

School of Geography, Development & Environment
Laboratory of Tree-Ring Research
University of Arizona
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RESEARCH INTERESTS

Human ecology, land use, climate dynamics, social simulation, cultural evolution, Earth system science, social-ecological networks, environmental data science

EDUCATION

- 2019 **Ph.D.** in Anthropology, **Arizona State University**
Committee: C. Michael Barton (chair), John M. Anderies, Matthew Peeples
- 2015 **M.A.** in Anthropology, **Arizona State University**
Advisor: C. Michael Barton
- 2013 **B.A.** in Archaeology, **Boston University**
Advisor: Christopher H. Roosevelt

ACADEMIC EMPLOYMENT

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| <i>Current</i> | Postdoctoral Scholar , Scripps Institution of Oceanography.
Geosciences Research Division: Integrating Holocene temperature and precipitation reconstructions with genomic and archaeological data, Jade d’Alpoim Guedes (PI). |
| 2019-21 | Postdoctoral Research Associate , University of Arizona.
Employed under NSF-supported “ P2C2 : Spatiotemporal variability in western United States snowpack during the Common Era,” Kevin Anchukaitis (PI). |
| 2015-18 | Graduate Research Associate , Arizona State University.
Employed under NSF-supported “ CNH : The emergence of coupled natural and human landscapes in the western Mediterranean,” C. Michael Barton (PI). |
| 2013-19 | Graduate Research Associate , Arizona State University.
Employed under NSF-supported “Collaborative research EaSM2 : Linking human and Earth System models to assess regional impacts and adaptation in urban systems and their hinterlands,” Brian O’Neill (PI). |

PEER-REVIEWED PUBLICATIONS (CITATIONS 155, H-INDEX 4)

- In press | Smith, M.E., J. Lobo, M. Peeples, A. York, B. Stanley, K. Crawford, **N. Gauthier**, A. Huster. "The persistence of ancient settlements and urban sustainability." **PNAS**.
- 2021 | Ellis, E.C., **N. Gauthier**, K. Klein Goldewijk, R. Bliege Bird, N. Boivin, S. Diaz, D. Fuller, J. Gill, J. Kaplan, N. Kingston, H. Locke, C. McMichael, D. Ranco, T. Rick, M.R. Shaw, L. Stephens, J.C. Svenning, J.E.M. Watson. "People have shaped most of terrestrial nature for at least 12,000 years." **PNAS**, 118 (17). doi:10.1073/pnas.2023483118
- Quinn, J., E. Cook, **N. Gauthier**. "Patterns of vertebrate richness across global anthromes: prioritizing conservation beyond biomes and ecoregions." **Global Ecology and Conservation**, 27. doi:10.1016/j.gecco.2021.e01591
- Gauthier, N.** "Hydroclimate variability influenced social interaction in the prehistoric American Southwest." **Frontiers in Earth Science**, 8 (731). doi:10.3389/feart.2020.620856
- 2019 | Stephens, L., D. Fuller, N. Boivin, T. Rick, **N. Gauthier**, A. Kay, B. Marwick (lead authors, with 113 contributing authors). "Archaeological assessment reveals Earth's early transformation through land use," **Science**, 365 (6456). 897-902. doi:10.1126/science.aax1192
- Khider, D., J. Emile-Geay, N.P. McKay, Y. Gil, D. Garijo, V. Ratnakar (lead authors, with 87 contributing authors including **N. Gauthier**). "PaCTS 1.0: A Crowdsourced Reporting Standard for Paleoclimate Data," **Paleoceanography and Paleoclimatology**. doi:10.1029/2019PA003632
- 2018 | Barton, C. M., E. Tortosa, O. Puchol, J. Riel-Salvatore, **N. Gauthier**, M. Conesa, G. Pothier-Bouchard. "Risk and resilience in the Late Glacial: A case study from the western Mediterranean," **Quaternary Science Reviews**, 184. 68-84. doi:10.1016/j.quascirev.2017.09.015
- 2016 | **Gauthier, N.** "The spatial pattern of climate change during the spread of farming into the Aegean," **Journal of Archaeological Science**, 75. 1-9. doi:10.1016/j.jas.2016.09.004.
- 2012 | **Gauthier, N.** "Pax Seleuciana: Archaeological approaches to ethnicity in the Hellenistic east," **Vexillum** 2 (2012). www.vexillumjournal.org.

IN REVIEW OR UNDER REVISION

- Revision | **Gauthier, N.**, K.J. Anchukaitis, B. Coulthard. "Pattern-based downscaling of snowpack variability in western North America." Under revision at **Climate Dynamics**.
- Gauthier, N.** "Trade, migration, and the dynamics of spatial interaction." Under revision at **Journal of Archaeological Science**. SocArXiv preprint: doi:10.31235/osf.io/trbf8.

BOOK CHAPTERS

- In press | **Gauthier, N.** “Agricultural risk management in Mediterranean environments: a computational modeling approach.” In *Simulating the Transition to Agriculture and Its Ecological and Cultural Consequences*, edited by S. Bergin and S. Pardo-Gordó. In press at **Springer**.
- Barton, C.M., I. Ullah, **N. Gauthier**, N. Miller, G. Snitker, I. Esteban, J. Bernabeu-Aubán, A. Heimsath. “Digital Proxies for Validating Models of Past Socio-Ecological Systems in the Mediterranean Landscape Dynamics Project.” In *Simulating the Transition to Agriculture and Its Ecological and Cultural Consequences*, edited by S. Bergin and S. Pardo-Gordó. In press at **Springer**.

PREPRINTS AND WORKING PAPERS

- In prep | Barton, C. M., S. Bergin, R. Robertson, **N. Gauthier**, J. Bernabeu-Aubán, S. Pardo-Gordó, G. Snitker. “Constructing the cultural-ecological niche of Mediterranean agriculture: Paleoclimate, crop modeling, and Anthropocene prehistory.” Intended for **PNAS**.
- 2019 | **Gauthier, N.** “Multilevel simulation of demography and food production in ancient agrarian societies: A case study from Roman North Africa.” Intended for **Human Ecology**. SocArXiv preprint doi:10.31235/osf.io/5be6a.

AWARDS AND HONORS

- 2020 | **University of Arizona Sursum Fellow**. University of Arizona.
- 2017 | **Graduate Excellence Award**. College of Liberal Arts and Sciences, Arizona State University.
- 2015 | **Reynold Ruppé Prize in Archaeology** for best paper in archaeology by a graduate student at ASU: “The spatial pattern of climate change during the spread of farming into the Aegean.” School of Human Evolution and Social Change, Arizona State University.

GRANTS AND FELLOWSHIPS

- In prep | “**NSF HEGS**: Spatially explicit hindcasts of long-term human population dynamics.” PI: **N. Gauthier**. Co-PI: C. Pearson.
- “**NSF HEGS**: Long-term settlement persistence and urban sustainability.” PI: M.E. Smith. Co-PI: **N. Gauthier**, J. Lobo, M. Peeples, A. York.
- “**NSF Senior Archaeology**: The use of archaeological and paleoenvironmental correlates to understand climate-related migration and its effect on contemporary indigenous peoples.” PI: Scott Ortman. Co-PI: M. Aldenderfer, D. Bird, S. Ingram, C. Scaffidi. Senior Personnel: K. Douglass, **N. Gauthier**.

Pending	<p>“NSF DISES: Integrating dendrochronology, hydrology, and archaeology to assess the role of infrastructure in arid socio-hydrological systems.” PI: Jeffrey Dean. Co-PI: N. Gauthier, L. M. Norman, M. Pailes.</p> <p>“NSF DISES: Long term resilience in coupled natural and human systems of terraced agriculture.” PI: C.M. Barton. Co-PI: A. Heimsath, H. Sarjoughian, I. Ullah, M. Acevedo, A. Diez-Castillo. Senior Personnel: S. Bergin, N. Gauthier, I. Ésteban, G. Snitker.</p>
2020	<p>Postdoctoral Research Development Grant. “Towards integrated hindcasts of past socio-environmental systems.” University of Arizona. \$1,955.</p> <p>Travel Grant. PAGES-INQUA ECR workshop: Past Socio-Environmental Systems. \$750.</p>
2018	<p>Collaborative Research Grant. A. Wissler, Co-PI. ASU Center for Bioarchaeological Research. \$4,850</p> <p>Travel Grant. ASU Graduate and Professional Student Association. \$950.</p>
2017	<p>Graduate Visitor Fellowship. National Center for Atmospheric Research, Advanced Study Program. Host: Peter Lawrence. \$6,750.</p> <p>Graduate College Travel Award. ASU Graduate College. \$200.</p> <p>Travel Grant. ASU Graduate and Professional Student Association. \$950.</p> <p>Bursary. Computer Applications in Archaeology Conference. \$295.</p>
2016	<p>Group Travel Grant. ASU Graduate and Professional Student Association. \$630.</p>
2015	<p>Travel Grant. ASU Graduate and Professional Student Association. \$950.</p>
2013	<p>Graduate Research Associate Fellowship. ASU. \$18,000/yr through 2020.</p> <p>Conference Travel Grant. ASU SHESC Research Committee. \$250.</p> <p>Conference Participation Travel Award. Boston University Undergraduate Research Opportunities Program. \$350.</p> <p>“Quantifying the Spatial Variability of Archaeological Sediments in Thin Section.” Student Research Award, Renewal. Boston University Undergraduate Research Opportunities Program. \$1,600.</p>
2012	<p>“Quantifying the Spatial Variability of Archaeological Sediments in Thin Section.” Student Research Award. Boston University Undergraduate Research Opportunities Program. \$1,200.</p> <p>Mapping Responses to Climate Change in Bronze Age Lydia. CAS Summer Research Scholar. Boston University. Undergraduate Research Opportunities Program. \$4,000.</p> <p>Platt Fellowship. American Schools of Oriental Research. \$1,000.</p>
2009	<p>Dean’s Scholarship. Boston University. \$30,000/yr, through 2013.</p>

- 2021 | **Gauthier, N.** “An open-source modeling pipeline for past demography and land use.” Paper presented at the **PAGES/PEOPLE 3000** (PalEOclimate and the PeopLing of the Earth), virtual workshop. †
- 2020 | **Gauthier, N.** “Simulating Population Growth, Food Production, and Social Interaction in Semiarid Environments: Pattern, Process, and Feedbacks.” Paper to be presented at the **PAGES-INQUA joint ECR workshop: Past Socio-Environmental Systems**, La Serena, Chile. (Postponed due to Covid-19)
- Gauthier, N.** “Drought regimes influenced social interaction in the US Southwest.” Poster presented at the **17th biennial Southwest Symposium Archaeological Conference**, Tempe.
- M. Aldenderfer, D. Bird, K. Douglass, **N. Gauthier**, S. Ingram, B. Scaffidi. “Climate migrants of the past, present, and future.” Paper presented at the **26th Annual Meeting of the European Association of Archaeologists**, Budapest. †
- 2019 | **Gauthier, N.** “Generalized Additive Mixed Models for Spatial Networks.” Poster presented at the **84th Annual Meeting of the Society for American Archaeology**, Albuquerque.
- Wissler, A., and **N. Gauthier**. “The Frailty-Mortality Paradox: Insights from the Spanish Flu Pandemic of 1918.” Poster presented at the **84th Annual Meeting of the Society for American Archaeology**, Albuquerque.
- 2018 | **Gauthier, N.** “Agent-based modeling of anthropogenic land cover change: A case study from Roman North Africa.” Paper presented at the **NCAR Land Model, Biogeochemistry, and Social Dimensions Working Group** meetings, Boulder.
- Gauthier, N.** “Forum: the nuts and bolts of agent-based modelling for archaeological science.” Invited discussant at the **83rd Annual Meeting of the Society for American Archaeology**, Washington, D.C. †
- Gauthier, N.** “Agricultural niche construction in Roman North Africa: Simulating irrigation and deforestation on a desert margin.” Poster presented at the **83rd Annual Meeting of the Society for American Archaeology**, Washington, D.C.
- Barton, C. M., I. Ullah, **N. Gauthier**, N. Miller, G. Snitker, I. Esteban, J. Bernabeu-Aubán, A. Heimsath. “Digital Proxies for Validating Models of Past Socio-Ecological Systems in the Mediterranean Landscape Dynamics Project.” Paper presented at the **24th Annual Meeting of the European Association of Archaeologists**, Barcelona. †
- 2017 | **Gauthier N.** “Placing people in the environment: Coupling agent-based land-use and earth system models.” Symposium paper presented at the **CoMSES Net Virtual Conference**. †
- Gauthier, N.** “Parametric uncertainty in a simple model of a social-ecological network.” Symposium paper presented at the **2017 Computer Applications and Quantitative Methods in Archaeology** conference, Atlanta. †

- cont.* | **Gauthier, N.**, M. Peeples. “Drought variability and the robustness of agrarian social networks.” Poster presented at the **82nd Annual Meeting of the Society for American Archaeology**, Vancouver.
- Ullah, I., **N. Gauthier**, N. Miller, G. Snitker. “Connecting the human and the natural: Coupled human-earth systems models and the digital proxy record.” Poster presented at the **Community Surface Dynamics Modeling System Annual Meeting**, Boulder.
- Bergin, S., S. Pardo-Gordó, C. M. Barton, J. Bernabeu-Aubán, **N. Gauthier**. “Testing social and ecological drivers for the initial spread of agriculture on the Iberian Peninsula.” Paper presented at the **82nd Annual Meeting of the Society for American Archaeology**, Vancouver. †
- 2016 | **Gauthier, N.** “Agricultural risk management in Mediterranean environments: a computational modeling approach.” Symposium paper presented at the **81st Annual Meeting of the Society for American Archaeology**, Orlando. †
- Barton, C. M., E. Tortosa, O. Puchol, J. Riel-Salvatore, **N. Gauthier**, M. Conesa, and G. Pothier-Bouchard. “Risk and Resilience in the Late Glacial: a Case Study from the Western Mediterranean.” Keynote presentation at **MEDINES - Late Glacial to Early Holocene Socio-ecological responses to climatic instability within the Mediterranean Basin**, Tarragona. †
- 2015 | **Gauthier, N.** “Creating high resolution climate reconstructions from statistically downscaled palaeoclimate simulations.” Paper presented at the **21st Annual Meeting of the European Association of Archaeologists**, Glasgow.
- Gauthier, N.**, C. Luke, and C. Roosevelt. “Extreme Weather Events and 10,000 Years of Land-Use Change in the Gediz River Valley.” Symposium poster presented at the **80th Annual Meeting of the Society for American Archaeology**, San Francisco. †
- 2014 | Luke, C., C. Roosevelt, **N. Gauthier**, K. Egerer. “Water and People in the Marmara Lake Basin (Middle Gediz), Western Turkey.” Paper presented at **QuickLakeH 2014 - An International Workshop on Lakes and Human Interactions**, Ankara.
- 2013 | **Gauthier, N.** and E. Wallace. “Image Analysis, GIS, and the Microstratigraphy of Occupation Deposits from Tell es-Sweyhat, Syria.” Paper presented at the **2013 Annual Meeting of the American Schools of Oriental Research**, Baltimore.
- Gauthier, N.** “Quantifying the Spatial Variability of Archaeological Sediments in Thin Section.” Paper presented at the **78th Annual Meeting of the Society for American Archaeology**, Honolulu.
- 2012 | **Gauthier, N.** “Modeling Past Environmental Change and Agropastoral Land Use in the Marmara Lake Basin, Western Turkey.” Poster presented at the **Boston University 15th Annual Undergraduate Research Symposium**, Boston.

INVITED PUBLIC TALKS

- 2021 | **“Third Thursday Food for Thought” dinner series.** Old Pueblo Archaeology Center, Tucson.
- 2020 | **School of Geography and Development Colloquium.** University of Arizona, Tucson.
- 2019 | “Reconstructing land use and global environmental change in the Holocene,” **School of Anthropology Lecture Series.** University of Arizona, Tucson.
- “Hydroclimate variability influenced social interaction in the prehistoric American Southwest,” **Laboratory of Tree-Ring Research Brown-Bag Talk.** University of Arizona, Tucson.

TEACHING AND MENTORING

- 2020 | **Panelist**, “LGBTQ+ Fieldwork Panel.” Out in STEM (oSTEM) at the University of Arizona.
- Judge**, “Earth Week Lightning Talks.” University of Arizona School of Earth and Environmental Sciences.
- 2019 | **Instructor**, “Building a Website.” University of Arizona School of Geography and Development professional development seminar.
- 2018 | **Instructor**, “Winter School: Agent-Based Modeling of Social-Ecological Systems.” Arizona State University Global Biosocial Complexity Initiative.
- Guest Lecturer**, “ASB 326: Human impacts on the environment: An archaeological perspective.” Arizona State University, Spring semester.
- 2014 - 16 | **Mentor**, “Undergraduate Apprenticeship Program.” Arizona State University School of Human Evolution and Social Change.

FIELDWORK

- 2016 | **Bova Marina Archaeological Project.** Calabria, Italy. Pedestrian survey, architectural recording, geodatabase management.
- 2016 | **Eastern Cibola Archaeological Project.** New Mexico, USA. Pedestrian survey, ceramic analysis.
- 2014 - 15 | **Kaymakçı Archaeological Project.** Manisa Province, Turkey. Stratigraphic excavation, flotation, soil-chemistry sampling, 3-d photography of excavation areas.
- 2014 | **US-Mexico Border Water and Environmental Sustainability Training Program.** Sonora, Mexico. Field spectrometry, micro UAV and balloon aerial photography, electrical resistivity survey, seismic refraction survey.
- 2012 - 14 | **Central Lydia Archaeological Survey.** Manisa Province, Turkey. Pedestrian survey, electrical resistivity survey, 3-d scanning and photogrammetry.

COMPUTER SKILLS

- Technical: Agent-based social simulation, climate modeling, GIS, remote sensing/image analysis, statistical and machine learning, photogrammetry.
- Software: AgiSoft Photoscan, ArcGIS, Blender, CESM, GRASS GIS, ImageJ, L^AT_EX, NetLogo, NextEngine Scanstudio, Python, R, SQL, Unix.

WORKSHOPS AND TUTORIALS

- 2018 **Functionally Assembled Terrestrial Ecosystem Simulator Tutorial.** National Center for Atmospheric Research.
- 2017 **Last Millennium Reanalysis Workshop and Hackathon.** National Oceanic and Atmospheric Administration, National Center for Atmospheric Research.
- 2016 **Community Earth System Model Tutorial.** National Center for Atmospheric Research.

SERVICE AND PROFESSIONAL AFFILIATIONS

- Reviewer: Advances in Archaeological Practice, Environmental Archaeology, Frontiers in Earth Science, Journal of Archaeological Science, Journal of Computer Applications in Archaeology, Journal of Field Archaeology, Journal of Human Evolution, Journal of Open Source Software, Network for Computational Modeling in Social and Ecological Sciences, ASU Graduate and Professional Student Association Travel Program, UA Postdoctoral Research Development Grant Program.
- Member: Global Land Programme, Past Global Changes, PEOPLE-3k, Society for American Archaeology, Coalition for Archaeological Synthesis.