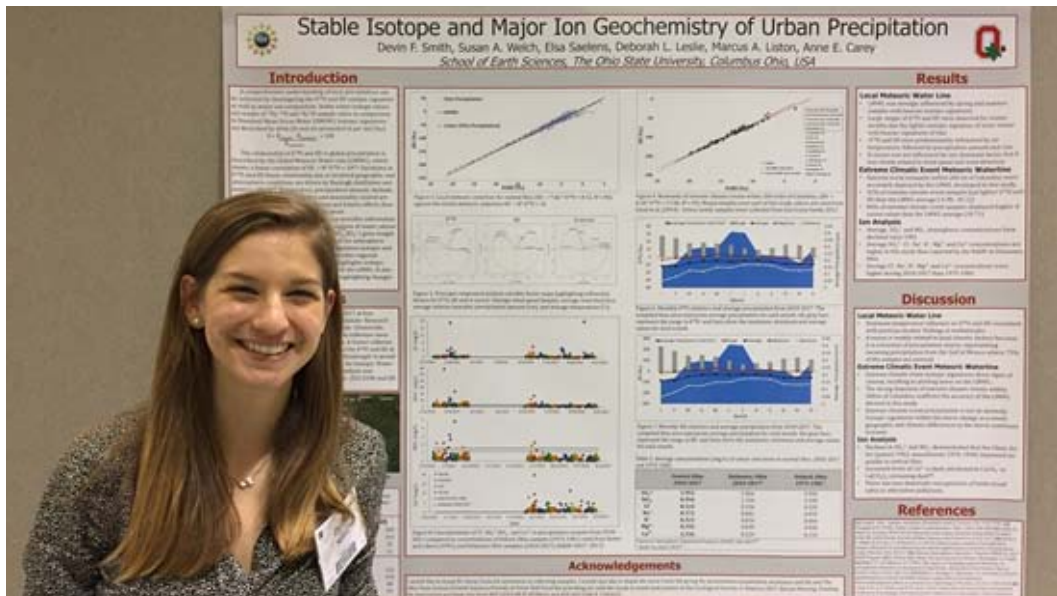


December 2017 News Notes

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Alumni Change Lives



Devin Smith is a first-year M.S. student working with Dr. Anne Carey. Here she describes how the Friends of Orton Hall fund helped further her graduate studies. If you are interested in giving to support the Friends of Orton Hall or other funds, please visit our giving page ([link](#)).

With the help of the Friends of Orton Hall Fund I traveled to the Annual Geological Society of America 2017 Conference to present my research on the isotopic and chemical composition of central Ohio precipitation. My study focused on analyzing stable isotopes $\delta^{18}\text{O}$ and δD in precipitation to identify source characteristics and influencing climatic factors. I also examined concentrations of major ions in precipitation to identify natural aerosols and anthropogenic pollutants present in urban environments. Building off a precipitation dataset collected from 2010 to 2017 by Earth Sciences students and faculty members, I assisted in precipitation sample collection and laboratory analysis throughout the summer. Additionally, samples of five major hurricane remnants were collected over the course of the study, adding a new and exciting aspect to my research. This dataset provided insight into the isotopic transformation of major climatic events as they travel across the continental United States. It was rewarding to attend the Annual GSA 2017 Conference and present my findings to peers and future colleagues. The conference was also an incredible learning opportunity as I gained experience in articulating my research and expanded my knowledge by interacting with scientists in different fields. This study is still ongoing, and in the future my master's thesis will build on the results I presented at the Annual GSA 2017 Conference. I would like to thank the Friends of Orton Hall Research Fund for providing me with these opportunities.

Baccalaureate Degrees Awarded in Autumn 2017

On December 10, twelve students received their baccalaureate degrees in Earth Sciences at Ohio State's Autumn 2017 commencement ceremony. Four of these Earth Sciences majors are receiving the B.S. degrees with Research Distinction and one is receiving B.S. with Honors Research Distinction. This group of newest Earth Sciences alumni and alumnae continues the high numbers of degrees awarded with distinction, with 42% of this semester's graduates receiving their baccalaureate degrees with Research Distinction or with Honors Research Distinction.

Congratulations to all the Autumn 2017 graduates in Earth Sciences!

Student	Sub-specialty	Research Advisor	Thesis title	Distinction
Chandler Adamaitis	ESY	Dave Cole, Sue Welch, and Julie Sheets	Fracking the Code on Flowback Fluids	Research Distinction and Magna cum laude
Joseph Bapst	BA			
Vincent Chu	GSC	Michael Barton	Modeling the Fractional Crystallization of Basalts on the Island of Hawai'i	
Sarah Clark	BA			
Stephen Ferreira	GPH	C. K. Shum	Application of Gravity-Geologic Method over the South China Sea	
Ellie Hagen	ESY	Michael Barton	A Comparative Study of Arksutite in the Egersund Dikes and SNC Meteorites	
Ryan Heber	PGG	Ann Cook	Mineralogy of Gas Hydrate Bearing Sediment in Green Canyon Block 955, Northern Gulf of Mexico	Research Distinction and Magna cum laude
Joon Lee	GSC	Michael Bevis	Elastic Dislocation Theory: Investigating the Effect of the Free Surface on the Symmetry of Displacement Across a Fault	Research Distinction
Stephen Maldonado	ESY	Berry Lyons and David Bromwich (Geography)	Surface Atmospheric Conditions Associated with Arctic Sea Ice Retreat, Resolved by the Arctic System Reanalysis	Honors Research Distinction and Magna cum laude
Jack Pelishek	PGG	Ralph von Frese	Seeing the Salt: An Integration of Gravity and Seismic Datasets in the Unexplored Laurentian Basin	
Kathryn Smart	PGG	Ann Cook	Modeling Well Log Responses in Hydrate-Bearing Silt	Research Distinction
Lucas Stone	BA			

Arctodus - The Short-Faced Bear



The Orton Geological Museum has recently acquired a sculpture of the head of a short-faced bear (*Arctodus*) (bottom) from the Geauga Park District. The short-faced bear was a member of the mammalian megafauna that roamed Ohio during the Pleistocene Epoch. This remarkable sculpture is in the Recent Acquisitions display in the Orton Geological Museum. Needless to say, Dale Gnidovec (top) and the Museum are very pleased to accept this donation. (photo: Patti Dittoe)

Update from Professor Emeritus Scott Bair

In September, the AAPG Division of Environmental Geosciences awarded Scott its Meritorious Contributions Award at the eastern section meeting in Morgantown, West Virginia. In his citation, James McDonald (M.S., 1990) of the Ohio Geological Survey stated the award was “In recognition of 30 years of teaching, service, and research to advance environmental geosciences for safer extraction of oil, gas, and groundwater.” Specifically mentioned were the studies Scott performed with his graduate students on the movement and attenuation of benzene, toluene, and xylene, which occur naturally in oil/gas field brines, in shallow aquifers from spreading brine for snow, ice, and dust control (Rob Digel, M.S., 1989; Melinda (Springfield) Chapman, M.S., 1988); the deep, long-term flow patterns of hazardous waste injected into the Mt. Simon Sandstone from Class I injection wells in Ohio, Michigan, Illinois, and Kentucky (Mike Gross, 1988; Neeraj Gupta, 1993); and the in-house explosion of methane gas at a residence in Bainbridge Township, Geauga County, Ohio and the occurrence of methane gas in 26 nearby homes due to faulty construction of an oil/gas well (2012, with professors Dave Freeman, Marietta University, and John Senko, Akron University).

As the 2017 Edwards Aquifer Distinguished Speaker, Scott presented a series of lectures last May at the headquarters of the Edwards Aquifer Authority in San Antonio, Texas. (The Edwards Aquifer is one of the most prolific artesian aquifers in the world. It covers an area of 4,350 square miles in south-central Texas and provides water for agriculture, ranching, in-dustry, several really big springs, and more than 2 million people in the San Antonio and Austin regions.)

The first presentation was based on the research of Michelle Torres (M.S., 2012), which dealt with the problems encountered drilling 450 geothermal wells to a depth of 550 feet through an “unknown” paleokarst zones underlying the South Oval (well, believe it or not, unknown to the University and the driller) and the origin of the paleokarst as flank-margin caves during Devonian sea-level fluctuations.

The second lecture dealt with the cause of the explosion in an occupied residence in Bainbridge Township, Ohio, and the contamination of 26 other residential wells with methane gas. The research showed the stray gas was caused by a faulty cement seal between the production casing and the borehole wall, and not by hydraulic fracturing, as stated by several media outlets.

The last presentation was based on the groundwater flow and transport modeling by Maura Metheny (M.S., 1998; Ph.D., 2004) and featured animations of TCE movement created by Martin Van Oort (M.S., 2006). The modeling results were contrary to the findings of the jury, as presented in the “A Civil Action” book and movie, and showed that the majority of the TCE pumped from Woburn municipal wells G & H was not derived from improperly disposed TCE by employees at the W.R. Grace plant on the same side of the Aberjona River as the production wells, but from illegally dumped barrels and drums containing TCE and other organic solvents on the Beatrice Foods property on the opposite side of the river. The jury, apparently, did not understand that the 3-dimensional character of groundwater flow could cause TCE to move beneath the river into the deeper well screens.



In April 2018, Scott will be the banquet speaker at the 15th Sinkhole Conference, sponsored by the National Cave and Karst Research Institute, to be held in Shepherdstown, West Virginia, which is surrounded by magnificent sinkholes, caves, and springs. The presentation title is “The Science Beneath the Ohio State Geothermal Field Fiasco: A Cool Story About a Hot Topic.” Many of you may remember seeing the shocking spectacle of groundwater rising like geysers from dozens of ill-constructed geothermal wells while looking out the back windows in Mendenhall.

New NSF Funding for Basin Research Group

The Basin Research Group, led by Dr. Derek Sawyer, received a new NSF RAPID grant to acquire multibeam mapping and sediment sampling/coring to document erosion and deposition in response to two Category 5 hurricanes (Irma and Maria) that hit the region in September. The team was in St. John prior to the hurricanes and therefore the post-hurricane data will allow a detailed understanding of the changes to the bay floor and where deposition and erosion occur in response to hurricanes as well as to clarify how hurricanes are manifested in the rock record. The team was in St. John November 22-December 06 and just returned from the Fall American Geophysical Union (December 11-15) to present preliminary results.

The team included two of Sawyer’s PhD students Trevor Browning and Brandi Lenz. These new datasets will be included as an important component of Trevor’s doctoral thesis on erosion of tropical volcanoclastic islands as well as other student thesis projects. Multibeam mapping will provide detailed information on the net change

over the entire bay. Approximately 100 grab samples will provide sedimentologic information, and 6 cores will be provide age-dating and stratigraphic information. Water samples will be analyzed for chemical constituents.

The community of Coral Harbor and the eastern half of the island were still without electricity and involved in the large clean-up effort of debris, which included many downed trees, power lines, structures, and boats that were either sunk or washed ashore. During the final day of the trip the team hosted a group of 15 local high school students to provide hands-on demonstrations of multibeam mapping, water sampling, and sediment coring.



Common scene with vegetation stripped from the mangroves/trees and boats overturned and sunk in the harbor



Giff Hill School students and teachers with Basin Research Group



Above, Ohio State graduate students Trevor Browning and Brandi Lenz

Brevia

A restricted endowment in Dr. Scott Bair's name has been set up to support hydrogeology research. The fund will honor Scott and his contributions to the field of hydrogeology. This endowed fund will support field activities and meeting attendance for future students studying hydrogeology at The Ohio State University. To give, click visit the fund's site ([link](#)). The fund currently contains over \$30K thanks to your kind donations thus far! Of course, giving to this and all OSU funds is tax deductible.

The American Geosciences Institute (AGI) is excited to welcome Sarah K. Fortner, Ph.D., from the Geological Society of America (GSA) and Wittenberg University as its second Member Society Scholar-in-Residence. As a Scholar-in-Residence, Fortner will support informed decision-making by connecting geoscience practitioners and students with local decision-makers. She will be developing teaching modules that help the geoscience community to expand local civic engagement and will work on several collaborative opportunities with AGI and GSA.