

Andrea M. Erhardt

Assistant Professor
Director- Kentucky Stable Isotope Geochemistry Laboratory
Department of Earth & Environmental Sciences
University of Kentucky
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EDUCATION

Doctor of Philosophy, June 2013

Stanford University, Department of Geological and Environmental Sciences
Dissertation Title: Application of elemental and isotopic proxies to reconstruct Pacific Ocean circulation and productivity during periods of climate change

Master of Science, December 2005

Colorado School of Mines, Department of Geology
Thesis Title: Relative Contributions of Climate and Tectonics on Fluvial Sedimentation on the Wasatch Formation of Western Colorado

Bachelor of Science, June 2001

Northwestern University, Department of Environmental Engineering
Second Major: Geological Sciences

PROFESSIONAL APPOINTMENTS

August '16 – Present **Assistant Professor**, University of Kentucky, Lexington, KY
July '15 – July '16 **Postdoctoral Research Associate**, University of Cambridge, UK
March '14 – July '16 **Postdoctoral Research Associate**, Magdalene College, University of Cambridge
July '13 – July '15 **CIFAR Postdoctoral Research Fellow**, University of Cambridge, UK

RESEARCH INTERESTS

- Understanding the role of microbial activity in carbonate formation
- Quantifying the effects of rapid climate change on ocean chemistry
- Understanding changes in the carbon cycle through geologic time
- Reconstructing paleoclimates using isotopic proxies
- Developing methods for non-traditional isotope analysis on novel substrates

PUBLICATIONS

**Advisee*

**Wilson J, Munizzi J, Erhardt A.M.* (2020). Preservation methods for the isotopic composition of dissolved carbon species in non-ideal conditions. *Rapid Commun Mass Spectrom.* 34, 8903. <https://doi.org/10.1002/rcm.8903>

**Lyon, E., McGlue, M.M., Stone, J., Kim, S., Erhardt, A.M., Zimmerman, S.,* (2020). Late Holocene hydroclimate changes in the eastern Sierra Nevada revealed by a 4600-year paleoproduction record from June Lake, CA. *Quaternary Science Reviews*, 242, 106432.

- Erhardt, A.M.**, Turchyn, A.V., Dickson, J.A.D., Sadekov, A.Y., Taylor, P.D., Wilson, M.A., Schrag, D.P. (2020). Carbonate hardgrounds suggest persistence of low Mg/Ca oceans over the Phanerozoic, *Geochemistry, Geophysics, Geosystems*, 21, e2019GC008448.
- Erhardt, A.M.**, Turchyn, A.V., Bradbury, H.J., Dickson, J.A.D. (2020) The calcium isotopic composition of carbonate cements: A record of sedimentary carbonate precipitation and ocean chemistry? *Chemical Geology*, 540, 119490. <https://doi.org/10.1016/j.chemgeo.2020.119490>
- Ford, W.I., Fox J.F., Mahoney, T., DeGraves, G., **Erhardt, A.M.**, Yost, S. (2020) Backwater Confluences of the Ohio River: Organic and Inorganic Fingerprints Explain Sediment Dynamics in Wetlands and Marinas, In Press, *Journal of the American Water Resources Association*.
- **Reis, A., Erhardt, A.M.,* McGlue, M.M., Waite, L. (2019) Evaluating the Effects of Post-Depositional Alteration of Carbonates on the Interpretation of $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$ in a Mud-Rich Depositional Environment: A Case Study from the Midland Basin, USA. *Chemical Geology*, 524, 196-212. doi.org/10.1016/j.chemgeo.2019.06.021
- Magiera, M., Lechleitner, F.A., **Erhardt, A.M.**, Hartland, A., Kwiecien, O., Cheng, H., Bradbury, H., Turchyn, A.V., Riechelmann, S., Edwards, L., Immenhauser A., F.M. Breitenbach, S.F.M. (2019) Local and regional Indian Summer Monsoon precipitation dynamics during Termination II and the Last Interglacial, *Geophysical Research Letters*, 46, 12454-12463. doi.org/10.1029/2019GL083721
- **Lyon, E.,* Freeman, R., Bathon, J., Fryar, A., McGlue., MM, **Erhardt, A.M.**, Rosen, A., Sampson, S., Nelson, A., Parsons, J. (2019). Attitudinal impediments to geoscience major recruitment among ninth graders at a STEAM high school. *Journal of Geoscience Education*. doi.org/10.1080/10899995.2019.1700593
- Erhardt, A.M.**, (2017) Paleoceanography: Tropical Ties. *Nature Geoscience*, 10, 714-715.
- Robinson, R.S., T.C. Moore, **A.M. Erhardt**, and H. Scher, (2015). A transient peak in regenerated production during the Eocene Oligocene Transition. *Paleoceanography*, 30(7). DOI:10.1002/2015PA002777
- Moore, T.C. Jr., S. Kamikuri, **A.M. Erhardt**, J. Baldauf, H.K. Coxall, and T. Westerhold (2015). Radiolarian Stratigraphy near the Eocene-Oligocene Boundary. *Marine Micropaleontology*, 116, 50-62. [doi:10.1016/j.marmicro.2015.02.002](https://doi.org/10.1016/j.marmicro.2015.02.002)
- Erhardt, A.M.**, C.E. Reimers, D. Kadko, and A. Paytan, (2014). Records of trace metals in sediments from the Oregon hypoxic zone: Investigating the occurrence of hypoxia in the past hundreds to thousands of years. *Chemical Geology* 382 32-43. DOI: 10.1016/j.chemgeo.2014.05.029
- Moore, T.C. B.S. Wade, T. Westerfold, **A.M. Erhardt**, H.K. Coxall, J. Baldauf, and M. Wagner (2014). Equatorial Pacific productivity changes near the Eocene-Oligocene Boundary, *Paleoceanography* 29, 825–844, [doi:10.1002/2014PA002656](https://doi.org/10.1002/2014PA002656).

- Erhardt, A.M.**, H. Pälike, and A. Paytan, (2013). High-resolution record of export production in the eastern equatorial Pacific across the Eocene-Oligocene transition and relationships to global climatic records. *Paleoceanography* 28 1-13. doi:10.1029/2012PA002347.
- Paytan, A, E T Gray, Z. Ma, **A. Erhardt** and K. Faul, 2011. Application of Sulphur Isotopes for Stratigraphic Correlation. *Isotopes in Environmental and Health Studies*, 1-12. DOI:10.1080/10256016.2011.625423.
- Griffith, E., M. Calhoun, E. Thomas, K. Averyt, **A. Erhardt**, T. Bralower, M. Lyle, A. Olivarez-Lyle, and A. Paytan, 2010. Export Productivity and Carbonate Accumulation in the Pacific Basin at the Transition from a Greenhouse to Icehouse Climate (Late Eocene to Early Oligocene). *Paleoceanography* 25, PA3212
- Mackey, K. R. M., G. L. van Dijken, S. Mazloom, **A. M. Erhardt**, J. Ryan, K. R. Arrigo, and A. Paytan. 2010. Influence of atmospheric nutrients on primary productivity in a coastal upwelling region. *Global Biogeochemical Cycles* 24, GB4027.

In Review and Revision

- Cameron B. de Wet, C.B., **Erhardt, A.M.**, Sharp, W.D., Marks, N.E., Bradbury, H.J., Alexandra V. Turchyn, A.V., Xu, Y., Oster, J.L., Semi-Quantitative Estimates of Rainfall Variability during the 8.2kyr Event in California using Speleothem Calcium Isotope Ratios. In review after minor revisions, *Geophysical Research Letters*.
- **Fichtner, V.*, Lange, S.M., Krause, S., Borca, C.N., Huthwelker, T., Schurr, S., Immenhauser, A., **Erhardt, A.M.**, Treude, T., Pederson, C., Strauss, H., Microbial activity affects sulfur in biogenic aragonite. In review, *Depositional Record*.
- Bonzani R.M., Alexander, K.V., Metz, A., Munizzi, J.S., Manzano, B.L., Davidson, M.J., Farish, G., **Erhardt, A.M.** Deer Management Strategies and Hypothesis Testing To Explain the Increase in Prehistoric Human Maize Consumption in the Eastern Woodlands of the United States: An Investigation of the Stable Carbon Isotopic Evidence, In review at *Environmental Archaeology*.
- Erhardt, A.M.**, Douglas, G., Jacobson, A.D., Wimpenny, J., Yin, Q-Z., Paytan, A. Pb isotopes in pre-anthropogenic dust across the Pacific Ocean. Submittal to *Paleoceanography and Paleoclimatology* expected early October 2020.

RELEVANT WORK EXPERIENCE

- Sept. '01 – Sept '02 **Environmental Engineer**, Geochemistry Group, Camp Dresser & McKee, Denver, CO
- Sept '98 – Dec '00 **Environmental Engineering Co-op**, Water Resources Group, Camp Dresser & McKee, Chicago, IL

RESEARCH GRANTS

- | | |
|---|----------|
| Expedition Support 378, Alex Reis (2020) | \$9,691 |
| Examining hydrologic connections at Fern Cave, Alabama and implications of stream connectivity on biological diversity and isolation (2019) USFWS Co-PI's Miller, Tobin, Niemiller, Erhardt | \$14,999 |
| Causes and extent of elevated groundwater methane concentrations in Eastern | \$9,602 |

Kentucky, Kentucky Water Resources Research Institute (2018) PI- Erhardt, Co-I Parris	
Liquid Water Isotope Analyzer (VPR Instrumentation Grant) (2018) PI-Erhardt, Co-I Fryar	\$79,816
Isotopic and geochemical analysis of fluid flow in a paleokarst system, San Andres Formation, West Texas (Pioneer Natural Resources) (2017-2020) PI- Erhardt	\$600,000
Stable isotope analysis and paleoceanographic study of Wolfcamp Formation, West Texas (Pioneer Natural Resources) (2017-2019) PI- Erhardt, Co-I McGlue	\$240,000
Biogeochemical characterization of backwater wetlands for improving water quality in disturbed Appalachian watersheds on the Ohio river. (2017-2018) Co-PI's Erhardt and Ford	\$25,000
Canadian Institute for Advanced Research Postdoctoral Fellow (July 2013- 2015)	\$100,000
Schlanger Ocean Drilling Fellowship (2008-2009)	\$30,000
Stanford University McGee Fellowship (2006, 2007)	\$4,000
American Association of Petroleum Geologists Grant-in Aid (2003)	~\$2,500
Geological Society of America Research Grant (2004)	~\$1,500

HONORS

- Outstanding Graduate Student Advisor, College of Arts and Sciences (2020)
- Teachers Who Make a Difference (2017)
- Early Career Researcher, American Geophysical Union Paleooceanography and Paleoclimatology Committee (2016-present)
- Outstanding Student Presentation, International Conference for Paleooceanography (September 2013)
- Shore-Based Scientist IODP Leg 320 (2009)
- University of California at Santa Cruz Research Fellow (Sept. 2007- 2015)
- Association of Women Geoscientists – Outstanding Graduate Student Award (2005)
- Association of Geoscience Students – Best Teaching Assistant (2004)

SCHOLARSHIPS, AWARDS

Returning Carers Grant, University of Cambridge (December 2013)	~\$13,000
Student Travel Grant Recipient, Goldschmidt Geochemistry Conference (2010, 2013)	\$4,000
Student Travel Grant Recipient, Int. Conf. for Paleooceanography (2007, 2010, 2013)	~\$2,500
Shell Foundation Travel Grant (2006, 2007, 2008, 2009, 2010, 2011)	\$2,500
Women's Forum of Colorado Scholarship (2004)	~\$1,000
Rocky Mountain Association of Geologists Graduate Scholarship (2003)	~\$500
John and Lois Haun Fellowship (2003)	~\$2,000
Robert L. Burch Family Scholarship (2003)	~\$3,000
Timothy Bartshe Scholarship (2003, 2004)	~\$5,000
Farley Family Scholarship for Cooperative Education (2001)	~\$1,000
Environmental Engineering and Water Resources Group of ASCE Scholarship (2000)	\$2,000

INVITED SEMINARS

- 2020. *Miami University* The geochemistry of carbonate hardground cements as potential recorders of past seawater chemistry
- 2019. *Indiana State University* Evaluating the Effects of Post-Depositional Alteration of Carbonates on $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$ in a Mud-Rich Depositional Environment: A Case Study from the Midland Basin, USA
- 2019. *Southern Illinois University* Evaluating the Effects of Post-Depositional Alteration of Carbonates on $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$ in a Mud-Rich Depositional Environment: A Case Study from the Midland Basin, USA
- 2018. *Appalachian State University* Isotope tracers of pore water geochemistry variability across a backwater wetland- a case study from the Fourpole Creek Watershed, Huntington, WV

2017. *Vanderbilt University* Can authigenic carbonate in carbonate hardgrounds allow us to reconstruct the evolution of pore water chemistry?

2016. *University of Alabama* Carbonate hardground cements- using geochemical tools to reconstruct Phanerozoic ocean chemistry

STAFF AND POSTDOCTORAL RESEARCHERS SUPERVISED

- 1) Rich Dabundo, laboratory manager. November 2016- October 2017
- 2) Dr. Jordon Munizzi, research facility manager. January 2018-present
- 3) Dr. Vanessa Fichtner, postdoctoral researcher. April 2018-April 2020. Sulfur isotopes in the San Andres Formation.

STUDENTS SUPERVISED

Ph.D. Students Supervised

- 1) Lyon, Eva. University of Kentucky, Department of Earth and Environmental Sciences. Co-supervised with Dr. Michael McGlue. March 2020.
- 2) Avery, Elizabeth. University of Kentucky, Department of Earth and Environmental Sciences. Co-supervised with Dr. Alan Fryar. *Hyporheic zone restoration of a stream on the University of Kentucky Campus*. Expected Completion, Spring 2022.
- 3) Reis, Alex. University of Kentucky, Department of Earth and Environmental Sciences. *An investigation of High-Latitude Marine Sediment Diagenesis using Non-traditional Stable Isotope Systems during Global Scale Climate Transitions*. Expected Completion, Spring 2022.

M.S. Students Supervised

- 1) Reis, Alex. University of Kentucky, Department of Earth and Environmental Sciences. *A Multi-Indicator Approach to Understanding the Diagenesis of Carbonates in Pennsylvanian Mudrocks of the Midland Basin*. Spring 2018.
- 2) Tamakloe, Frank. University of Kentucky, Department of Earth and Environmental Sciences. *High Resolution Chemostratigraphy of the Wolfcamp-D in the Midland Basin*. Spring 2019.
- 3) Alvarez Villa, Cristopher. University of Kentucky, Department of Earth and Environmental Sciences. *Identification of the causes and extent of elevated methane concentrations in the groundwater of Eastern Kentucky*. Expected Completion, October 2020.
- 4) Wilson, Jonathan. University of Kentucky, Department of Earth and Environmental Sciences. *Isotopic and chemical tracers of groundwater flow in Grand Canyon National Park*. Expected Completion, December 2020.

Undergraduate Research Projects Supervised

- 1) Young, Holly. University of Kentucky, Department of Earth and Environmental Sciences. *Pore water geochemistry variability across a backwater wetland- a case study from the Fourpole Creek Watershed, Huntington, WV*. 2018.
- 2) Betchol, Cailey. University of Kentucky, Department of Earth and Environmental Sciences. *Changes in Kentucky's Licking River effect on isotopes of freshwater mussel shells*. 2018.
- 3) McQueen, Bronson. University of Kentucky, Department of Earth and Environmental Sciences. *Using geochemical methods to trace groundwater/surface water interaction*. 2019-present.
- 4) Collins, April; Shirkey, Felicity; Steiner, Lucy; Whitney, Jennifer. *Tap water isotopes across Lexington and their relationship to a new local meteoric water line*. 2020-present

Undergraduate Student Workers

- 1) Thompson, James. March – August 2017
- 2) Morrison, Bailee. August 2017- Dec 2019
- 3) Rich, Rowan. August 2017- Dec 2019
- 4) Wilson, Jonathan. January 2018- now graduate student

- 5) Collins, April. August 2018-present
- 6) Al Riyami, Riyam. September 2018-May 2019
- 7) Varias, Madoline. January 2019-May 2019
- 8) McQueen, Bronson. May 2019-present
- 9) Steiner, Lucy. October 2019-present
- 10) Whitney, Jennifer. October 2019-present
- 11) Shirkey, Felicity. October 2019-present
- 12) Lynch, Kelly. Jan 2020-June 2020

High school instructor intern

- 1) Doughty, David. July – August 2017

Ph.D. Dissertation Committee

- 1) Lo, Edward. University of Kentucky, Department of Earth and Environmental Sciences. Expected Completion, Spring 2021.
- 2) Witten, Ashley. University of Kentucky, Department of Anthropology. Olmec household organization, Tres Zapotes, Veracruz, Mexico. Expected Completion, Spring 2021.
- 3) Mahmud, Anik. University of Kentucky, Plant and Soil Sciences. Selenium remediation in coal-slurries.

M.S. Thesis Committee

- 1) Sherman, Amanda. University of Kentucky, Department of Earth and Environmental Sciences. 2019.
- 2) Schindler, Kim. University of Kentucky, Department of Earth and Environmental Sciences. 2019.
- 3) Bond, William. University of Kentucky, Department of Earth and Environmental Sciences. 2019.
- 4) Barna, Josh. University of Kentucky, Department of Earth and Environmental Sciences. 2019.

SUPERVISED STUDENT SCHOLARSHIPS AND AWARDS

Avery, Elizabeth (PhD): Fulbright Scholar (2019); Geological Society of America On to the Future Travel Grant, \$550 (2018); Southeast Section Geological Society of America Research Grant, \$900 (2018); National Science Foundation Stipend for 4th Cargese Summer School, \$3,500 (2018)

Lyon, Eva (PhD): GSA Student Research Grant (2017); Paclim student travel support (2017, 2019); IPA-IAL student travel support (2018)

Reis, Alex (MS and PhD): NSF full support for attendance at Urbino Paleooceanography Summer School, \$3000 (2019), Staff Scientist appointment on IODP Expedition 378- 3 months' salary & a maximum of \$19,000 in research support following the expedition (2018); US Science Support Program Travel grant for IODP PSS- \$2000 (2018); SMART Scholarship for Service Semi-finalist (2018 & 2019); GSA Student Grant- \$1550 (2017); AAPG Grants-in-Aid- \$2500 (2017); IAS Student Travel Grant for Flugel Carbonate Microfacies Course- \$600 (2018) International Association of Sedimentologists Travel Grant for Flügel Course, €280 (2018)

Tamakloe, Frank (MS): IAS Travel Grant (Jan 2018); GSA Graduate Student Research Grant (April 2018); NSF-SEPM ISC Travel Grant (July 2018); Full-Time Offer Chevron (September 2018)

Alvarez-Villa, Christopher (MS): AAPG Student Grant in Aid (2019)

Wilson, Jonathan (MS): GSA John W. Hess Research Grant- \$1530 (2019)

ACADEMIC SERVICE

- Proposal reviewer for: NSF Marine Geology and Geochemistry program, NSF Paleo Perspectives on Climate Change, NSF Major Research Instrumentation Grants, National Environmental Research Council United Kingdom (NERC), ERC DFG German Research

- Foundation, Chilean National Science and Technology Commission, Petroleum Research Fund of the American Chemical Society
- Manuscript Reviewer, *Nature Geoscience, Geology, Geochimica et Cosmochimica Acta, Palaeogeography, Palaeoclimatology, Palaeoecology; Marine Chemistry; Chemical Geology; Marine Geology; Geochemistry, Geophysics, Geosystems; Journal of Archeological Science; Journal of Great Lakes Research; Minerals Magazine*
- American Geophysical Union Outstanding Student Presentation Award Coordinator, Paleoceanography and Paleoclimatology Section (2017, 2018, 2019)
- Session Co-chair Geochemical Indicators of Past Climate and Environmental Change, Goldschmidt Conf. (August 2020)
- Session Co-chair Dynamics of the Global Weathering Feedback and its Impact on the Exchange of Carbon and Oxygen with the Atmosphere Goldschmidt Conf. (August 2017)
- Session Co-chair Low Temperature Geochemistry Session Goldschmidt Conf. (June 2014)

TEACHING

University of Kentucky

- Low Temperature Geochemistry: Fall 2016- 2 UG, 3 MS, 1PhD; Fall 2017- 7 UG, 5 MS, 2 PhD; Fall 2018 4 UG, 1 MS, 2PhD; Fall 2019 5 UG, 1 MS, 1PhD; Fall 2020- 9UG, 2MS, 3PhD
- Isotopes in the Environment: Spring 2017- 12 MS, 2 PhD; Spring 2018- 10 MS, 2PhD; Spring 2019- 4 MS, 4 PhD
- Endangered Planet EES 110: Spring 2019- 76 UG

University of Cambridge

- Guest Lecturer, Teaching Methods in the Geological Sciences
- Small Group Instruction, Hydrosphere, Sedimentology, Climate, and Paleocology
 - o Designed weekly small group tutorials
- Laboratory Instructor, Hydrosphere, Geochemistry

Stanford University

- Instructor and Course Design, Mentoring in Research
 - o Designed and co-taught course for graduate students
- Instructor and Course Design, Professional Development in Geoscience Education
 - o Designed and taught course on teaching methods for graduate students
- Teaching Instructor, California Gold Rush scientific writing course
- Teaching Assistant, Paleoceanography, Introduction to Geological Sciences, How to Critically Read and Interpret Scientific Papers

University of California- Santa Cruz

- Teaching Assistant and Exercise Design: Environmental Geology
 - o Designed laboratory exercises for 10 week course

Colorado School of Mines

- Laboratory Instructor and Exercise Design: Sedimentary Geology, Petroleum Geology
 - o Designed laboratory exercises for semester long course for upper level undergraduates
- Instructor, Geology Field Camp for Petroleum Engineers
 - o Ran field exercises, graded work, and assisted students over the 2 week field camp

OUTREACH

- Water Professionals Student Chapter guest speaker
- Mentor, post-secondary school teacher through U Kentucky School of Education
- Panelist, Science Speaks

- Panelist, Dual Career Geoscientists, Goldschmidt 2017
- Co-Organizer, Women in Geoscience, University of Kentucky
- Mentor, Goldschmidt Geochemistry Conference
- Classroom teaching via coursework in Communicating Ocean Sciences to the public
- Community outreach activities, including Sally Ride Festival, Geokids, and presentations at local schools
- Weekly volunteer tutoring of a disadvantaged high school student through the Colorado I Have a Dream Program (2 years)- most improved student.

ANALYTICAL SKILLS

- Preparation, measurement, and interpretation of H, C, N, O, and S isotopes in a wide range of compounds
- Electron microprobe microanalysis (EPMA) of carbonates
- Sr and Ca isotope analysis on a Thermal Ionization Mass Spectrometer (TIMS)
- Measurement of Pb, Mo, and Nd isotopes on a Neptune MC-ICP-MS
- Measurement of cation and anion concentrations using the Dionex Ion Chromograph
- Trace metal chemistry, including column chemistry for Sr, Ca, Pb, Mo, and Nd isotopes
- Measurement of trace metals on an Element ICP-MS
- Bulk sediment digestion and measurement of trace metal ratios
- Measurement of metal ratios and isotopes for novel media, including ferromanganese coatings, detrital fractions, corals, porewater and seawater
- Separation of mineral fractions, particularly marine barite

FIELD EXPERIENCES

- Shipboard Scientist, R/V Wecoma; March, 2008, August, 2008
- Field Researcher, Slope and Basin Consortium; Summer 2002, 2003, 2004

CONFERENCE PRESENTATIONS (As Assistant Professor at the University of Kentucky)

* *Advisee Presentation*

* *Undergraduate Advisee Presentation*

2020

Erhardt, A.M., Fichtner, V., 2020. Differing impacts of meteoric diagenesis in the Permian San Andres Formation. Geological Society of America. *Invited Presentation.*

Erhardt, A.M., Tamakloe, F., McGlue, M., 2020. Using $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{34}\text{S}$ as indicators of diagenesis in an interbedded shale and carbonate system. Goldschmidt Geochemistry Conference, Virtual.

2019

de Wet, C.B., **Erhardt, A.M.**, Marks, N., Sharp, W.D., Oster, J.L., Xu, Y., 2019. Toward quantitative records of rainfall using speleothem Ca and Sr isotopes. American Geophysical Union. *Oral Presentation.*

***Fichtner, V.**, Tobin, B.W., Wilson, J., **Erhardt, A.M.**, 2019. $\delta^{34}\text{S}$ of dissolved sulfate uncovers groundwater dynamics in Grand Canyon karst systems. American Geophysical Union. *Poster Presentation.*

***Reis, A.J.**, Griffith, E.M., **Erhardt, A.M.** 2019. Constraining Sediment Diagenesis in the South Pacific using Non-traditional Stable Isotope Analyses. International Conference on Paleooceanography, Sydney, Australia. *Poster Presentation.*

- Erhardt, A.M., *Fichtner, V.**, 2019. Using multi-phase sulfur isotopes to differentiate between primary and diagenetic Permian carbonates. International Conference on Paleooceanography, Sydney, Australia. *Poster Presentation.*
- *Fichtner V., Erhardt, A.M.**, 2019. Sulfur tracks diagenetic processes in Permian San Andres Formation. *Goldschmidt Abstracts*, 987. **Oral Presentation.**
- *Alvarez Villa, C., Erhardt, A.M., Fryar, A., Parris, T.M., Zhu, J., Webb, S.E.**, 2019. Identification of the causes and extent of elevated methane concentrations in the groundwater of Eastern Kentucky, Geological Society of America Annual Meeting. *Poster Presentation.*
- *Wilson, J.W., Erhardt, A.M. Tobin, B.W.**, 2019. Using $\delta^{13}\text{C}$ of dissolved inorganic carbon and dissolved organic carbon as tracers to characterize karst spring systems of the Shivwits Plateau at Grand Canyon National Park. Geological Society of America Annual Meeting. *Poster Presentation.*
- *McQueen, B., *Avery, E.A., Zhu, J., Fryar, A., Erhardt, A.M.**, 2019. Using geochemical methods to trace groundwater/surface water interaction. Geological Society of America Annual Meeting. *Poster Presentation.*
- *Lyon, E., McGlue, M.M., Erhardt, A.M.**, 2019. Late Holocene hydrologic changes in the Eastern Sierra Nevada based on an analysis of high resolution geochemical data from June Lake (CA). Geological Society of America Annual Meeting. *Poster Presentation.*
- *Alvarez Villa, C., Erhardt, A.M., Fryar, A., Parris, T.M., Zhu, J., Webb, S.E.**, 2019. Identification of the causes and extent of elevated methane concentrations in the groundwater of Eastern Kentucky, Eastern Section American Association of Petroleum Geologists. *Poster Presentation.*
- *Tamakloe, F., Erhardt, A.M., McGlue, M.M., Waite, L.** 2019. High-Resolution Chemostratigraphic Analysis of Wolfcamp D Shale-Unit in Upton and Midland Counties – Is it possible to identify stratigraphically significant surfaces using $\delta^{13}\text{C}_{\text{carb}}$? American Association of Petroleum Geologists Southwest Chapter Meeting. *Poster Presentation.*
- Cameron B. de Wet, C.B., Sharp, W.D., **Erhardt, A.**, Oster, J.L. 2019. Application of the speleothem calcium isotope paleo-rainfall proxy to the 8.2 ka event in coastal California. PACLIM, Pacific Climate Workshop. *Poster Presentation.*
- *Lyon, E., McGlue, M.M., Erhardt, A., Kim, S., Zimmerman, S.**, 2019. A 4500 year paleoproductivity record from June Lake, eastern Sierra Nevada (CA). PACLIM, Pacific Climate Workshop. *Poster Presentation.*

2018

- Erhardt, A.M., *Reis, A., McGlue, M., Waite, L.**, 2018. Evaluating the Effects of Post-Depositional Alteration of Carbonates on $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$ in a Mud-Rich Depositional Environment: A Case Study from the Midland Basin, USA. American Geophysical Union. **Oral Presentation**
- *Fichtner, V., Erhardt, A.M.**, 2018. Sulfur isotopes in pyrite, anhydrite, elemental sulfur and carbonate associated sulfate as recorders of diagenesis in the San Andres Formation, West Texas. American Geophysical Union. **Oral Presentation**
- De Wet, C., **Erhardt, A.**, Sharp, W., Oster, J., 2018. Application of the speleothem calcium isotope paleo-rainfall proxy to the 8.2 ka event in coastal California. American Geophysical Union. *Poster Presentation*
- Erhardt, A.M., Ford, W.A.**, 2018. Geochemical characterization of hyporheic zone geochemistry in a backwater system: a case study from Fourpole Creek, Huntington, WV. Geological Society of America Annual Meeting. **Oral Presentation.**

- *Wilson, J., Haag, W., Weisrock, D., Price, S., Erhardt, A.M., 2018. Variation in stable isotopes of freshwater mussel shells in the Licking River of Kentucky. Geological Society of America. Poster Presentation.*
- *Avery, E., Erhardt, A.M., 2018. Effects of injected waste water on a heterogeneous system. Geological Society of America. Poster Presentation.*
- Erhardt, A.M., *Young, H.A., Ford, W.I., 2018. Isotope tracers of pore water geochemistry variability across a backwater wetland- a case study from the Fourpole Creek Watershed, Huntington, WV. American Society of Agricultural and Biosystems Engineers Annual Meeting. *Invited Keynote Presentation***
- *Reis, A.J., McGlue, M.M., Waite, L., Erhardt, A.M., 2018. A Multi-Indicator Approach to Understanding Carbonate Diagenesis in Pennsylvanian Mudrocks in the Midland Basin. IODP Petrophysics Summer School.*
- *Avery, E., Erhardt, A.M., 2018. The role of dolomitization on fluid flow in a paleokarst system. Fluid Flow Through Porous Media Symposium.*
- *Bechtol, C., Haag, W., Price, S., Weisrock, D., Erhardt, A.M., 2018. Changes in Kentucky's Licking River effect on isotopes of freshwater mussel shells. Southeast Geological Society of America. Poster Presentation*
- *Young, H.A., Ford, W.I., Erhardt, A.M., 2018. Pore water geochemistry variability across a backwater wetland- a case study from the Fourpole Creek Watershed, Huntington, WV. Southeast Geological Society of America. Poster Presentation*
- Roney, E., Oster, J., Sharp, W., Marks, N., **Erhardt, A.**, Breitenbach, S., 2018. Calibrating multiple isotopic proxies in a modern aragonite speleothem from Northeast India. European Geophysical Union.
- Manzano, B.L., Pollack, D., Henderson, A.G., **Erhardt, A.**, Munizzi, J., 2018. Fox Farm, a Large Fort Ancient Village in Mason County, Kentucky: Evidence of Turkey (*Meleagris gallopavo*) Management? Society of American Archaeology.

2017

- *Reis, A.J., McGlue, M.M., Waite, L., Erhardt, A.M., 2017. A multi-proxy approach to understanding the diagenesis of carbonates in Pennsylvanian mudrocks. American Geophysical Union. Poster Presentation.*
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