

## UGA Geology News - Summer 2022

With the end of the 2021-22 academic year, UGA Geology inhales a breath as fresh as one on any night of a Fall or Spring Athens event. What's palpable is the return to experiential learning in the classroom, in the field, in the lab, and even at social gatherings. Geology Field camp is back in Colorado and the Interdisciplinary Field Program is heading west. As you can see from the adjacent picture, mother nature is always ready to challenge the field camp faculty, staff, and students. This past year has been interesting because most everyone had pivoted back to in-class instruction, with somewhat of a pandemic silver-lining. By being forced to explore online resources to enrich virtual learning, faculty and students have realized that using assets like Google Earth, virtual lab experiments, and zoom to bring in guest speakers has created new opportunities. The blending of



traditional physical learning with the world of virtual learning has leapfrogged geology curricula into the future in a way that otherwise may have taken a decade. I am amazed at the talent of our faculty and our students, working together, to train the next generation of geoscientists. Every review for the demand of geoscientists (including those by AGI, AAPG, and GSA) sees a decade of growth in a diverse range of subdisciplines ready to meet societal needs. This includes the areas of Geophysics, Earth observation, Data management, Environmental and societal governance, Monitoring of change, Earth systems modeling, and Laboratory analytics. The demands go beyond oil, gas, and mineral ores. Geology has traditionally studied the deep surface, but the next 20 years will have added focus to the shallow subsurface or what is now become known as the Critical Zone.

To that end, we are excited to enter the newly enacted federally funded Battelle Savannah Research Alliance (or as the government likes its acronyms, "BSRA", <https://www.battellesra.org/>). This is a network of five universities, that include UGA, Ga-Tech, USC, Clemson, and SCSU to collaborate with scientists at the Savannah River National Laboratory (SRNL). The intent is to create a system like other



university-national laboratory alliances, such as the longstanding programs operating at Lawrence Livermore, Oak Ridge, Pacific Northwest, and Los Alamos National laboratories. This past year, Dean Dorsey authorized the search for two new tenure track positions in Geology. After a lengthy effort to interview a talented applicant pool, we are excited to bring on two new faculty to start this Fall. The first position is in Geobiology, which is being filled by Dr. Avishek Dutta. He is most recently coming from Scripps, where among many areas of study in microbiology, Avishek had done some fascinating work on deep geomicrobiological communities living under the Decan Trap. He brings the fast-developing world of molecular biology techniques as a tool to better understand function using machine learning. This converges fields of geology, microbiology, and big data, which is clearly a direction we are all taking. The other hire is Dr. Brennan Ferguson, who has just finished her Ph.D. work at Clemson and specializes in subsurface contaminant transport. She specializes in uranium transport with talents in reaction kinetics and mechanisms. Brennan will have her lab hosted near the SRNL at UGA's Savannah River Ecology Lab. Geology's BSRA hires are being complemented by scientists from many other disciplines throughout UGA and it looks like we will have great benefit from this new initiative that brings together world-class expertise in laboratory management, nuclear operations, national security, and scientific research to SRNL. Please give Avishek and Brennan a warm welcome as they join us in the Fall.

This academic year could not have ended on a better note with the celebration to recognize recently retired faculty and dedicate the newly named Allard Petrology Lab. Pictured below are some of the physical attendees. With the added technology of zoom, we had 91 alumni and friends of UGA Geology participate.



The event was held at the Georgia Center and the festivities included short speeches from recently retired faculty Sue Goldstein, Marta Patino-Douce, and Alberto Patino-Douce. Sue, Marta, and Alberto were recognized for their dedication and long careers in the Geology department by each receiving a custom earthenware platter hand-made by artist Traci Walters. The platter shown in the picture was presented to Marta. Sue and Alberto received theirs last year by mail when the event was sidelined by the pandemic.



The dedication of the Allard petrology lab was led by Skip Forsthoff, which included a respectful roasting of Gilles' dedicated career of teaching and research. The program also included vignettes about Gilles given by Jim Saunders, Jeff Shellebarger, and Charlotte Abrams. The capstone of the event was a short speech by Gilles himself, which was delivered in his well-recognized impeccable graceful form. We were grateful for Gilles' entire family, who traveled from afar to make sure he could partake in all the food, drink, and social activity. Please stop by the Geology building to see the granite plaque that has been installed outside of room 325. The words engraved upon the stone barely describe the full impact and contributions Gilles has made to UGA and the discipline of Geology.



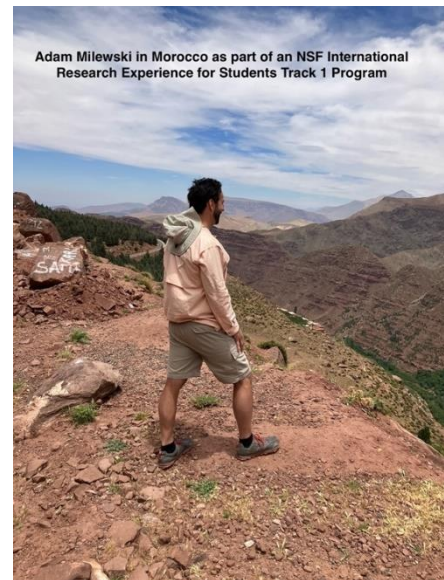
Brief updates on the faculty start with Doug Crowe, who is now championing an effort to ground truth mineral identities in the Allard Collection by verifying with X-ray diffraction. He and a small army of undergraduates are analyzing many of the specimens and adding diffractograms the database with identifications made using to the International Centre for Diffraction Data powder diffraction files. Please explore the database by going to the following URL: <http://128.192.226.15/search/>. Andy Darling has embellished the dinosaur course, which is ever popular with the UGA undergraduates seeking science credits. At the same time, Andy continues to research the complex uplift and erosion history of the Colorado Plateau with a newly acquired data set of cosmogenic nuclides. He is also expanding this cosmogenic new technology to age-old questions about the geomorphic evolution of the southeastern United

States, as he works with a graduate student, Holden Aronson who is estimating erosion rates in the Calhoun Critical Zone Observatory in South Carolina (see photo on the left). Speaking of



South Carolina, also shown in the photo with Holden is Oluwaseun Adeyemi. “Olu” as many call him, is working with Adjunct Professor John Washington in a PFAS contaminant site near Florence, SC. PFAS is also known as the “forever chemicals”, long used to keep stains off fabrics. Olu is looking at the mineralogy of the site to see how they might interact with the fate and transport of PFAS. See our news page <https://geology.uga.edu/news/all> to read about the work John is doing to bring this worldwide problem to a better understanding. No doubt this will be a challenge to all because it is possible that in high concentrations, these compounds can severely degrade human health as well as the natural environment around us.

Charlotte Garing was recognized as Teacher of the Year, which puts her in a very respected and highly regarded cohort of UGA professors. She has been mentoring several graduate students and convened a session at AGU on *Experimental and Computational developments in modeling geologic carbon storage*. Charlotte also joins Adam Milewski on a new multi-investigator project that is looking at the Claiborne Formation in southwest Georgia. This work is funded by the GA EPD to consider the impact of water storage on rivers and agricultural enterprises. Erv Garrison reports Kelly Cronin will return to UGA Geology as a Post-Doctoral Fellow in July. She has just completed an academic year of instruction at Georgia Southern University. She will work with Erv through the summer and fall on his NSF-funded research off the coast of Georgia using an underwater drone. As part of her post-doctoral work, Kelly will transition to instruction in the spring of 2023. Kelly is a UGA Geology graduate where she worked with Sally Walker.



Adam Milewski was awarded a new three-year grant by Chemours to study the risk-informed performance-based evaluation of hydrology in South Georgia. Adam also continues to expand his “air force” of drones (UAVs) that are carrying more and more sophisticated sensors including LiDAR and multi-wavelength visible and IR spectrometers. UAV technology has now become a regular part of the Geology curriculum. As this newsletter is written, Adam is in Morocco conducting hydrologic research and teaching a cohort of students as part of the NSF

IRES-Track-1 program. Valentine Nzungu remains active where he was an invited speaker to the University of Bagdad, Department of Geology, Iraq, and he also guest lectured at an American Chemical Society meeting and at a Georgia Junior Science and Humanities symposium speaking on the topic of chemical neutralization of chemical warfare agents. Valentine sole-authored an abstract at the Electric Power Research Institute Boron Summit where he discussed the removal of boron from coal combustion wastewaters. Mattia Pistone was the first author on a paper discussing seismic attenuation during magmatic vesiculation in the highest impact journal in the field of geophysics, *Geophysical Research Letters*. He published another paper that addressed subduction and carbonate platform interactions. Mattia presented three invited lectures, spanning venues from the UGA Department of Chemistry to the University of Pavia, Italy, to the University of Glasgow, UK. Back in Athens, he is developing a 3D printing lab, which has the greatest number of printers on the UGA campus, with hopes to use them in both teaching and research. This summer Mattia is spearheading a seed project called BioVolcano, which is exploring the idea that volcanoes emit excess Hg before major eruptions. He and an interdisciplinary team will be looking at insects, plants, soil microbes, and soil minerals to test this hypothesis.

It's been another busy year for Steve Holland and the Strat Lab, with four master's students graduating: Anik Regan (Cretaceous Judith River Formation of Montana), Samantha Khatri (Cretaceous–Paleogene boundary in North Dakota), Max Deckman (Triassic Chugwater Formation of central Wyoming), and Elliot Blake (Jurassic Sundance Formation of north-central Wyoming). All four worked on projects linking the nonmarine fossil record to sequence-stratigraphic architecture, which is the ongoing



focus of the lab. This summer, Katie Loughney will finish her post-doctoral fellowship on Neogene mammal fossils in extensional basins of Nevada, and new master's student Marjie Cone will be testing for stratigraphic controls on fossil wood in fluvial channels of the Pennsylvanian Breathitt Group in eastern Kentucky. We made it to eastern Kentucky for our Spring field trip; it was a great trip, even with getting completely soaked on Saturday. This fall, Samantha will be starting her Ph.D. studies in the Strat Lab, and we welcome a new master's student Cade Orchard from Earlham College in Indiana. The Strat Lab photo above is on Sapelo Island. Back row (left to right): Elliot Blake, Max Deckman, Marjie Cone. Front row (left to right): Katie Loughney, Samantha Khatri, Anik Regan, Steven Holland. (Photo by Steve Holland).

Bruce Railsback continues to add content to his website dedicated to Geoscience resources. Please visit railsback.org frequently, as Bruce updates on a regular basis. The Earth Scientist's periodic table is a rich source of information about how elements really behave under Earth conditions (i.e., not like in a chemistry beaker in the lab...). His illustrations are being used by many others in publications, with the number that is freely available (with attribution!) in the hundreds. Rob Hawman convened a thematic session at S.E. GSA on "*Geophysical Insights and Applications: From Mantle to near Surface.*" Rob continues to examine the structure of the lithosphere across the Appalachians using earthquakes and reflection profiling. He and his students explore mountain roots, lithospheric layering, and mantle flow using seismic waves. Last, but certainly not least, Sally Walker continues to exude excellence as the Shellebarger Professor of Geology. Sally managed her project from the NSF Polar programs division, studying scallops as a key indicator of sea ice conditions in both the past and the present. Her plate is kept full in her role as Associate Editor for three international geoscience journals, including *Frontiers in Earth Sciences- Paleontology, Ichnos, and Palaios.*

On the international front, UGA Geology continues to build ties with Turkish Universities and their geoscience programs. UGA Geology has established international collaborative agreements via the European Union ERASMUS+ program (<https://erasmus-plus.ec.europa.eu/>). Student, faculty, and staff exchange is occurring between UGA and Istanbul Technical University and Istanbul and Middle East Technical University, Ankara. Beyond ERASMUS+, the University System of Georgia has just approved two new Adjunct Professors to UGA Geology. This includes Professor Dr. Nurgul Balci and Professor Dr. Emin Ciftci, both from Istanbul Technical University, Department of Geological Engineering. We are excited to have them become part of our scholarly efforts. Nurgul is well known for her research on microbialites in alkaline lakes that serve as analogs for relict lakes on Mars. She has been a keynote speaker throughout North America and the Mediterranean on the use of isotopes, metagenomics, and sedimentary rock textures for understanding planetary evolution. Emin is internationally known for his work on orogenic gold deposits. He is also recognized throughout Turkey for his English-Turkish dictionary of technical terms in Earth Sciences. We look forward to fruitful collaborations with these two as they join our other Adjuncts, Drs. Omer Ece, Besty Reitz, John Washington, and Sandy Whitney. Sandy's directing and running of the Tanzania Study Abroad program is going strong, and like our field camp and IFP, we are happy to see them back in action. Kudos also go to Julie Cox for receiving a grant to help with the running of IFP. See the URL below for the details. Although IFP is not international, I've said for years that the diversity of culture experienced during that 8-week domestic program is greater than many study abroad programs.

<https://geology.uga.edu/news/stories/2022/interdisciplinary-field-program-receives-grant-uga-parents-leadership-council>

Back in the department we have reorganized and hired new staff. Rachel Ashton was conscripted to a new centralized business program within the entire Franklin College. Fortunately, Geology was assigned to Rachel, so we still get her expert oversight. Ashely Arnold is now our Office Manager, doing what she had done before, but now also doing some things that Rachel had to leave behind. The silver lining to this realignment is that we hired Shay Nash. Shay is quickly becoming part of the UGA Geology family and is now taking on institutional memory that is essential for keeping the department smoothly running. Combined with Michael Durham and hourly undergraduates (Caroline and Nicky), the staff has been wonderful to work with.

Looking forward to the next academic year is promising. The UGA Geology Alumni advisory board wants to expand its annual meeting to create more opportunities to learn about the department's needs. Grant Eager will continue to serve as the board chair. The idea of having an annual alumni reunion has gained momentum, so please be on the lookout for announcements and save the end of April for the chance to be in Athens for fun and festivities.

Best,

Paul Schroeder

Professor and Head

