

UGA Geology News - 2019

Fall 2019 Geology News

Student/Alumni Updates

The geology department had numerous summer happenings. Let's start with a big round of applause going to our Imperial Barrel Award (IBA) team for taking first place in the regional competition and participating in the international finals in San Antonio, TX. The team performed well, and we are thankful to the generous support from our industry supporters (Chevron) for making it all possible. We are already assembling this year's team, who traveled to the annual GSA meeting in Phoenix, AZ to participate in a basin analysis workshop with help from corporate donations.



Photo caption: Kudos to the IBA team, as they won the regional competition, which resulted in an invitation to the International competition. From left to right are Sydney Lee, Cash Owens, Sydney Shatz, Trez Rice, Gustavo Larramendi, and Dr. Christian Klimczak.

Erik Alberts was recognized with our 2018-2019 Outstanding Young Alumni Award. Erik was quite helpful volunteering his time advising the IBA team to develop their prospects (within the limits

of the competition rules). At the same time, Frank Lieth was recognized with our 2018-2019 Outstanding Alumni Award, in particular for his time and efforts to lead the UGA Alumni Advisory Board and development of personal and corporate (Vulcan) support for the Geology endowment funds. I will reiterate here, as in every newsletter, how important alumni and corporate support is to the UGA Geology department. These contributions are enabling student field trips and research experiences that otherwise would not happen.

This fall, with thanks to Doug Crowe, we will again host Exxon-Mobil for recruiting in the S.E. United States. They generously offer a short course training session that is part of their recruiting program at UGA. Because of the location in Athens, it allows for a few “local” UGA Geology students to participate. Chevron (Devon Verellen, UGA grad) hosted a webinar for our geology majors to help improve resumes. Chevron is also returning to interview UGA students to find candidates for their intern program. Please check our UGA Geology web page for details about a Houston-based alumni gathering scheduled for fall 2019.

Faculty Updates

Doug Crowe and **Christian Klimczak** led another successful field camp season in Canyon City, CO. We continue to benefit from the support of Newmont that help needs-based geology majors to participate in field camp. Look for a few changes in running field camp, as Klimczak will be taking more of the lead. We will also be bringing in our newest Assistant Professor, Mattia Pistone, to be part of instruction. Don't worry, Doug and Chris will still be there imparting their specialized talents. The number of Geology majors has undergone a downturn in the past few years. This is a national trend being experienced by all geoscience departments. We all know the cyclic nature of our geoscience careers. The upturns and downturns the different sectors (petroleum, economic minerals, environmental, government, and academics) all seem to go at different frequencies. If they were as predictable as Milankovitch periodicities, then we'd know future trends. Unfortunately, the various sector cycles are not well forecasted.

Andy Darling is now fully onboard teaching intro sections and Earth science for middle school educators. He showed some awesome pictures of his trip to the Alaska Brooks Range this summer. He is serving as an officer in the GSA Geoscience Education Division, which should keep us on the leading edge for outreach across STEM disciplines in geoscience.

Sue Goldstein continues her work with the Cushman Foundation. Her PhD student, Chris Smith is culminating exciting research on trace elements in foram shells across different taxa. They are finding definite positive correlations between trace metal concentrations and uptake. Forams have potential to be used as “canaries in a coal mine” for detecting metal contamination in coastal environments. The work that Sue and Chris are doing is some of the first systematic efforts to realize that there are important taxa specific factors to be considered before using forams as indicators of ecosystem health.

Rob Hawman is deeply involved with the study of the crust and upper mantle in the southern Appalachians, while at the same doing plenty of outreach in local schools. Rob advised one of our

Chevron sponsored graduate students, Andrew Clements, who is focusing on geophysics and tectonics. Other Chevron sponsored students include Isik Yazici, who recently arrived from Istanbul Technical University and is now being advised by Christian Klimczak in structural geology and planetary science. Charlotte Garing will also be supporting a graduate student with Chevron funds in the Fall 2020 term.

Charlotte Garing and **Mattia Pistone** are pursuing NSF-MRI proposals this year. One is for a 3D X-ray microscope and one for a new electron microprobe. This work is being done in concert with the UGA Georgia Electron Microscope facility with a footprint for the new instrument being held at the new STEM building now under construction located on the backside of the Georgia Museum of History. We are thankful to our corporate donors again, as we have dedicated some of their funds to bootstrap start-up initiatives.

The room for Charlotte Garing's Flow in Porous Media Lab has been entirely renovated and equipment is progressively being set up. Among the devices installed and running is a Helium Pycnometer. It provides a direct measurement of the skeletal volume of a rock sample, an essential quantity to estimate the grain density and porosity of the sample. Charlotte was also selected to participate to the Teaching Academy Fellow Program for the current academic year (2019-2020). This provides an opportunity to work closely with award-winning senior Teaching Academy faculty mentors throughout the year to reflect on teaching and mentoring and built instructional toolkits at an early point of her career.



Photo caption: Teaching Academy faculty mentors with Charlotte Garing standing next to UGA President Jere Morehead (red tie) and other new academy members.

Adam Milwesi's water resources and remote sensing group is robust with many projects and grad students (in addition to his growing home family... congratulations Adam!). Rachel Rotz taught the very first section of introductory geology to UGA's freshman college this summer. This program brings rising seniors to campus the summer term before they start at UGA and gives them a running start at college life and the chance to realize that geology can be a career path. Rachel and Adam are investigating dune formation mechanisms and the role of water in dune formation and stability (along with Bob Craddock from the Smithsonian Institute) in Australia using UAVs, geochemistry, and remote sensing.



Photo caption: Adam Milewski on the Madigan Track in the Simpson Desert (left). UAV image of a dune in Lake Caroline (right).

Adam is working with researchers at Cadi Ayyad University (Dr. Nour-eddine Laftouhi) and Grad student, Michael Durham to install additional soil temperature probes and collect data in Morocco to better understand the rates and variability of transmission losses in semi-arid basins. Preliminary results suggest high recharge rates and extreme variability in Ourika Basin, Morocco. Adam also spent time with the Summer IFP in the southwestern US, teaching about arid ecosystems and the balance of water within.

Speaking of IFP, the summer went with a bumper crop of 23 students and 15 staff. IFP is oversubscribed, which makes it tough for staff leaders like Julie Cox to decide who can and can't go. Her advice is to apply early and have a passion for being outside. IPF and field camp are now fully under the umbrella of the Office of Global Engagement's domestic study away portal. After a few bumps in the beginning both IFP and field camp working well with OGE. OGE is now giving relief in the area of risk management and offers a slick online portal, which now lets the faculty focus more on matters of instruction. The collective goal is to keep these experiential learning opportunities affordable. Scholarships from alumni are very important to making this happen.

Sally Walker has returned the fold at UGA Geology after her Spring-Summer leave to Texas A&M in the Endowed Halbouty Professorship. She said the interactions with the A&M faculty and

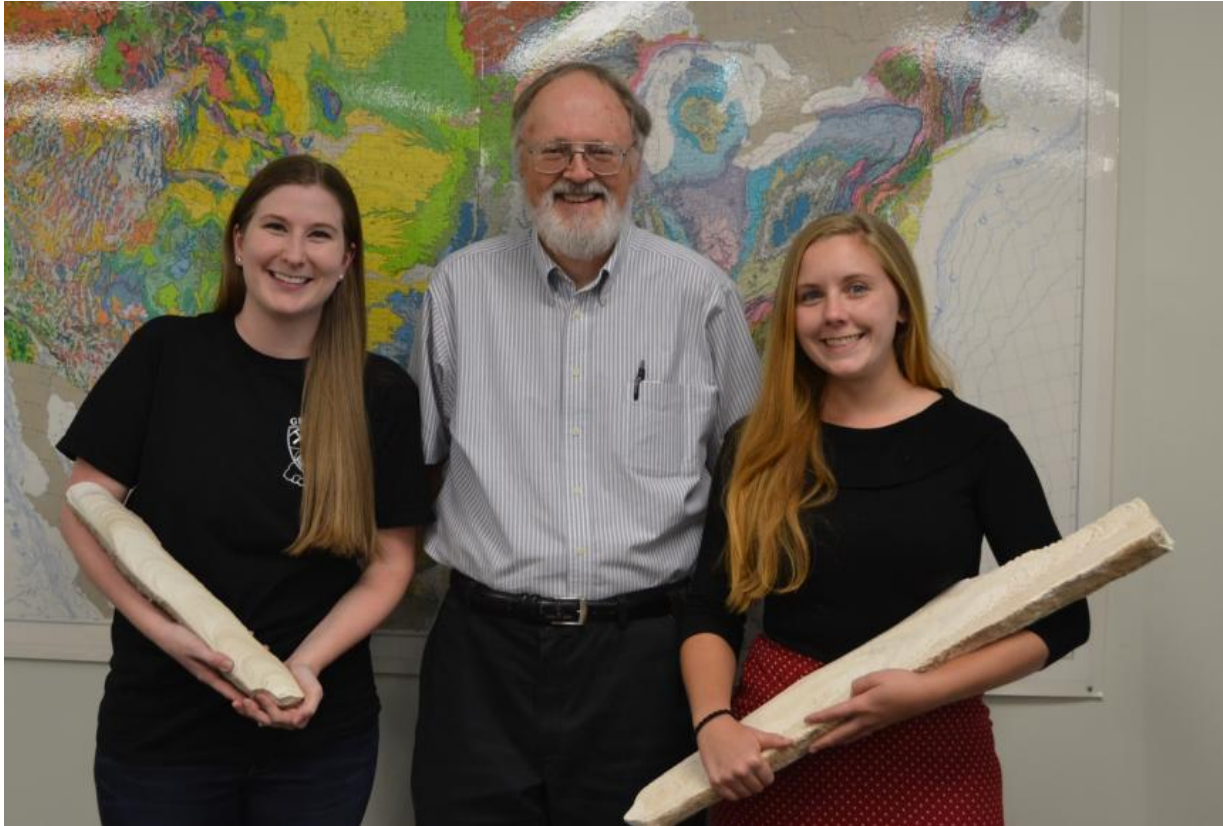
students was fantastic. Sally claims, however, the UGA Athens campus architecture is more beautiful than the A&M College Station campus and is happy to be home. Sally is now getting into her newly funded NSF project to study Antarctic scallops as key to paleoenvironments and sea ice condition.

Steve Holland is currently transitioning between two major themes for the Stratigraphy Lab. His group is finishing a study of the Jurassic Sundance Seaway, concerning the stratigraphic and paleoecological evolution of a short-lived (15 my) epicontinental seaway in western North America. His group is starting a multi-year project on the stratigraphic paleobiology of terrestrial systems. Nearly all work on stratigraphic paleobiology that applies event-stratigraphic and sequence-stratigraphic principles to the construction and interpretation of the fossil record has been on the marine fossil record. The new focus significantly expands the application of stratigraphic paleobiology. Both projects have been generously supported with research assistants funded by the Chevron Corporation.



Photo caption: UGA Stratigraphy Lab students examining an abandoned channel in the Pennsylvanian Breathitt Group, eastern Kentucky.

Bruce Railsback's research continues to use stalagmites as records of past climate and to develop new approaches for that effort. In the last few years, students Hillary Sletten, Rachel Sellers, Katelynn Garrett, Ny Riavo Voarintsoa, and Laura Dupont have completed projects unraveling past climate changes in Spain, southern Africa, and Madagascar, and Laura Dupont is working on yet another project at present. This research involves analysis of uranium and thorium isotopes to determine stalagmite ages, and analysis of carbon and oxygen isotopes and observations at our lab's microscope to determine past changes of climate (mostly wet vs. dry). They are also developing new petrographic methods for understanding past climate and sifting through data about settings of modern stalagmites to similarly develop better approaches to understanding past climate.



Laura Dupont, Bruce Railsback, and Susan Kraft with a couple of stalagmites.

A grant awarded by a major coal-fired power company to Dr. Valentine Nzungu's research group is supporting the development of cost-effective and environmentally sustainable solutions for removing boron and bromide from water in ash basins at coal-fired power plants. The treatment media is prepared mostly from waste products by combining recycled aluminum cans, steel manufacture slags and enhanced biochar from the pyrolysis of plant biomass. When the solution is fully developed and validated, the resulting treatment media will be applied as permeable reactive media for filtration and stabilization of boron and bromide in surface water and groundwater. As electric utilities around the country look to dewater and close ash basins, boron and bromide have emerged as two of the most challenging contaminants of concern for which coal-fired power plants desire cost-effective and sustainable solutions to treat.



Photo caption: Pictured above are column tests performed in the lab of Valentine Nzengung. He and his graduate student are exploring the use of other wastes (aluminum cans, biochar, and slags) to stabilize deposits of coal ash from power plants.

As for myself, I am excited to say that we continue to foster the UGA-ERASMUS+ programs with our colleagues in Turkey at Middle Eastern Technical University and Istanbul Technical University. Recall the ERASMUS program is effectively the study abroad program for all European Union Universities including Turkey who pays into the EU. ERASMUS+ pays for faculty/staff/student exchange. Rachel Ashton attended a staff workweek in Ankara, Turkey where she learned about all the issues particular to working with student and faculty exchange. With the recent change of US State Department security level to level-2, we can now start exchanging undergraduates using “credit hour mobility units”. This is a great opportunity to expose our students to cultural enrichment and the European system where geological sciences and engineering are combined into the same program. Graduate students in my critical zone (CZ) group back in Athens are addressing unique topics ranging from geologic mapping of the Calhoun CZ observatory, the making of Martian soil simulants and growing plants, linking mineral-potassium to ecosystem nutrient cycles, and the study weathering of economic clay deposits north of Istanbul, Turkey. Alumni and corporate donations that help keep instrument facilities up and running (like the XRD, isotope, and probe labs) are essential for the success of students.



Photo caption: Critical zone science group after attending keynote lecture by Beth Shapiro (center front). Beth is author of the popular book “How to clone a Mammoth” and past UGA IFP and mineralogy student. Others, left to right are Huseyin Demir, Bear Jordan, Paul Schroeder, Peter Steiner, and Laura Fackrell.

Please check the geology.uga.edu web site often for updates to events such as colloquia and alumni gatherings. We now have contacts in the cities of Houston (Devon Verellen), Denver (Ed Mortiz), and Atlanta (Grant Eager) in case you want network or find out when UGA Geology people might be gathering for social events. Stay in touch!

Paul Schroeder
Professor and Head