

## September 2014 News Notes

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### Alumni Change Lives

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*Jeff Pigott is a graduate student in SES working with Professor Wendy Panero. Here he explains how funding from the Friends of Orton Hall fund helped to further his graduate studies.*

I'm a senior PhD student currently studying mineral physics. Part of my thesis topic is on the effect of compositional variations and deep storage of H<sub>2</sub>O on mantle geophysical data. In 2013, I received funding under the NSF East Asia and Pacific Summer Institutes (EAPSI) program to travel to Perth, Western Australia to conduct a computational investigation of water incorporation in majorite garnet (MgSiO<sub>3</sub>). Majorite is the second most abundant mineral in the Earth's transition zone (410-660 km) where it accounts for as much as 40% of the rock volume. My calculations show that substitution of 4 hydrogen atoms for 1 silicon atom is the most energetically favorable configuration for water storage in the majorite garnet structure. Additionally, the effect of hydrogen on majorite elasticity is significant and needs to be considered in order to prevent overestimates of temperature anomalies in Earth's mantle based on seismic velocities. The Friends of Orton Hall (FOH) fund provided support for me to present the results of this research at the 2013 AGU Fall Meeting in San Francisco, CA. I am thankful for the support provided by FOH as it allowed me to present my work at an important international conference in my field which ultimately advances my academic career. By attending the meeting, I was able to network with experts in mineral physics, geochemistry, seismology, and geodynamics and engage in fruitful discussions about my research and potential postdoctoral opportunities.



## Faculty Profile: Audrey Sawyer

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I always wanted to find a career that combined my love of science and the outdoors, but I didn't understand my career options. Biology and chemistry didn't capture my interests. How could I become a "scientist" like the researchers in National Geographic?

During my freshman year at Rice University, I explained my nebulous career goals to a wise upperclassman, who suggested I sign up for an oceanography class in the geology department. Our class took a field trip to visit ancient carbonate reefs, and I declared geology as my major. During my summers at home in Pennsylvania, I interned at the New Jersey Geological Survey and worked closely with geophysicists, structural geologists, and hydrogeologists on diverse projects. I used geophysics to identify leaky underground storage tanks and map fractures in bedrock aquifers. Those summers cemented my interest in hydrogeology and water resources. I also learned to fly fish. While wading in streams, I often wondered whether I could find a job that involved field work in trout streams.



Not surprisingly, I pursued research on stream-groundwater interactions for my PhD. My goal was to understand how wood debris in streams influenced patterns of groundwater flow and temperature in streambed sediment, where trout and salmon lay their eggs. I have since expanded my research to new aquatic settings ranging from mountain streams to large rivers and bays. I seek to understand how the exchange of surface water and shallow groundwater influences water quality, geochemical cycles, and ecosystem processes. I use computer models along with field and laboratory observations to determine how water transports nutrients, contaminants, and heat across streambeds, lakebeds, and seabeds. I am currently a collaborator in an NSF-funded Critical Zone Observatory in Pennsylvania and Delaware that focuses on human impacts on carbon sequestration in watersheds.

As a new faculty at Ohio State, I look forward to extending my research on surface water-groundwater interactions to the Great Lakes. I also enjoy interacting with students and will teach the undergraduate course, Exploring Water Issues, this coming spring.

# AAPG Chapter Update

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## Buckeye Presence at the SEG/AAPG Student Expo

Six chapter members attended and presented posters at the 17th Annual SEG/AAPG Student Expo on September 8-9 in Houston, TX. Our members were able to engage and interview with industry professionals from over thirty companies. In addition to developing professionally, they were able to improve technically while attending short courses. Members attended Exxon Mobil's "Integrated Basin and Play Analysis" (IBA) Short Course, that focused on basin analysis and hydrocarbon exploration and development, mirroring the competitive environment of the IBA (Imperial Barrel Award) Competition. Schlumberger/PetroTechnical Services (PTS) Technology Day was also attended as members visited Schlumberger's Richmond Campus and learned about the leading service technologies in geophysical exploration, reservoir characterization and geological modeling utilized in Exploration & Production



## Member Activity

The chapter got off to a great start with the 1st Annual AAPG Cook Out, where new and active SES students were able to meet other chapter members and converse over the chapter's direction this semester. We officially got the semester started with a great showing at the first chapter meeting of the semester on September 2nd.

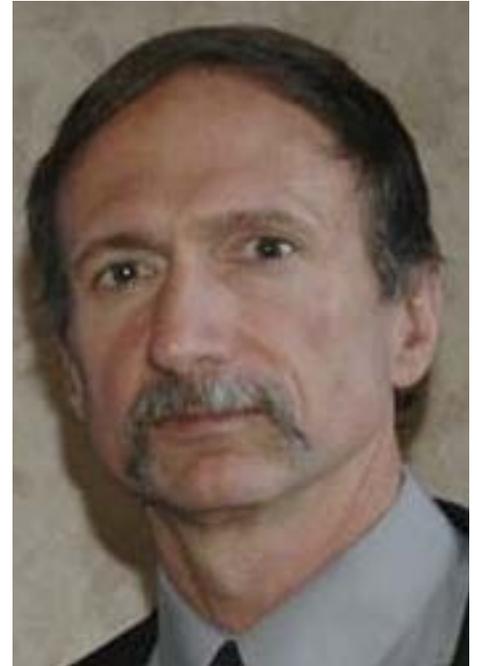
(Official Grill Masters - Secretary Hanna Brouman and Community Chair Lienne Sethna )

Contact us at [aapg@osu.edu](mailto:aapg@osu.edu) for all things AAPG at Ohio State. Stayed tuned and GO BUCKS !!!

# Alumni Profile: Mike Strobel

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I can honestly say that my experiences at OSU have directly shaped my career for the past 30+ years. While still an undergraduate at OSU in 1983, I had the opportunity to go with Lonnie Thompson to the Quelccaya Ice Cap in Peru. This experience led to working with Ian Whillans in Antarctica that same year. I ended up going to Antarctica five times, Greenland twice, and other field trips to Alaska and glaciers in the US. I ended up working with the Byrd Polar Research Center (it was called the Institute of Polar Studies when I was first hired) until the late 1980s, when I was hired by the USGS in Columbus and went back to get my Masters while working part-time. After completing my MS degree, I transferred to the USGS office in Grand Forks, North Dakota in 1990 and continued to work while completing my PhD at the University of North Dakota. After graduation, I spent three years in South Dakota leading the USGS Black Hills Hydrology Study, then a few years in North Carolina as the Studies Chief for the USGS office. In 2001, I became the Deputy State Director for the USGS Nevada Water Science Center in Carson City, NV. After almost 20 years with the USGS, I became the Director of the NRCS National Water and Climate Center in Portland, Oregon in 2007 and have remained there ever since. My position with NRCS is both challenging and extremely rewarding.



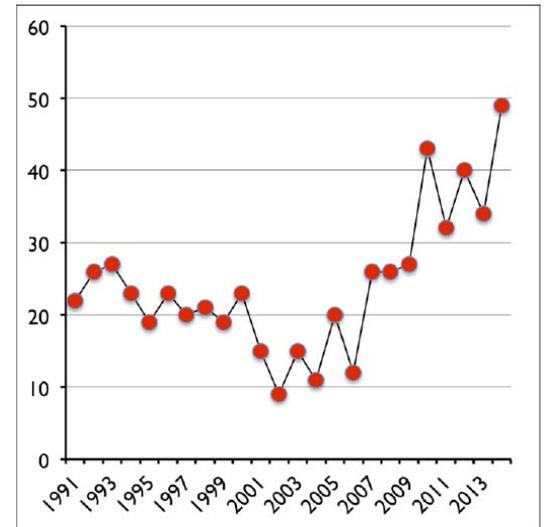
I oversee the Snow Survey and Water Supply Forecasting Program in the Western US (includes the 885 SNO-TEL station network) and the national Soil Climate Analysis Network (SCAN). My job also is heavily focused on climate change research and analysis. I enjoy the travel to remote and beautiful parts of the west, but the downside is having to oversee program budgets and dealing with Washington DC. I have had the opportunity to continue teaching, and have been an adjunct professor and instructor at universities in North Dakota, Minnesota, South Dakota, North Carolina and Nevada. I have been married to Carissa for 17 years, and we have three children (Spencer - 16, Hunter - 14, and Emma - 12). I try to stay active and recently completed my last state (South Carolina in January) in my quest to run marathons in all 50 states. Maybe I will try for the seven continents next. The marathons were a challenge, but very rewarding and a great way to see the country. The hardest part of this adventure was doing five marathons in six days last year, and 20 total over the course of the year. I also coach track at my kids' school and enjoy camping with the family. We love living out west and spending time in the mountains. I also was a volunteer firefighter for 15 years and really enjoyed that added excitement in my life.

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# Record Number of Students in Mineralogy

SES has record numbers of students in mineralogy this year, reflecting a huge growth in the number of majors across all four of our BS tracks. The 49 students enrolled in Earth Sciences 4421, Earth Materials, compose the highest enrollment in mineralogy during the past 25 years. As can be seen in the photo, Mendenhall 247 was full on the first day of classes, August 27, 2014. At the beginning of the Fall 2014 semester, there were 149 declared undergraduate majors in the School of Earth Sciences. Mineralogy remains required for the legacy Geological Sciences degree, in which 18 students are declared, and in the new Earth Science degree is required for the Geological Sciences track (29 students) and the Petroleum Geology and Geophysics track (44 students). Mineralogy is an elective for the other two BS tracks (Earth System Science and Geophysics) and has always been an elective in the BA degree. As the beginning course in the Mineralogy-Petrology-Structural Geology-Field Camp sequence, mineralogy is chosen as an elective by all students planning to attend field camp, everyone's favorite Earth Sciences experience. The graphic shows mineralogy enrollment since 1991.

## Mineralogy Enrollment by Year

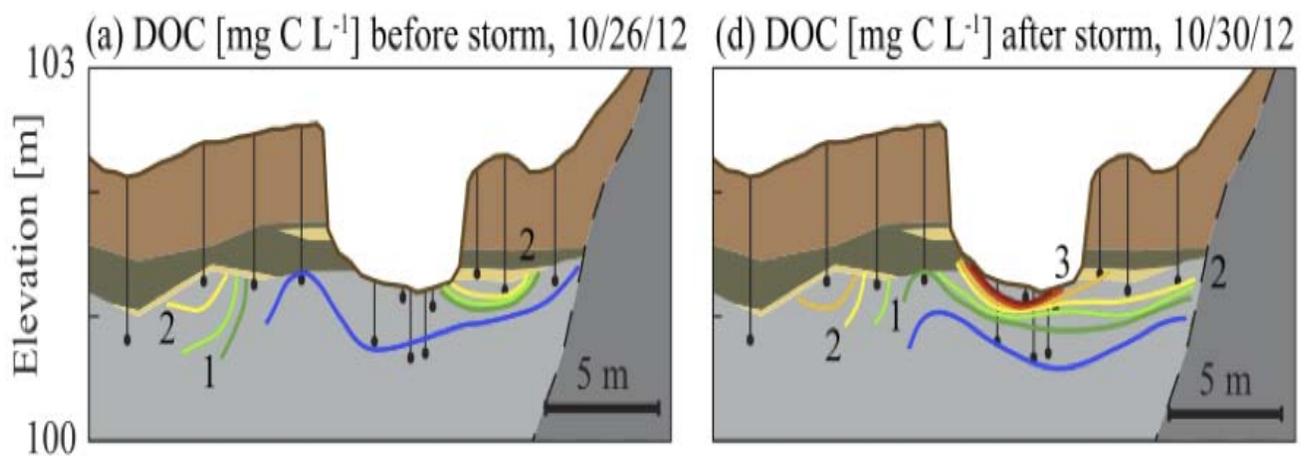


# Sawyer group monitors groundwater during Hurricane Sandy

Here, Prof Audrey Sawyer describes a paper recently published by her group in *Water Resources Research*. Congratulations, Audrey!

We monitored groundwater in a floodplain during Hurricane Sandy and showed that floodplain topography had a large impact on groundwater discharge to the river and organic carbon transport in the floodplain aquifer. Studies of groundwater dynamics and carbon transport in floodplain aquifers during major storms are essential for understanding how watersheds release carbon during extreme events.

The graphic shows dissolved organic carbon (DOC) concentrations in the floodplain aquifer before and after Hurricane Sandy. DOC was rapidly delivered to the shallow floodplain aquifer and streambed sediments.



Sawyer, A. H., L. A. Kaplan, O. Lazareva, and H. A. Michael (2014), Hydrologic dynamics and geochemical responses within a floodplain aquifer and hyporheic zone during Hurricane Sandy, *Water Resources Research*, 50, doi: 10.1002/2013WR015101.

# Brevia

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Kevin Meyer, new graduate student in Earth Sciences and University Fellowship holder, is the author of a newly published paper that includes data from his undergraduate thesis research at the University of Texas, Austin, where he work in Jay Banner's group. Kevin is working under the direction of Professor Anne Carey and he plans to pursue research on weathering in small stream on high standing islands for his M.S. degree. Citation: Feng, W., B. F. Hardt, J. L. Banner, K. J. Meyer, E. W. James, M. L. Musgrove, R. L. Edwards, H. Cheng, and A. Min, 2014, Changing amounts and sources of moisture in the U.S. southwest since the Last Glacial Maximum in response to global climate change, *Earth and Planetary Science Letters*, 401: 47–56.

Casey Saup, an undergraduate senior in SES was featured in a recent issue of the Arts and Sciences Undergraduate Student News. The profile is under: Student Research Profile - Coral & Ocean Conditions. Casey's profile on the College of Arts and Sciences website can be seen [here](#).

Prof Emeritus Hal Noltimier became President of the OSURA (Ohio State University Retirees Association) in July. Prof Noltimier is Chair of the OSURA Benefits Committee, organizes and chairs an Annual Tax Seminar each January, founded and conduct the Hiking/Walking Group, and is a member of numerous committees such as cultural Arts, Travel, Membership, and have been involved continuously with OSURA since retirement in 2009.

Mike Wilkins was recently in Seoul, South Korea, for a workshop jointly hosted by the International Continental Drilling Program (ICDP) and the International Ocean Discovery Program (IODP). The workshop aim was to determine suitable procedures for obtaining materials suitable for microbiological analyses during deep subsurface drilling expeditions on the research vessels JOIDES Resolution and Chikyu, or mission specific drilling platforms. During many scientific drilling legs, valuable microbiological data can be collected from rock and sediment cores to inform on the 'deep biosphere' and help determine parameters for the limits of life in the subsurface. The workshop was followed by a meeting of the International Society for Microbial Ecology (ISME) at the COEX convention center in the Gangnam district of Seoul.