at Chaco Canyon, New Mexico, was at the intersection of a nascent professional archaeology in the American Southwest, the emergent trading post economy in the Four Corners region, the establishment of national monuments through the Antiquities Act, and the creation of a culture history for indigenous people rather than by them. The sociocultural and political dynamics surrounding the Wetherill Trading Post continue to have profound consequences for archaeological research and historical preservation. In 1910, the Wetherill Trading Post changed management but the physical plant continued to grow and became the core of the National Monument's administrative and visitor facilities. The buildings were leveled in 1952 with little documentation and the trading post complex largely disappeared under windblown sand and vegetation. The University of New Mexico has conducted investigations at the trading post since 2007 which suggest that some of our understanding about the prehistoric period has been masked or misled by historical landscape modification.

Wills, Richard [129] see Young, Eric

Wills, W.H. [120] see Sturm, Jennie

Wilmsen, Edwin [298] see Killick, David

Wilson, Coen [277] see Herries, Andy

Wilson, David (Florida State University) and Jessi Halligan (Florida State University)

[171] *It's the Faunal Countdown! Analysis of Faunal Remains from the 2017 Excavations at the Ryan-Harley Site, Wacissa River, Florida*

In 2017, the Florida State University underwater field school conducted excavations of the middle-Paleoindian Ryan-Harley site (8JE1004) in the Wacissa River in northwest Florida. These excavations recovered significant faunal remains from three one-meter units in association with lithic artifacts, potentially representing a Suwannee-aged disposal midden. Previous research at the site, the only known single-component Suwannee site, has indicated that faunal materials represent a broad-spectrum subsistence adaptation. The current analysis focuses upon contextualizing the new faunal remains within the known site dataset. Fabric analyses are conducted in tandem with more traditional zooarchaeological methods in order to discuss site formation processes in combination with Middle Paleoindian subsistence strategies.

Wilson, Dean [254] see Potter, James

Wilson, Dean

[254] *Nature and Organization of Ceramic Production During Early Phases in the Chuska Valley*

Examination of pottery recovered during recent investigations of the Navajo-Gallup Water Supply Project include the recording of stylistically-based typological categories and descriptive attributes relating to the manufacture and exchange of pottery vessels. This data provides clues relating to changing strategies of pottery production and community ties spanning seven centuries. Trends discussed here relate to important changes associated with the earliest ceramic periods (Early Basketmaker III through Late Pueblo III period) that provide among the best evidence relating to a series of shifts in the influences, organization, and nature of ceramic production and exchange. Such observations are critical to a better understanding of the early development of Pueblo adaptive strategies and lifeway.

Wilson, Jennifer (Archaeological & Historical Services-EWU), Sean Stcherbinine (Archaeological & Historical Services- EWU) and Roger Kiers (Washington Dept. or Transportation)

[357] *Building Bridges: Federal, State, and Tribal Collaboration on the US 101 Elwha River Bridge Replacement Project, Washington State*

Dam removal is restoring the culturally significant ecosystem of the Elwha River on Washington's Olympic Peninsula, but the resulting increase in water flow at the US 101 Elwha River Bridge has accelerated erosion at pier foundations, necessitating replacement. Ethnographic and archaeological evidence indicate the area surrounding the bridge has been used for thousands of years by the Klallam people and contains important information about the early to middle Holocene prehistory of the Elwha River valley. In collaboration with the Washington State Department of Transportation, National Park Service, and the Lower Elwha Klallam Tribe, Archaeological and Historical Services supported compliance efforts by conducting geomorphological studies, intensive survey, and National Register of Historic Places (NRHP) evaluative testing, resulting in the identification of three archaeological sites considered eligible under NRHP criteria A and D. Details of the compliance process and the sites' Section 4(f) implications are discussed, as well as the project's contributions to the regional knowledge of pre-contact groups in western Washington.

Wilson, Jeremy [72] see Peterson, Ryan

Wilson, Jeremy (Indiana University-Purdue University, Indianapolis), Amber VanDerwarker (University of California-Santa Barbara), Duane Esarey (Illinois State Archaeological Survey) and Broxton Bird (Indiana University-Purdue University Indianapolis)

[348] *Drought, Diet, Demography, and Diaspora during the Mississippian Period: A View from the Central Illinois River Valley*

For decades archaeologists have conjectured about the impacts of climate change on the distribution of Mississippian and related pre-Columbian populations in midcontinental North America. Until recently, climatological reconstructions were

coarse grained and lacked the temporal and spatial resolution to link in any substantive way with archaeological datasets on settlement size and distribution, subsistence, population movement, and biological relatedness. By that same token, archaeologists working in this region are only beginning to assemble operative databases to assess the relationship between the distribution of people and climate change. In this paper we examine the emergence, trajectory, and eventual decline of Mississippian polities in the central Illinois River valley (CIRV) of west-central Illinois. As a proximate hinterland to Cahokia and the American Bottom, the CIRV witnessed the development of early 11th century Mississippian centers, late 12th and 13th century consolidation into fortified towns and villages, and regional abandonment as part of the Vacant Quarter by the early 15th century. We investigate the variance in paleoethnobotanical, bioarchaeological, and settlement datasets from a series of time-transgressive Mississippian sites in the CIRV, comparing them to our recently developed high-resolution, multi-proxy lake sediment records that track midcontinental hydroclimate patterns over the last 2,000 years.

Wilson, Kurt (University of Utah) and Brian Codding (University of Utah)**[65] *The Marginal Utility of Inequality***

The emergence of hereditary social inequality resulted in enormous impacts on human history, yet its causes remain heavily debated and unexplained. Here we propose and evaluate an environmentally informed model explaining the emergence of social inequality based on the interaction between circumscription and environmental inequality. We demonstrate how the combination of the two conditions results in situations where social inequality, as the best of bad options, may represent the optimal decision. Crucially, we demonstrate how inequality affects the payoffs for both dominants and subordinates, suggesting an explanation for its persistence. We then test this model ethnographically, using generalized linear mixed models on data from the Standard Cross-Cultural Sample. Our initial results support the model hypothesis that increasing circumscription and environmental inequality correlate with increasing social inequality among documented societies. The model results also suggest articulations with current archaeological inequality ideas, connecting with elite self-interest and collective good arguments. Overall, our research suggests social inequality may emerge as a result of dynamic ecological conditions.

Wilson, Michael and Metin Eren (Kent State University)**[67] *Modern versus Prehistoric Hafting Mediums: Are They Comparable?***

This paper examines the performance of three different projectile point hafting mediums in order to determine whether thermoplastic adhesive is an applicable medium to use in archaeological experiments concerning projectile point ballistic experiments. The study examines ninety, triangular projectiles (thirty points hafted with each of the three mediums): one group is hafted with the thermoplastic adhesive while the other two, organic-based medium groups will consist of a wood-resin pitch glue and a collagen-based hide glue, all fired into a domestic pig carcass. The statistical analysis from each group will offer insights regarding the performance of modern mediums in archaeological experiments.

Wilson-Green, Joanna [396] see Gonzalez, Kerry

Windes, Thomas (University of New Mexico, Department of Anthropology)**[313] *Hard Times and Mobility in Thirteenth-Century SE Utah: A Chronometric Study***

Large areas of the western Northern San Juan Region were repopulated in the early AD 1100s and mid AD 1200s, but the overall lack of systematic chronometric dating has complicated our understanding of events during these critical periods of settlement and abandonment. The Wood Project has assisted federal land managers in documentation of intact and semi-intact dwellings throughout southeastern Utah that are suffering from increased visitation, natural deterioration, and the threat of energy extraction. Our work has endeavored to systematically document intact building sites in basins and canyon systems throughout the area, in order to provide base-line information for the visible fragile structural wood remains, architecture, and additional cultural materials. In many cases, these wood elements and other remains have never been systematically recorded, even though they have the potential to greatly refine the temporal aspects of the late Ancestral Puebloan occupations and the subsequent final depopulation of the region by these people. Dates and detailed architectural documentation from our work on Cedar Mesa, and larger region, provide a new subset to add to the growing interest in the prehistory of the area.

Winemiller, Terance [219] see Ochoa-Winemiller, Virginia

Winemiller, Terance (Auburn University at Montgomery), J.J. Ortiz-Aguilú (Universidad Técnica de Manabí), María Isabel Silva-Iturralde (Centro Cívico Ciudad Alfaro) and Jaime Andrés Velázquez-Mora (Centro Cívico Ciudad Alfaro)

[409] *Using LiDAR and Environmental Suitability Models to Predict Probable Locations of Ancient Settlements in Manabí, Ecuador*

In recent years, LiDAR has gained popularity among archaeological researchers for its capability to reveal ancient settlement features hidden beneath dense vegetation coverage in heavily forested areas. More often, these studies have revealed undocumented monumental architecture and in some cases modified landscapes such as agricultural terraces, canals, and elevated causeways. Recently, we processed LiDAR flown over Cerro Jaboncillo, Manabí, Ecuador. Earlier surface reconnaissance revealed a landscape dotted with dispersed Manteño settlement features and modified landscapes. We developed a bare earth model and subjected the data to a geographic information systems based suitability modeler that employs drainage, slope degree, networks, and other factors to predict the probable location of previously unknown settlement units. Our modeler revealed that the scope of settlement at Cerro Jaboncillo was much more extensive and heavily engaged in intensive agriculture than previously known as well as provides possible indications of a settlement hierarchy and social stratification.

Winnick, Meg

[3] *Artifacts and Lesson Plans: Using 3D Technologies to Teach Archeology*

Archeology education initiatives can benefit from 3D technologies to develop further engagement between archeological artifacts and the public. In the summer of 2018, the National Park Service in collaboration with the National Council of Preservation Education crafted a project to help NPS write guidelines for parks developing 3D printed artifact lesson plans. The goal of the project was to make park resources available on site and digitally. The project produced two lesson plans, one based on an already existing collection of 3D artifacts and one based on an artifact that had not yet been scanned. Both lesson plans were in keeping with the NPS goals, to utilize new sciences and technologies to educate and promote stewardship among the public. This paper will address the project challenges for implementing 3D technology in education programs while offering solutions to those challenges. Archeology has become invaluable as an interpretive tool, and 3D technologies can help archeologists and educators engage communities in a more meaningful way.

Wintch, Kenneth, Deanne Matheny and Ray Matheny (Brigham Young University)

[420] *Surveying Montezuma Canyon*

This paper presents the history of archaeological surveys by Brigham Young University in upper and middle Montezuma Canyon during the latter half of the 20th Century. The sequence, methods, context and goals of those various inventories are briefly presented, followed by a brief discussion of salient results and patterns of aboriginal settlement and occupation in the canyon. Lastly, we present an idea of our research orientation from here forward, as we work toward a canyon-wide summation of what has been learned about the Montezuma Canyon drainage during BYU's work there in the 20th Century.

Winterhalder, Bruce [146] see Pacheco-Cobos, Luis

Wiseman, Chelsea [240] see Benjamin, Jonathan

Wisner, Gavin (Northern Arizona University)

[374] *A Zooarchaeological Analysis of Caves Branch Rockshelter and Sapodilla Rockshelter*

This poster provides an analysis of faunal materials from mixed deposits in both the Caves Branch Rockshelter (CBR) and Sapodilla Rockshelter (SDR) in Central Belize. This analysis continues previous research at the two sites from contexts spanning the Protoclassic to Terminal Classic temporal periods concerning ancient Maya ritual and mortuary behaviors. The composition of fauna from both rockshelters demonstrates similarities and differences between animal use at the sites and articulates the practices leading to the deposition of faunal remains. Analysis of materials followed methods used at the

Northern Arizona University, Department of Anthropology, Faunal Analysis Laboratory (NAUDAFAL), including standard procedures for identifying elements, taxonomic categories, and taphonomic features. For example, evidence of burning illustrates one of the primary taphonomic features present on these faunal remains. These data are further understood and interpreted through the context in which they were discovered, primarily location within the cave and associated artifactual or mortuary materials.

Wisner, Gavin [374] see Tappan, Katie K.

Wissler, Amanda (Arizona State University) and Nicolas Gauthier (Arizona State University)

[9] The Frailty-Mortality Paradox: Insights from the Spanish Flu Pandemic of 1918

The difficulty of inferring health from skeletal remains is an enduring problem in bioarchaeology. The concept of "frailty" has emerged as a convenient tool for relating observed skeletal lesions to human health and mortality, yet the biases inherent in archaeological samples have left the concept undertheorized. It remains unclear whether frailty should be considered an unchanging property of individuals - an innate risk of death - or whether frailty depends on changes in an individual's external environment, such as a major epidemic event. We analyze a sample of 193 individuals who died during the Spanish Flu pandemic of 1918, when healthy young adults (traditionally the least frail segment of the population) were most severely affected. We present data on age-at-death, and several nonspecific indicators of skeletal stress, and use a multi-state hazard model to show how the relationship between frailty and risk of death varied over the course of the pandemic. We discuss how a more rigorous approach to the concept of frailty in modern populations can improve our understanding of disease, mortality, and the determinants of health in the ancient world. These results suggest that frailty should not be considered in isolation from the physical and social environment.

Wistuk, Bronson (Binghamton University)

[250] Quispi Rumi: Geochemically Sourcing Obsidian from the Patipampa Sector of Huari

From 2017-2018, over 1,000 obsidian artifacts were excavated from the Patipampa sector of Huari, once the administrative capital of the Wari state. During the 2018 season, over 350 artifacts were analyzed via portable X-ray fluorescence (PXRF) and then fingerprinted to Andean obsidian sources when possible. Artifacts found within architectural spaces were prioritized, aiding the understanding of non-elite spaces in the capital city. This paper focuses on obsidian's role in state power, the economy, and cosmopolitanism as lived by the people of Huari. The presence or absence of local and exotic obsidians draws attention to how the Wari chose to exploit or not exploit the Ayacucho Region's resources. While this assemblage is from a single, small sector of the city, it is the most extensive geochemical investigation of obsidian excavated from Huari to date.

Witt, Christopher [245] see Crown, Patricia

Witt, David [136] see Lewis, Jenifer

Witt, David [245] see Neitzel, Jill

Witt, David (NYS Department of Environmental Conservation)

[421] "Once an Indian Village:" The Buffum Street Site, Dispossession, and Contested Municipal Landscapes in Buffalo, New York

The Buffum Street Site in South Buffalo, New York, is the location of a multicomponent Seneca Village, with an historic component dating between AD 1780 and 1844. This village served as the focal point of the Buffalo Creek Reservation, and important cultural features such as a mission church, the first permanent school in Buffalo, ancestral mounds, and burial grounds within an earth ring were present. The famous Seneca orator, Red Jacket, lived here while he fought against the loss of the Seneca land base. After the sale of the Buffalo Creek Reservation in the 1840s, the land has been slowly parceled off and is now the site of a suburban neighborhood. A 6.8 acre lot surrounding the former Public School 70 and the 1.6 acre Seneca Indian Park are all that remains of this important cultural and historic landscape. However, a major development involving the school threatens what remains. Despite knowing of the area's importance to the Seneca people,

municipal boards have approved the proposed changes; these approvals have been contested in court. This paper will present the site's history, and link municipal actions with the ongoing pattern of colonial dispossession experienced by the Seneca people.

[167] *Discussant*

[136] *Chair*

Witt, Kelsey [109] see Yarlagadda, Karthik

Witte, Emilee, Emily Schach (Arizona State University) and Donna Nash (University of North Carolina at Greensboro)

[290] *Comparison of Slip Colors from Andean Styles*

Rescue excavations conducted at the Terminal Terrestre site in Moquegua, Peru recovered a diverse collection of complete ceramic vessels representing several styles dating to Terminal Middle Horizon (900-1100 CE), Late Intermediate period (1100-1400 CE), and Late Horizon (1400-1532 CE). Through the use of portable X-Ray Fluorescence (pXRF), over sixty vessels of the Chiribaya, San Miguel, and Inka styles were examined for differences in paste, slip, and pigment chemical compositions. The sample features vessels that use diverse colors, distinctive motifs, and difference production technologies. Pottery from the Terminal Terrestre were compared to examples from Cerro Baúl and Cerro Mejía. The focus of the analysis is to determine if the use of pigments as slip colorants changed overtime and were more restricted with the local Chiribaya and San Miguel versus the imperial styles of the Wari and Inka.

Wohlgemuth, Eric (Far Western Anthropological Research Group), Daron Duke (Far Western Anthropological Research Group, Inc.), Sarah Rice (Far Western Anthropological Research Group, Inc.), James Kangas (USDI, Bureau of Reclamation) and Mark Slaughter (USDI, Bureau of Reclamation)

[36] *Hot Rock Cooking of Desert Lily and Winding Mariposa*

We describe Late Holocene hot rock roasting of desert lily (*Hesperocallis undulata*) in the Salton Basin of southeastern California, and winding mariposa (*Calochortus flexuosus*) near the Virgin and Muddy rivers confluence in southern Nevada. We briefly note differences but focus on similarities in these two arid region plant foods, and their use by sedentary groups from adjacent areas. Desert lily use probably peaked with periodic population influxes associated with Colorado River divergences into the Salton Basin. Winding mariposa appears to largely antedate the Western Virgin Puebloan settlement, possibly marking a wild carbohydrate option for the resident human population prior to fully committed maize-based farming.

Wohlgemuth, Eric [110] see Hull, Bryna

Wojtal, Piotr [368] see Haynes, Gary

Wold, Arthur (University of Iowa)

[47] *Environmental Reconstruction Using Molluskan Faunal Remains at Woodpecker Cave*

Woodpecker Cave is a Late Woodland rock shelter site in Johnson County, Iowa, and was the location of a field school operated by the University of Iowa from 2012-2018. During seven field seasons, over 25 kilograms of mussel shell were recovered; many of these were small, unidentifiable pieces found in screens. Shell hinge morphology is the key to identifying species, and from 3300 fragments containing hinges, over 2700 specimens were identified. Mussel shells are uniquely suited to inform us about ancient environments because they are very sensitive to environmental changes. This has also meant they have been the subject of a large amount of ecological research, and those findings are often applicable to species present in the Woodpecker Cave assemblage. This poster uses an interdisciplinary approach to help characterize the state of the Iowa River near Woodpecker Cave during the Late Woodland, and more generally, explores which environmental factors freshwater mussel remains are best suited to inform us about.

Woldekiros, Helina (Washington University in Saint Louis)**[242] *The Social and Economic Context of Salt Production and Distribution in the Horn of Africa: Past and Present***

Salt was a significant item of trade in the Horn of Africa for at least 2000 years. It was valued by both mobile pastoralists and settled agriculturalists. It is also one of the few commodities for which direct archaeological evidence is lacking. Archaeological and ethnoarchaeological research conducted on the Afar salt trade route in northern Ethiopia provided contextual evidence on the production and distribution of salt from the Aksumite period (450 BCE-900 CE) to the present. Ethnoarchaeological and textual evidence showed that rock-salt was the primary type of salt traded on this ancient trade route. Contemporary highland farmers and lowland mobile pastoralists using donkeys, mules and camels transport about 20,000 tons of salt annually. The research shows that the pace and speed of salt production and distribution are determined by the logistical requirement of the Afar trade route. Analysis of lithics, ceramics, plant, and animal remain collected from campsites, rest-areas, small-towns, and villages located along the trade route provide proxy data for salt distribution in prehistory indicating regional participation in salt trade.

[242] Chair**Wolf, John and Nicole Slovak****[315] *John Rick and New Technologies for Archaeological Research / John Rick: The Ultimate Authority***

John Rick has been an advocate for the application of new technologies to archaeological field investigations, throughout his career. He has been devoted to training his students in the use of those technologies. Recently, the project he co-directs at Chavín de Huántar has added Stanford engineering students to the field team. Conceived as an aspect of the on-going conservation efforts at the site, the engineering students and their projects have become fully integrated into the broader investigations at Chavín. The 2018 field season saw the introduction of robot technology to the exploration and artifact recovery efforts within the restricted canal and gallery spaces. The prospects for further engineering applications to archaeological research hold great promise for both disciplines and is a fitting legacy for John Rick, as archaeologist, teacher, and mentor. John Rick's contribution to theoretical discussions on the origins of authority and the distinctions between system-serving and self-serving systems are the focus of Nicole Slovak's presentation. John's leadership style both in the classroom and in the field embodies a kind of system-serving model that promotes inclusion and equanimity within the archaeological community, and which can serve as a model for archaeological collaboration and research in the twenty-first century.

Wolf, Marc (GC CUNY) and Thomas Guderjan (Maya Research Program [MRP])**[30] *Filling in the Maya Mosaic of Northwestern Belize: Survey and Mapping at MRP***

For several decades, MRP (Maya Research Program) has been working to amass an enormous base of survey and mapping data from the Three Rivers (Blue Creek, Bravo, Booth's) and upper La Lucha escarpment region of Belize. Over 50 archaeological sites have been precisely recorded using innovative technologies and techniques that complement other projects within the area, both internally—admirably at the nearby Program for Belize lands by the many University of Texas projects centered around massive sites like La Milpa and its sustaining area—and internationally like the work conducted within view-shed of the giant Alacranes bajo system of Mexico across the border. These mapping efforts have been supported by a vast network experienced excavators, archaeobotanists, conservators, water management specialists, GIS technicians, soil scientists, bioarchaeologists, artists, engineers, topographers, chemists, education professionals and other social and physical scientists. This discussion will focus on a selection of these sites and some of the noteworthy research methods that has been successful in lending greater geographical and cultural context to this area of Belize.

[234] Moderator**[234] Discussant**

Wolf, Sibylle [15] see Dutkiewicz, Ewa

Wolfe, Christopher [387] see Herrmann, Nicholas

Wolff, Barbara [250] see Isbell, William

Wolff, Christopher [10] see Holly, Donald

Wolff, Christopher [10] see Samuels, Amanda

Wolff, Christopher (University at Albany) and Donald Holly (Eastern Illinois University)

[308] *Of Longhouses and Lineages: Evaluation of Transformations in Maritime Archaic Social Organization in the Far Northeast*

The social organization of Maritime Archaic groups of Newfoundland and Labrador is notoriously difficult to assess due to poor preservational environments, challenging logistics of working in the Subarctic, and a paucity of research directly applicable to such questions; however, a long chronological sequence of their residential architecture and mortuary patterns has been documented that suggests that it may have undergone significant transformations in the Middle Holocene. While several researchers have proposed various causal elements that contributed to these transformations, a focused evaluation of how descent and residence patterns contributed and/or were affected by these shifts across the Maritime Archaic range is lacking. Part of the reason for this is that their world was vast and seemingly stretched beyond the ability to maintain direct social connections; yet, despite large distances, the material culture suggests they maintained some form of social relatedness even as we see regional variations develop in their socio-economic strategies. In this paper we discuss data from Maritime Archaic houses and burials from different periods and evaluate the possibility that they represent significant transformations in their social organization, including their descent and post-marital residence patterns.

Wolfhagen, Jesse [127] see Rapes, John

Wolfhagen, Jesse (Stony Brook University)

[128] *Exploring Seasonal Aspects of Past Herding Systems Using Bayesian Modeling of Animal $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ Enamel Isotopic Profiles*

Intra-tooth samples of enamel $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ isotopic values produce isotopic profiles that reflect seasonal fluctuations in temperature, precipitation, and dietary composition. Archaeologists have interpreted trends found in animal isotopic profiles to estimate birth seasonality and to elucidate past management strategies (e.g., seasonal foddering) and variability in these aspects of herding systems across communities and over time. These research aims rely on comparisons of isotopic profiles. To help standardize such comparisons across teeth, Balasse and colleagues (2012) developed parametric summaries of isotopic profiles. These summaries typically work best with an intensive intra-tooth sampling strategy, however, preservation and budgetary constraints preclude this approach in all situations. This poster explains how to estimate isotopic profiles precisely using Bayesian statistics. Fitting a seasonal regression model to isotopic profiles of enamel $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values in sheep and cattle teeth, researchers can produce parameter estimates and uncertainty statements surrounding isotopic profiles for teeth sampled as few as 5-6 times. This method may greatly expand the sample of specimens an archaeologist can use to explore seasonal differences in herds' diets and birth patterns as well as the strength of seasonality in the past. Model outputs also provide a straightforward way to evaluate hypotheses probabilistically.

[128] *Chair*

Wolin, Daniela (NYU Institute for the Study of the Ancient World), Michelle Young (Yale University) and Natali Lopez Aldave (Universidad Nacional Mayor de San Marcos)

[286] *Identification of Bilateral Congenital Radioulnar Synostosis in an Early Horizon Burial from the Site of Atalla, Peru*

Bioarchaeological research can help trace the development and distribution of rare pathologies across space and time, aiding in our understanding of how past peoples experienced and made sense of a variety of conditions and diseases. Congenital radioulnar synostosis (CRUS), a developmental condition resulting in fusion of the proximal radius and ulna, is one such pathology rarely identified in the archaeological record. This presentation introduces a prehistoric case of bilateral CRUS observed in a subadult excavated at the site of Atalla in the Huancavelica region of Peru. Atalla is a large early

village site with monumental public architecture and long-distance trade connections with other areas of Peru. The subadult, which dates to the Early Horizon (ca. 800 BCE) occupation of the site, was interred flexed in a simple oval-shaped pit associated with a nearby feature of a roughly circular arrangement of angular stones and rounded cobbles. This example is only the second case of CRUS reported from Peru and may represent the earliest case identified worldwide.

Wollwage, Lance and Allyson Brooks (Washington State, Department of Archaeology and Hi)**[75] Beyond Data Recovery: Developing Mitigation for the Public Benefit in Washington State**

For historic properties such as archaeological sites and historic buildings, data recovery or documentation is often the predominant mitigation strategy offered by federal agencies when a cultural resource will be impacted by a federal undertaking. By extracting important information before destruction, we recover some part of a historic resource's informational value and address important questions of science, engineering, and culture. But all too often, for everyone except cultural resource professionals, recovered data disappears into an inaccessible sea of grey literature. The Washington State Historic Preservation Office has been implementing creative mitigation strategies that have ranged from incorporating historic mining resources into a private resort development to developing web-based GIS systems in order to increase access to cultural resource information in ways that are responsive to the needs of the public, Tribes, and scientific communities.

Woloszyn, Janusz [252] see Rozwadowski, Andrzej

Wolverton, Steve [46] see Nagaoka, Lisa

Womack, Andrew (McGill University)**[298] Who Attended Their Funerals? A Petrographic Comparison of Pottery from the Majiayao Culture of Neolithic China**

In northwestern China's Gansu Province, painted pottery from the late Neolithic Majiayao Culture has long been admired for its skillful construction and beautiful painted motifs. Since the majority of whole vessels have been recovered from graves, it has generally been assumed that these items were produced primarily for mortuary purposes, including for displaying wealth or projecting the political or religious power of the deceased. This paper reassesses these claims in light of a petrographic analysis of sherds from nearby mortuary and habitation contexts. By examining the production processes embedded in these items, including producer choices in paste recipes and raw material selection, as well as surface treatment, I suggest that vessels from mortuary contexts are not simply displaying wealth or power. Instead, they likely reflect diverse communities of producers and consumers who were directly participating in funerary events. These results highlight the importance of examining production choices alongside vessel style and context when interpreting the role of pottery in mortuary settings.

Wong, Gillian (University of Tübingen, Institute for Natural Scientific Archaeology), Dorothee Drucker (Senckenberg Centre for HEP University Tübingen), Britt Starkovich (University of Tübingen, Senckenberg Centre for HEP) and Nicholas Conard (University of Tübingen, Senckenberg Centre for HEP)**[48] The Environmental Context of the Magdalenian in the Lone Valley of Southwest Germany**

The Swabian Jura of Southwest Germany is home to some of the best studied Paleolithic archaeological sites in the world. These sites have diverse artifact assemblages that include bone and lithic artifacts, art objects, combustion features, microfaunal remains, and archaeobotanical remains. This diversity allows researchers to reconstruct past environments from sources that lie in direct association with cultural remains. Although studies in geoarchaeology, archaeobotany, geochemistry, and paleontology have reconstructed Paleolithic environments at these sites, very few reconstruct the local conditions during the Magdalenian. The Magdalenian (~16.3 to 12.7 cal kyr BP in Southwest Germany) has distinctly regional settlement patterns that are, at least in part, a result of local environmental conditions. We use faunal remains from Langmahdhalde, a recently discovered rockshelter site in the Lone Valley of the Swabian Jura, to reconstruct local-scale Magdalenian environments and climates. These reconstructions are based on microfaunal analysis and carbon and nitrogen stable isotopic analysis on horse (*Equus ferus*), red deer (*Cervus elaphus*), and reindeer (*Rangifer tarandus*) archaeofaunal remains. We use these data to discuss the characteristics of local ecosystems in the Lone Valley during the Magdalenian and apply this to current interpretations of settlement patterns during the Magdalenian in the Swabian Jura.

Wonson, Katherine (National Park Service)**[85] The Vanishing Treasures Training Program- Closing the Skills Gap**

Vanishing Treasures (VT) began its training program in 2014 with five trainings and 90 trainees. Today, we have trained over one thousand people and hosted 90 trainings. Our growth has been guided by A Technical Preservation Needs Assessment and Training Strategy completed in partnership with the University of Pennsylvania. This document outlined the major skills gaps and resource preservation training needs in the NPS and identified a core curriculum and training delivery strategy for the VT program. As we have implemented this strategy, we have learned many lessons along the way and identified further training needs not met by our training offerings.

This session will explore the development of the training program, lessons learned and future directions for providing education on the preservation of traditional resources. We will also share ways in which our training program complements the project and technical assistance arms of the VT program.

Woo, Katherine (The University of Sydney)**[240] Shifting Palaeoeconomies in the East Alligator River Region: An Archaeomalacological Perspective**

The East Alligator River Region (EARR), Australia, has undergone considerable environmental change throughout the Pleistocene and Holocene. Rising sea-levels and changing climatic conditions drastically altered the environments and ecosystems of this region, forcing its inhabitants to adapt their economic strategies in order to successfully exploit these new and evolving landscapes. Throughout these shifting environmental sequences molluscs have played an important role in the economic activities of people, as demonstrated by the abundance of molluscan material found in sites throughout the region. Molluscs have rarely been analyzed in detail in the EARR, resulting in a poor understanding of their role in the past economies of the region. Given that molluscs provide critical information on both past economic and social activities and environmental conditions, this gap in the literature is clearly one which must be addressed. This research fills this gap through the detailed and holistic analysis of two rockshelter sites in the region: Madjedbebe and Ngarradj Warde Djokeng. A multifaceted approach, which utilizes current zooarchaeological methods and biological and ecological information, has been used to critically evaluate and build on current archaeological and environmental models for the region to provide a more comprehensive picture of past societies in the EARR.

[240] Chair

Wood, Paul [131] see Dudzik, Beatrix

Woodard, Buck (American University)**[14] Representing Historical Culture on the Big and Small Screen: Success and Challenges from the Algonquian Chesapeake**

In what ways can archaeology and historical anthropology contribute to popular media representations of the past, and what responsibility do consultants have to ensure accurate portrayals of the peoples and cultures they study? For projects that combine dramatic performance, scholars and indigenous descendant communities, the drive for "authenticity" is often conjoined and conflicted with artistic license, romanticism and contemporary politics of representation. Television and film work that wish to access "real" Native people and culture must often contend with the impacts of colonialism, issues of narrative ownership and the negotiation of cultural authority. The outcome of civic engagement and collaboration can however, produce notable results that satisfy multiple stakeholders.

Woodcock, Rachel [37] see LeFebvre, Michelle

Woodcock, Rachel (University of Florida) and William Keegan (Florida Museum of Natural History)

[170] *Measuring Seasonality in Codakia orbicularis Clams from Lucayan Sites in the Bahamas*

The shells of *Codakia orbicularis* clams are common at archaeological sites throughout the Bahama archipelago. These clams were harvested as food, and their abundance indicates that they were processed in habitation areas. Previous studies have suggested that the shells record daily, tidal, and seasonal growth sequences that can be used to determine when during the year that the living animal was harvested. However, there are a number of problems with those earlier studies that need to be addressed before clam shells can be exploited to their full potential. This study examines a large number of recently harvested living animals and compares them to archaeological specimens from the central Bahamas. Visual observations of cross-sectioned shells, along with carbon and oxygen isotope measurements, are used to develop a model of *Codakia* growth that can be used to determine the time of year when specific shells were harvested. In addition, the isotopic signatures should contribute to the refinement of paleoclimate models for the medieval Warm Period which coincides with the Lucayan occupation of the Bahamas.

Woodfill, Brent (Winthrop University)

[303] *El Aragón: A Late Classic Town in Highland Alta Verapaz*

In April 2018, members of Proyecto Salinas de los Nueve Cerros were contacted by a local contractor who found something he said was of archaeological importance. Upon examination, he had uncovered the largest figurine workshop yet discovered in Mesoamerica. After receiving emergency financing from the National Science Foundation, project members conducted a salvage excavation of the site in July of the same year. Although El Aragón has been heavily damaged by the growth of Coban over the past 60 years, team members were able to recover important information about figurine manufacture, interregional ties, and the economic foundation of this important site in a heretofore uninvestigated corner of the Maya world.

[165] *Discussant*

Woodfill, Brent [339] see Leight, Megan

Woodhead, Genevieve (University of New Mexico)

[380] *You Spin Me Right Round: Reading Southwest Indented Corrugated Pottery for Movement and Directionality*

Corrugated vessels are ubiquitous in the northern U.S. Southwest, and yet their research potential is often overlooked. This study examines corrugated pottery to determine how much uniformity or variability goes into the process of manufacturing these everyday, utilitarian objects. The sample comprises Ancestral Puebloan and Mogollon corrugated vessels from the collections of the University of New Mexico Maxwell Museum, the Museum of Indian Arts and Culture, and the University of Colorado Museum of Natural History. I evaluate a potential relationship between coiling direction and indentation angle. Because corrugated vessels memorialize their own making, they shed light on the ceramic production process broadly. They also act as specific testaments to prehispanic pottery-making practices.

Woodland, Carol (University of New Mexico) and Keith M. Prufer (University of New Mexico)

[174] *Comparative Stable Isotopic Analyses between Dental Enamel and Bone Collagen among Central American Archaeological Samples Spanning 8,000 Years*

Carbon, Nitrogen and Oxygen stable isotope analyses are popular tools within the field of archaeology. Applications for stable isotope analyses of human and faunal bone collagen and dental enamel include environmental reconstructions, modeling subsistence patterns, and investigating human-animal relationships, as well as potential to better understand human and animal physiology as it relates to carbon.

Using materials from two rock shelter sites in the Maya lowlands of southern Belize with a 10,000 year continuous use history, this project examines the relationship between $\delta^{13}\text{C}$ in tooth enamel and in bone collagen. We analyzed paired dental enamel and XAD purified bone collagen from 40 skeletons of humans and animals from two rockshelter sites in Belize dating from 9000-1000 BP. We present data on the offset between $\delta^{13}\text{C}$ from collagen and enamel within functional groups or taxa. We assess if there is a relationship between animal diet and $\delta^{13}\text{C}$ collagen-enamel offset, as well as if there is a change in the offset between human foragers and agriculturalists. Finally we assess the relationship between enamel

$\delta^{18}\text{O}$ and enamel-carbon offsets, and suggest some physiological processes to explain the overall differences.

Woodruff, Paul [75] see Wallander, Amanda

Woods, James (College of Southern Idaho)

[255] *Replication Experiments: The Devil Is in the Details*

The manufacture of Mesoamerican flaked stone “profiles” involved a multi-step sequence from large percussion blank to detailed finishing using pressure-flaking. This paper explores issues involved with this last stage. Included is the shaping of head profiles often with elaborate headdresses; facial features including nose, eyes, ears, and mouths; arms and legs sometimes with digits; and an array of decorative margins including undulations, serrations, deep notches, and other complex repetitive patterns. During final shaping of a profile, a small flaking error would be catastrophic requiring substantial repair, a complete change in intended design, or discard. A distinctive Maya nose could become a diminutive “beak”, or a delicately serrated serpent tail could look like a saw with a tooth missing. This paper will summarize experiments using smaller preforms to illustrate the effects of missteps and attempted repairs of delicate margin features.

Woodson, Kyle [194] see Medchill, Brian

Woodson, Kyle (Gila River Indian Community) and Chris Loendorf (Gila River Indian Community)

[246] *Platform Mound Communities along the Middle Gila River*

Extensive archaeological evidence shows that major shifts in settlement patterns occurred over time within the Phoenix Basin, and it appears that population densities along the lower Salt and middle Gila Rivers fluctuated through time, such that periods of high density along one stream correspond with concurrent episodes of low density along the other river. When Platform Mound communities were at their height during the late Classic period, population density appears to have been comparatively low along the middle Gila, with only 12 Platform Mounds at 11 sites compared with 52 Mounds at 31 sites along the lower Salt. In contrast, much larger settlement areas such as Snaketown were present in the same area during the Preclassic period, and data show that during the Classic period many people moved either upstream to the Casa Grande area, or north to the lower Salt River and the Tonto Basin. The middle Gila and lower Salt Rivers have divergent stream flow regimes, which appears to at least partially account for the differences observed in settlement patterns, including the scale of the Platform Mound communities along the two rivers.

Woodworth, Anna (Anthropology at State University of New York at New Paltz), Kenneth Nystrom (Anthropology at State University of New York at New Paltz) and Natalija Condic (Archaeological Museum of Zadar)

[386] *Reconstruction of the Diet at the Iron Age Site of Cvijina Gradina, Croatia*

Cvijina Gradina, located along the Zrmanja River in present day Croatia, was once one of the largest Liburnian settlements during the Iron Age period (6th – 1st century BC). The settlement was prominent in the region’s economic and sociopolitical sphere, leaving behind significant bioarchaeological evidence of diet to be researched. Based on the fragmentary skeletal material excavated at eight grave sites, the MNI is determined to be 41. This study reconstructs the diet of the Iron Age site of Cvijina Gradina through interpretations of stable carbon and nitrogen isotopic ratios. Previous research into the diet of Iron Age settlements at nearby sites suggested that Croatian Iron Age diet was composed predominantly of C3 plants and generally low $\delta\text{N}15$ values. Researchers theorize this diet was primarily herbivorous, with little contribution from marine food sources. This research contributes to our understanding of regional variability in Iron Age diets. It also establishes a baseline for considering how Romanization during the onset of the first millennium impacted the region.

Wooten, Kimberly (California Department of Transportation)

[69] *The Archaeology of the Color Pink*

Journey with me to the year 2167, where our intrepid archaeologist has made a fascinating discovery... a FOOB! Carefully cradled in its pale pink packaging, this breast prosthetic is thought to have had ritual purposes, and while the prosthetics do not deteriorate over time, intact packaging has never been found in situ before! This presentation uses humor and archaeology to discuss the author’s personal experiences with cancer and the association of the color pink with femininity and breast cancer. The author’s intention is to use this forum to bring to light archaeologists who work with disabilities on a

daily basis and basic legislation that governs treatment of disabilities in the workplace.

Worman, F. Scott (Missouri State University)**[90] MSU-VCNP Archaeology Field Schools: Collaborative Experiments in CRM Training**

Field schools serve the vital functions of training students in research methods and introducing them to the realities of field-based investigations. Beyond that, they typically have been a venue for faculty to pursue academic research agendas. In the summers of 2015 and 2016, I led field schools in the Valles Caldera National Preserve (VCNP) that focused explicitly on preparing students for careers in Cultural Resource Management (CRM). I worked in collaboration with the Cultural Resources staff of the VCNP to design and complete projects that met their Section 106 and Section 110 compliance needs. The location of the field school in the Jemez Mountains facilitated student interactions with CRM professionals working in a wide range of contexts, including federal and tribal offices as well as museums and the private sector. I weigh the benefits and costs of a CRM-focused field school, emphasizing long-term student outcomes and exploring the specific challenges it presents for faculty and hosts. Finally, I discuss ideas about improving outcomes for all stakeholders.

[229] Discussant**Worne, Heather (University of Kentucky)****[273] Care Provision for Victims of Violence in Late Prehistoric Tennessee**

This paper addresses care provision for victims of violent trauma during the Mississippian period in the Middle Cumberland Region of Tennessee. Previous research in the region has identified several cases of individuals surviving incidents of intentional violence. However, there has been little attention given to whether healthcare provisioning would have been necessary for their survival. This paper focuses on the injuries sustained by a middle adult male from a late prehistoric agricultural community in the region. The individual has well-healed blunt or sharp force injuries to multiple facial bones around the right eye orbit. All of the injuries appear to have been caused by a large thin or sharp weapon, such as an axe. Utilizing the Bioarchaeology of Care methodology, his injuries are assessed to determine the possible immediate and long-term impacts on his ability to perform daily activities within the specific biocultural context, and what type of care he likely received from other members of his community. This paper will also discuss some of the trends of non-lethal violent injuries and possible care provisioning throughout the region.

Worth, John (Univ. of West Florida)**[367] From Accommodation to Massacre: Evolving Native Responses to Spanish Military Expeditions in the Interior Southeast, 1540-1568**

Between 1540 and 1568, three Spanish military expeditions penetrated the interior region of the southeastern United States, interacting on two or more occasions with several Native chiefdoms extending between Alabama and the Carolinas. The army of Hernando de Soto crossed this entire area in 1540, followed by revisits to the western portion of this region by members of Tristán de Luna y Arellano's expedition in 1560, and additional revisits in the eastern zone by Juan Pardo's expeditions between 1566 and 1568. While the Soto expedition was characterized by only short-term stays in any one location in this region, both the Luna and Pardo expeditions involved lengthier stays and thus more extensive interactions with groups previously visited by Soto. Careful comparison of documentary accounts, including several newly-identified sources regarding the Luna expedition, provides fresh insights into the evolution of native responses to these military expeditions across nearly three decades. Native strategies of accommodation and passive resistance ultimately evolved into open hostility depending on the size of the Spanish forces. This evolution ultimately culminated in the Native massacre of more than a hundred Spaniards in five remote forts, leaving the deep interior free of further European intrusions for more than a century.

Worth, John [367] see Bolte, Christina

Worthington, Brian [89] see Colten, Roger

Wouters, Barbora [351] see Tys, Dries

Wren, Colin (University of Colorado - Colorado Springs), Curtis Marean (Arizona State University), Eric Shook (University of Minnesota), Kim Hill (Arizona State University) and Marco Janssen (Arizona State University)

[33] What Makes a Forager Turn Coastal? An Agent-Based Approach to Coastal Foraging on the Dynamic South African Paleoscape

Gram for gram, coastal shellfish have significant benefits over many terrestrial resources. They are higher in calories, fats, and proteins than most plants and are available in denser and more predictable patches than mammals. However, there are costs to foraging coastal shellfish. Foragers may have to travel significant distances to the coast or over-exploit terrestrial resources near the coastal strip. Further, coastal resources are temporally constrained on bi-weekly and daily tidal cycles. Human behavioural ecology (HBE) offers models to assess the caloric and time allocation trade-offs involved, but are insufficient to deal with the complexity of these spatially and temporally dynamic coastal-terrestrial foraging systems. Agent-based Models (ABMs) offer a powerful, underutilized method for building complex HBE models. We present an ABM of the "Paleoscape," a model of a South African coastal region, with agent foragers programmed with the logic of HBE. We model the spatial and temporal dynamics of this foraging system to understand the adaptive trade-offs of what makes a forager go coastal? We show that distance to the coast, costs of residential mobility, caloric returns of coastal vs. terrestrial resources, seasonality, population density, and anticipating tidal cycling all factor into the adaptiveness of a coastal foraging adaptation.

Wright, Aaron (Archaeology Southwest)

[84] An Ecology of the Patayan-Yuman Dreamland

The far-western Southwest presents a landscape of wide, once-perennial rivers cutting through a xeric terrain of lava plains and mountain peaks. For the Yuman-speaking tribes tethered to the waterways, this landscape is both physical and metaphysical, in that it is simultaneously the place where people, animals, and spiritual beings reside, as well as the canvas on which the acts of creation played out. Dreaming—traditionally the quintessential religious experience of the riverine Yuman tribes—is the pathway for individuals to transcend space and time and acquire spiritual knowledge and wisdom. While dreaming, one's spirit traverses the physical landscape to reach the sacred places where metaphysical agents and mytho-historical events are grounded. This paper demonstrates the relevance of traditional riverine Yuman religious belief and practice for understanding the relationships their ancestors, known archaeologically as the lowland Pataya, maintained with their surroundings. Our recent research into the geoglyphs, petroglyphs, and trails along the lower Gila River indicates these enigmatic facets of the archaeological landscape are experientially and narratively tied to the dreams of the historic Piipaash and Quechan and their Patayan ancestors. We suggest the practice of creating these designs served to map and materialize the dream experience onto the landscape.

[84] Chair

Wright, Aaron [84] see Wallace, Henry

Wright, David (Seoul National University)

[32] Construction of Pleistocene Geochronologies in Central Africa: Luminescence Dating in Northern Malawi

Advances in understanding the Pleistocene archaeology of Africa depend on well-dated models of human behavioral change. Portions of southern Africa with limestone caves and eastern Africa with volcanic tephra have datable materials (uranium and argon, respectively) beyond the limit of the radiocarbon clock (50ka). However, central Africa does not have such deposits and requires the application of alternative dating techniques. Extensive soil formation and cycles of erosion and deposition add further challenges within this context. This paper summarizes a decade of geoarchaeological research in northern Malawi, where a geochronology is built on Optically Stimulated Luminescence (OSL) dating of open-air archaeological sites on alluvial fans. Challenges in OSL dating systems with heterogeneous geologies and dynamic deposition processes will be discussed. However, once considered, these data have proven invaluable in understanding human-induced landscape change and adaptive niche construction within the Pleistocene of the southern portion of the African Rift Valley.

[32] Chair

Wright, David [247] see Thompson, Jessica

Wright, Henry [248] see Hixon, Sean

Wright, Jeneva [129] see Davis, Kara

Wright, Joshua (University of Aberdeen)**[161] Place Making and Ephemerality**

At first the two ideas of this paper's title can seem contradictory, but as three separate words they come together. What is the valency between the hypothesised solidity of an archaeological place and the stream of events that go into making it, transforming it, and erasing it? The ephemeral nature of the archaeological sites created by mobile communities is often the first thing that is said of them and after that comes a long chain of strictures limiting what interpretations are possible. Here I propose a more positive outlook. Using case studies from the Eurasian steppe this paper will search for seemingly ephemeral places and find them as assemblages of many materials. Of primary interest to this discussion will be more mobile subjects ranging from sheep to metals and less mobile ones like stone or drainages. The subject here is not site location models, but an exploration of how places are crafted by the knowledge and action of many actors both ancient and modern.

[101] Discussant**Wright, Kevin (The University of Alabama)****[204] Beads and Bohr Models: Using XRF to Discuss Choctaw Identity Formation**

This paper presents the results of a study that uses x-ray fluorescence (XRF) to examine European glass trade beads from the Chickasawhay Creek Sites (22KE630 & 22KE718) in Kemper County, Mississippi. Together, these two sites present a unique opportunity to examine Choctaw ethnogenesis. Although a combination of archaeological and ethnohistorical research has aided in examining Choctaw origins, questions concerning how families were integrated into a larger society and the formation of a Choctaw identity persist. By using a practice-based approach, this paper discusses the application of chemical characterization analyses in bead studies to establish more accurate dates of occupation, discuss body adornment and identity, and examine Choctaw-French interaction during the 18th century.

Wright, Sterling (University of Oklahoma), Nihan Kilic (Laboratories for Molecular Anthropology and Microbiology), Karissa Hughes (Laboratories for Molecular Anthropology and Microbiology), Nawa Sugiyama (Department of Anthropology, George Mason University) and Courtney Hofman (Laboratories for Molecular Anthropology and Microbiology)**[253] Biomolecular Preservation in Dental Calculus from the Teotihuacan Ritual Landscape**

During the Classic Period (AD 1-550), thousands of people migrated to the ancient city of Teotihuacan. This population growth forged Teotihuacan into a center for economic, political, and religious activities for the Mesoamerican region. While archaeological evidence has provided a wealth of information about the state, little is known about its inhabitants. Several interdisciplinary approaches, such as chemical isotope analysis, have generated some data about some individuals, but genetic studies at Teotihuacan remain scarce due to the lack of biomolecule preservation. However, the DNA of dental calculus provides a new source of ancient biomolecules that may be more robust to contamination and degradation than the DNA found in dentine. In this study, we applied shotgun sequencing techniques to four dental calculus samples from two

localities at Teotihuacan. All four individuals lived during the Classic Period. Three individuals were interred within the Moon Pyramid, while one individual was interred within the nearby Plaza of the Columns Complex. Our results suggest that the biomolecular integrity of dental calculus is context-dependent. Although we failed to recover an oral microbiome for three samples, the recovery of one microbiome still expands the geographic and temporal dataset of ancient dental calculus.

Wrobel, Gabriel [134] see Hair, Amy

Wu, Jing (School of Archaeology, Jilin University, China)

[416] New Discovery of a Special Site of Liao and Jin Dynasties (907-1234 A.D.) in Jilin Province at Northeast China

Around 2010, an ancient site was confirmed in the west area of Jilin Province at northeast China, which named Chun-Na-Bo Site Group (春捺钵遗址群). Without any systematical archaeological research, it was considered to have something to do with the Spring Fishing and Hunting Trip of the Emperors of Liao and Jin Dynasties. From 2013-2018, we carried out a lot of targeted investigation and excavation. This Site Group consists of four zones, which all located at grassland area near waters, and the ancient human's activity areas were all distributed on the soil platforms above the ground surface. There are more or less typical relics of Liao and Jin Dynasties in every soil platform, and hardly anything else of other periods. In some excavated soil platforms, we also discovered some special architectural and field life remains. Based on our work, we have two preliminary conclusions. First, the archaeological investigation shows that Chun-Na-Bo Site Group was different from most ancient sites in China. Second, to a certain extent, the characteristics of Chun-Na-Bo Site Group are similar to the historical records about the location and activities of Spring Fishing and Hunting Trip of the Emperors of Liao and Jin Dynasties.

Wu, Xiaohong (Peking University)

[130] Exploring the Emergence of the Dian (Shizhaishan) Culture: A View from Settlement Study

As archaeological data from settlement sites of eastern Yunnan were largely absent until very recently, the Bronze Age culture in the area was interpreted through materials taken from burials around Lake Dian and nearby regions. These mortuary data provide a picture of socially stratified and materially resourceful communities ruled by warrior elites, and are thought to be the material remains of the Dian culture (also called Shizhaishan culture based on the name of the type site). While perceivable opulence in rich Dian graves allude to the advent of complex social formation and political consolidation occurring around 500 BC, questions about the reasons behind the social changes, as well as the process of such changes, are yet to be answered by information drawn from settlement studies. In the light of recent archaeological activities conducted in Dian basin and adjacent areas south of Lake Dian, important data are emerging that will hopefully assist in resolving current issues on the formation of Dian society. Using available stratigraphical and chronological data from these settlement sites, this work will explore issues relevant to the emergence of the Dian culture and society.

[130] Chair

Wurz, Sarah [402] see Reynard, Jerome

Wygant, Brian (Adelphi University), Kathryn Krasinski (Adelphi University), Charles Holmes (University of Alaska Fairbanks), Barbara Crass (University of Alaska Fairbanks) and David McMahan (McMahan Consulting)

[10] Evaluation of Pleistocene Mammoth Ivory Use and Radiocarbon Laboratory Results from the Holzman Site in Interior Alaska

The recently discovered Holzman site lies along the west bank of Shaw Creek, a northern tributary of the Tanana River, Interior Alaska. Excavations beginning in 2015 revealed an expedient stone technology alongside well-preserved hearths, avifauna and large mammal remains including a mammoth tusk in deeply buried deposits. Evidence of food preparation and ivory tool manufacture has been dated to at least to 13,700 cal BP making Holzman one of the earliest in the Americas. Radiocarbon dates from separate laboratories are compared alongside a discussion on the importance of distinguishing between ivory scavenging and active hunting activities.

Wyllie, Cherra

[405] Classic Veracruz Tuxtla Polychrome Ceramics

Tuxtla Polychrome ceramics of south-central Veracruz, Mexico occupy a visible presence in precolumbian museum collections. Boldly rendered deities and zoomorphic figures are the focal point of bowls, plates, and vases, their images alluding to a complex supernatural world. While well represented among the corpus of Classic Veracruz artifacts, these vessels have been effectively ignored by archaeologists and art historians. This presentation attempts to rectify the gap in the material record, examining Tuxtla Polychromes with regards to their archaeological contexts. Motifs will be considered relative to Classic Veracruz forms and iconography. The enigmatic imagery can often be viewed from multiple perspectives, providing what archaeologist Richard Burger calls “anatropic” readings. This examination is designed to lay the groundwork for future study.

Wynne-Jones, Stephanie [87] see Fitton, Tom

Wynne-Jones, Stephanie (University of York)**[347] Chair**

Xi, Tongyuan [78] see Tian, Duo

Xia, Yin [299] see Li, Xizhen

Xian, Yiheng**[78] Identification of Turquoises from Different Mining Areas using Lead and Strontium Isotope Composition**

The Hekou Turquoise Mining Site in Shaanxi Province can provide significant clues to the provenance of turquoise in early China. In this study, we analyzed turquoise ore samples from other turquoise mines near Hekou Mining Site in eastern Qinling Mountains and established an origin identification model of turquoise ores using the ratio of lead and strontium isotopes. The lead and strontium isotopes in turquoise ore samples from five mines in the eastern Qinling Mountains were detected using High Precision Mass Spectrometer. These data could be used to explore the provenance characteristics of mines. The samples from the same origin had lead isotope ratios with comparatively good consistency. Turquoise ore samples could be classified into two groups according to the critical value of the lead isotope ratio ($^{207}\text{Pb}/^{208}\text{Pb}$), 0.410. The samples could also be classified into two groups based on the critical value of the strontium isotope ratio ($^{87}\text{Sr}/^{86}\text{Sr}$), 0.7105. In addition, this study found that the combination of the lead and strontium isotope ratios could appropriately distinguish the origins of turquoise ores from these mines. The identification result obtained with the established model indicates that some of Erlitou turquoise ores came from Hekou Turquoise Mine.

Xiaolin, He (Wuhan University)**[299] Arrangement of the Handicraft Industry at the Site of Taijiasi in the Shang Dynasty**

The Shang Dynasty-era site of Taijiasi was excavated from 2014 to 2017. Excavations revealed many remains of bronze casting and bone-tool manufacture. This paper focuses on the arrangement of the two different kinds of handicraft. Along with analysis of other house and sacrificial remains, archaeologists can investigate the basic standards of bronze casting and bone-tool manufacture in the Huai River Basin during the Shang Dynasty.

Xie, Liye (University of Toronto), Chun Fu Liu (University of Toronto) and Casey Lun**[361] Settlement Relocation and the Emergence of Early Urban Centers in the Heartland of Chinese Civilization, 2500-1600 BCE**

Settlement patterns and social structures shifted significantly around 2500 BCE in the late Longshan era, and again around 1600 BCE when an intraregional state identified with the historical Shang dynasty evolved in the Central Plain, heartland of

Chinese civilization. Our research examines the political transformation from pre-state to dynastic societies between 2500 and 1600 BCE from the perspective of urban formation.

We argue that the Taosi (2300-1900BCE) and Erlitou (1750-1520BCE) urban sites formed from the settlement relocation and nucleation of populations from multiple villages. Multiple lines of evidence support this argument. First, both the Taosi and Erlitou sites are far from previous regional centers. Second, both urban centers appear to have been politically important from their inception. Third, mortuary patterns, pottery assemblages, stone tools, house structures, and dietary traditions within each urban center appear exceptionally diverse, suggesting a complex population makeup.

Although the triggers to this nucleation process remain unclear, the construction of the urban centers involving groups from previously unrelated communities would have provided an environment for social re-engineering, even if the political outcomes were unintended. Therefore, settlement relocation and the construction of the urban centers contributed to the formation of dynastic polities.

Xiuhtecutli, Nezahualcoyotl (Tulane University) and Aurelio López Corral (INAH Tlaxcala)

[68] Not Only of Obsidian: The Chert Assemblage in Late Postclassic Tlaxcallan

Surface survey and excavations of Late Postclassic Tlaxcallan at the site of Tepeticpac recovered various lithic artifacts in addition to the chipped obsidian assemblage. Although the chipped non-obsidian artifacts were far fewer than obsidian artifacts, they were still found throughout the site in both surface domestic and excavated public spaces. Most of the chert recovered comes from Unit 7 on Plaza 4. The varied lithic assemblage at this locality suggests this area represents a public space where some of these items were traded. This presentation will focus on the chert assemblage at Tepeticpac and assess how this industry differed from obsidian chipped stone. More chert manufacture seems to have taken place from earlier stages of reduction than for obsidian, although there are no chert sources close to the site. Given the difference in the type of industry, chert seems to have had a different utility at Tepeticpac, rather than have served as an alternative material for the same uses.

[132] Discussant

Yaeger, Jason [198] see Kray, Christine

Yaeger, Jason (University of Texas at San Antonio) and M. Kathryn Brown (University of Texas at San Antonio)

[199] Entangled: The Shifting Networks That Linked the Classic Maya of Belize's Mopan Valley to Adjacent Regions

Some Mayanists have eschewed the notion that Classic Maya polities were territorially based, arguing instead that they were constituted through networks of political alliances that were continually reinforced through gifting, diplomacy, and warfare. That idea is our springboard for examining the changing ways in which the Classic-period kingdoms of Belize's Mopan River Valley—Buenavista del Cayo, Xunantunich, and Las Ruinas de Arenal—were entangled in broader political, social, and economic networks that were activated and materialized through the flow of people, objects, and ideas. These flows connected the rulers of these kingdoms to larger powers outside the valley, particularly Tikal, Caracol, and Naranjo—in relationships that varied from antagonistic to collaborative. Some flows penetrated deeper into Mopan Valley society, engaging non-royal elites and commoners as well. Furthermore, although we often focus on hierarchical, top-down flows, other networks were horizontal in nature, creating links between individuals and communities across the broader region. We sketch these various networks, highlight how they changed over time, and discuss how they inextricably linked the Mopan Valley of western Belize into larger dynamics of what is today the eastern Petén and western Belize.

Yakabowskas, Dana and Christopher Wolff (University at Albany)

[10] Between a Rock and a Coastal Place: Analysis of Archaic Raw Material Use at Stock Cove, Newfoundland

The Maritime Archaic (ca. 8,000-3,200 BP) were the earliest peoples to inhabit the island of Newfoundland. As they settled the island around 6,000 years ago, their ability to maintain lithic traditions were key to their success. Finding new sources of lithic material would have been necessary and that process would have varied greatly across the island. In southeastern Newfoundland, far away from key lithic sources on the mainland, this would have been even more important as exchange networks were increasingly stretched. This study examines raw materials recovered from the earliest documented site in southeastern Newfoundland, the Stock Cove site, through analyses of its debitage patterns during the Archaic occupation. The material provides an insight into landscape learning by its earliest inhabitants, site use patterns, lithic production

strategies, and more broadly, the peopling process of the region.

Yamada, Hitoshi (Tohoku University)**[358] Supernatural Gamekeepers among the Ainu and Their Possible Parallels**

Supernatural gamekeepers of the Ainu appear in yukar divine songs. Mainly as master of deer (yuk kor kamuy) or master of salmon (cep kor kamuy), they have controlled the main suppliers of animal protein. On the one hand, they were believed to keep the animals in a storehouse or a bag, or to multiply them from bristles, scales or bones. On the other, however, if hunters or fishers catch too much game, they could hide the animals and prevent the human beings from destroying them. In this paper, I will compare the Ainu gamekeepers with parallel figures among neighboring ethnic groups as well as in Northeast Japan.

Yamagawa, Kaishi and Hiroto Takamiya (Research Center for the Pacific Islands, Kagoshima)**[74] Transition from Hunting-Gathering to Agriculture in Amami and Okinawa Archipelagos, Japan**

Archaeological research in Amami and Okinawa archipelagos in the southwestern part of Japan started more than one hundred years ago. One of the most important archaeological themes in this region has been when food production began here. Archaeologists have agreed that the subsistence economy of the Gusuku period, prior to the Ryukyu Kingdom, was agriculture. Much less is known about the Shellmidden Period, which precedes the Gusuku Period. Large amounts of faunal remains and accidentally recovered plant remains prior to 1990s have been used to argue that the Shellmidden people relied on wild animals and plants, yet other scholars believed that Shellmidden people practiced food production because amounts of plant remains recovered from the islands had been so sporadic. Our results have strongly suggested that the Shellmidden people mainly relied on wild plants, and food production was introduced into this region ca. 8th to 12th AD. Two important findings are 1) hunter-gatherers lived on "small islands" for more than six thousand years and 2) transition from the former to the latter took place in the "small islands" context.

Yamin-Pasternak, Sveta (University of Alaska Fairbanks) and Igor Pasternak (University of Alaska Fairbanks)**[31] The Book Antler on the Sea and Community Perspectives from Sireniki, Anna's Home Village in Chukotka, Russia**

Nearly three decades after her dissertation fieldwork in the village of Sireniki, which she conducted in the late Soviet period, anthropologist Anna Kerttula de Echave continues to be closely entangled within the life and social relationships of the community. In many Sireniki households, Anna's book 'Antler on the Sea: the Yupik and Chukchi of the Russian Far East' is a proudly displayed heirloom. Its Russian translation was completed years ago by a self-taught local resident, and the book is highly regarded as an accurate and sensitively captured account that continues to be relevant for the concerns and experiences of the post-Soviet times. This paper shares the Sireniki community perspectives on Anna's contribution, documented by the authors in the course of ethnographic research in Chukotka conducted between the years 2001 and 2017. We focus on the core issues that Anna Kerttula de Echave tackles in her anthropological research and writing. In doing so, we aim to discuss the place of community-situated ethnography in today's anthropological landscape, and to turn the attention of the Arctic archaeology community to the issues of cultural resource management in Sireniki – the longest continuously occupied Yupik village in the Arctic and Anna's forever Chukotkan home.

Yan, Huifa (Renmin University of China)**[416] Funerary Transitions in the Chu State during the Warring States Period (480-221 BC)**

The Warring States Period has been regarded as an essential period in terms of the transition of political structure. This transition leaves its influence on the forms of burials and tombs. This study aims to provide a new perspective on the political transition by studying the changes of remains of the elite tombs of Chu State during the Warring State Period. Different from the traditional Chinese approaches on tomb studies which focus on the general typology of burial objects, this study takes more factors, such as the buried locations, functions, and written records of burial objects into consideration in order to generate a more comprehensive classification system for the Ding bronze vessels buried in these tombs. This study suggests that the form of Chu burial standard had experienced an essential transition during the Warring State Period, which includes the emergence of new burial rituals and objects. While the new burial standard emerged, the old standard had not faded out, but instead coexisted with the new one. This implies the political transition during Warring State might also help generate new ideas on ideology.

Yang, Dongya [47] see Lubinski, Patrick

Yang, Eun Gyeng (Pusan National University, Korea)

[361] *The Northern Wei Temple Layout at the Yungang Grottoes in China and East-West Cultural Exchange*

Despite its critical role as a source for restoration works on Buddhist temples and pagoda, the Buddhist sites located in the upper plot of the Yungang Cave(雲岡石窟) have not been sufficiently studied. In this paper, location of sites and full information acquired through field trip and excavation data are presented. In particular, this paper addresses issues regarding the origins of an unique temple layout and paintings of No.33 upper cave and assimilation into Chinese style. In addition, what caused the east-west cultural exchange in Buddhist temples and the monks who had resided here, are discussed, based on the historical records stating temple names and archaeological data. It is thought that the Yungang Cave upper Buddhist temple site of cavern No.33 was established in the Northern Wei Period. Pagoda is positioned in the middle of the garden with a rectangular outline and surrounded by monk's residential pavilions. This arrangement type is distinguished from the one pagoda-one Buddha hall system represented by the Siyuanfosi(思遠佛寺) and Yongning temple(永寧寺) sites. So it is time to survey on the origins of this temple layout, background and east-west cultural exchange.

Yang, Liping (Shaanxi Province Archaeological Academy)

[214] *The Dissemination of Miaodigou Culture Painted Pottery*

The cultural sequence of the Wei River valley, as exemplified by Miaodigou Culture of the Middle Yangshao Period, represents a pinnacle as reflected in its masterfully crafted ceramics. The classical forms are pointed-bottomed amphorae, flat-bottomed bottles, coarseware jars, deep basins, and deep bowls. Of special importance are red vessels that have been painted with bird motifs, curved triangles, floral motifs, leaf motifs, eye motifs, crescents, whirls, bands, and net patterns. This painted ware is distributed almost throughout the whole Yellow River Valley. At the same time, the amphorae and painted vessels of the Miaodigou Culture had a marked influence on the ceramics of surrounding regions. In the east, this influence reached the sea at the mouth of the Yellow River. In the south, it crossed the Qinling Mountains to the northern and southern shores of the Middle Yangzi River. In the north, it arrived at the south-central part of Inner Mongolia and to Northeast China. And in the west, the Gansu and Qinghai regions received this influence. This makes it the largest archaeological culture in prehistoric China in terms of its distribution and influence as well as an important factor for the search of the origins of Chinese civilization.

Yang, Shiyu (Jilin University), Xingyu Man (Jilin University), Xuezhu Liao (Jilin University), Xiaofan Sun (Jilin University) and Jiaxin Li (Jilin University)

[389] *Diet Reconstruction of Ancient Population from Banlashan Cemetery, a Neolithic Hongshan Archaeological Culture Site in China—Based on Stable Isotopic and Dental Microwear Analysis*

Hongshan culture is a famous archaeological cultures in the Neolithic Age in China, and its economic structure has always been the focus of academic attention. According to the bone material unearthed from the cemetery, the diet characteristics of the late Hongshan people can be effectively recovered through the integrating stable isotopic and dental microwear analysis. The result of isotope analysis showed diet structure of the Hongshan population should be subject to C4 plants or the animals feeds on C4 plants . The mean $\delta^{15}\text{N}$ value of delta was $9.1\pm0.3\text{‰}$, with little difference between individuals, indicating that individual food selection was relatively simple at that time, and animal protein accounted for a high proportion. For dental microwear analysis, which focus on the microscopic scratches, first or second permanent molars belong to 13 individuals are analysed, the ratio between the length of the horizontal scratches and the length of the vertical scratches of Banlashan population is 87.14%, which is close to the ration of Vedda people and Andamanese. The results of this study show that the reconstruction of ancient population recipes in a variety of ways is of great significance to the recovery of the economic structure and the status of social development.

Yang, Yuzhang [416] see Li, Weiya

Yao, Alice (University of Chicago)

[161] Salutary Failures: Bronze Age Metallurgists in China and Their Faulty Seams

Creativity and imagination are subjects which do not often appear in the archaeology of craft. Though archaeologists study innovation in relation to a craft's technological developments and discoveries, we approach such novelties as progress bound rather than creative pursuits. Craft workers are, after all, toiling for other people in exchange for their basic means of existence. This paper addresses the problem of creativity in archaeology and argues that making and imagination are not antagonistic and does not have to presuppose an opposition between mind and hand. Focusing on Bronze Age metalworkers from the Dian polity in Southwest China, this paper examines how mistakes and breakdowns in casting may provide a basis for understanding creativity in craftwork. Failures-in-making not only reflect individual differences in skill and learning. They can also demonstrate how "type forms," or generic categories of objects, are only viable things insofar as their makers commit themselves to taking some direction of action. The paper asks more generally how mistakes co-create a craft person's understanding of standard and judgement.

Yaquinto, Jessica (Living Heritage Anthropology) and Lyle Balenquah (Independent Contractor- Hopi)**[244] Passing the Microphone: The Heritage Voices Podcast as Community-Based Archaeology**

The Heritage Voices Podcast, hosted by the Archaeology Podcast Network, centers the voices of indigenous and traditionally associated peoples in discussions on anthropology, cultural resources and heritage, and land management. This includes a focus on community based archaeology and museums, collaborative ethnography, and tribal consultation. From the beginning co-hosts Jessica Yaquinto and Lyle Balenquah have approached the podcast in a community based manner in order to provide episodes that resonate with communities while being educational and engaging to all listeners. Podcasting provides a unique opportunity to both literally and figuratively pass the microphone to indigenous and other traditionally associated community representatives who are all too often marginalized or excluded from these discussions. The podcast provides an accessible opportunity for our listeners to understand the wide diversity of indigenous and traditionally associated community perspectives and how we can collaborate in our work to protect peoples' connection to place.

Yaquinto, Jessica [313] see Knight, Terry

Yardumian, Aram**[359] Archaeology and Genetics in the South Caucasus**

Archaeology and genetics research all too often live separate lives within anthropology departments. Although the potential for corroboration and perspective-shift seems vast, the two disciplines require fluency in specialized technical registers that adds difficulty even to reading published papers. In addition, sometimes the lines of evidence seemingly contradict one another. Anthropological genetics work in the South Caucasus is sailing ahead, with analysis of both contemporary populations and ancient individuals underway at multiple institutions, and with new findings published regularly. This report will review some recent Caucasus-related genetics research, highlighting key findings and problems in matters such as population continuity, settlement routes and patterns, and connections to trends in greater Eurasian population dynamics.

Yarlagadda, Karthik (Department of Anthropology, University of Illinois, Urbana-Champaign), Kelsey Witt (School of Natural Sciences, University of California), Kristin Hedman (Illinois State Archaeological Survey), Kelly Swanson (Department of Animal Sciences, University of Illinois) and Ripan Malhi (Department of Anthropology, University of Illinois)**[109] The Influence of Diet on the Ancient Dog Gut Microbiome**

Coprolites are recognized as an important source of archaeological data; they contain biological remains from the organism's diet, as well as genetic material from microorganisms, dietary components, and the host. Modern studies have shown that the gut microbiome reflects dietary trends; as microbial remains are also present in coprolites, these provide another angle for studying the diet and health of ancient organisms. To expand upon previous analyses of ancient dogs at Janey B. Goode, we turned to microbial analysis of a subset (N=8) of our previously sampled dog coprolites. We shotgun sequenced libraries constructed from the coprolites, in addition to bone and soil controls (N=5). For a comparative analysis, we additionally sequenced another set of modern dog samples (N=8). These modern dog samples reflect 4 individuals sampled twice, when fed a high- or low-protein diet. Comparing the final ancient and modern data sets reveals similarities in

trends of bacterial phyla in accordance with dietary patterns. We noted an increase in gut-associated phyla with increased ancient DNA preservation in the coprolites. Altogether, our data reflects the dietary conditions of these ancient dogs and helps us understand the relationship these ancient dogs may have had with the human individuals at the site.

Yaworsky, Peter [35] see Codding, Brian

Yaworsky, Peter (University of Utah), Kenneth Vernon (University of Utah Archaeological Center), Simon Brewer (University of Utah Department of Geography), Jerry Spangler (The Colorado Plateau Archaeological Alliance) and Brian Codding (University of Utah Archaeological Center)

[128] Evaluating the Efficacy of Regression and Machine Learning Models to Predict Prehistoric Land-use Patterns

Archaeologists continue to rely on predictive models that suffer from the same errors that have plagued the discipline for decades: small training sets, improper statistical techniques, and vague or only implicit theory. To address these shortcomings, we develop a framework for modeling archaeological site occurrences with machine learning. Drawing on insights from species distribution modeling in ecology, we evaluate the predictive power of four statistical modeling approaches—generalized linear models, generalized additive models, maximum entropy, and random forests—to predict Formative Period archaeological site locations in the Grand Staircase-Escalante National Monument. We assess each modeling approach using a threshold-independent measure, the Area Under the Curve, and a threshold-dependent measure, the True Skill Statistic. We find that the random forests approach produces the most accurate predictive models, followed by maximum entropy and generalized additive models.

Yegorov, Dmitry (Dmitry Yegorov), Steven Rosen and Ofer Marder

[95] The Heat Treatment of Flint in the Middle Pre-Pottery Neolithic Site of Yiftahel (Lower Galilee, Israel) and Its Social Interpretation

Recent examination of the lithic collection from the Middle Pre-Pottery Neolithic B (MPPNB) site of Yiftahel (10,100-9,250 BP cal.) has revealed a relatively large number of flint artifacts showing traces of intentional heating. Heat treatment of siliceous stones is a worldwide phenomenon that was mainly used during the initial stages of chaîne opératoire for the improvement of blank detachment process. Nevertheless, visual observations of the assemblage from Yiftahel supplemented by physical tests indicate that the heat treatment was performed during the later stages of reduction sequence and was mainly present on blades, before their transformation into tools. Careful and intentional annealing of this type of blanks probably allowed better control over the heat treating process and more successful propagation of pressure retouch during the final stages of tool fashioning. In some cases, heat treating also affected the color of the item making it visually more attractive. The smooth and aesthetic appearance of pressure retouch on the one hand and the appearance of "eye-catching colors" of the blanks on the other, perhaps increased the economic value of finished tools and influenced their spread within local exchange trade networks and perhaps beyond.

Yeh, Hui-Yuan [389] see Chen, Liang

Yéo, Arouna [277] see Kienon-Kabore, Timpoko Hélène

Yepez Alvarez, Willy

[356] Caminos del Horizonte Medio en Arequipa: Paisaje como un espacio socialmente constituido

Presentamos los caminos que durante el Horizonte Medio integraron al valle de Siguas, Vitor, Majes y Ocoña dentro de una dinámica de estudio de la visibilidad y ritualidad espacial. Para ello tomamos con ejemplo de discusión el sitio de Quilcapampa La Antigua, valle de Siguas, Arequipa, Perú. La problemática que subyace a esta investigación se centra en comprender cómo fue la interacción entre las comunidades locales y el estado Wari a lo largo de las rutas de la región.

Yerka, Stephen [77] see DeMuth, Robert

Yerkes, Richard (Ohio State University)

- [275] *Were Neolithic and Late Prehistoric Fortifications a Deterrent to Escalating Conflicts in Early Agricultural Societies in Temperate Europe and Eastern North America?*

In Central and SE Europe from 5500-4000 cal. B.C.E., during the Neolithic (N) and Early Copper Age (ECA), and in Eastern North America during the Late Prehistoric (LP) period (900-1650 A.C.E.), there were similar socioeconomic changes in agricultural societies. Larger settlements with food storage were established, but interaction and exchange between groups was not always peaceful. "Trading and raiding" was marked by new production and distribution patterns, but also by increasing evidence for conflict and interpersonal violence. A common response to escalating violence in both areas was the construction of fortifications around settlements. Cross-cultural studies have shown that defensive fortifications have distinctive archaeological attributes not found in other enclosures. There is indisputable evidence for traumatic injuries and violent deaths in agricultural groups who fortified their settlements. However, is there any evidence that these fortifications were a deterrent to further conflict and violence? Evidence from agricultural tribes living in Neolithic villages in Belgium, from MLN and ECA settlements in Hungary, and LP villages in the Ohio Valley is compared to learn if this was the case. The labor and time needed to construct defensive ditches and palisades was substantial, but the benefits may have been psychological rather than strategic.

Yeshurun, Reuven [402] see Crater Gershtein, Kathryn

Yeshurun, Reuven [402] see Seymore, Mason

Yeshurun, Reuven (University of Haifa) and Catherine F. West (Boston University)

- [415] *Foxes and Humans at the Late Holocene Uyak Site, Kodiak, Alaska*

The red fox (*Vulpes vulpes*) is a generalist, omnivorous predator that is often drawn to human environments, exploiting anthropogenic refuse. Foxes may bear little or significant economic importance to prehistoric human foragers, depending on the environmental, economic, and cultural context. Here we investigate human-fox interaction at the late Holocene Uyak site (KOD-145) on Kodiak Island, Alaska. We apply zooarchaeological, taphonomic and stable isotope analyses to the fox remains and find that complete animals were processed for meat and pelts and then discarded. Stable isotope results support foxes as omnivores eating in both the terrestrial and marine environments, and a comparison of archaeological and modern foxes show more dietary variability in ancient foxes. Together, these data suggest that the Uyak foxes were drawn to the village as a stable source of food subsidies, eating discarded marine and terrestrial resources, and consequently were embedded in human subsistence as sources of meat and raw materials. The regular presence of foxes within the settlement could explain why the villagers, who already enjoyed an abundant supply of marine foods, included foxes in their diet.

Yezzi-Woodley, Katrina, Jeff Calder (Department of Mathematics, University of Minnesota), Peter Olver (Department of Mathematics, University of Minnesota), Martha Tappen (Department of Anthropology, University of Minnesota) and Reed Coil (Department of Sociology and Anthropology, Nazarbay)

- [57] *Improving Zooarchaeological Methods for Classifying Fragmented Faunal Remains Using Differential Geometric Methods and Machine Learning*

Accurately identifying bone fragments and the agents that broke them is essential to site reconstruction and improving our understanding of human evolution and behavior. Here we implement geometric invariants and machine learning on digital 3D models of experimentally derived bone fragments to classify them by breakage agent. We characterize the surface with far more geometric properties (such as total volume, surface area, higher moments, torsion and surface curvatures) than used by traditional zooarchaeological methods, while also expanding our sample to include several taxa and modes of breakage. Using surface curvature, preliminary results of hominin and carnivore broken elk bones exhibit exemplary pairwise classification rates (>92% in all tests) according to skeletal element, actor of breakage and, in the case of hominin broken bones, method of breakage. Several methods of machine learning are employed including KNN, decision trees, random forests, and neural networks. These methods quickly and efficiently capture and exploit a rich amount of shape information used for evaluating competing hypotheses regarding hominin behavior, surpassing the current state-of-the-art in zooarchaeology and taphonomy. Given the success of the preliminary research, we expect that individual specimens, not simply assemblage level trends, will be classifiable to breakage agent.

Yijia, Qiu [113] see Shaw-Müller, Kyle

Yilales, Mariana [248] see Latorre, Claudio

Yoder, David (Weber State University), James Allison (Brigham Young University), Scott Ure (Brigham Young University) and Haylie Ferguson (Brigham Young University)

[420] *Coal Bed Village: Test Excavations of a Major Ancestral Pueblo Site in Southeast Utah*

Coal Bed Village (42SA920), located at the confluence of Coal Bed and Montezuma Canyons, is one of the largest Ancestral Pueblo sites in the state of Utah. The site was first documented by William Henry Jackson in 1875, but has never been systematically investigated. Rubble mounds covering the top, slope, and alluvial terrace below a small isolated mesita appear to be remnants from a large village probably dating to the A.D. 1200s (although surface ceramics suggest earlier use as well). Much of the site is currently threatened by erosion triggered by arroyo cutting from Montezuma Creek, leading to increased attention from archaeologists. In 2018, Brigham Young University and Weber State University held a joint field school at the site. In this presentation we discuss the preliminary results of our test excavations, surface collection, and aerial photogrammetry, all designed to better document the site and learn what is being lost to erosion.

Yoshimura, Kazuaki

[74] *A Study of the Armor Production System in the Middle Kofun Period*

Possessing complex three-dimensional structures, and created using the most advanced technologies, including technologies introduced from the Korean Peninsula, the armor of the Kofun Period in Japan represents the finest iron technology of that period. It is commonly accepted that armor was produced centrally under the Yamato royal authority and distributed to outlying areas. However, this hypothesis lacks details and the actual conditions of workshops and production organization, such as design and production batches, and division of labor are completely unknown. There has been little progress clarifying armor production units and manufacturing organization because the design steps and the first half of the production process are insufficiently studied. Through the collection and analysis of precise three-dimensional measurements, this project has confirmed that the riveted cuirasses of the Middle Kofun Period were made using two-dimensional templates at the stage of cutting out plates, and that multiple cuirasses were made using the same template. This presentation combines analysis of the units of armor design with analysis of the technological components of the production process to examine production batches and division of labor. Through analysis of tombs containing armor from the same production batches, a reconstruction of the armor production system is attempted.

Yost, Scott, Jeremy Loven (PaleoWest Archaeology) and Steven Gilbert (PaleoWest Archaeology)

[254] *Mortuary Customs at a Small Pueblo II Habitation Site in the Chuska Valley, New Mexico*

Recent data recovery investigations conducted by PaleoWest Archaeology as part of the Navajo-Gallup Water Supply Project uncovered four human burials at a small Ancestral Puebloan residential site (NM-Q-14-104) located in the Chuska Valley area of northwest New Mexico. Archaeological excavations conducted at NM-Q-14-104 provided an opportunity to examine the care and treatment of individuals interred in the burials and to explore potential differences in body/burial placement, skeletal health, and association of grave items based on the age and gender of the deceased. These observed mortuary customs are then contrasted with the burial practices utilized by the inhabitants of contemporaneous sites within the Chuska Valley to relate how typical or unique this case study is to the greater regional practices.

Young, Bailey (Eastern Illinois University) and Isabelle Catteddu (Centre National de la Recherche Scientifique, Paris)

[351] *INRAP and the Changing Early Medieval Landscape in France*

When the first “modern” monograph of a Merovingian settlement site excavation, Brebieres, near Douai, was published in 1974, it reinforced the then common impression among historians of a little-developed and unstable rural hamlets, inhabited by impoverished peasants with crude technologies—in striking contrast to the well-equipped and productive villa-centered landscapes of the Roman past. Recent decades of extensive and intensive preventive archaeology (much of it carried out since its creation in 2001 by INRAP – Institut national de recherches archéologiques préventives--) have shown this to be a much-mistaken impression, and are providing evidence that a classic medieval landscape of village clustered around castle and church-with-cemetery did not emerge rather abruptly, like “feudalism” around the year 1000, but resulted from slow and steady growth underway since at least the seventh century. This paper will draw on recent excavations, some largely

unpublished, to illustrate the emerging picture.

Young, D. Craig [82] see Schmitt, Dave

Young, Danielle (University of Central Florida)

[404] Starch and Phytolith Analyses from Ceramic Residues in the Llanos de Mojos

The Llanos de Mojos in the Bolivian Amazon is a tropical savanna that saw increased archaeological attention beginning in the latter half of the 20th century. However, paleoethnobotanical research has been limited up until this decade despite significant results and great potential. Paleoethnobotanical inquiry in Mojos can enhance our understanding of human-plant interactions. Starch grains and phytoliths from economic plants recovered from ceramic residues provide a direct link to food preparation, consumption, and agriculture. This paper describes the results of analyses of 31 residue samples from ceramic food-processing graters and serving vessels recovered from Isla Santa Maria, a forest island near Santa Ana del Yacuma, during the 2018 field season. This presentation discusses how the methodology and preliminary results from the analyses are part of a larger investigation into the relationship of food and landscape in the West Central Mojos that combines GIS, landscape, and paleoecological approaches.

Young, Eric (OSD DPAA), Piotr Bojakowski (Defense POW/MIA Accounting Agency) and Richard Wills (Defense POW/MIA Accounting Agency)

[129] Underwater Archaeology at DPAA: Efforts to Address U.S. Military Loss Incidents

A significant portion of the Defense POW/MIA Accounting Agency (DPAA)'s unresolved loss cases involve incidents that occurred over water, at sea, or otherwise within a body of water. In the context of underwater forensic archaeology, addressing these cases require a complex process of historical and archival research; large-scale GIS analysis; investigation and correlation with known incidents; and site search, survey, and recovery activities to the extent possible. The end goal is to recover and identify the remains of unaccounted for individuals, or to otherwise resolve their fate. These efforts increasingly require a high degree of collaboration and coordination with individual historians and researchers, non-profit groups, universities, and academic organizations; local, state, and federal agencies; and foreign host nations and international organizations. DPAA continues to develop its underwater procedures and capabilities in its pursuit of this challenging mission.

Young, Michelle (Yale University) and Sadie Weber (Harvard University)

[64] Rethinking Ecological Verticality for the Initial Period: A Case from South-Central Peru

Murra's model of the vertical archipelago continues to reverberate in discussions of ecological exploitation across Andean regions, while other scholars have argued that such frameworks essentialize Andean societies by projecting ethnohistorical data onto the deep past. New ceramic, microbotanical, and isotopic evidence from Atalla and other sites in the Huancavelica region demonstrate a compelling case for the movement of peoples between this highland region and settlements on the Peruvian south coast. In this paper, we present evidence of interaction between the communities living in these disparate geographic regions to evaluate the utility of ecological verticality for understanding the sociopolitical landscape of south-central Peru during the late Initial period (1100-800 B.C.).

Young, Michelle [286] see Wolin, Daniela

Young, Sera [119] see Renteria, Bernardo

Younger, Alexandra, C. Reid Ferring (University of North Texas Department of Geography) and Steve Wolverton (University of North Texas)

- [261] *The Chaîne Opératoire of Late Archaic through Mesilla Phase Assemblages from the Placitas Arroyo Site Complex, Lower Rio Grande Valley, New Mexico*

The chaîne opératoire approach to lithic analysis has rarely been imported from the Old World and applied to analysis of New World lithic assemblages. However, that approach is appropriate for virtually any lithic technology, providing a structured methodology that shifts attention from typological studies to explicitly behavioral analyses, complimenting studies of both intrasite and intersite patterns of variability and change. Analysis of several assemblages from the Placitas Arroyo site complex reveals changing patterns of raw material procurement and selection, core reduction strategies, as well as tool production and discard. The most striking result thus far is the quite uniform emphasis on flake production from well-prepared cores, and the near absence of manufacture or maintenance of bifacial tools, especially projectile points. Associated with common ground stone artifacts, the flaked stone materials may well represent intensive food processing. Regardless, the technological patterns being revealed by the chaîne opératoire approach illustrate a productive new means to gain insights into changing behaviors in the Jornada Mogollon cultural tradition.

Younger, Erin [312] see Phillips, Laura

Younger, Rebecca (University of Glasgow) and Kenneth Brophy (University of Glasgow)

- [65] *Authentically Inauthentic and Real Fakes: An Archaeology of Contemporary Stonehenge Replicas*

Stonehenge (UK) has inspired replicas on every inhabited continent, with nearly 30 in North America alone. Few could – nor are intended to - be mistaken for the real thing. We explore several contemporary Stonehenges, illustrating the range of forms, materials and motivations associated with such replicas. We focus on artworks - Deller's inflatable Sacrilege, the now-dismantled Stonefridge/Fridgehenge, New Mexico, and 1990s Scottish protest sculpture Carhenge; memorials such as Maryhill Stonehenge, Washington; and tourist attractions Stonehenge Aotearoa (New Zealand) and Esperance Stonehenge (Australia). In a digital age, analogue Stonehenges continue to be built and we argue that the most appropriate way to interrogate this phenomenon is to treat replicas as archaeological sites in their own right. The disciplinary concerns of archaeologists leave us well-placed to analyse the corpus of replica Stonehenges and interpret the materiality, use and meaning of these monuments, and the value placed on the material over the virtual. More broadly, the examples discussed suggest that regarding replicas as archaeological sites has cultural value, viewing contemporary monuments as expressions of societal values. At a time when we are increasingly being challenged to differentiate between real and fake, archaeology has an opportunity to contribute to wider socio-political discourse.

Young-Wolfe, Halona (State University of New York at Binghamton)

- [250] *From the Ocean to the Mountain: Marine Shell in the Patipampa Sector, Huari, Ayacucho, Peru*

Excavations in the residential area of Patipampa in the city of Huari revealed a striking amount of marine shell. While a large percentage of this shell assembly is *Spondylus*, other marine shell, such as mussel, is also present. The assemblage includes worked shell objects, unworked fragments and whole shells. The variety of marine shell at this highland site raises questions about the use, movement, and meaning of marine shell during the Middle Horizon. While the use of *Spondylus* in the Andes is well documented, much less is understood about how the Wari people obtained, utilized, and valued other types of marine shell. This talk uses the shell assemblage from Patipampa to explore the use and significance of marine shell in the Wari empire. Were shell items manufactured in the residential areas of the Huari capital? Was shell a high status item limited to the Wari elite, or does the Patipampa evidence point to a broader availability of shell objects? What can the Patipampa shell assemblage tell us about the movement of shell from the Pacific Ocean to the Andean highlands? And how are the histories of these objects entwined with the lives of people throughout the Wari empire?

- [250] *Chair*

Yousef al-Aali, Yaaqoub [352] see Roberts, James

Yu, Chong (Sun Yat-sen University)

- [34] *The Establishment of the First 3D Fish Bone Reference Collection in China*

Zooarchaeological researchers in China have previously focused on mammal remains, as have many places around the world. However, mammal species are only one part of the animal resources that people used in ancient times, especially in

the areas by water. Young zooarchaeologists have begun to get involved in the work of identification and research on fish remains in China in recent years. However, the lack of comparative collections strongly affects the accuracy and the efficiency of the related research. We have started to collect fish specimens (both fresh water and marine species) to build our own fish bone collections. In order to share these collections with more zooarchaeologists in China, we use blue light 3D scanning to scan the main elements of the fishes we have in the collection. Blue light 3D scanning is very suitable for samples which are very small and thin and it works very well on fish bones that traditional 3D scanner cannot do. In this presentation, we want to share our experience in building our fish bone collection and current achievement of the 3D database.

Yu, Chun and Ya Wei Dong**[78] Casting Experiment for a Small-Sized Bronze Statue of Buddha Dating to the Tang Dynasty**

The four-footed base is a specific structural feature of bronze statues of Buddha in China during the fourth to ninth century BC. This feature appears to have been made using the lost wax method, but experimental methods indicate that the four-footed base was made with the sand mold casting process. This was the traditional bronze casting technology of Shang and Zhou dynasties, and its form is rooted in a kind of furniture that was popular in Han-Jin period.

Yu, Pei-Lin (Boise State University)**[26] On the Neolithic Edge: Predicting Crop Adoption by Paleolithic Foragers of Taiwan**

The adoption of agricultural crops by intensified foragers occurred throughout Southeast Asia, resulting in mixed and low-level economies. Behavioral ecology provides models for evolutionary decision-making for mixed forager-gardener economies. The Paleolithic to Neolithic transition in Taiwan is represented by a small but growing number of sites. The tempo and mode of adoption of individual crop types is not yet well understood. I use ethnoarchaeological research about ancient crop types still in cultivation in Taiwan to assess a prediction that crops were not adopted en bloc by foragers. In observing differing costs and benefits of individual cultivars, foragers would initially have valued characteristics such as adaptation to local conditions and resilience to stressors that were compatible with mobility needed to maintain access to wild mountain and aquatic resources, rather than crop productivity by weight. This paper will feature a listing of Neolithic Taiwan crop types in hypothesized rank order of adoption, and archaeological implications.

[377] Discussant**[26] Chair**

Yuan, May [409] see Levin, Samuel

Yue, Zhanwei [299] see Uchida, Junko

Zagala, Ryan [119] see Renteria, Bernardo

Zaidner, Yossi [402] see Crater Gershtein, Kathryn

Zalloua, Pierre, Lisa Matisoo-Smith (Department of Anatomy, University of Otago, Dunedin), Michele Guirguis (University of Sassari, Sassari, Italy), Anna Gosling (Department of Anatomy, University of Otago, Dunedin) and Lorenzo Nigro (Università di Roma, La Sapienza, Rome Italy)

[321] Phoenician Settlements: A Story of Integration and Cultural Assimilation

Since the second millennium BCE, the Phoenicians linked east and west through their established trade networks across the Mediterranean. We investigate the extent of Phoenician integration with the communities they settled across the western Mediterranean. Skeletal samples from Phoenician burial sites in Lebanon, Italy, Spain, and Tunisia were collected. We obtained complete mitochondrial genomes on all collected samples and genome-wide data on a subset of these. We analyzed and compared ancient DNA results with genomes from populations across the Mediterranean. Our results indicate

evidence of continuity of genetic lineages from pre-Phoenician populations in all settlements except for the island of Ibiza where genetic discontinuity between the early Phoenician settlers and the island's modern inhabitants was observed. We also find evidence of new, unique lineages likely resulting from Phoenician trade networks or settlements strategies that included the translocation of women throughout the region as well as the assimilation of indigenous women in Phoenician settlements. Combined, this evidence suggests significant female mobility and genetic diversity in Phoenician communities, reflecting the inclusive and multicultural nature of Phoenician society. Our data demonstrate that both migration and cultural assimilation were common, resulting in surprisingly cosmopolitan communities in the past.

Zangrando, Atilio and Angélica Tivoli (Centro Austral de Investigaciones Científicas (CAD))

[364] Colonization of the Southern Tip of the World

In the last years of the 1980s, Luis Borrero elaborated an archaeological model of the peopling of Patagonia and Tierra del Fuego which still prevails. In particular, this model provides expectations for the settlement of Tierra del Fuego, which have not yet been completely depleted. From a biogeographical perspective, these expectations arise from the vicariance conception, where two separated stages in the history of human populations of southern South America were proposed by the formation of the Magellan Strait (Borrero 1989-90). Diverse cultural processes are involved. Hunter-gatherer populations arrived in Tierra del Fuego during the end of the Pleistocene. As shown by different archaeological contexts, coastal-marine adaptations took place some millennia later (~6000 uncal. BP). Coastal occupations can, however, be traced back to the early Holocene at the south coast of the island. In this paper, we analyze some implications concerning the peopling of Tierra del Fuego by addressing: a) the evidence in relation to settlement and subsistence patterns, and in particular the role of coastal environments in such process; b) problems of site formation and taphonomy, and c) the identification of archaeological discontinuities in the distribution of archaeological evidence.

Zaro, Gregory (University of Maine)

[337] Late Antiquity Revealed: Assessing Urban Change at Roman Nedinum in Northern Dalmatia, Croatia

In 2015, the Nadin-Gradina Archaeological Project (NGAP) began as a collaborative effort between the University of Zadar and University of Maine to unravel the long-term record of urban change in the Ravnici Kotari region of northern Dalmatia, with a primary focus on the Nadin-Gradina archaeological site. Since its inception, the NGAP has confirmed a 2,500-year record of occupational settlement that includes Liburnian Iron Age origins, Roman establishment of the municipium Nedinum, and Late Antique settlement of the late 3rd through late 6th centuries. Following an apparent centuries-long period of abandonment, the hilltop town was reestablished during the Late Medieval and Venetian/Ottoman eras. In this paper, we present new archaeological evidence for the Late Antique settlement, a relatively underexplored period in archaeological studies of urban change in the Classical world, particularly among smaller provincial settlements. Drawing upon the results of our recent excavations, we review architectural and artifactual data in a regional context to offer insight into the broader debate of urban decline vs. transformation that so often characterizes Late Antique studies.

[284] Discussant

Zarrillo, Sonia (University of Calgary)

[137] Discussant

Zarzycka, Sandra (University of North Texas), Todd Surovell (University of Wyoming), Madeline Mackie (University of Wyoming) and Spencer Pelton (University of Wyoming)

[110] Establishing Provenance of Ochre from the La Prele Mammoth Site: A Geochemical Analysis

Red ochre is a ferrous iron oxide mineral used for cultural expression and utilitarian tasks by hominins beginning 250,000 years ago. The use of ochre continued into the New World. While its use by Paleoindians has been noted, the function and significance of ochre for these groups is not well understood. To conceive the importance of ochre to Paleoindians, it is necessary to determine the distance Paleoindians were willing to carry it. Thus, geochemical analytical techniques were applied to determine the provenance of ochre from the La Prele Mammoth site (48CO1401) in Douglas, Wyoming. The La Prele site is a ~13,000 year old mammoth processing and campsite that contains scattered ochre nodules and a prominent ochre stain. Using ICP-OES and ICP-MS analyses, the geochemical signature of La Prele ochre was established and compared to four ochre sources in Wyoming. Based on this analysis, the archaeological ochre from the La Prele site is sourced to the Powars II ochre quarry 108km away. This is direct evidence that Paleoindians were willing to carry ochre within their mobile toolkits for long distances, which speaks to its significance. These geochemical analytical techniques

have potential for establishing provenance of ochre from other regions and periods.

Zavala, Bridget M. (Universidad Juarez del Estado de Durango) and Gerardo Aldair Garcia Ortega (Universidad Juárez del Estado de Durango)

[373] *Landscape Archaeology and Plant Use in Northern Durango, Mexico*

This paper presents the results paleoethnobotanical and architectural analyses at two prehispanic sites in northern Durango, Mexico. The sites, Corral de Piedra (PAS017) and Los Berros (PAS023), were recently excavated as part of the Proyecto Arqueológico Sextín" which seeks to build a "deep chronology" in the Sextín valley located at the frontier between the "southwest" and "mesoamerica". Here we contextualize aspects of everyday life related to the environment -built and not built- in order to consider how dwelling in the Sextin changed through time.

Zavodny, Emily (University of Central Florida)

[183] *Amber Runs through It: The Centralization of Wealth and Power in Late Prehistoric Like, Croatia*

Prehistoric cultural and sociopolitical development in the mountainous region of Like, Croatia is still poorly understood despite over a century of archaeological excavations. Traditional cultural-historical narratives based on grave good typologies suggest that a unified regional culture, the Iapodians, emerged at the end of the Bronze Age and rapidly expanded across the area. This interpretation has yet to be systematically tested, and so this study analyzes Late Bronze and Early Iron Age mortuary contexts and assemblages to better characterize regional trends towards centralization and integration. Large-scale sociopolitical and economic reorganization during this period is evidenced by the shift in burial practices from individual stone mounds to large communal cemeteries and the inclusion of large quantities of foreign goods, such as Baltic amber, in graves. Results suggest that communities began to participate in the new far-flung continental trade networks during the Late Bronze Age, and that some valleys were able to accumulate more wealth and power than others by controlling access to local mountain passes. These patterns suggest the beginnings of a regional hierarchy, but not yet the fully developed cultural and sociopolitical system known as the Iapodians.

Zavodny, Emily [248] see Ebert, Claire

Zborover, Danny (Institute for Field Research)

[198] *"They came to loot our treasures": Indigenous, Pirates, and Indigenous-Pirates on the Mexican Pacific Coast*

Recent studies show that the Spanish conquest of the Oaxacan Pacific Coast was shaped, and even orchestrated, by indigenous kingdoms (Zapotecs, Mixtecs) and allied groups (Pochutecs, Chontal) that vied for control over key trading ports. These same indigenous players continued their cycles of conflicts, alliances, and trade with other intrusive European powers—English, Dutch, and French—that disrupted the region's delicate geopolitics throughout most of the Colonial period. In this presentation we explore the complex interactions between these so-called 'pirates' and the Chontal people. Both consisted of closed groups which operated on the margins of the Spanish empire. To elucidate this dynamic yet elusive period in Pacific and global history, we consider shifting settlement patterns, landscape modifications, historical records, linguistic evidence, and long-term social memory encapsulated in contemporary festivities.

[140] *Discussant*

Zborover, Danny [286] see Cheever, Sylvia

Zeanaah, David (California State University, Sacramento)

[26] *The Role of Theory and Ethnographic Analogies in Understanding Paleoindian Mobility in the Great Basin*

Great Basin hunter-gatherers procured obsidian from more distant sources during the Pleistocene-Holocene Transition (PHT) than did their Holocene successors, suggesting a more mobile subsistence adaptation. However, this requires annual rounds and logistic forays beyond the scale of ethnographic, pedestrian foragers, and fails to explain evidence of broad-spectrum foraging that would not have required such extreme mobility to procure. Alternative explanations hold that social

exchange, rather than subsistence needs, shaped obsidian conveyance, and argue that the PHT adaptation can best be understood by direct analogy with ethnographic Great Basin foragers. But Paleoindians lived in climatic circumstances and at population densities utterly unlike ethnographic groups of the region. I argue that these contending interpretations rely on a questionable assumption that hunter-gatherer "bands" are organized as closely related households. An alternative approach informed by behavioral ecology and recent archaeogenetic and ethnographic evidence suggests that the Paleoindian pattern can be better understood in terms of high individual mobility, flexible group composition, and long-distance mating networks in a resource landscape of extremely low population density. Such an approach should be founded on the expectation that both social and subsistence incentives play critical but non-contradictory roles in structuring the mobility of low population density hunter-gatherers.

Zeanah, David [35] see Weitzel, Elic

Zedeno, Maria [8] see Soza, Danielle

Zedeno, Maria [80] see Reitze, William

Zedeno, Maria (University of Arizona)

[239] *What Is 'Good Hair'? – Personhood, Ritual, and Resurgence of Bodily Adornment among the Equestrian Blackfoot*

Painting and writing from Fort Union Trading Post, North Dakota in the 1830s, George Catlin greatly admired Plains Indian coifs, body paint, and insignia, painstakingly describing each individual's appearance. Contemporary descendants of Blackfoot warriors whom Catlin painted, joyfully display their portraits as evidence of the ancestors' bravery and status. Through portraits, photographs, and artifacts, this paper examines popular and unique objects and substances of bodily adornment, beginning with pre-contact burial customs and continuing through the Colonial and Reservation periods to: (1) scrutinize the interplay between deep tradition and European-influenced innovation in ritually and socially charged bodily adornment, and (2) examine the effects of Federal religious proscription on the persistence of traditional regalia among the reservation-era Piikani (Montana Blackfeet). The paper concludes with an assessment of the strategies followed by contemporary Blackfoot traditionalists to faithfully maintain or reproduce ritual regalia and its current ritual and personal significance.

Zeder, Melinda (Smithsonian Institution)

[352] *Documenting Domestication 2.0*

Published in 2006, the edited volume Documenting Domestication: New Genetic and Archaeological Paradigms presented case-study examples of cutting-edge approaches to documenting the domestication of plant and animal species. The twelve years since the publication of this book have seen remarkable advances in our ability to track domestication using archaeobiological, genetic, and archaeological markers. Perhaps more importantly, our understanding of this complicated process has also deepened over this time – how it begins, how it unfolds, and how the pace and direction of domestication varies in different plant and animal species, and in different cultural contexts. This presentation reviews these advances considering first the improvements in defining domestication. It then reviews the range of approaches to documenting its progress in both plants and animals. It stresses the importance of being able to tie individual markers explicitly and exclusively to some aspect of the domestication process. It also emphasizes the value of multi-marker approaches to documenting domestication that bring together genetic, archaeobiological, and archaeological data to monitor the process of domestication in plants and animals.

Zeidler, James (Colorado State University)

[314] *Jama-Coaque Ceramic Traits in Coastal Colima, West Mexico?: A View from the Jama Valley, Coastal Ecuador*

In spite of a long tradition of scholarship dedicated to the theme of prehispanic maritime contacts between the Pacific coastal areas of Ecuador and Mesoamerica, most arguments for these contacts have been based on a wide variety of trait comparisons between ill-defined cultural sequences in the respective contact zones, often spanning multiple centuries. In this paper, I examine specific ceramic traits found in well-dated archaeological phases of the long Jama-Coaque cultural tradition of northern Manabí, Ecuador, and show when and how some of these traits appear in coeval archaeological contexts (ca. 450-650 CE) at two archaeological sites in coastal Colima, Mexico. Two vessel forms in particular will be

examined: (a) shallow pedestal bowls (comporteras or cajetes); and (b) heavy ceramic seats or plates (asientos-plató) having either polypod supports or thick annular bases. Both of these vessel forms fall outside the canons of coastal Colima ceramic traditions and were correctly identified as intrusive by Mexican archaeologists. Comparisons of the nature and social complexity of the two contact areas are discussed and previous models of long-distance maritime interaction and exchange are reexamined in light of this specific example of maritime contact.

Zeitlin, Nicholas (University of Massachusetts, Boston)**[91] The Socio-economic Dynamics of Iron Production in Viking Age Northern Iceland**

Understanding how an agricultural society organized the production of iron and the trade of farming implements allows us to describe how they managed natural resources and non-agricultural activities as a community. In the North Atlantic region known for its ephemeral material culture, slags and other metal smelting byproducts present a robust category of artifacts which can be analyzed. These materials including ferrous slags and other waste products, are often noted and discarded during survey focused fieldwork. Basic typological analysis allows for the identification of stages of production at a site. When placed into the context of a regional study, the degrees of specialization of sites can be determined. The Skagafjörður Church and Settlement Survey (SCASS) has identified several sites which include materials associated with iron production in the Viking and Medieval periods. This project presents methodologies, results and discussion of artifacts collected across multiple regions in the Skagafjörður Valley in northern Iceland. Results suggest small-scale production at the communal level distributed over the landscape using specialized activity sites.

Zejdlik, Katie (Western Carolina University), Jonathan Bethard (University of South Florida), Nyárádi Zsolt (Haáz Rezso Museum, Odorheiu Secuiesc, Romania) and Andre Gonciar (ArchaeoTek Canada)**[386] Medieval Transylvanian Church Burial Patterns and Demographics**

The Papdomb archaeological site is located immediately outside the village of Văleni (Hungarian: Patakfalva), Romania in the historic region of Transylvania. Papdomb comprises the ruins of a medieval Székely church and its associated cemetery. Human interment within the walls of the church started in the second half of the 12th century and extended to the early 17th century with most the burials interred during the 14th and 15th century. Analysis found that 147 individuals were buried within the church and ranged in age from perinate to old adult. Males outnumbered females by nearly 2:1. Individuals were typically interred in an extended, supine position within a wooden coffin and rarely contained grave offerings. Evidence of ad sanctos, near the saints, burial was evident in that 38% of the burials were placed near the altar space at the front of the church. Additionally, the noble family crypt was near the pulpit area, also at the front of the church. In contrast, four examples of multi-person burial were recovered from the back of the church. This paper will highlight these specific examples while also offering general demographics and patterns.

Zejdlik, Katie [386] see Reinman, Lauren

Zelenetskaya Young, Tatiana (Temple University)**[410] Where Does One Site Begin and Another End: Defining Site Boundaries in the Cochuah Region, Q. Roo**

If we define a site as a place in which an indication of past human-related activities (such as artifacts or features) are located, and describe a boundary as a space where two or more settlements connect, bond together, or separate from each other, then how do we delineate boundaries between settlements? Above all how do we define the site boundaries in the archaeological record? This paper examines data collected from the transect which was cleared between two sites in the Cochuah Region; attempts to determine if the sites were a single aggregate or two distinct sites; and also attempts to define boundaries between these settlements. It proposes that in the investigated area certain topographic features such as small hills/rock outcroppings, deep soil pockets, and milpas serve as natural boundaries.

[410] Chair**Zerboni, Andrea (Università degli Studi di Milano, Dipartimento di Scienze della Terra “A. Desio”), Guido S. Mariani (Università degli Studi di Milano), Sahra Talamo (Max Planck Institute, Department of Human Evolution), Fabio Negrino (Università degli Studi di Genova) and Julien Riel-Salvatore (Université de Montréal, Département d’Anthropologie)**

- [195] *Detecting Transitions: Cultural and Environmental Changes Preserved in Archaeological Sediments from Western Liguria*

The reconstruction of Pleistocene human peopling along the Tyrrhenian coastline of Liguria is of critical importance. This region has yielded among the most recent evidence of Neanderthal occupation and the most ancient traces of modern humans in southern Europe. The reconstruction of the subsistence strategies of Pleistocene hunter-gatherer groups and the climatic conditions of the landscape they settled in is also very challenging. A geoarchaeological approach can help investigate the latter questions. In fact, anthropogenic sediments in rock shelters distributed along the extant coastline of western Liguria offer the opportunity to detect environmental changes and identify functional areas, possibly related to cultural transitions. In this contribution, we discuss preliminary results of a micromorphological investigation on sediments from two key sites of the region: the Bombrini rock shelter (Ventimiglia) and the Via S. Francesco open-air site (Sanremo). At Bombrini rock shelter, sediments preserve evidence of different degrees of weathering, with the older being more weathered than the upper ones. This suggests a progressive transition towards more cold conditions. At Via S. Francesco an analogue transition is also evident along with a main change in sediments supply, from sand dune to loess, thus suggesting a progressive decrease of the sea level.

Zertuche, Federico [56] see Meza-Peñaiza, Abigail

Zetina-Gutierrez, Maria De Guadalupe [71] see Alvarez Estrada, José

Zetina-Gutierrez, Maria De Guadalupe [71] see Pantoja, Luis

Zetina-Gutierrez, Maria De Guadalupe (Sociedad sin Fronteras del Patrimonio Cultural A.C.)

- [71] *Contribuyendo a la Viabilidad y a la Calidad en la Práctica Arqueológica desde la Sociedad sin Fronteras del Patrimonio Cultural A.C.*

Actualmente identificamos problemáticas críticas que inciden directamente en la viabilidad y la calidad de la práctica arqueológica en México: (1) presupuesto nacional recortado a la cultura, la investigación, la protección y la conservación del patrimonio cultural tangible en instituciones y universidades; (2) sobreoferta de profesionales independientes que no tienen incentivos para invertir en su autoformación causando deserción y subempleo; (3) estancamiento en crecimiento profesional en quienes sí están ejerciendo que estandariza una práctica heterogénea y con carencias éticas; (4) acceso muy limitado a las tecnologías de innovación para eficientar la operatividad y la investigación; (5) desarticulación entre los profesionales del patrimonio cultural y el resto de la sociedad incluyendo a la iniciativa privada y a la población civil. Consecuentemente, el acceso a la cultura sigue siendo elitista. Ante este panorama en 2016, surge una iniciativa informal que proveyó algunas donaciones de tecnología a los proyectos arqueológicos y que en 2018 se convirtió en la "Sociedad sin Fronteras del Patrimonio Cultural A.C. Esta ponencia muestra la propuesta de esta asociación civil para contribuir a resolver estos asuntos críticos desde una postura que considera la inclusión de todos los sectores de la sociedad y el trabajo colaborativo como factores clave.

- [71] *Chair*

Zhan, Shijia

- [416] *Marxism in Chinese Archaeology*

Since the founding of the People's Republic of China, Marxism became a kind of official philosophical thinking embedded in all the humanities. Thus, in most Western archaeologists' minds, Chinese archaeology is a kind of Marxist archaeology, as Bruce Trigger described. We admit to this kind of definition, but the status of contemporary archaeology is already changed just as the transition with Marxism. There are three major stages of the transition which correspond to social and political changes. First was in the 1950s, when the basic theory was heavily effected by Soviet archaeology. Then, in the 1960s to 1970s, scholars were drawn into leftism. After that, Marxism seemed to be weakened in academic research; indeed the authority insisted that Chinese archaeology must be guided by Marxism. In general, the concept of social modes from Marx and Engels is always used in the analysis of subsistence strategies. Also, because of the similar pursuit in science, objectivity and techniques, Chinese archaeologists seems to be more interested in processual archaeology, as the practical archaeologists seek to find a base theory pattern in the new period.

Zhan, Xiaoya [389] see Chen, Liang

Zhang, Chengrui (Harvard University)

[361] *Chair*

Zhang, Meng

[26] *Across Boundaries: Origin of Microblade Technology in NE Asia under a Macroecological Approach*

The spread of microblade technology has been explained using human migration and cultural transmission under the culture-historical paradigm of a “refugium model” that illustrates movements of foraging societies from Transbaikal eastward to the Paleo-Sakhalin-Hokkaido-Kurile (PSHK) Peninsula and to North China in the beginning of the Last Glacial Maximum (LGM). Environmental deterioration and human migration are cited as drivers of cultural and technological change. This study uses a macroecological approach based on Binford’s Constructing Frames of Reference to examine impacts of the LGM on Paleolithic hunter-gatherers in NE Asia. Results from Binford’s projections of ungulate biomass suggest that refugia did not exist in the PSHK Peninsula, thus origins of microblade technology were a more complicated cultural process. The appearance of microblade-based societies in NE Asia is not necessarily explained by human migration from the Altai Mountains or Transbaikal, since the shrinkage of ungulate biomass under environmental pressure and previous technology could provide adaptive advantages for people equipped with microblade-based weaponry. Viewing the appearance of microblade technology as a cultural process, rather than a historical event, can help archaeologists better explore these dynamics.

Zhang, Quanchao [389] see Wang, Jiaqi

Zhang, Xiangyu [78] see Gao, Bo

Zhang, Zhengwei (Department of Anthropology, Washington University in St. Louis)

[78] *Hunting vs. Herding: The Eastern and Central Tibetan Plateau's Earliest Inhabitants*

Our understanding of when and how humans settled high altitude (>3000 m.a.s.l.) regions of the Tibetan Plateau has been greatly extended in the past decade. In this paper, we shift the focus from plants to animal resources, and explore the diversity of animal-based subsistence strategies used to adapt to challenging environments in both eastern and central parts of the plateau. Our findings demonstrate that wild animal resources were a significant, and perhaps the primary, contributor to subsistence strategies utilized by people who were arguably the earliest successful year-round settlers of the eastern Tibetan Plateau. It appears that domesticated herd animals, such as sheep, goat, and cattle or yak, were indispensable to the success of early year-round settlers of the central Tibetan Plateau.

Zhao, Chao, Qingchuan Bao (Inner Mongolia Institute of Cultural Heritage) and Xiaonong Hu (Ulanqab Museum)

[361] *A Study of Transition to Agriculture in the Ulanqab Region of the Southern Mongolian Steppe Zone of China*

Mongolia steppe is widely thought as a marginal zone for agriculture, yet the recent excavations of two inhabit sites and a survey with more than 1000m² in Ulanqab, central Inner Mongolia have found evidences that people made efforts to do food production during Neolithic period. By studying site structures and the form, composition and spatial distribution of lithic assemblages based on excavation and survey materials, I explored how the subsistence, mobility and social integration are interplayed to drive the changes of human adaption to the steppe environment across the time of the transition to agriculture. The preliminary results show that during early Neolithic period, a certain degree of population aggregation has developed prior to the development of food production and the mobility declined as the relative importance of food production increased. However, unlike central North China, such tendency did not develop into full-fledged agriculture. Low-level food production has been maintained in this region into the Bronze age and as Holocene Megathermal passed by, the relative importance of hunting has even increased and the stable sedentism has never been evolved.

Zhao, Kun [299] see Li, Xiuzhen

Zhao, Yu-chao (University of Michigan Museum of Anthropological Archaeology) and Li Feng (Institute of Vertebrate Paleontology and Paleoanthropology)

[389] *Mobility, Land Use, and Technological Organization at the Site of Yangshang, Gansu, China*

The excavation in Yangshang site generated a high-resolution record in the West Loess Plateau of China, and demonstrated that ancient human occupied this region at least since MIS7. In looking for evidence of possible changes in the mobility, land use, and organization of lithic technology that may have been concurrent with the paleoenvironment changes identified in Yangshang, we concentrate on three lines of the evidence based on the lithic and fauna data revealed from L6-8 which contain large enough database to conduct necessary statistical analysis: typological analysis provides comparable data on lithic types across different periods which may reveal the provisioning stately among each main cultural layers; the lithic raw material economic analysis will focus on the variation of raw material frequencies and the consumption of cores and flake blanks; artifacts' volumetric densities from the sampled excavation units and vertical stratigraphic distribution intensities will provide information about the expansion and frequency of occupation during different periods. The primary aim of these attribute/metric-based analysis is to investigate the long-term evolutionary process in terms of the possible adaptive variation in stone tool manufacture and use patterns occurring over many thousands of years.

Zhao, Zhijun [302] see Hayashi Tang, Mana

Zhou, Yuduan [361] see Li, Yinghua

Zhu, Hong [183] see Berger, Elizabeth

Zhu, Kimberly (University of California, Santa Cruz) and Guillermo ae Anda (INAH)

[360] *What's in That Incense Burner? A Study of Residues at Balamku*

It is so widely accepted that the Maya burned copal incense in their rituals that the assumption has gone unquestioned. During the 2018 season, the Gran Acuífero Maya Project began a multi-year investigation of the cave of Balamku near Chichen Itza. The cave contains a large number of incense burners filled with burned material that permits a far closer scrutiny of this aspect of Maya ceremonialism. The first preliminary examination of botanical material has found large quantities of charred wood that appears to be pine. This discovery has important economic implications because of the distance from the cave to the nearest source of pine. This and other contents will be discussed in my presentation.

Zierden, Martha [34] see Reitz, Elizabeth

Zilhão, João (ICREA/University of Barcelona)

[15] *Personal Ornaments and the Middle Paleolithic Revolution*

The Middle-to-Upper Paleolithic transition is a watershed. By the later Upper Paleolithic, all continents were occupied, all the world's ecosystems were exploited, and all aspects of ethnographically observed hunter-gatherer culture the archaeological record can preserve are indeed found. Prior to about 100,000 years ago, such is not the case. There is therefore little reason to question the notion that, in a geological or evolutionary time scale, that transition is a "revolution" in the sense of Gilman's (1984) "Upper Paleolithic Revolution:" a protracted process of technological improvement and demographic growth, combined in a feedback loop with developments towards more sophisticated modes of communication and social organization. However, we now know that body painting, personal ornamentation, object decoration and formal burial emerged as early as ~120,000 years ago. As otherwise implied by the fact that, in Europe, the beginnings of cave art date to >65,000 years ago, which implies Neandertal authorship, that emergence is more amenable to social- or demography-based explanations than to cognitive- or human taxonomy-based ones. Given that the association of formal burial with residential localities is strongly suggestive of formalized territoriality, this Middle, not Upper Paleolithic Revolution may well represent the emergence of ethnicity and ethnic boundedness.

Zimmer, Adam**[179] Queer (Re)Collections: How Anatomical Collections Obscure Identities**

Anatomical skeletal collections have often been framed as encompassing “the poorest of the poor” or the most marginalized of a given society. This framework has shaped the way that these collections have been studied for decades. A queered understanding of how these collections were formed and who is actually encompassed within them reveals a much more nuanced understanding. These collections stand at the intersections of race, class, and gender and therefore an intersectional approach must be used in order to question the assumptions we hold about them. Using the George S. Huntington Anatomical Collection as an example, this paper takes a queerly-situated approach to understand the ways that anatomists, medical professionals, and now bioarchaeologists obscure the identities of the dead.

Zimmerman, Larry (IUPUI/Eiteljorg Museum)**[244] Discussant****Zimmermann, Mario (Washington State University) and Gabriel Ortiz A la triste (Universidad Autonoma de Yucatan)****[58] Feasts for the People, Crumbs for the Bird: Communicating Archaeological Data on Ancient Crop Diversity**

Food security and food adequacy are at the core of many sustainability debates. Growing urban populations and a simultaneous decline in staple crops are severe threats to both. While the relation between rising demographics and subsistence has been a focus of scholarly debate in anthropology, crop diversity in ancient agrosystems is generally not. These theoretical discussions have centered on calories per unit of surface area and starch is responsible for most caloric provisioning by plants. This paper draws on a microbotanical database for ancient Maya cities from three different geographical districts and varying time periods, therefore enabling comparative analyses between urban communities and tracing crop-diversity over time. Regarding outreach to local communities, our proposal relies on a double appeal as contemporary Yucatecos exhibit considerable interest in both ancient Maya culture and cuisine. We propose to organize gatherings that allow for informal exchange of ideas, structured presentations of diet-related research, as well as culinary experimentation with identified ancient plant-foods. Finally, our strategy to communicate nationally and/or globally builds upon the far-reaching impact of social networks by creating fact-based social media content that is consciously crafted to impact a broader audience whose information consumption patterns have changed dramatically over the past decade.

Zimmermann, Mario [198] see Hernandez, Hector

Zinsius, Brandon (University of Connecticut), Jonathan Haws (University of Louisville), Michael Benedetti (University of North Carolina, Wilmington) and Telmo Pereira (Universidade do Algarve)**[403] Site and Assemblage Integrity for Middle and Upper Paleolithic Levels at Lapa do Picareiro, Portugal**

Central Portugal is a critical area of study for addressing the replacement of Neanderthals by Anatomically Modern Humans in Iberia. This paper presents new data on lithic refitting and assemblage integrity from Lapa do Picareiro, a cave in central Portugal containing punctuated levels of occupation within a continuous sequence of deposition spanning the Middle and Upper Paleolithic. These levels contain lithic and faunal remains recovered using high resolution spatial recording methods. The lithic assemblages from Levels JJ, FF, DD, and W, each contain a numbers of refits, allowing us to demonstrate their intact stratigraphic position and to conduct spatial analyses of lithic reduction and activity areas in the Early Upper and Late Middle Paleolithic. Using lithic refits as a measure of site and assemblage integrity, this paper highlights the importance of Lapa do Picareiro as a key site for the study of the Middle-Upper Paleolithic transition in southern Iberia.

Ziólkowski, Mariusz (University of Warsaw), Jacek Kosciuk (Faculty of Architecture, Wroclaw University of Science) and Bartłomiej Cmielewski (Faculty of Architecture, Wroclaw University of Science)**[233] Coricancha: Between Historical Studies and 3D Scanning**

This paper stresses the importance of surveying precision for any studies related to Inca architecture and urbanism. Based on 3D laser scanning of the Coricancha complex, different cases are presented. The first case is an evaluation of hypotheses regarding the possible astronomical function of this temple. Among them, of particular importance is the one formulated by R.T. Zuidema and A.F. Aveni, according to which astronomical observations at the Coricancha constituted

the structural skeleton of a specific Inca calendar cycle of 328 days. This article presents a critical analysis of this hypothesis, based on precise measurements of the orientation of the temple carried out by the authors of the text. The second case, based on the same 3D laser scanning data, is a preliminary study on the Coricancha's metrology. The overall dimensions of the whole temple and particular buildings are discussed.

Zipkin, Andrew [32] see Bertacchi, Alex

Zipkin, Andrew (School of Human Evolution and Social Change)

[72] *Discussant*

[72] *Chair*

Znachko, Caroline L. [371] see Riegert, Annie

Zona, Margherita (University of Liverpool), Edouard Masson-MacLean (University of Aberdeen), Carly Ameen (University of Exeter), Camilla Speller (University of British Columbia) and Keith Dobney (University of Liverpool)

[20] *Tracing the Human Exploitation of Salmonids on the Pacific Coast of North America*

Pacific salmonids (*Oncorhynchus* spp.) are important economic and subsistence resources for contemporary and past indigenous peoples of the Pacific coast of North America. The seven recognised *Oncorhynchus* species each occupy different ecological niches and exhibit diversity in seasonal spawning and migratory behaviours. Although salmonid remains are ubiquitous at archaeological sites from California to Alaska, their remains are notoriously difficult to identify to species level using traditional zooarchaeological techniques. This prevents archaeologists from fully reconstructing human subsistence strategies, which were influenced by the seasonal availabilities of different species. While ancient DNA analyses have successfully separated species, these methods are destructive and cost-prohibitive. Geometric morphometrics (GMM) has proven successful in capturing subtle biological variations of closely related species and represents a cheaper and non-destructive alternative for the identification of archaeological *Oncorhynchus* species. Initial results, using modern wild specimens of known species as reference, verified by DNA analysis and ZooMS, demonstrate that GMM is effective in identifying certain species of *Oncorhynchus* with a high level of confidence. These results will aid in the refinement of past subsistence strategies surrounding this keystone species, and provide a deep-time perspective on both pre-industrial population baselines and native ranges for modern conservation policy and climate change studies.

Zori, Colleen [310] see Zori, Davide

Zori, Colleen and Noa Corcoran Tadd (Leiden University, NL)

[315] *Firmer Footings: Building Authority in Inca Colesuyu*

John Rick's 24 years of excavation at Chavín have had a broad and enduring impact on colleagues and students across the Andes. Here we build on John's specific interest in built space and its relationship to political hierarchy by developing two brief case studies in southern Peru and northern Chile that explore the architectural process as a central domain for the making and remaking of Inca authority. At Moqi, located in the Locumba Valley, construction of the imperial sector was preceded by intensive modification of the underlying hilltop. Builders in the local sector also modified the landscape, but in ways that differed from those employed by the Inca. Closing rituals conducted upon site abandonment in both the Inca and local sectors signal the importance attributed to the architectural spaces by the site inhabitants. Further to the south, in the Palca-Tacora corridor, a chain of Inca waystations (tambos) connected the altiplano with the Caplina and Lluta coastal valleys. Here the small yet formal tambos were carefully inserted into agro-pastoralist landscapes, suggestive of a complementary extensive strategy that reshaped the quotidian spaces of the local communities. Both cases highlight the 'capture' and shaping of the spatial domain in transforming Inca-local relationships.

Zori, Davide (Baylor University), Colleen Zori (Baylor University), Veronica Ikeshoji-Orlati (Center for Advanced Study in Visual Arts, National), Dennis Wilken (Kiel University) and Deirdre Fulton (Baylor University)

[310] Settlement Shifts and the Transformation of Power in Medieval Italy: Preliminary Results from the Excavation of the Castle of San Giuliano

Northern Lazio, Italy, was a region of shifting boundaries in the Middle Ages. Across the medieval centuries, it encompassed the southern extent of Lombard territory, a southwestern edge of Byzantine lands, and a northern portion of the Papal States. Given the scant textual documentation of this region, archaeology is key to investigating changes in settlement patterns and economic interactions characterizing this dynamic period. We present data from three seasons of geophysics survey, drone photography, and open-area excavations at the medieval castle complex of San Giuliano. This site was part of a broad restructuring of the settled landscape of medieval Italy, in which people chose or were forced to move onto fortified hilltops. The San Giuliano Archaeological Research Project aims to test three explanatory models for the emergence of these fortified sites: 1) manifestations of state power, 2) privatized feudal enterprises, and 3) communal village-based initiatives. In this paper, we present our project's preliminary data concerning the spatial layout, political order, and economic organization of the castle, with particular attention to a hall at the heart of the complex. Fine glassware and ceramic servingwares, alongside zooarchaeological analysis of refuse in an associated granary, suggest that this was a feasting hall.

Zralka, Jaroslaw (Institute of Archaeology, Jagiellonian University), Bernard Hermes (The Nakum Archaeological Project), Carmen Ting (University of Cyprus), Christophe Helmke (University of Copenhagen) and Wieslaw Koszkul (Jagiellonian University)

[199] Political Alliances and Trade Connections Seen in Ceramic Record from the Classic Period: The Perspective of the Maya Site of Nakum, Guatemala

Archaeological investigations at Nakum (an important Maya site located in northeastern Guatemala) brought about the discovery of many monochrome and polychrome ceramics in many different architectural contexts. The style of ceramics supplemented in many cases by mineralogical and physico-chemical analysis of ceramic samples indicate that Nakum was part of a broad and complex network of political and economic interactions between various sites and polities of the Southern Maya Lowlands during the Classic period. Here we report on the Nakum ceramics from the Late and Terminal Classic periods that show the connections that this center maintained with other important polities of Guatemala, Belize and Mexico.

Zsolt, Nyárádi [386] see Zejdlik, Katie

Zubieta Calvert, Leslie (Marie Curie Fellow, University of Barcelona)

[394] Narratives in Clay and Pigment: Cultural Knowledge and Social Practices in the Sierra Mixe, Oaxaca

The artistic expressions of the Ayuujk (Mixe) peoples are little known in Mexican archaeological research. In this presentation I discuss the possible narratives behind the presence of plastic art and rock art, unprecedented in Mesoamérica, located in the context of a subterranean landscape in the Sierra Mixe of Oaxaca. In particular I will focus on the repercussion that this research has in relation to the study of memorization techniques and transmission of knowledge. The documentation of such material culture in collaboration with members of the Mixe community has been enriched by information shared by some senior women and men of the local community. The recovered ethnographic data in this ongoing project allows us to understand the significance that stories today of mythic beings and heroes have in the collective imaginary of the Ayuujk people and the impact that the imagery discovered at the site have had to buttress the identity of the present-day Mixe population. I will also discuss the challenges behind the measures that have been discussed jointly to protect this cultural legacy.

Zuckerman, Jill

[265] Early to Late Archaic Cultural Traditions in Southeast Massachusetts

The Gulf of Maine Archaic Tradition is poorly represented in Southeastern Massachusetts. Following recent excavations in Somerset, hundreds, if not thousands of pieces of quartz chipping debris, cores, and expedient edge tools were recovered from a relatively small area of distribution. This large amount of non-diagnostic quartz debitage strongly indicates the presence of this Early Archaic tradition. In addition, a separate locus containing a Late Archaic component, yielded mainly Brewerton projectile points, and clearly modified tools and scrapers. Several other materials were represented in this locus including quartzites and rhyolites, but the presence of quartz drops significantly. This paper will discuss how these two loci

fit into our understanding of the indigenous cultural history of Southeastern Massachusetts.

Zwyns, Nicolas [416] see Gillam, J. Christopher

Zych, Thomas (University of Toledo) and John Richards (University of Wisconsin-Milwaukee)

[348] Pushing and Pulling the Mississippian Moment Into the Western Great Lakes

This paper provides a comparative review of the regional chronology, material culture indicators, and environmental data for three site-centered locales (Trempealeau/Fisher Mounds, Fred Edwards, and Aztalan) harboring Middle Mississippian components in southern Wisconsin and the Upper Mississippi River Valley. These data are used to discuss the introduction of Mississippian technological innovations, ideational systems, and new subsistence regimes into the western Great Lakes region during the late tenth and early eleventh centuries A.D. This process can be modeled as the result of a variety of causal factors that include demographic, cultural, social, political, and environmental referents. Moreover, data from the three locales discussed suggests that the particular mix of these factors and the degree to which one or more are paramount varies on a case-by-case basis. These factors reveal the differential negotiation of Middle Mississippian influences into the western Great Lakes.