THE UNIVERSITY OF MEMPHIS

Earth Science News

Fall 2016

Dr. Dan Larsen

Greetings! As I begin this newsletter I am reminded of the honor and privilege it is to teach students and pursue research endeavors at the University of Memphis. I hope your education at the University and subsequent employment experience has been just as enjoyable. The University is bustling with new construction projects and enjoying a growth spurt in enrollment, which we hope will translate well for Earth Sciences in the years to come. Research productivity and student graduation rates in Earth Sciences have continued to improve over the past year. Our success is evident by several book publications, acquisition of significant research grants, and numerous accolades for our faculty and students. In this issue we highlight our activities, congratulate faculty and student award winners, and explore how we are making Earth Sciences an even better academic and research program.

We continue to follow through on enhancements to our teaching and research environment. Last spring we constructed our outdoor rock garden to display our treasured and voluminous non-teaching rock collections. We are in the process of preparing the signs to complete the educational experience that we hope to provide with the rock garden. We converted one of our old labs, Johnson 105, to a smart classroom with full computer projection capabilities. Currently, we are designing academic banners for the windows in the north and south stairways of Johnson Hall. We are also planning to make improvements to the departmental computing facilities in the coming year.

Several developments in our academic programs are underway to better suit the needs of our students. An area of interest for many students has been in environmental science; however, options for a degree emphasis in this area are currently non-existent. Earth Sciences, through the guidance of a multidisciplinary committee, is formulating an Environmental Science concentration in our B.A. program that will provide a flexible degree option for students interested in technical aspects of our environment. Also in the works is a B.A. concentration in Meteorology, which will proceed as long as sufficient faculty support can be obtained from the University administration.

We have a colloquium speaker series in Earth Sciences in which we invite prominent researchers and professionals to give lectures to the students and faculty. Please see our departmental web page, http://www.memphis.edu/earthsciences/, for

more information on upcoming speakers, departmental activities and events.

Interested in visiting campus, meeting faculty and students, and seeing what is happening at Earth Sciences? Please join us for our ***departmental open house, Earth Sciences Day,*** on ***Saturday, October 15th, 2016*** (see announcement below). I encourage you as well to explore the many facets of our program through our web site and feel free to contact me or any of the other faculty members – we would love to hear from you!

Earth Sciences Awards

Several faculty in Earth Sciences either received University awards or were nominated for awards. Dr. Roy Van Arsdale is the 2016 Willard Sparks awardee, the University of Memphis' highest honor bestowed upon a faculty member. Dr. Van Arsdale's research in the Mississippi River valley and New Madrid Seismic zone were emphasized in his selection for the award. As a further honor, he also delivered the summer 2016 commencement address in which he provided students with some keys to success as well as anecdotal humor. Other faculty nominated for awards include Dr. Arleen Hill for the Alumni Distinguished Teaching Award and Dr. Esra Ozdenerol for the Thomas Briggs Teaching Award.

Within the Department of Earth Sciences several awards are made to students. Dennis West received the Paul H. Sisco Outstanding Senior Award in Geography. Taylor A. Weathers received the Outstanding Senior in Geology. Jason Doan received the Chi Beta Phi Science Award in Geology. Shelby Hobbs received the Davies Award in Archaeology. Our newest award, the Outstanding Earth Scientist Award was given to Dennis West for all around service contributions to the department and academic excellence. Jason Doan also received the Lounsbury Scholarship in Geology.

Awards and scholarships are some of the best ways to recognize student achievement and to provide assistance to students achieving academic excellence. Please feel free to contact Dr. Larsen (dlarsen@memphis.edu) if you are interested in contributing to an award fund or developing a new award fund.

Earth Sciences Faculty

Dr. Angela Antipova – In 2016, I chaired and organized two paper sessions "Neighborhood satisfaction and quality of life within an urban environment", session 1 and 2, at the 61st Annual Meeting of the Association of American Geographers (AAG), March 29-April 2, in San Francisco, CA. I was also a presenter: "Neighborhoods and urban amenities: a study of perceived preferences and stated satisfactions."

I have been invited to present my urban research at the colloquium and graduate student seminar at the Department of Geography, University of Tennessee (UT), Knoxville (title "Neighborhood amenities and attitudes and satisfactions", September 15-16, 2016) and at the geography seminar at the Department of Geography, Miami University, Oxford, OH (title "The Memphis Aerotropolis and employment clusters in

Memphis MSA, Tennessee", scheduled for October 7, 2016).

In 2016, I published the following paper: Banai, R. and A. Antipova. Retail-Center Viability and Urban Form: A Micro Analysis (in press *The International Review of Retail, Distribution and Consumer Research*). *Published online: 11 Jul 2016.*

Current research projects: (1) I am collaborating with colleagues (Dr. Dan Larsen) at University of Memphis on environmental exposure and maternal health in Shelby County using 2011 vital records (births) data obtained from the TN Department of Health; (2) I am working on a book titled "Urban Areas, Travel Behavior, and Resident Satisfaction" on urban built environment, accessibility and satisfaction which will be published by the *Palgrave Macmillan*).

Dr. Angela Antipova at the Fisherman's Wharf during the AAG conference in San Francisco, 2016

Earth Sciences Day 2016

10:00 am – 2:00 pm
Saturday, October 15, 2016

Join us for an open house of Johnson Hall - collection displays, research posters, meet the faculty and students

But wait, there's more! We will have a cookout, outdoor fun for kids, and activities for budding Earth Scientists of all ages!

THE UNIVERSITY OF MEMPHIS

For more information, please contact:
Dan Larsen (dlarsen@memphis.edu), 678-4358 or
Julia Crutchfield, 678-2177

Dr. Jerry Bartholomew – I have worked with three graduate students on their MS-thesis projects this year. Avery Soplata is studying historic and prehistoric landslides near Chimney Rock, North Carolina. Graham Ellsworth is looking at structures related to the Heart Mountain detachment fault in Wyoming. Chris Loyacano is examining strain in the Cordilleran fold-thrust belt in SW Montana. Additionally, I am working with Taylor Armstrong who is now in his third-year of his PhD-study in China on active faults in cooperation with Professor Dewei Li at the China University of Geosciences (Wuhan) (CUG). We are finishing the revision of a major manuscript on the 2010 Yushu earthquake in the Qinghai Province, China and preparing to submit another manuscript with Guifan Chen, a PhD-student at CUG who studied for a year at Memphis as an exchange student with me, on the 1955 Zheduotang earthquake in the Sichuan Province, China. Will Jackson, who completed his MS-degree with me a couple of years ago is the lead author on our 2016 paper on paleoseismites in the Big Horn Basin of Montana and Wyoming. I plan to return to China later this year to do more work on active faults there.

Jackson, W.T., Jr., Bartholomew, M.J., Dupre, W.R., Armstrong, T.F., Stewart, K.G., 2016, **Campanian paleoseismites of the Elk Basin anticline, northern Big Horn Basin, U.S.A.: A record of initial Laramide deformation:** Journal of Sedimentary Research, V.86, p.394-407.

Soplata, A., Bartholomew, M.J., Wooten, R.M., 2016, **Historically destructive landslides of the Hickory Nut Gorge near Chimney Rock, North Carolina**: Geological Society of America, Abstracts with Programs, V.48, no.3, T7-poster 51.

Rock fall debris at base of cliff at Chimney Rock, North Carolina

Dr. Dorian J. Burnette – Over the past year I took two of our Ph.D. students, Brad Baker and Zeb Wallace, to the National Weather Association Annual Meeting in Oklahoma City. These two students are working on dissertation projects that will be of interest to the meteorology community. Zeb is looking at how rural populations receive tornado warnings, and Brad is developing a climatology of significant severe thunderstorm environments. As part of Brad's training, he assisted me on a project looking at how teleconnections (e.g., El Niño Southern Oscillation) influence significant severe thunderstorm days across the U.S. back to 1950. We have found some interesting signals, and are about to submit a paper for publication. Brad's dissertation research takes over from there, where he will work on extending time series of significant severe thunderstorm days back to

1925. Brad, Zeb, and I also ran into two University of Memphis alumni at the National Weather Association Annual Meeting (see photo). These alumni hold meteorology degrees from the time when our department offered a B.S. degree in meteorology. Incidentally, I am part of a team now exploring the possible revitalization of a meteorology and climate science concentration at the undergraduate level in the Department of Earth Sciences.

I am also the advisor for Tim Alexander (Ph.D. student) and Sarah Wilson (M.S. student). Tim is looking at a research project that develops icing climatologies to assess the impact of active winter seasons on the efficiency of sub-surface flow constructed wetlands. Sarah is working with myself and Dr. David Lumsden this semester on testing the feasibility of using fossilized wood from the Upland Complex to assess paleoclimate.

Finally, I am in the final year of a collaborative project with Dave Stahle (Arkansas), Ed Cook (Columbia), and Ben Cook (NASA GISS) funded by the National Science Foundation, where we will compute a North American Seasonal Drought Atlas using tree rings. Over the last year, we published a new drought atlas for Mexico as an invited paper in *Quaternary Science Reviews*. I also gave an invited talk on the Mexican Drought Atlas at the Society for Historical Archaeology conference in Washington, D.C. We have launched a web application that will allow interdisciplinary groups of students and researchers to explore the new Mexican Drought Atlas at the following URL: http://drought.memphis.edu/MXDA. This new server at drought.memphis.edu will soon become home to suite of web applications that allow users to explore all tree-ring reconstructed drought atlases (Eastern Australia and New Zealand, Monsoon Asia, North American, Old World, and the forthcoming North American Seasonal Drought Atlas).

Left to Right: Erik Proseus (FedEx, U of M Alumnus), Brad Baker (Ph.D. Candidate), Dr. Burnette, Rick Smith (Norman National Weather Service, U of M Alumnus), and Zeb Wallace (Ph.D. Candidate)

Dr. Robert Connolly – Dr. Robert Connolly has retired as the C.H. Nash Museum Director and as a faculty member at the University of Memphis. He continues to work on research and complete projects in his new home in New Orleans. Earth Sciences faculty and I greatly appreciate Dr. Connolly's contributions to the museum and the department. His final Masters student in Earth Sciences, Elizabeth Cruzado Carranza, completed her M.S. during the spring semester and is now pursuing a Ph.D. at Louisiana State University.

Dr. Randy Cox – My time has been occupied by teaching, graduate coordinator duties, and three or four research projects over the last year. As always I very much enjoyed teaching introductory physical geology and landforms. I look forward to taking the best pupils in these classes on a Saturday fieldtrip to fun and interesting places like Cushman cave and the Rosie boulder field (possible K/T boundary impact tsunami deposit) and hope they figure out they might like Earth Sciences as a major. Fall 2015 I taught a swell group of pupils in Structural Geology and saw most of their smiling faces the next summer at Geology Field Camp. Chris Powell and I taught a graduate seminar on tectonic geomorphology to Earth Sciences and CERI pupils that included a fieldtrip the Sugar Creek thrust fault in Tipton County. Chuck Langston went with the class, and a good time was had by all. Despite my absentmindedness in my capacity as graduate coordinator, the orientation and scheduling meetings for new graduate pupils and graduate assistants went relatively smoothly as the Fall term began.

Research-wise, I continued my projects on fluvial terrace deformation in south Arkansas with graduate pupil Eric Gamble, Cenozoic faulting in Tipton County, Tennessee with graduate pupil Chris Vanderlip, and Quaternary faulting in east Tennessee with Bob Hatcher and his pupils at UT Knoxville as well as help from Eric. After a considerable amount of field, computer, and lab work, Eric has been able to show that the attitudes of terrace treads are consistent with westward tectonic tilting, and he is on track to graduate in December. Likewise, Chris spent a tremendous amount of his time in the field, pouring over wire-line logs, and in front of his computer trying to characterize the deformation he's seeing in his field area in Tipton County. His original local project has expanded into a two quadrangle project since we got an EDMAP proposal funded that supports Chris as an RA and undergrad Jeff Mitchell as an hourly-paid assistant. A Nuclear Regulatory Commission award is funding our Quaternary faulting study in the east Tennessee seismic zone. Our tentative results are very interesting in that there appears to be a corridor of Quaternary faulting that follows the northwest edge of the Smoky Mountains, and it may be a principal structure involved in late Cenozoic rejuvenation of the southern Appalachians.

Chris Vanderlip spies hoodoos in kudzu in Tipton County on the bank of Big Muddy.

Dr. David Dye – Over the past year I continued documenting artifact collections of Mississippian ceramic vessels from the Lower Mississippi Valley, photographing seven major collections. My photograph of a kneeling male siltstone figure from the Sellars site in Wilson County was chosen to represent the Tennessee state artifact. The edited volume, *New Deal Archaeology in*

Tennessee, was published by the University of Alabama Press, as well as an article in Handbooks Online, Oxford University Press. I presented eight papers, including one on Mississippian long distance trade at the University of Gothenburg, Sweden. I also attended the Spiro Mound Iconography Presidential Seminar at the School for Advanced Research in Santa Fe. Two graduate students, whose committees I chaired, Sharon Freeman and Karla Oesch, graduated this past May with master's degrees. I reviewed manuscripts for four journals, including the *Journal of Archaeological Science* and *Southeastern Archaeology*. I serve on a doctoral committee at the University of Alabama, where I am an adjunct faculty member. I am continuing my research on Mississippian exchange, ritual, and warfare in the Lower Mississippi Valley.

The Tennessee state artifact from the Sellars site in Wilson County photographed by Dr. Dye

Dr. Arleen Hill – During the past year I published four papers, including my first related to education. The "Involve me and I learn" Special Issue of *Annals of Anthropological Practice* will be out in November 2016. Keri Brondo (UM – Anthropology) and Suzanne Kent (Colorado State University - Anthropology) and I teamed up to share our experience infusing an engaged scholarship research experience into the Gender and Environment class we taught in the fall 2015 semester. The learning was transformative for the students and inspired me to embed service-learning into both of the courses I taught in the spring. The Partnership between faculty, the Honors College and Shelby Farms Park continues to thrive with 18 students in my Spring 2016 honors forum delivering spring break curricula to about 23 Shelby County Schools students. Seminar in Emergency Management students conducted a service-learning project for the University's Crisis Management Team. Being a finalist for a Distinguished Teaching Award reinforced that the energy invested in innovative classroom experiences is well worth it and appreciated by our students. Outside the classroom I was fortunate to have three new projects funded – these will keep me busy for the next five years while also supporting undergraduate and graduate research assistants. One project teams an architect (P. Jeanne Myers), anthropologist (Keri Brondo), and geographer (me) to consider the relationship between residence hall space configuration/amenities and student outcomes/retention particularly for first-generation students. The project lasts just one year and supports 2 graduate students and 1 undergraduate; TBR provides the support. The second project is funded by The Center for Collaborative Conservation (CCC) at Colorado State University Warner

College of Natural Resources and focuses on the intersection of voluntourism and livelihoods in Utila, Honduras. Finally, US HUD funding to the TN Department of Economic and Community Development supports a multi-year, multi-institution/agency collaboration to support resilience building in West TN. I'll be a lead on a two-year vulnerability study with TDEC and join the management team integrating project components to sustain resilience during the final three years. Looking ahead I look forward to finishing up a project exploring voluntourism and resilience on the island of Utila in Honduras; completing the TBR project exploring residence hall space influence on student success and retention; and hosting Fulbright Scholar Dr. Orsolya Kegyes-Brassai who will be visiting from Gyor Hungary for the spring 2017 semester.

Dr. Hsiang-te Kung – During 2016, I published two papers with Chinese colleagues and geographers (Zhang Fei and Wang Hong et al.) on (1) "**Dynamics of land surface temperature (LST) in response to land use and land cover (LULC) changes in the Weigan and Kuqa river oasis, Xinjiang, China.**" Arabian Journal of Geosciences, (2016) 9:499. DOI:10 1007/s12517-016-2521-8, 14 pp and (2) "**The Spatial and Temporal Analysis of Water Quality in LiangZi Lake, in Wuhan, China**." in the Journal of Environmental Engineering, Chinese Academy of Environmental Sciences, 2016-0132, July 28, 2016. One of my Ph.D. students, Ronne Adkins submitted two papers from his dissertation entitled "**Feasibility of Growing Switchgrass as Feedstock for Lignocellulosic Ethanol Production Across China: Modeling Potential Yield**" to Environment, Systems and Decisions, Springer Journal, 2016; and "**Predicting Potential Switchgrass Distribution across China Based on GARP and Maxent Ecological Niche Models**." to Environment, Systems and Decisions, Springer Journal, 2016 (Pending). I co-authored and submitted several research papers with Chinese geographers to other professional journals. I was invited to be an associate editor for the peer-reviewed Journal – Frontiers of Earth Sciences (FESCI) and served as external assessor for faculty promotion to Associate and Full Professors in Hong Kong University and Universiti Kebangsaan Malaysis, respectively. I was invited as External Examiner (EE) for the Undergraduate Program and Curriculum of the Department of Geography at Hong Kong University from 2013 to 2016 and was invited to the University to interview students and faculty of the Department and Deans of School of Social Sciences. I have completed the 2013-2014 and 2014-2015

reports during my visit of HKU in March. In March, I was invited by the Research Grants Council of Hong Kong (RGC) as an external assessor for couple research proposals. Ms. Li Yingnan and Mr. Bobby Porter have completed their MS degrees under me in 2015-106 and Mr. Thomas Lane DePriest plans to graduate with a Ph.D. in 2016 and his dissertation is on "Impacts of Urban Sprawl of Jackson, TN on Precipitation, Urban Runoff and Floods, and Water Quality." I was also invited by the Tennessee Governor's School on International Studies (GSIS) to give two presentations on "South China Sea" and "China's One Child Policy."

As Founder and Director of the Confucius Institute at the University of Memphis (CIUM) and Asian Studies and International Trade (ASIT) since 2007, and with the great support of the Dean of Arts and Sciences, the CIUM has focused more on University and local community cultural program. I submitted "The CIUM Performance Statement and Annual Evaluation" to the Dean and Vice Provost for Research in June. I and the CIUM staff were invited to the Middle Tennessee State University Grand Opening for the Center for Chinese Music and Culture in March. During the ceremony, President Sidney A. McPhee and Director Zheng Guanping recognized me and the contribution of the CIUM. The CIUM will work with CIMTSU on a consortium of CIs in Tennessee in partnering and cooperating on various projects, e.g. K-12 Chinese language and culture teaching, summer bridge camp, China studies for principals and superintendents, educators, and university administrators. The CIUM was invited to participate in the Germantown International Festival in August to give a "Dragon Dance" performance in Germantown City Government Great Hall. It was a great success and warmly received and complimented by many in the audience.

Dancing dragon at the Germantown multi-cultural festival, August 2016

Dr. Youngsang Kwon – During the past year I have been working in the field of Biogeography, focusing on eastern tree species distribution examined by latitudinal gradient in species richness. I was involved with several related research topics working closely with graduate students. Alison Lang successfully defended her master thesis and graduated this summer. Her work is to develop tree species richness in Southeastern US forest using LASSO and GLM modeling approach. A manuscript is being prepared for submission to the journal of Forest Ecology and Management. I also submitted a research paper – "**Area-based fuzzy land cover assessment between MODIS and FIA**", co-authored by Bradley Baker (PhD student) and is under review at Environmental Modeling and Assessment. I received a Faculty Research Grant as a PI

with co-PI Dr. Reza Banai to conduct research to reveal the morphology of Memphis sprawl using daytime and night time remote sensing. We focus on a key statistic—consumption of land relative to the growth in population in the Memphis metropolitan region over a thirty year span. Of particular interest is how the Memphis metropolitan region compares with other U.S. cities with and without an urban growth boundary (UGB) that limits expansion of urban development into the open space urban fringe. I also served as the Earth Sciences Colloquium series organizer and invited six distinguished guest speakers in Spring semester 2016 (seven will be invited during the Fall 2016 semester).

Dr. Dan Larsen – As I write this newsletter contribution I am returning from a successful Geological Society of America (GSA) meeting in Denver, Colorado, where I led a field trip to my dissertation research area in Creede, Colorado. Along with co-author Pete Lipman, USGS retired, we published a lengthy GSA field guide article on the lake deposits and regional volcanic setting of the Oligocene Creede caldera. On another nostalgic note, I co-authored a paper in Geological Magazine with my Masters research advisor, Dr. David Elliot, about Jurassic volcanic history of Gondwanaland. In regard to graduate students, John Bursi and Justin Paul defended their respective Masters theses during the fall 2015. Both students have found gainful employment in the environmental consulting industry. Currently, I am mentoring two Masters students, James Eason and Billy Simco, and co-mentoring Andrew Murphy with Dr. Kwon. James is conducting groundwater flow modeling of recharge processes in the unconfined region of the Memphis aquifer at the Pinecrest Presbyterian Camp near LaGrange, TN, building on John Bursi's research. Billy is investigating water balance and groundwater research in an urban creek in Jackson, TN. Andrew is completing a spatial statistical analysis of the upper Claiborne confining unit in Shelby County. My three Ph.D. students, Jack Koban, Scott Schoefernacker, and Chuck Thibault are all very close to completing their degrees. Much of my active research continues to be in the Memphis area, where I work with CAESER (Center for Applied Earth Science and Engineering Research) faculty and staff on groundwater research in the region. I am also working with Dr. Cox, graduate student Chris Vanderlip, and undergraduate student Jeff Mitchell on an EDMAP-sponsored geologic mapping project in Tipton County. I continue to work with Kristian Olson (MS, 2014) on a manuscript regarding his research in the Tecopa Basin in southeastern California. As Department Chair, I usually teach one course a semester (last spring it was Soils and Soils Processes) and geology field camp during the summer, but research needs required that I not teach during the fall 2016 semester.

Fall on Snowshoe Mountain, San Juan Mountains, Colorado – it was a cold and snowy day for my Geological Society of America field trip!

Earth Sciences Club

The Earth Sciences Club is involved in several activities on campus and sponsors lectures, field trips, and other outdoor activities.

Dr. Andrew Mickelson – My students and I continue to work on several archaeological sites at Ames Plantation, best known for perennially hosting the National Bird Dog Trials just east of Memphis. We continue to work on the remains of a late prehistoric Native American town and mound complex as well as several outlying small-scale farmstead sites dating to 1000-1300 AD. We have found the remains of houses, storage and trash pits, as well as hearths. Ben Cross, my most recent master's student just completed his thesis where he examined household variability at the Ames site. I am pleased to say that Ben is moving on to Ohio State University, where he will pursue his doctorate in archaeology.

Ben Cross and Shelby Hobbs, two MS students in archaeology, excavate a large storage pit at Ames Plantation, TN.

Dr. Esra Ozdenerol – I released my new textbook titled ***Spatial Health Inequalities: Adapting GIS Tools and Data Analysis*** on August 23, 2016. The book demonstrates the spatial health inequalities in six most important topics in environmental and public health, including food insecurity, birth health outcomes, infectious diseases, children's lead poisoning, chronic diseases, and health care access. These are the topics that I have done extensive research on and the book provides a detailed description of each topic from a global perspective. Each chapter identifies relevant data and data sources, discusses key literature on appropriate techniques, and then illustrates with real data with mapping and GIS techniques. This is a unique book for students, geographers, clinicians, health and

research professionals and community members interested in applying GIS and spatial analysis to the study of health inequalities.

You can access the textbook through the following link:

https://www.crcpress.com/Spatial-Health-Inequalities-Adapting-GIS-Tools-and-Data-Analysis/Ozdenerol/p/book/9781498701501

Dr. Ryan Parish – The focus of my research is on the prehistoric consumption, use, and distribution of tool-stone. Specifically, I am interested in developing non-destructive techniques allowing archaeologists to source artifacts made of chert (flint) back to the location on the landscape where people acquired it. Reflectance spectroscopy is proving to be an accurate method to source chert artifacts. Currently, the project entails the creation of a chert type database for the Midwest and Southeast containing approximately 5,000 samples from over 150 deposits located in nine states. Recently published research includes the study of hunter gatherer group movements at the Kincaid Site, IL (*Illinois Archaeology*), Paleoindian group mobility along the Tennessee River (*Journal of Archaeological Science Reports*), and the application of reflectance spectroscopy to chert sourcing (*Archaeologia Polona*). Using reflectance spectroscopy and the chert database I am beginning research of Hopewell (200 BC – AD 350) disc cache bifaces, Poverty Point projectile points, and Ice Age American spear points. The results of these studies will give us clues regarding migration, trade, social interaction, cultural development, and resource exploitation.

I lead the Spring Break Field Trip last March, taking students to the Poverty Point Site, LA, Novaculite Quarries, AR, Crater of Diamonds State Park, AR and Carson Mounds, MS. I am currently serving as the archaeology undergraduate advisor. We have 20 active geoarchaeology students, of which six graduated during the spring and summer semesters. Finally, I am involved in a newly founded organization, the Nonconnah Creek Conservancy, whose mission is to restore, conserve, and promote community awareness of the cultural and natural resources along Nonconnah Creek. Please contact me if you would like to become involved.

Students standing on literally tons of prehistoric artifacts at Magnet Cove, Arkansas the location of dozens of prehistoric Novaculite Quarry sites

Dr. Jose Pujol – I published the paper: **Regression between earthquake magnitudes having errors with known variances** in the Journal of Seismology, 2016, v. 20, pp. 1041–1056. This paper addresses an ongoing debate between two research groups, shows that their analyses have methodological inaccuracies that affected their conclusions, and presents a

correct treatment. The problems with their analyses have been addressed in more detail in the following peer-reviewed comments, submitted this year: **Comments on "Unbiased estimation of moment magnitude from body- and surface-wave magnitudes,"** by R. Das, H. Wason, and M. Sharma, and "**Comparative analysis of regression methods used for seismic magnitude conversions**" by P. Gasperini, B. Lolli, and S. Castellaro accepted for publication in the Bulletin of the Seismological Society of America. I also continue working on the book: '**Fundamentals of inverse theory and parameter estimation**', to be published by Wiley.

Dr. Roy Van Arsdale – The 2015-16 academic year has been busy. My colleagues and I have written a number of papers with one published (Lumsden, D.N., Cox, R.T., Van Arsdale, R.B., and Cupples, W.B., 2016, **Petrology of Pliocene Mississippi River Alluvium: Provenance Implications**, Journal of Geology, v. 124, p. 501-517) and three that will be published soon. My research is focusing on the Mississippi River Valley both in terms of its geomorphic evolution and the seismic threats from the New Madrid seismic zone. Work completed by Matthew Greenwood in his MS thesis focused on the southeastern continuation of the Reelfoot fault southeast of Reelfoot Lake, TN (Greenwood, M.L, Woolery, E.W, Van Arsdale, R.B., Stephenson, W.J., and Patterson, G., **Continuity of the Reelfoot Fault across the Cottonwood Grove and Ridgely Faults of the New Madrid seismic zone**, in press with the Bulletin of the Seismological Society of America. One project that was particularly interesting is our continuous coring of the full thickness of the Mississippi River floodplain near West Memphis and a Pleistocene Mississippi River terrace near Joiner, AR. Although these boreholes were drilled as part of our ongoing earthquake research they both provide a unique detailed look at the OSL dated stratigraphy of the Holocene and late Wisconsin alluvium. This is Alex Ward's MS thesis and we have a paper in review with Seismological Research Letters (Ward, A., Counts, R., Van Arsdale, R., Larsen, D., and Mahan, S., **Quaternary displacement rates on the Meeman-Shelby horst and Joiner Ridge horst, eastern Arkansas: results from coring Mississippi River alluvium**). A third paper is from the Ph.D. research conducted by Richard Martin who graduated a few years ago (Martin, R.V., and Van Arsdale, R.B., **Stratigraphy and structure of the Eocene Memphis Sand above the eastern Margin of the Reelfoot rift in Tennessee, Mississippi, and Arkansas, USA**, in press with the Bulletin of the Geological Society of America). If you would like a pdf of any of these articles please contact me and I will send them as soon as they are published.

Although the health and happiness of my family and friends are at the top of my list of reasons to be grateful this past year there was an event that I am very happy to report. Last spring I was selected as the Willard Sparks Eminent Faculty Award winner for 2016. Not only did I receive a very nice monetary award I also gave the formal

address to the University graduating class in the summer convocation. That was fun.

I am optimistic that our research will continue on the Pliocene Mississippi River deposits called the Upland Complex as mapping it is part of a new funded HUD project. Hopefully, next year will also bring more drilling through the Mississippi River floodplain to better document the age of Meeman-Shelby horst and Joiner ridge horst faulting. We are particularly interested in the seismic threat posed by these structures because they are very close to Memphis.

Graduate student Alex Ward photographing core at the Meeman-Shelby Fault drilling site.

Emeritus faculty in residence:

Dr. Phili Deboo – I have been retired for more than a decade, but I enjoy coming to my office almost every day. Usually, I now teach one course a year, usually Physical Geology. I always have enjoyed having contact with students, and that joy has not abated.

Dr. David Lumsden – I continue to teach one course per semester (Historical or Oceanography). My latest (and probably last) publication just came out in the Journal of Geology with some other guys carried as co-authors (Lumsden, D.N., Cox, R.T., VanArsdale, R.B., and Cupples, W.B., 2016, **Petrology of Pliocene Mississippi River Alluvium: Provenance Implications**: Journal of Geology, v. 124, p. 501-517.). I also am supervising S. Wilson's special problem on the potential of petrified wood texture in determining Pliocene climate. I spent the summer fishing in Lake Erie with my grandsons and achieved my usual success (0 fish, 2 zebra mussels, several kilograms of algae)

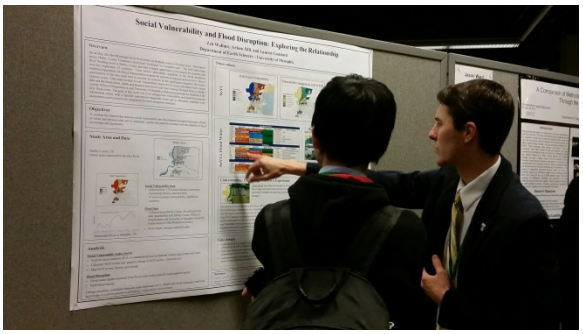
Instructor:

Dr. Julie Johnson - This past year I had the pleasure of interacting with some of the department's graduate students in a graduate-level seminar course. We researched a variety of tectonic environments, focusing on the unique magmatic processes that occur there. The graduate students' interests were forearc uplift basins, intrusions in the Mississippi Embayment and the Absaroka Volcanic Province.

My research focus remains in the field of igneous geochemistry and petrology as applied to the study of magmatic and subduction zone processes. Recently, I have been looking at ophiolite sequences for their potential to provide information about magma differentiation during the early stages of subduction. By pursuing this topic, I can address the question of whether the formation of felsic and intermediate plutonic rocks during subduction initiation is a common, possibly large-scale process, or a rare phenomenon.

Student Spotlight:

Zebulon Wallace



Ph.D. Candidate, Zebulon Wallace, explaining his research to a colleague at the American Association of Geographers Convention, 2016.

My research focuses on tornado risk communication in rural communities and the perceptions that people have of that risk. My interest in hazards stems back to April 27, 2011, when the major tornado outbreak in the southeast devastated several small communities near my home. I knew then that I wanted to help rural communities become more resilient. Coming from a very rural place myself, I was concerned about how people in these communities receive their warning information (access and availability). Once I got to the U of M and had the opportunity to attend the Annual Natural Hazards Workshop in Colorado with Dr. Hill and the American Meteorological Society meeting and the National Weather Association meeting with Dr. Burnette, my focus on risk communication in rural areas was reinforced and defined. Rural communities may be underserved in terms of the platforms available for warning dissemination, and my goal is to understand how we can best reach this population. My doctoral research aims to understand the perspectives of forecasters, emergency managers and rural residents and to identify gaps in knowledge, trust, and platform preferences. Hopefully, the end results can be used to meet the risk communication needs and realities for rural residents and thereby enhance their community resilience.

While at the U of M, I have had the opportunity to work with practitioners and scholars from a variety of professions and disciplines. I have received hands on experience through research projects funded by the Department of Homeland Security and the Tennessee Board of Regents. I have been fortunate to present at multiple conferences and to have two peer-reviewed publications, with another in preparation. I have gained valuable teaching experience as the instructor of two introductory courses and as a TA for approximately 540 total weather and climate students. Together these experiences provided me with the tools I need to move forward with my career goals. I am grateful to this department and especially Drs. Hill and Burnette for their support, and for the opportunity to explore my curiosities with them and ultimately to contribute to tornado risk reduction. My path to Memphis began in a conversation with Lisa Keys-Mathews, who earned her doctoral degree in Earth Sciences at the UoM in 2007. Lisa and I share a focus on hazards geography which led her to introduce me to Arleen Hill, her former advisor who recruited me to Memphis. As I anticipate graduating in May and consider my own academic career, I look forward to recommending ESCI at the University of Memphis to my students.