

April 2014 News Notes

- Alumni Change Lives
- Professor E. Scott Bair Retires
- Faculty Profile: Michael Wilkins
- Appalachian Field Geology for Educators
- SES scores again at the Denman Undergraduate Research Forum
- Brevia

Alumni Change Lives

Christina Zerda (BS 2014) received support from The Friends of Orton Hall fund. Here, Christina describes how this helped advance her career. The picture shows Christina with poster at the Denman Forum, where she won third place.

I began my research with Dr. Barton my sophomore year without any knowledge of the subject or what I was getting into. Two years later, I am graduating with a BS with research distinction, a 3rd place finish in the 2014 Denman Forum, a successful poster presentation at AGU, and knowing I found my niche in geology. My research focuses on the magma chambers beneath the East Pacific Rise, which is a mid-ocean ridge in the Pacific Ocean off of the coast of Central America. We chose the EPR due to its fast spreading rate and the prominence of several transform faults in the northern section. Ultimately, we hope to better understand not only what affects these transforms and other features have upon oceanic crust petrology, but a better understanding of mid-ocean ridges in general. While we originally looked at the depths at which these rocks began the process of crystallization, focus eventually turned to the surface features of the ridge and their effect upon the pressures of partial crystallization. What I think is the coolest aspect of this project and area of study is the challenge of it. Samples must be dredged from the ocean floor or taken via submersibles. Unlike other projects, there is no actual collection of data on my part – it is mostly interpretation; understanding the process of crystallization, ocean ridges, and the mantle are all pivotal in being able to figure out the history of the rocks. Working with Dr. Barton has been an amazing experience. Not only has he been a great figure in my research, but he has helped me become a more confident scientist and person. So when he wanted me to present my poster at the American Geophysical Union, I spent months being terrified of my first experience at a conference.

This past December, I traveled to San Francisco, CA for the annual Fall Meeting of AGU. It was the first time I had never been to San Francisco or to a national conference. At AGU I had the chance to present my poster on the very last day, second to last time slot. With the funds from Friends of Orton Hall, I was able to experience some of the city, such as taking the famous cable cars to Fisherman's Warf, and learn about current research in my field at the conference. On the second day at the conference,



I was a little over-zealous and sat through an entire session of talks on the mid-ocean ridge I research, the East Pacific Rise, and quickly exhausted myself mentally. But most importantly, I had a very positive experience presenting my poster. Norman Sleep, one of the pioneers in my area of research, searched me out and came to my poster to talk to me – the highlight of my poster session! I left AGU tired but much more confident in myself and my research, all made possible due to the generosity of Friend of Orton Hall.

But hopefully, my first experience at AGU will not be my last, as I will be returning for my Master's to continue my work with Dr. Barton. I received a University Graduate Fellowship to support me in my first year of study this coming year. While I am not 100% certain as to what my exact project will be, I am certain it will continue my study of ocean ridges and petrology.

Professor E. Scott Bair Retires

Professor Scott Bair is retiring at the end of spring semester. He and his wife, Julie, will be leaving the Scarlet & GRAY skies of Ohio and moving to their newly-built home on the Outer Banks where the skies are Carolina Blue. Scott took his B.A. degree in geology from The College of Wooster and his M.S. and Ph.D. degrees from Penn State University. He joined the faculty in the Department of Geology and Mineralogy in 1985 having spent the previous six years working in the Geotechnical Division of Stone & Webster Engineering Corporation. His classes always showed his interests in the application of theory to applied and societal problems. Under his tutelage 37 graduate students received their degrees (see list below). His former students are employed across the country working for federal and state government agencies, academic institutions (high school, college, university), local and nationwide consulting firms, and law firms.



While at Ohio State, Scott developed graduate and undergraduate courses in hydrogeology, numerical modeling of ground-water flow, field methods in hydrogeology, speleology, water resources, and contaminant hydrology. His teaching skills were recognized by Ohio State in 1990 when he received the Alumni Distinguished Teaching Award, Ohio State's highest award. In 1998, he received a grant from the Honors College at OSU to develop a course titled "Science in the Courtroom." In the course his students became expert witnesses in a mock trial with first-year law students became their attorneys. He and Kevin Svitana (Ph.D., 2005) later developed a web-based version of the course using a grant from the NSF Division of Undergraduate Education. Their website is housed at the Science Education Research Center at Carleton College. The website is used by high school, college, and private individuals around the world. Last year the website had its 2 millionth hit. Scott also taught professional short courses for the National Ground Water Association, Ohio DNR, Ohio EPA, Michigan DNR, Michigan Department of Health, Pennsylvania DNR, and for several consulting firms.

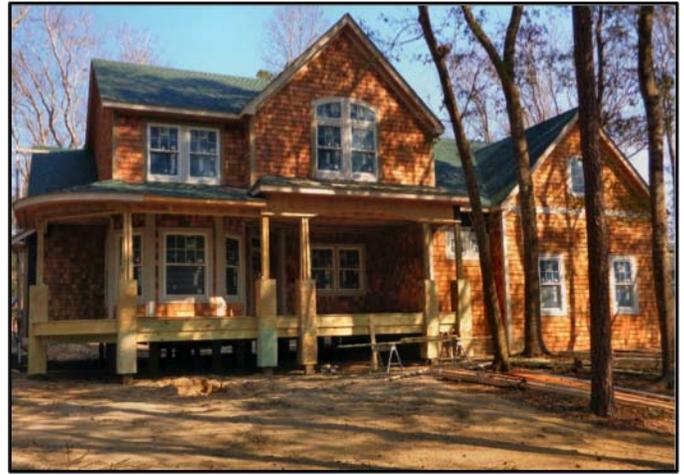
During his 29-year tenure at Ohio State, Scott received nearly \$2 million in grants from various state and federal agencies including NSF, US EPA, USDA, USGS, Ohio EPA, and Ohio DNR. With his students, he published more than 40 papers in *Water Resources Research*, *Journal of Hydrology*, *Mathematical Geology*, *Ground Water*, *Journal of Hydrogeology*, *Environmental and Engineering Geosciences*, *Journal of the American Water Resources Association*, *Journal of Geoscience Education*, *Ground Water Monitoring Review* as well as technical reports for Ohio DNR, US EPA, and US Geological Survey. Scott served on technical panels for the US Centers for Disease Control, Ohio Hazardous Waste Review Board, and Governor Celeste's Brine Spreading Review Panel. Currently, Scott is a member of the US EPA Science Advisory Panel on Hydraulic Fracturing.

Scott is a Fellow of the Geological Society of American and in 2000 he was awarded the Birdsall-Dreiss Distinguished Lectureship by the Hydrogeology Division. This enabled him to present the research he, Maura Metheny, and Martin van Oort did unraveling the transport of TCE and PCE to two municipal wells in

Woburn, Massachusetts and the associated cluster of childhood leukemia cases. He presented their work at 53 colleges and universities in the US, Canada, and Japan. In 2013, Scott received the George B. Maxey Award for Distinguished Service from the Hydrogeology Division of GSA. Also in 2013, the Central Ohio Chapter of AIPG awarded him its Outstanding Achievement Award citing his research contributions to societal issues and the training of students for professional careers.

To relieve any fears of alumni and friends may have regarding his logic to move to the Outer Banks during a period of climate change resulting in sea-level rise,

he wants everyone to know that their home sits atop a 28-foot high sand dune in a maritime forest. Scott and Julie plan to relax in the warmth of the sun and enjoy the 60 more sunny and partly sunny days that occur than in central Ohio. They are protected from hurricanes by 100+ year old, oak, hickory, dogwood, holly, ironwood, sassafras, and loblolly pine trees as well as future rip-rap created by the multi-million dollar homes seaward of their location. Construction of their home is to be completed in July and they plan to move in early August. If you are in the area, stop by 54 Trinitie Trail in Kitty Hawk.



Professor Bair's Former Advisees

Torres, Michelle (M.S., 2012)

Codispoti, Julie (M.S., 2011)

Bartkowiak, Brandon (M.S., 2008)

Epp, Kathy (M.S., 2008)

Spahr, Paul (M.S., 2007)

Van Oort, Martin (M.S., 2006)

Beanland, Shay (M.S., 2004)

Metheny, Maura (Ph.D., 2004; M.S., 1998)

Thomas, Heather (M.S., 2001)

Kristen Riker-Coleman (M.S., 2000)

Barton, Andrew (M.S., 1998)

Hammer, Matthew (M.S., 1998)

McClenahan, Leslie (M.S., 1997)

Erb, Nelson (M.S., 1997)

Hanson, Kristen (M.S., 1997)

Lahm, Terry (Ph.D., 1997; M.S., 1993)

Sminchak, Joel (M.S., 1997)

Myer, Eric (M.S., 1997)

Finton, Christopher (M.S., 1994)

Springer, Abe (Ph.D., 1994; M.S., 1990)

Gupta, Neeraj (Ph.D., 1993)

Gross, Mike (M.S., 1992)

Craig Payne (M.S., 1992)

Dumouchelle, Denise (M.S., 1992)

Nortz, Pat (M.S., 1992)

Cunningham, William (M.S., 1991)

Mayhew, Jennifer (M.S., 1991)

Roadcap, George (M.S., 1990)

Steck, Paul (M.S., 1990)

Kelley, Mark (M.S., 1989)

Digel, Robert (M.S., 1989)

Chapman (Springfield), Melinda (M.S., 1988)

Sheets, Rodney (Honorary, 1988)

Beard, Thomas (M.S., 1988)

Eberts, Sandra (M.S., 1987)

Jagucki, Phillip (M.S., 1987)

Faculty Profile: Michael Wilkins

An informal bio of each SES faculty member is featured each month in this newsletter, in (roughly) reverse chronological order. This month, we feature Asst. Professor Dr. Michael Wilkins.

My high school biology teacher would often enthusiastically launch into long monologues about the wonders of microbial life – about the reactions they catalyze, the environments they inhabit, the stresses they tolerate and thrive in. I suspect this was a major factor in me pursuing undergraduate education in a microbiology program at the University of Birmingham (UK). Following graduation, I moved up to the University of Manchester (UK), to work with Professor Jon Lloyd investigating interactions between bacteria and a series of radionuclides. Here we



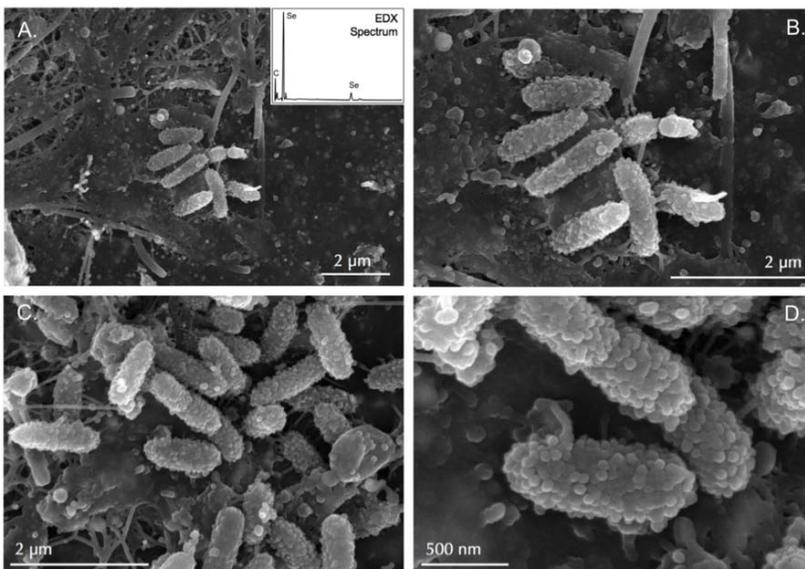
exposed bacterial cells to a range of generally disagreeable elements (to us), including uranium, technetium, and radium, and watched in amazement as cells survived, and even used the compounds for energy generation.

In search of better weather, I moved to the University of California at Berkeley for a post-doctoral position with Professor Jill Banfield. Here I was part of a large multi-institutional project that performed field experiments at Rifle, Colorado, assessing the ability of indigenous microorganisms to remediate a range of metals, including uranium, vanadium, and selenium. This project spanned the spectrum of emotions; a long arduous 110° F day in the field might be followed by an evening of trout fishing on the Roaring Fork River. The success of this work resulted in me taking a senior research scientist position at Pacific Northwest National Lab (PNNL), a US Department of Energy-operated facility in Richland, WA. Research at PNNL was focused around the realization that microorganisms in the environment catalyze a huge range of processes, with implications for biogeochemical cycles at the molecular and global scale. Almost every environment on Earth is colonized by microorganisms, from hot springs at Yellowstone, to sub-seafloor sediment kilometers beneath the Earth's surface.

These thoughts were fresh in my mind as I joined The Ohio State University in September 2013. I have a joint appointment between SES and the Department of Microbiology, reflecting my research that often occurs at the interface of microbiology, geochemistry, and mineralogy. My lab is currently working on a range of projects that attempt to understand the function of microbial communities in natural and engineered environments. These include prairie pothole environments in North Dakota, where extremely high concentrations of sulfur and organic carbon in lake sediments may drive significant microbial activity. In addition, we are also investigating

indigenous microbial communities in deep shale environments in Ohio, where microorganisms play a key role in methane generation and the oxidation of hydrocarbons. Finally, we continue to work at Rifle, Colorado, developing novel methods for assessing microbial activity in aquifer systems.

The image at right shows microorganisms from the Rifle subsurface that have reduced the mobile selenate ion to elemental selenium (Se(0)). The elemental selenium has precipitated as small spheres on the outside of the cells, and is now immobilized in the subsurface.



Appalachian Field Geology for Educators, Spring 2014

Field Geology for Educators – Appalachians (Earth Sci 5189.06) is being offered in Spring 2014, and is the most recent incarnation of a Spring Break–focused, Appalachian-based field course for educators that has been offered regularly since 1961. According to notes provided by Prof. Emeritus Russ Utgard, the Spring 2014 offering is the 39th offering of this trip for OSU students. In its 53-year history, this course has been offered under four course numbers (Geology 630, Geology 880, Geology & Mineralogy/Geological Sciences 583, and – now – Earth Sciences 5189), and has been taught by a distinguished group of faculty (at least until the last three years...). Faculty involved with this course have included Bob Bates, Walt Sweet, Stig Bergstrom, Claude Rust, Mac Weiss, Jim Collinson, Vic Mayer, David Elliot, Garry McKenzie (25 times!), Russ Utgard (25 times!), and Doug Pride (13 times!). Larry Krissek became instructor-of-record for this course in 2011, and has now taught its present version since 2012.

The present version of this course includes four pre-trip meetings and one post-trip meeting, but the majority of the work still takes place in the field during OSU's Spring Break. The first three days of the Spring Break trip are spent in eastern West Virginia, exploring the structural geology and stratigraphy of the western Valley and Ridge. Work is based out of Moorefield, WV, and takes advantage of exceptional new outcrops that are being opened along the westward extension of US 48 (also known as "Corridor H" in West Virginia). We also examine the classic cross-section through the Wills Mountain Anticline at Greenland Gap – a locality that was described in a GSA DNAG Centennial Fieldguide volume 25 years ago. (The accompanying photo, below, shows some of the students from this year's class examining an outcrop of the SE-dipping Helderberg Group on the eastern limb of the Wills Mountain Anticline, at the eastern end of Greenland Gap.) To the students, perhaps the most noteworthy stratigraphic unit introduced in this area is the Marcellus Shale, which outcrops in several of the synclinal valleys.

The remainder of the week is occupied with day-trips from Columbus – one to the Ordovician and Silurian of southwestern and west-central Ohio (including fossil-collecting at Caesar's Creek State Park and a stop at Young's Dairy), and the second through the Devonian, Mississippian, and basal Pennsylvanian of central and east-central Ohio. Although the present version of this course does not travel as far south and east as previous versions, the new focus on Ohio geology has been added to provide the educators with the background they need to incorporate sense-of-place activities as they take teaching positions in Ohio.

For the past three years, enrollment in this course has ranged between 13 and 18 students, with the students spread among pre-service undergraduates, M.Ed. students, Ph.D. students in science education, and in-service educators. This year's class numbers 15: 12 undergraduates, 2 M.Ed. students, and 1 in-service high school teacher. They all survived their first experience in the field – and I think they'd all recommend visiting the Stray Cat Café in Moorefield for an interesting cultural experience! If any of our alumni are interested in more information about this course or the localities we visit, please contact Larry Krissek at krissek.1@osu.edu or 614-292-1924.



SES scores again at the Denman Undergraduate Research Forum

Congratulations to all our undergraduate students who participated in the 2014 Denman Undergraduate Research Forum on Wednesday:

Joe Lonsert, Shannon Hibbard, Brittany Van Wagenen, Jake Harrington, Chrissy Zerda, Mario Gutierrez, Daniel Ardrey, Julia Young, Zach Cotter, Zachariah Cowan, Michael Kellum, and two students from other majors doing research under SES faculty mentorship, Michael McBride and Paige Clark.

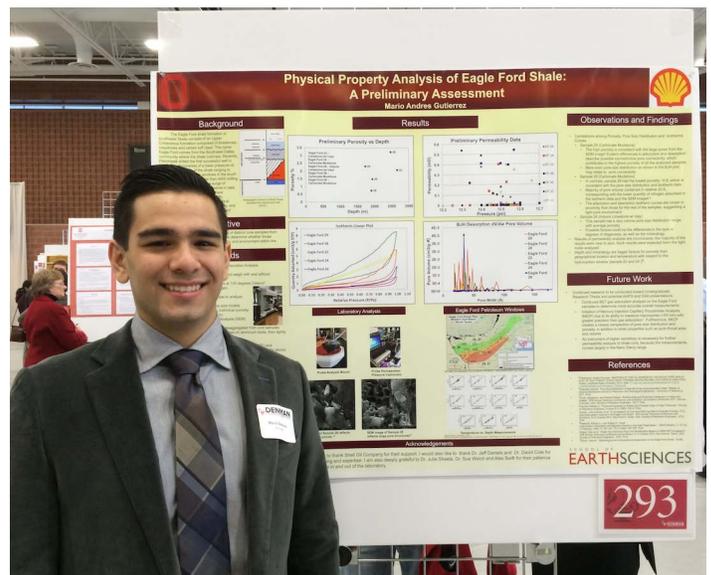
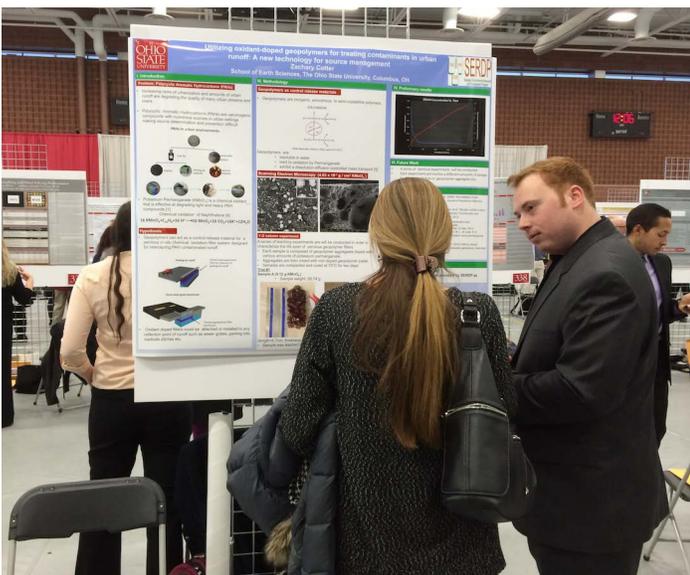
Special congratulations go to the prize winners from SES, prizes in the Mathematical and Physical Sciences division: Mario Gutierrez and Zach Cotter each won Second Place prizes, and Chrissy Zerda won a Third Place prize.

Once again a great showing, with SES taking three of the seven prizes awarded in the Math & Physical Sciences Division.



The photo at left shows some of the SES Denman participants: From the left: Jake Harrington, Julia Young, Zachariah Cowan, Brittany Van Wagenen, Christina Zerda, Michael Kellum, Zachary Cotter, Joseph Lonsert, Mario Gutierrez, and Shannon Hibbard.

Zach Cotter (below at left) and Mario Gutierrez (below at right) both won second prize. A photo of third prize winner Christina Zerda with her poster is shown on the first page of this month's News.



Brevia

Prof. Ralph von Frese tasted true spring over SES spring break in Rome, Italy where he presented an invited briefing before members of the Italian parliament entitled 'Extending Earthquake Hazard Studies from Stochastic to Deterministic Realities.' The briefing was triggered by the L'Aquila earthquake of 2009 and resultant call for an enhanced national earthquake hazards reduction program. Ralph is a foreign delegate to the Centro di Geomorfologia Integrata per l'Area del Mediterraneo (CGIAM) that is developing the program.

BPRC researcher Lonnie Thompson and former U.S. Representative for South Carolina's 4th congressional district Bob Inglis addressed an audience of legislators and faith community representatives at the State of the Climate event held at the Ohio Statehouse on March 18th. You can see Lonnie Thompson's interview with NBC Channel 4 following the event online ([link](#)).

Earth Sciences minor, Lisa Miller, won a prize at the Natural and Mathematical Sciences undergraduate research forum. For a full story on SES participation in the NMS forum, see last month's News.

Trey Fortner (BS 2000 and MS 2003) and Jason Manzo (MS 2002) have received a national award on behalf of **ARCADIS** and their client. Trey and Jason accepted the Groundwater Protection Award for "Protection of Public Supply Well Installation Relative to Superfund Sites," which was a project on behalf of LORD Corporation ([link](#)).