



Ready . . . Set . . . GEO!

NEWSLETTER

Fall
2019



THE UNIVERSITY OF ALABAMA®
Department of Geological Sciences

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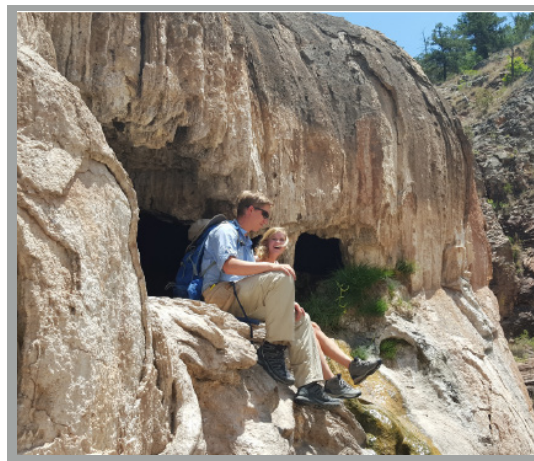
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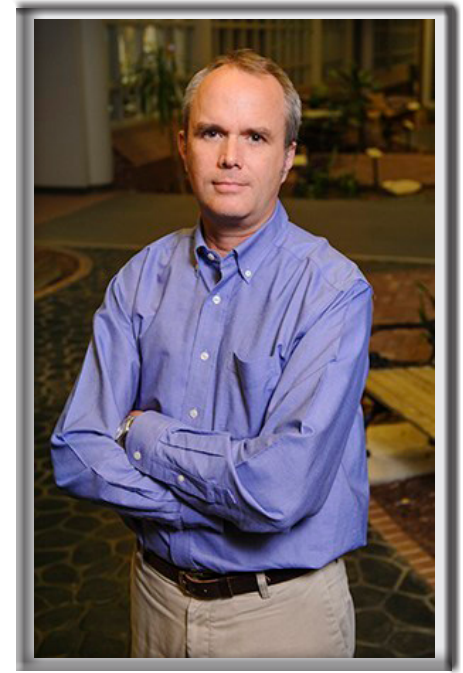
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A letter from our Chair

Dr. Fred Andrus

The department is gearing up for what promises to be an eventful semester. We will welcome a new Dean to the College of Arts and Sciences, Dr. Joe Messina, a geographer formally at Michigan State. We are also welcoming 16 new graduate students, one of our largest incoming classes ever. We will continue the search for our next Chair. This will be my seventh year serving as Chair, and while I value this job immensely, and find great satisfaction in trying to help the program grow and improve, my true passion is in research and teaching. I will continue to serve as long as I am needed, but I hope to pass the baton to the right person and return to the job I most love.



You may have heard that Alabama was recently classified as a Carnegie Research 1 university, joining the ranks of the most research-intensive institutions in the country, and Geological Sciences' research productivity helped drive this ranking. Last year our faculty and students published at a record pace. We set new highs of 139 published abstracts and 18 peer-reviewed papers by graduate students. Faculty wrote 83 peer-reviewed publications this year, and 84 last year, our two best ever. It is worth noting that these records are not just due to growth in the number of faculty and students, but rather both absolute and per capita publication rates have more than doubled over the past 5 years.

Alain Platter joined as a new faculty member with expertise in geophysics. He earned his Ph.D. at ETH Zurich, competed a post-doc at Princeton, and was assistant professor at Cal State Fresno before coming to Alabama. He is off to a strong start, as seen in his new grant from NASA for over \$300,000. Existing faculty also had some major achievements to note, including Rona Donahoe becoming Faculty Senate President and Delores Robinson becoming a Fellow of the Geological Society of America at their last national meeting.

Geology majors established the first student chapter of the American Institute of Professional Geologists (AIPG) in state history. This is the premier organization supporting professional environmental geoscientists. Alumnus Caryl Orr serves as its professional sponsor. We dominated the 3 Minute Thesis competition for the second year in a row, with two finalists, and Kaydee West placed third. Souvik Bhattacharjee, Lauren Parker, and Leah Travis Taylor won research grants from the Geological Society of America. Several students won internships, including BS in Geology major Stephanie White with ExxonMobil, MS student Jamekia Durrough-Pritchard at the National Water Center, and Ph.D. student Karena Gill at Chesapeake. Ph.D. candidate Christine Bassett won a prestigious NOAA Knauss Fellowship and will spend a year in Washington DC working toward informing policy decisions with science. There are many other achievements I don't have space to mention, so please read the rest of the newsletter to learn more

We traveled a great deal this year. A particularly notable expedition was a sediment-coring cruise to Antarctica by Becky Minzoni and her new Ph.D. student, Victoria Fitzgerald, the department's first National Science Foundation Graduate Fellow. You can learn more about their exploits from *Rolling Stone* and Public Radio International, which both reported extensively on the cruise. Tom Tobin and his student Bridget Murray traveled to India to study the role of the Deccan Trap eruptions in the extinction of the dinosaurs. Marcello Minzoni led his Ph.D. student Souvik Bhattacharjee and BS in Geology major Stephanie White to study carbonate outcrops in China, and his MS student Lucas Nibert to study carbonate muds in Cuba. Delores Robinson became one of the first US geologists to conduct fieldwork in Pakistan in recent decades. Faculty and students also traveled to many other places, including Bulgaria, Canada, Croatia, Germany, Japan, Korea, Nepal, New Zealand, Spain, Switzerland, Turkey, Uganda, and the United Kingdom.

Sadly, the department lost two of its pillars, Gary Hooks and Tom Joiner. Gary was a legendary teacher, guiding many students on to successful careers. It is always a pleasure to hear about his exploits in the field, his challenging classes, and the positive impact he had on so many students over his nearly 60 years as a professor. Tom Joiner was an alumnus, State Geologist, company founder, and a major benefactor to Alabama. He was also instrumental in founding the Geological Sciences Advisory Board (GSAB). As you will read later, the GSAB is thriving and continuing to support students. This is just one of Tom's many positive impacts in the world. We will miss them both greatly.

I have run out of space, but not out of stories to tell, so please keep up with the department's activities with this newsletter, our website, and twitter. We are fortunate to have a rich history and outstanding alumni, so please keep us informed of your milestones and career changes by emailing, calling, or filling out the alumni update form on our webpage.

Faculty and Staff



Paul Aharon
Emeritus/Retired



Fred Andrus
Chair, Professor



D. Joe Benson
Emeritus/Retired



Deidra Butler
Office Associate II



Sid Bhattacharyya
Mgr/Geochem. Res
Lab



Julia A. Cartwright
Assistant Professor



Ibrahim Cemen
Professor



Natasha T. Dimova
Associate Professor



Rona Donahoe
Professor



Debbie Frank
Support Assitant
(Budget & Finance)



Kim Genareau
Associate Professor



Andrew Goodliffe
Associate Professor,
Associate Dean of GS



Richard Groshong
Emeritus/Retired



Samantha Hansen
Associate Professor,
Undergrad. Director



Takehito Ikejiri
Instructor



Joe Lambert
Env. Isotope Spec.
ASIL Mgr



Karen Linville
Admin. Secretary



Yuehan Lu
Associate Professor



Ernest A. Mancini
Emeritus/Retired



Marcello Minzoni
Assistant Professor



Rebecca Totten Minzoni
Assistant Professor



Grey S. Nearing
Assistant Professor



Alberto Perez-Huerta
Associate Professor



Alain Plattner
Assistant Professor



Delores M. Robinson
Professor



Carl Stock
Emeritus/Retired



Harold Stowell
Professor



Berry (Nick) H. Tew
Professor, Director, Center for
Sed. Basin Research



Geoff Tick
Professor, Graduate
Program Director



Tom Tobin
Assistant Professor



Matthew Wielicki
Assistant Professor



Michelle Wielicki
Adjunct Professor



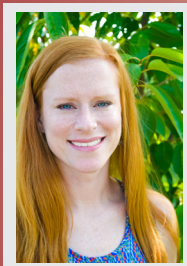
Bo Zhang
Assistant Professor



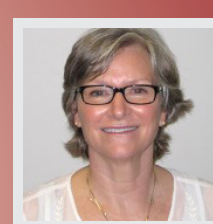
Yong Zhang
Associate Professor



Chunmiao Zheng
Adjunct Professor



Welcome, Donna Smith! Our newest member of the office team. Donna started Summer 2019. Please stop by the office and give her a warm welcome!



Congratulations to Beth Partlow on her retirement! Beth has worked with DGS for 5 years.

Faculty Updates



Rebecca Totten Minzoni

Assistant Professor

Micropaleontology Lab



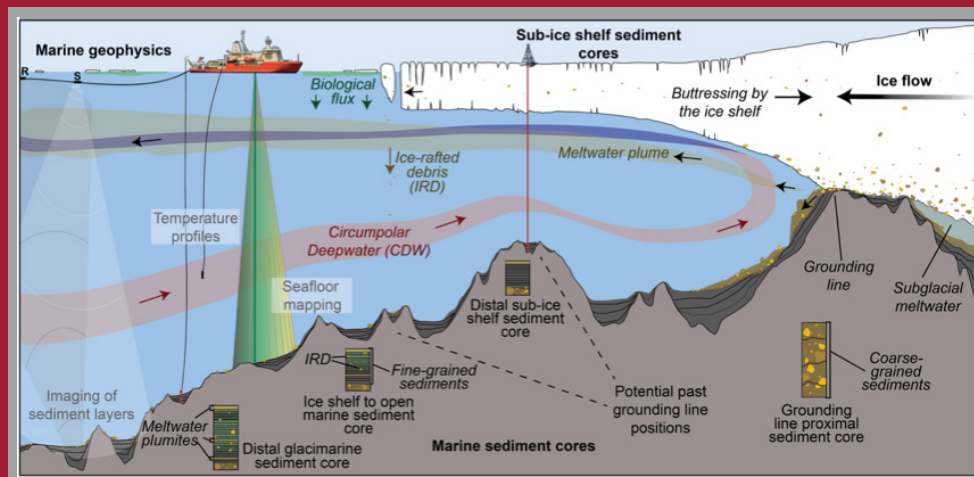
We have been busy setting up a new laboratory this year, complete with core processing work benches and microscopes for a range of microfossil analyses. We have been working on projects in Antarctica, here on campus, and at Dauphin Island! The Sedimentary Geology and Micropaleontology Lab gained 3 new members this year: Victoria Fitzgerald, Asmara Lehrmann, and Tyler Wood, who are all proud Texans. Victoria, a NSF Grad Fellow and Army veteran, started her PhD with me last January, thinking she'd be looking at Jurassic eolian rock cores. Instead she found herself offshore Thwaites Glacier, Antarctica, where our NSF- and NERC-funded marine geology team (called THOR for Thwaites Offshore Research) collected cores, water samples, and mapped the seafloor for two months! We had a blast aboard the R/V Nathaniel B. Palmer, entering newly ice-free areas that have never been explored before--a true frontier of science! When we arrived at the ice front of Thwaites Glacier, we had a BBQ and then pored over the new datasets and fresh mud cores that will keep us busy for years to come. My hometown of New Orleans was experiencing major river floods while we were in Antarctica, so it made our mission to study Thwaites Glacier's contribution to sea-level rise feel very relevant.

Our newest PhD student Asmara Lehrmann worked with me for her senior thesis at Trinity U on the Holocene flooding history and ecological responses in Mobile Bay. She is excited to continue studying sea-level rise impacts on the bay and also start research on sea-level sources from Antarctica, traveling with me to Thwaites Glacier this upcoming spring for a dedicated geology expedition to gather more sediment cores and image the sediment layers below the seabed. At the same time, we are happy to welcome our first-ever USGS EDMAP student to UA, Tyler Wood. He will work closer to home in the Gulf Coastal Plain, mapping the Coatopa Quadrangle in the Demopolis area, including the famous K-Pg boundary at Moscow Landing. We've been working with the Geological Survey of Alabama to get this project off the ground and help plan data collection that can be used in their state water model.

Meanwhile, Leah Taylor finished her innovative thesis on the paleobiology of mosasaurs and will be starting a PhD in paleoclimatology at Auburn. Adlai Fonseca finished his thesis on the dynamic retreat history of Antarctic fjords and will be starting a MS in computer science at University of South Alabama. We are selfishly happy that they are staying local and wish them the best in their future studies! Lauren Parker and Kyle Olsen are still hard at work on their theses on Weeks Bay, AL flooding history and the paleoenvironments of the Jurassic Norphlet Formation, with more updates to come!

The school year ended with a nice, warm summer that was a great change from the fieldwork in spring. The College of Arts & Sciences funded my faculty research fellowship at Dauphin Island Sea Lab, where Marcello and I were able to connect with new colleagues, work with Emily Elliott as she developed a new interactive Marine Geology class on the island, and collect fresh sediment cores for researching sea-level and storm impacts on Mobile Bay. We then took the family to South Italy to celebrate our 10th anniversary and Marcello's parents' golden anniversary, which was a real treat, gelato included.

We are looking forward to catching up with everyone and meeting all the new faces. Wishing all the best to everyone in the new semester!





Marcello Minzoni

Assistant Professor



Early Triassic giant ooids, south China

Dr. Minzoni and students in the University of Alabama Laboratory for Integrated Carbonate Research (UALICR) use modern and ancient outcrop analogues, quantitative forward modeling, as well as core, log, and seismic data to study both marine and non-marine sedimentary basins, with an emphasis on carbonate systems as archives of geochemical-biological and paleoclimate evolution, as well as hydrocarbon exploration targets. Current research is partially funded by the Petroleum research Fund of the American Chemical Society and the Gulf Coast American Geological Society and focuses on a regional study of the Jurassic Smackover Fm., the Permo-Triassic carbonate platforms in south China, and Pleistocene-Holocene carbonates in Cuba.

Doctorate students Carmen Atkins and Karna Gill tackle the depositional and diagenetic history of the Smackover, respectively. Carmen has focused on unrevealing the influence of water chemistry on Smackover facies distribution and is currently documenting her findings in her first manuscript. Karna has spent much of the semester analyzing core data for stable isotopic composition of early marine cements and replacive dolomite to assess initial oceanographic conditions of the Jurassic Gulf of Mexico and test several dolomitization models, while taking the summer for an internship with Chesapeake. PhD student Souvik Bhattacharjee is targeting the large-scale processes controlling carbonate deposition in ramp systems using stratigraphic forward modeling and synthetic seismic analyses. Dr. Minzoni, Souvik, and geology major Stephanie White traveled to China in January to study Early Triassic carbonate strata recording unusual ocean chemistry and carbonate deposition following the end-Permian extinction. Finally, MS student Lucas Nibert started his groundbreaking research on the depositional controls of carbonate mud mounds in Cuba and analogue features in Florida Bay. Dr. Minzoni and Lucas traveled to Cuba in April to present at the 500th anniversary of the city of Havana and to meet with Dr. Jesus Pajon for an initial reconnaissance and will return in the field in October to collect samples.

Additional expeditions to Cuba planned for Spring 2020 will include geology major Isabelle Evans, researchers from the Marine Institute of Havana, and Cuban students.

Dr. Minzoni and students had a busy year presenting their work at the Deepwater Technical Symposium in New Orleans, the GSA meeting in Indianapolis, and the GSL conference in the UK. Dr. Minzoni has also completed and submitted a synopsis of his 9-year research focus at Shell on the sequence-stratigraphic architecture of Early Cretaceous lacustrine carbonate reservoirs in offshore Brazil, one of the largest

hydrocarbon provinces in the world and is currently working on additional papers in collaboration with former colleagues at Shell.

This has been a very important year for the UALICR. The lab moved to the first floor and is now complete with state-of-the-art microscope station for petrographic analyses, a work area for core analysis and a large wall-mounted touch-screen monitor to promote team collaboration and discussion.

The lab has also added a hand-held core drill for outcrop sampling. The UALICR and Sedimentary Geology and Micropaleontology Lab under direction of Drs. Marcello Minzoni and Rebecca Minzoni are collaborating with the CSBS to spearhead an Energy Consortium Proposal for the study of the combined Norphlet-Smackover petroleum system. The consortium is expected to attract several Energy Companies and will support graduate and undergraduate students and enhance collaboration within the department.

Teaching took a halt in Spring 2019 to an ASPIRE semester after a busy Fall 2018 semester dedicated to a newly introduced Carbonate Petrology class. Despite the temporary abstinence from teaching, Dr. Minzoni dedicated part of the ASPIRE semester to lay the foundations for a series of rotating field classes in the Bahamas, Cuba, China, and Italy to offer undergraduate and graduate students an opportunity to travel the world and learn from the rocks. In the summer of 2020, the DGS will join forces with Trinity University and Guizhou University to offer a 3-week field course in south China.



Dr. Jesus Pajon, Dr. Minzoni, and Lucas Nibert in Havana



Julia Cartwright

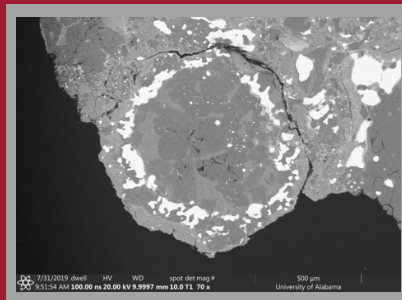
Assistant Professor

I am a planetary scientist that specializes in the analysis of meteorites as a ways to better our understanding of the Solar System and significant planet-forming processes. My main analytical expertise lies in noble gas analysis (He-Xe), chronometry (e.g. Ar-Ar, U-Pb) and compositional/petrography techniques. I have a number of active projects involving the study of various types of meteoritic materials and impact events, including 1) The study of melt clast phases within asteroid regolith materials as a proxy for impact rate in the Solar System and 2) The study of melt-drop-like phases called chondrules within chondritic meteorites to understand chondrule formation and subsequent process within the parent body.

The last year has been pretty busy in the Cartwright Cosmochemistry Laboratory (CCL). We had some fantastic news pretty early in the Fall 2018 semester – that my proposal submission to the NASA Solar System Workings Program to support my work on melt clasts had been selected for funding!! Hurrah!! The funds will support 3 years of research, including significant analytical costs for chronology techniques, sample acquisition, some small equipment purchases, and finally, some funding for a graduate student! More specifically, my research will involve

performing Ar-Ar dating of selected clasts at the Noble Gas Facilities at Arizona State University (ASU) (Prof. K. Hodges), and Pb-Pb and U-Pb at facilities at ASU (Prof. M. Wadhwa) and the Swedish Museum of Natural History (Dr. Whitehouse). I was absolutely thrilled and humbled to be selected by NASA, and I am excited to be able to continue my research in this field this Fall. I am awaiting to find out the results of another submitted NASA proposal involving my chondrule project, which includes collaborative work with fellow UA faculty Dr. A. Perez-Huerta, as well as instrument and meteorite specialists Dr. Jan Leitner (Max Planck Institute for Chemistry) and Dr. C. Vollmer (U. Münster).

Now, the NASA news wasn't the only major life event to occur in the Fall of 2018 – my husband and I were overjoyed to welcome the arrival of our twin girls! As you can probably imagine, with 3 kiddos under 3 in our house, mayhem has ensued. Returning from maternity leave in the Spring semester was a bit of a shock to the system, as with two little ones, a good nights sleep has been a rarity! I still regularly find duplo blocks in my work bag, and have often been seen in the department with yogurt stains on my shoulders from holding the babies!



A back-scattered electron (BSE) image of a chondrule within a carbonaceous chondrite meteorite, acquired using a scanning electron microscope (SEM) at the Central Analytical Facility (CAF) at UA.

Parenting aside, the CCL is starting to take shape, and major equipment purchases occurred throughout the Spring semester. The most important of these was our new microscope. So far, we have been able to take some good images of meteorite sections, and hope to develop our imaging skills throughout the coming semesters. We still have a bit of a ways to go before we have all of our imaging needs met, but we are certainly 'en-route'. The chemical laboratory, where we hope to develop some isotope geochemistry techniques, is still undergoing renovations, but we look forward to having that space ready for science! We are planning to expand on the meteorite collection within the CCL over the coming years. The collection was first established in 2017-2018 thanks to a generous donation

from Mr. Dick Goodsell, which provided the foundation of available materials for both research and teaching purposes. We have also been very happy to receive a few donations from Meteorite Specialist Ruben Garcia, as well as from members of the Georgia Meteorite Association.

I am thrilled to be welcoming three new graduate students to the group in the Fall 2019 semester. Ioannis Kouvatsis, comes to us from Bern in Switzerland, where he completed his Masters Degree in the field of meteoritics. Ioannis will be pursuing a Ph.D with emphasis on isotopic systems and



New CCL graduate students L-to-R, Ivy Do (holding a howardite), Ioannis Kouvatsis (holding a chondrite), Mark Boyd (holding a chondrite).

chronology studies of meteorites. Mark Boyd joins us from Durham, UK, where he completed his undergraduate degree in Natural Sciences with an emphasis on Earth Sciences. He was awarded a Graduate Research Fellowship and will be pursuing a Masters Degree with emphasis on spherule-shaped meteorite phases. Ivy Do comes to us from Columbus Georgia, where she completed her undergraduate degree in Earth and Space Sciences, with a focus on Planetary Geology and Astrophysics. She will be studying for a Masters Degree and will work with chronology studies of melt clasts within meteorites.

I have been actively collaborating with faculty in Physics and Astronomy and Chemistry, notably with Dr. A. Hauser, Dr. A. Ghosh and Dr. S. Deb. We are working on a project to examine materials using multiple techniques including microscopy, infrared spectroscopy, and raman spectroscopy. Physics graduate student Strange Law has been working on this project, which was supported by a UA RGC grant. Undergraduate students Sydney Briggs and Joseph Pavelites II have been working on this project and other smaller projects within CCL.



Tom Tobin

Assistant Professor

My name is Tom Tobin and I'm an assistant professor starting my fifth year in the Department of Geological Sciences. My research mainly focuses on the Cretaceous-Paleogene (K-Pg) boundary, and I usually employ a variety of tools in the geochemical, paleontological, and sedimentological fields to answer questions about the causes and effects of end Cretaceous mass extinction. Field work is very important to my research, and my field sites related to the K-Pg include Antarctica, India, Alabama, and Montana.

The last academic year has been fairly busy for me and the graduate students in my lab. Rachel Mohr defended her M.S. during last summer examining seasonality in K-Pg aged bivalve fossils from Antarctica. The manuscript based on this work will be submitted to *Geology* by the end of July. Rachel will continue working in my lab for her Ph.D. focused on ammonites from Alabama. Bridget Murray joined my lab to work on an M.S. examining environmental conditions in the latest Cretaceous of India as part of an NSF funded project. She participated in field work there during January 2019, which will form the basis of her M.S. thesis. Kaydee West is continuing research towards her Ph.D. on organic isotopic proxies in shells, and has been maintaining a snail condominium in our lab that will provide necessary samples for her research.

My work with three undergraduate students in the lab has also continued.

Jacob Honeck has been working on terrestrial carbon isotope records across the K-Pg boundary from Montana, and presented results of his work at SE GSA in March 2019, and has submitted further developments to GSA 2019. He will come assist me in the field in July 2019. Stephanie White sample and performed carbonate stable isotope analyses of late Cretaceous mollusks, which she will also present at GSA 2019. Caroline Doughty performed

extensive morphometric analyses of Antarctic ammonites, data which we are still working to process. All three students presented their research at URSCA in 2019.

I was excited to learn that NSF recently awarded funding for my proposed new isotope ratio mass spectrometer

(IRMS) capable of performing clumped isotope analyses.

The IRMS is currently being ordered, and will hopefully arrive in early 2020. With this instrumentation, we will have access to an exciting new geochemical proxy capable of reconstructing temperature in terrestrial and diagenetic environments, which were

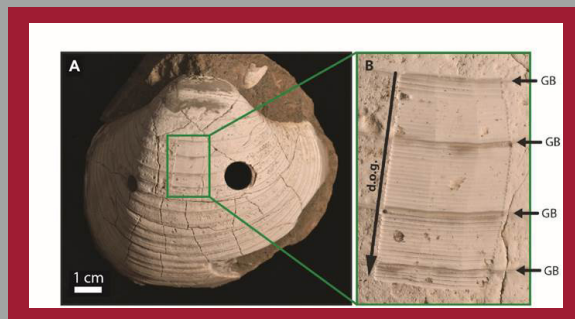
previously not viable targets for isotope paleothermometry. The equipment will be installed in the Alabama Stable Isotope Laboratory, which is currently being reorganized to accommodate the new IRMS and peripheral.

This year also saw my first publication authored by a UA undergraduate get published in *Paleontology* (Ellis and Tobin 2019), which was focused on ammonite paleoecology.

Rachel's submitted paper to *Geology* (Mohr et al. submitted) will be my first published manuscript with a graduate student. I was also involved in three other publications that were published or submitted this year, all focused on the sedimentology and stratigraphy of late Cretaceous strata in Antarctica (Tobin et al. 2018, Milanese et al. 2019, Tobin et al. in review).

In 2019-2020, I'm looking forward to installing, setting up, and calibrating the

new IRMS, which will probably take the better part of the year. Research with my graduate students will continue on their various projects. I also hope that Caroline and Jacob will continue undergraduate research in my lab, though Stephanie will be working on an internship in Houston in the fall. For more information on any of my research, see my newly updated website: <https://ttobin.people.ua.edu/>



Sampling of *Lahilla larseni* from Tom's Ph.D. student Rachel Mohr



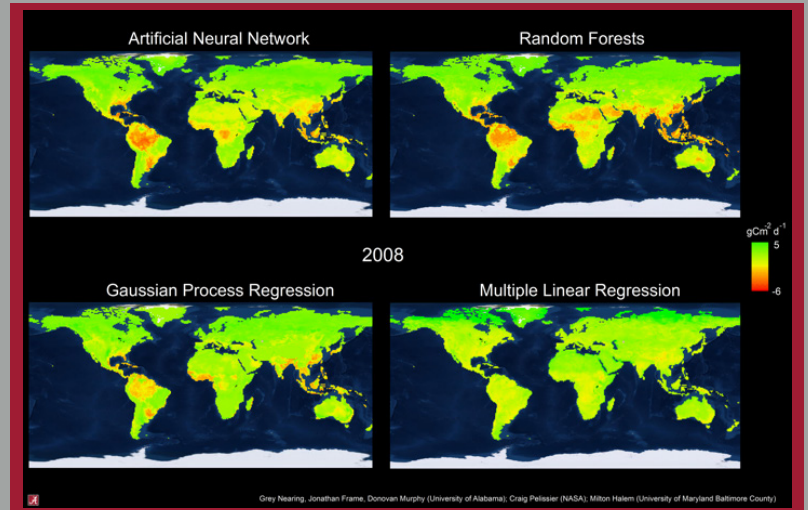
Dr. Tom Tobin and his MS student Bridget Murray doing field work in India



Grey S. Nearing

Assistant Professor

The Hydrological Modeling research group in the Department of Geological Sciences (led by Dr. Nearing) works on integrating large data sets and complex computational models to produce information about the global water cycle. Our group recently developed a set of comparisons between traditional hydrological models, which are based on biogeophysical process-based understanding of terrestrial hydrometeorology, and machine learning models that act on large and growing remote sensing and in situ Earth observation data sets. We use information theory to evaluate the accuracy and realism of these models across spatiotemporal scales. We have developed machine learning models and evaluation strategies for simulating streamflow, soil moisture, evapotranspiration, and global ecosystem carbon exchange. Our results, and those of other research groups doing similar comparisons, indicate that machine learning is a powerful method for hydrological and ecohydrological simulation.



This figure shows a direct comparison between four models of global net ecosystem exchange (ecosystem carbon flux) for a particular month in 2008. A new data product produced by undergraduate researchers in the Nearing lab created a monthly 0.5° global NEE product using remote sensing data and machine learning.



Kim Genareau

Associate Professor

In the Tephra Lab here at UA, we examine the products of explosive volcanic eruptions and effects of these eruptions on other parts of the Earth system, including the atmosphere.

As part of my NSF CAREER award, my students and I are seeking to understand the causes and consequences of volcanic lightning through laboratory experiments, microanalyses of natural and experimental samples, and remote sensing observations of volcanic lightning using satellites. We have conducted lightning simulation experiments in collaboration with our colleagues at Mississippi State University and results were published this year in both *Scientific Reports* and *Geophysical Research Letters*. Taylor Woods is currently conducting geochemical analyses of the most recent experimental products as part of her dissertation research using the instruments available in the CAF. She has advised an undergraduate research assistant, Michael Comas, on how to independently operate the scanning electron microscope in our lab, and he spent the summer collecting important data regarding the physical effects of lightning on volcanic ash. Ginny Andrews is examining volcanic lightning using satellite observations as part of her dissertation, and recently submitted an article to *Scientific Reports* describing observations of the June 2018 eruption of Fuego, Guatemala, using the Geostationary Lightning Mapper. Both Taylor and Ginny received a scholarship from the GSAB to conduct research over the summer, and they will be presenting results of their summertime efforts at the AGU meeting this fall. This year, I was awarded with a grant of \$170,000 from the Air Force Office of Scientific Research to obtain a high-voltage testing apparatus so that we can continue our lightning simulation experiments here at UA!





Samantha Hansen

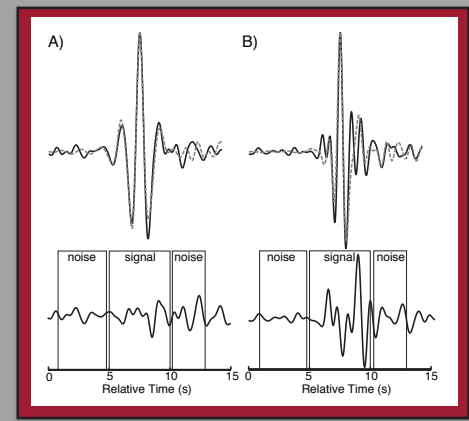
Associate Professor

My name is Samantha Hansen, and I'm an Associate Professor here in the Department of Geological Sciences (DGS). My research focuses on understanding fundamental geodynamic processes and Earth structure using earthquake data and a range of seismological analysis tools (see <https://geo.ua.edu/profile/hansen-samantha/> for more details). I also serve as the DGS Undergraduate Program Director.

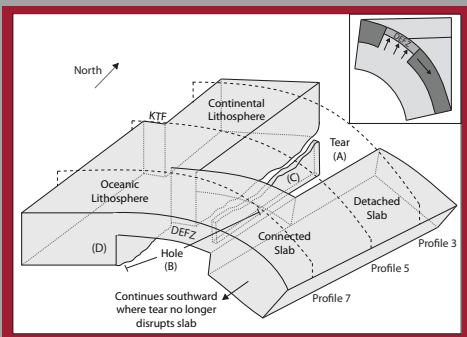
The previous academic year was very busy for me! In Fall 2018, I attended the GeoMod conference in Barcelona, Spain as well as the AGU conference in Washington D.C., where I presented my new tomographic model for the Western Hellenic Subduction Zone. This model highlights a trench-parallel tear in the subducting lithosphere that critically influences seismicity and volcanism throughout Greece. This work was also published in *Geochemistry, Geophysics, Geosystems* earlier this year. I also submitted an NSF proposal to deploy a new seismic array in the Wilkes Basin region of Antarctica to facilitate a joint seismic-geodynamic-ice-modeling project in collaboration with colleagues at Central Washington University, The University of Texas, and The University of Alaska. While we are still waiting to hear back from NSF, we've been told the proposal reviewed very well. So fingers crossed!

My M.S. student, Sarah Carson, graduated in December 2018 after completing her thesis entitled "Investigating Ultra-Low Velocity Zones (ULVZs) in the Southern Hemisphere using an Antarctic Dataset." ULVZs are anomalous regions along the core-mantle boundary associated with reduced seismic velocity and increased density; however, the origin of these structures is not well constrained. Sarah's work provides evidence for ULVZs in the vicinity of New Zealand and beneath the Weddell Sea, both close to and far from slow, hot regions of the lower mantle. These findings strongly support the concept that ULVZs must not only be thermal features but also compositionally distinct.

My M.S. student, Sarah Carson, graduated in December 2018 after completing her thesis entitled "Investigating Ultra-Low Velocity Zones (ULVZs) in the Southern Hemisphere using an Antarctic Dataset." ULVZs are anomalous regions along the core-mantle boundary associated with reduced seismic velocity and increased density; however, the origin of these structures is not well constrained. Sarah's work provides evidence for ULVZs in the vicinity of New Zealand and beneath the Weddell Sea, both close to and far from slow, hot regions of the lower mantle. These findings strongly support the concept that ULVZs must not only be thermal features but also compositionally distinct.



Example data showing P-waves (dashed gray) and core-reflected ScP waves (black) in comparison to one another and (bottom) their corresponding remainder traces when subtracted. The example in (A) does not show ULVZ evidence, but the one in (B) does indicate an ULVZ.



A conceptual model based on my tomographic results for the slab structure in the Western Hellenic Subduction Zone. Note that the slab is torn beneath northern and central Greece. More details can be found in Hansen et al. (2019).

In January 2019, a new Ph.D. student, Ashish Kumar, join my research group. In conjunction with a collaborator at New Mexico Tech, Ashish is using the computational facilities at the Alabama Supercomputer Center and is applying a full waveform ambient noise tomography approach to investigate the crustal and upper mantle structure in East Antarctica. He also plans to work with colleagues at Georgia Tech and The University of Oklahoma on a seismic event detection project. Soon, Ashish will be joined in my lab by Hesam Saeidi, a new Ph.D. student who will join our department in August 2019.

On a more personal note, I've had the good fortune to continue my global travels, including a three-week trip to Morocco in May 2019 and an upcoming trip to South Korea. Additionally, contingent upon approval from the UA Board of Trustees, I'll be named the DGS Lindahl Endowed Professor come fall. I greatly appreciate this recognition from the department and the college, and I look forward to continuing my research initiatives here at UA.



Natasha T. Dimova

Associate Professor

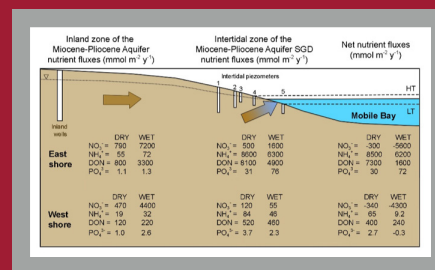
Dr. Natasha Dimova studies groundwater-surface water interactions and associated nutrient and contaminant changes at the land-ocean interface. To understand this complex coastal environment, Dr. Dimova applies a wide range of approaches including radiotracers from the U/Th decay series, stable isotopes (O, H and N), microbial DNA information, and shallow geophysical



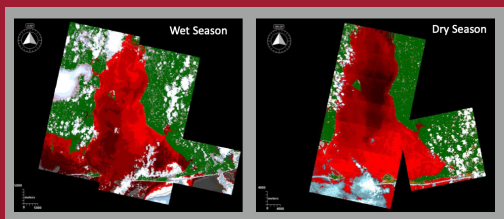
Map of the distribution of fresh SGD studies currently compiled by Mark Henry (MS student) for his thesis entitled "Global numerical modelling of fresh submarine groundwater discharge (FSGD) using multivariate analysis of aquifer characteristics". This project is a result of close collaboration with Dr. Moosdorf's research group in the ZMT Lab (Germany).

measurements (electrical resistivity tomography), to mention a few. While most of her work involves collecting and interpretation of field data from her own research on local to regional scales, Dr. Dimova is also working on problems related to water quantity and quality on larger scales (from regional to global). During the last several years Dr. Natasha Dimova and her research group was involved in a study unveiling sources and transformations of anthropogenic and naturally occurring nitrogen (N-) and phosphorus (P-) contaminants as groundwater percolates through coastal aquifer systems in Mobile Bay, Alabama. Heavy metal contaminations (As, Hg etc.) are a serious problem in coastal Alabama and high levels often result in beach advisories. In the last two years, our group became interested in a new project that tries to answer some fundamental questions related to heavy metal contaminations, including: how signals of heavy metal pollutions in the Mobile River Watershed are transported via suspended sediments to the coast and (2) what is their fate after entering the Mobile-Tensaw Delta. Research

by current student Jackson Stewart aims to correlate field data collection of suspended sediment (SS) distributions with satellite data (Figure 3) that will be implemented in a modelling tool for SS and heavy metal fluxes to Mobile Bay. This project is in collaboration with Dr. Sagy Cohen (Department of Geography at UA) and has been funded partially by the VP for research of UA in the past. Dr. Dimova's Radiation Measurement Laboratory is also involved in a project lead by Auburn social and geo scientists who are studying the cause-effect relationships between naturally occurring high levels of radon in drinking water and the extremely high level of leukemia and cancer in rural areas of Alabama.



N- and P- budgets and transformations in the subterranean zones in Mobile Bay, AL. The figure is from Daniel Montiel's research paper "Natural groundwater nutrient fluxes exceed anthropogenic inputs in an ecologically impacted estuary: lessons learned from Mobile Bay, Alabama" recently accepted in the journal *Biogeochemistry*.



Example of PlanetScope Imagery recolored with unsupervised classification to highlight suspended sediment variability (preliminary results by Jackson)

Currently, there are four graduate students in the Coastal Hydrogeology Lab (all students are fully or partially supported by an NSF EPSCoR grant to Dimova until 2020)

Stephen Anderson (Ph.D.): Stephen joined our research group as an undergraduate student in the summer of 2018. He has a degree in chemical engineering from the UA. Since summer 2019 Stephen is working towards his Ph.D. through the

UA interdisciplinary program between the Department of Material Science (Eng.) and the Geological Sciences (A&S). Mark Henry (MS), Alexander Lamore (MS) and Jackson Stewart (MS).

Recently graduated students: In the fall of 2018 Daniel Montiel graduated from our lab with Ph.D. in Coastal Hydrogeology. Through the years, Daniel's unique research was featured in multiple sources (e.g. <https://phys.org/news/2018-07-mobile-bay-excess-nutrients.html>). Daniel published all three chapters of his dissertation and was a co-author of a collaborative work between our research group and TAMU (Dr. Knappett) in a high impact journals. He is currently working as a research scientist at Geosytec, Tampa, FL. Daniel Montiel received the DGS award for best research by Ph.D. student in 2019.



Photo shows recent radon sampling campaign in Frithurst, AL in June 2019



Delores Robinson

Professor

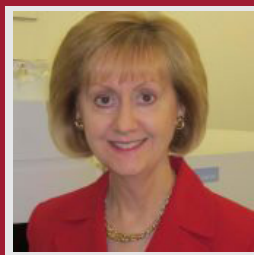
In pursuit of determining how mountains get built, Dr. Delores Robinson completed two field seasons. In November 2018, she went to Pakistan to work with Dr. Shah Faisal, Assistant Professor at the National Centre of Excellence in Geology at the University of Peshawar. Their work is funded by a grant from the National Academy of Sciences and USAID to determine the Hydrocarbon potential of the northern Pakistan thrust belt. She will go back with her Ph.D. student, William Schiffer, in October-November, 2019 for more field work. The second field season was a transect from the Himalayan high mountains in the north to the foothills in the south in western Nepal in April-May, 2019. This work is in conjunction with Dr. Nadine McQuarrie and her Ph.D. student, Mary Rouse, both at the University of Pittsburgh and Dr. Danda Adhikari at Tribuvan University in Kathmandu. Their work is funded by the National Science Foundation. Delores, William and her other Ph.D. student, Gourab Bhattacharya, attended the Himalayan-Karakorum-Tibetan Workshop in Bozeman, MT in June 2019. Gourab presented at the conference and has recently submitted two articles regarding his work on the Indus Basin Sedimentary Rocks in Ladakh, India. Gourab will graduate in December 2019. In May 2019, Delores had two M.S. students graduate, Claire Battistella and Somiddho Bosu. Publications from Robinson's Tectonics Group including past students in the past year are as follows: two from Dr. William Jackson (both in Tectonics, Will is now an Assistant Professor at the University of South Alabama), one from Dr. Subhadip Mandal (*Lithosphere*, Subho is now at Core Labs in Houston). Robinson was also a coauthor on two other publications: one from Joshua Olsen, University of Pittsburgh, in *Basin Research* and one from Travis Sizemore, University of Alabama in *Lithosphere*.



The field team entering Shey-Phoksundo National Park in western Nepal. Dr. Robinson is on the far left, Dr. McQuarrie in the middle and Mary Rouse on the right. April 2019.



Dr. Robinson is on the right in front of a salt diapir in northern Pakistan. Two graduate students from the National Centre of Excellence in Geology at the University of Peshawar are in the middle. A security guard is on the far left. November 2018.



Rona Donahoe

Professor

During the 2018-2019 academic year, Dr. Rona Donahoe hit the milestone of 35 years on the UA Faculty. She also completed her first term and was re-elected to a second term as President of the UA Faculty Senate. She continued to serve as chair of the Department's Tenure, Promotion and Retention Committee and as a member of several other departmental and University standing committees. Dr. Donahoe taught GEO 571: Thermodynamics for Geologists last Fall and GEO 470/570: General Geochemistry in the Spring. During this coming academic year, she will teach GEO 476/576: Environmental Field and Laboratory Methods (formerly titled Analytical Geochemistry) in Fall 2019 and will teach GEO 470/570 (retitled: Introduction to Geochemistry) in Spring 2020.

Over the past year, Dr. Donahoe served as a consultant to a local company seeking novel sources of REEs and continues to serve as a consultant to several electric power companies in the Southeast. She organized a session and gave an oral presentation at the Clay Minerals Conference in Edmonton, Alberta, and gave a poster presentation at the Goldschmidt Conference in Boston, MA. Dr. Donahoe is looking forward to spending time in Barcelona, Spain this August to participate in the upcoming 2019 Goldschmidt Conference. She is co-author of a paper published in *The Journal of Contaminant Hydrology* in July and will begin a new 3-year research project with the Geological Survey of Alabama during the upcoming academic year.

Dr. Donahoe currently has three M.S. students who are working to complete their degrees: Dusty Hawkins, who is studying a first-order stream impacted by acid mine drainage at Lake Harris; Erik Rheams, who is modeling water-rock interactions induced by injection of supercritical CO₂ at the Citronelle Oil Field in Mobile County; and Jonathan Riddle, who is performing an experimental study of CO₂ mineralization. All three students should complete their degrees during the 2019-2020 academic year.



Ibrahim Çemen

Professor

Dr. Çemen Joined the faculty of the UA Department of Geological Sciences in August 2009. He has been conducting research in petroleum structural geology using a combination of field, seismic, experimental, computer-based, and theoretical approaches. Specifically, his current major research interests are a) Extensional Tectonics; b) Petroleum Structural Geology and c) Earthquake geology and geophysics.

Dr. Çemen Received his BSc (Geological Engineering) from Istanbul University, MS (Geology) from Ohio University and his PhD (Geology) from the Penn State University. He has published over 60 research articles in several high impact journals; wrote 3 field guide books; edited 3 special volumes; and made over 300 presentations in scientific meetings, colloquiums, symposia, and as invited speakers in academia and industry. He has supported his research with grants totaling over \$5,000,000. The grants were from several agencies, including National Science Foundation, United Nations Development Projects, American Chemical Society, Private Foundations and Petroleum Industry.

Last year, Dr. Çemen worked on a UA Office of Sponsored Programs administered research project supported by the Turkish Petroleum Corporation (TPAO). He published the articles below within the last 12 months:

Sizemore, T., Wielicki, M. M., Çemen, I., Stockli, D., Heizler, M., and Robinson, D., 2019, Structural evolution of central Death Valley, California, using new thermochronometry of the Badwater turtleback; *Lithosphere* DOI: 10.1130/L1044.1

Lu, M., Lu, Y., Ikejiri, T., Hogancamp, N., Sun, Y., Wu, Q., Carroll, R., Çemen, I., and Pashin, J., 2019, Geochemical Evidence of First Forestation in the Southernmost Euramerica from Upper Devonian (Famennian) Black Shales; *Springer Scientific Reports* 9 (1) DOI: 10.1038/s41598-019-43993-y

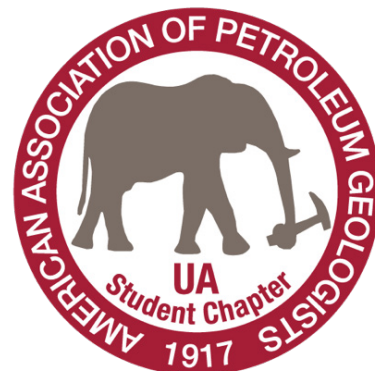
Etzel, T.M., Catlos, E. J., Ataktürk, K., Lovera, O. M., Kelly I., Çemen, I., and E. Diniz, E., 2019; Implications for Thrust-Related Shortening Punctuated by Extension From P-T Paths and Geochronology of Garnet-Bearing Schists, Southern (Çine) Menderes Massif, SW Turkey; *Tectonics* DOI: 10.1029/2018TC005335

Mahatsente, R., Önal, G., and Çemen, I., 2018; Lithospheric structure and the isostatic state of Eastern Anatolia: Insight from gravity data modelling; *Lithosphere*, DOI: 10.1130/L685.1

The AAPG (American Association of Petroleum Geologists) Student Chapter is entering its second consecutive semester of activity since its reactivation last December. Spring 2019 was a step in the right direction for the club. Two industry professionals gave talks to graduate and undergraduate students: Dr. Fred Schroeder and our very own Tony Smithson! We hope to have more educational talks this Fall as well. Our first meeting will be held on September 10th around lunchtime (location TBD).

We have some big plans in the works for students and faculty this fall. DGS alumna Rue Beyer of Nevada Gold Corporation (They are hiring geologists!) will be coming to visit and have lunch with interested students on October 24th, and we plan to host a tailgate the following Saturday for the Arkansas game (Roll Tide!!!). The club is also working on ordering T-Shirts and Official DGS Polos that will be available for purchase. The polo is a great way to represent our department at conferences and public outreach events. Additionally, AAPG is planning to host a geology camping trip to Cheaha Mountain in early November.

If you would like to learn more about the club, or are interested in joining, please contact us!



President:

Lucas Nibert

Email: lanibert@crimson.ua.edu

Vice-President:

Sam Walker

Email: srwalker6@crimson.ua.edu



Alabama Stable Isotope Laboratory

Department of Geological Sciences

The past year has been characterized by big changes, which promise an exciting future for the Alabama Stable Isotope Laboratory (ASIL). Two additional mass spectrometers will soon be added to the lab, existing lab space is undergoing radical renovations, a new sample preparation area has been established, all while ASIL continues to provide isotopic data for samples from around the world.

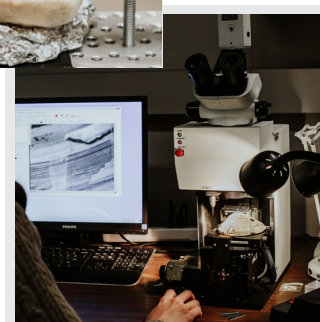
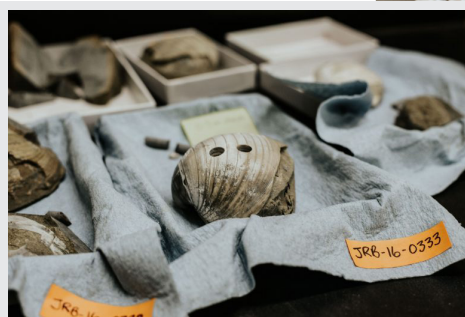
A National Science Foundation-funded grant by Dr. Tom Tobin will add a Nu Perspective mass spectrometer designed for “clumped isotopes.” Please see Dr. Tobin’s newsletter contribution to learn more about its capabilities. The other mass spectrometer is a Thermo Fisher Scientific Delta V with several attached peripherals and will be primarily used for isotopic determinations of organic materials (e.g., organic material within marine sediment). In preparation for the new instrumentation, much of the summer of 2019 has been dedicated to reorganizing one of the existing ASIL work areas. In addition to floors being cleaned and walls repainted, auxiliary air conditioning units will be installed as well as a stable electrical supply. Soon this renovated area will be bustling with new research endeavors never before possible in the state of Alabama.

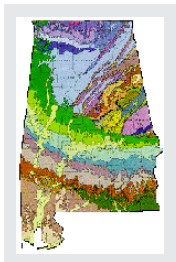
Yet another summer project has been a complete redesign of an area dedicated to sample preparation. Multiple drills used to generate subsamples range from basic handheld drills to state-of-the-art computer controlled drills capable of high-resolution sampling. Microbalances used in conjunction with the drills sit on top of new marble tables, which are ideal for a vibration-free environment. One of the marble surfaces was made from Sylacauga’s (AL) famous “pure white” marble quarry.

Be sure to check out our recently revamped ASIL website for more information about our equipment, current projects, and frequent lab users.

If you would like a tour of ASIL, simply reach out to me by email: jlambert@ua.edu.

<https://asil.ua.edu/>





Update from the Geological Sciences Advisory Board



GSAB members visiting Mission Control at NASA in Houston, Tx, Spring 2019

What is the Geological Science Advisory Board (GSAB), and what do they do?

The GSAB was founded in 2002 and includes alumni, corporate, governmental, and community members. The GSAB supports students, faculty, and staff in the Department of Geological Sciences at The University of Alabama and serves as a liaison with the business community and government in order to promote the interests of the Department within the university, the state, and the nation. A primary goal of the GSAB is to help recruit and retain talented, competent, motivated students and faculty. This is accomplished by providing scholarships and employment opportunities for students, and support to retain talented faculty. Through their annual membership contributions, and corporate matches and contributions, the GSAB has raised and awarded over \$400,000 that has supported nearly 300 scholarships to both undergraduate and graduate students in geological sciences.

The GSAB holds two meetings annually. In the fall, the GSAB meets at The University of Alabama campus on a Monday following a home Alabama football weekend. In the spring, the GSAB often meets at a location where Department of Geological Sciences' research is taking place, or a city where

there is a concentration of Alabama alumni. These meetings are typically well attended by members and faculty, along with students making presentations related to their on-going research. Time is always provided for social events and field trips during these meetings.

The Fall 2018 meeting took place in Tuscaloosa in conjunction with Homecoming at the University of Alabama the weekend of October 13. Social activities that weekend included an Alumni BBQ on Friday located in the Bevill Building. On Saturday before the game with Missouri, the Department of Geological Sciences hosted a children's fossil dig and displays in the College of Arts & Sciences tent on the Quad near Denny Chimes. Sunday evening, the board enjoyed a relaxing, pre-meeting social and dinner at the Cypress Inn located in Northport along the Black Warrior River. The board's business meeting took place on Monday, October 15th in the Bevill Building with approximately 30 members in attendance and included a State of the Department of Geological Sciences presentation by Dr. Fred Andrus, a State of the College of Arts & Sciences by Dean Robert Olin, and lunch with the Honors Day students, along with the recipients of Jones, Hooks, Joiners, and GSAB Scholarships.

The Spring 2019 meeting was hosted by Thomas See (current GSAB Chair) in Houston, Texas. Prior to the business meeting on Thursday May 9, the GSAB visited the Johnson Space Center (JSC) where they toured the International Space Station Mission Control Center, various astronaut training mock-ups, and several analytical labs located within ARES (Astromaterials Research & Exploration Sciences). Facilities visited within ARES included the Electron Beam labs, Mars Science Lab (MSL) / Curiosity rover-related facilities, the Experimental Impact Lab, and the Visitors Viewing Area of the Lunar Processing Facility.

During a typical spring meeting, the business meeting is normally held on a Friday with a pre-meeting social and dinner at a local restaurant on Thursday evening before the meeting. On the Saturday morning following a meeting, there is usually a field trip. In the Spring of 2018, the meeting was held at the 5 Rivers - Alabama Delta Resource Center with the field trip on the river delta accompanying students gathering seismic data and viewing the wildlife along the delta. In 2017, the Spring meeting was held in Muscle Shoals and included a field trip to the Florence Indian Mounds. Other Spring meeting locations have included Auburn University and a trip to the Wetumpka Crater impact site in 2014, and Mobile in 2015 with a field trip that included visits to several offshore oil & gas rigs located in Mobile Bay.

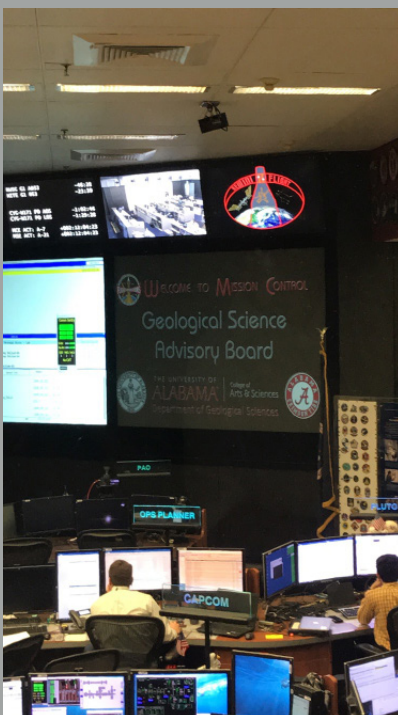
In addition to the scholarships funded directly from membership and corporate contributions previously mentioned, the Department of Geological Sciences has endowments valued at more than \$3.6 million to benefit student scholarships and the faculty. Of these, the GSAB has recently led in the establishment of several endowed scholarships valued at more than

\$653,000 to honor faculty and alumni leaders in the Department of Geological Sciences. These include the Douglas Jones - GSAB Endowed Scholarship, the GSAB-Hooks corpus, the Geological Sciences - Gary Hooks Scholarship Endowment, and the Thomas J. Joiner Endowed Scholarship in Geology. Together, these endowed scholarships currently generate more than \$26,000 in funds to distribute to graduate and undergraduate students within the department. If you combine that to the nearly \$25,000 plus on average available from membership and corporate contribution annually, the GSAB is intimately involved in the annual distribution of approximately \$50,000 in scholarships to deserving and needy students pursuing degrees in the field of Geological Sciences.

Do you want to help?

We would love to have you join the GSAB. And, there is not a requirement that you have to be a graduate from the Department of Geological Science at the University of Alabama to join and become a member of the Geological Sciences Advisory Board. Although the majority of the GSAB is composed of alumni of the Department of Geological Sciences, we currently have members from government and industry who never attended the University of Alabama, as well as

a member from the faculty at Auburn University. If you are interested or if you have questions regarding the GSAB and/or the Department of Geological Sciences at the University of Alabama, please direct those inquiries to Dr. Fred Andrus, chair of the department, at fandrus@ua.edu, 205-348-5177 or Thomas See, the current GSAB chairperson, at tsee@thpi.com, 281-731-6729.



A personal welcome from the men and women working in Mission Control at Johnson Space Center, Houston TX.

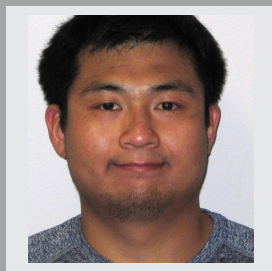


Graduate Student Updates



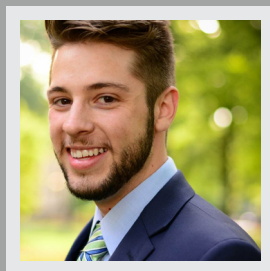
Ian Anderson, MS

My research is focused on linking pressure and temperature to time for the local magmatic and metamorphic units in George Sound, New Zealand.



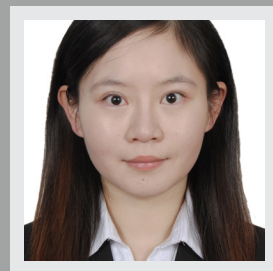
Jian Chen, Ph.D.

Geochemical Evidence for The Effects of Plaeo-environment on Late Devonian Mass Extinction.



Alex Lamore, MS

Determining the effect of peat sediment layer on geochemical transformations within the Mobile Bay coastal aquifer.



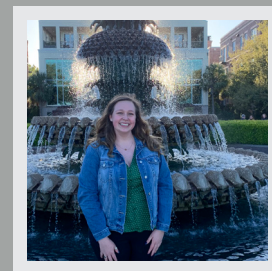
Bingqing Lu, Ph.D.

Numerical modeling of flow and transport in porous and fractured media



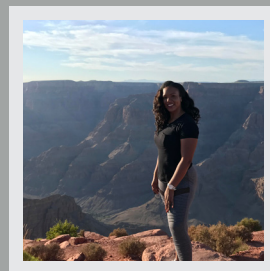
Sam Walker, MS

My thesis work seeks to understand the structural evolution of the Mississippi Embayment through thermochronometry of igneous intrusions in Arkansas.



Mary Hastings Puckett, MS

I am working with Drs. Lu and Zhang to develop a model to demonstrate the physical and biogeochemical behaviors of nutrients in lotic systems.



Karena Gill, Ph.D.

My dissertation focuses on understanding the diagenesis of the Smackover Formation using fluid inclusion studies.



Souvik Bhattacharjee, Ph.D.

A study to quantitatively assess the impact of physical and chemical variables and their interactions on carbonate factory types and facies architecture in carbonate depositional systems.



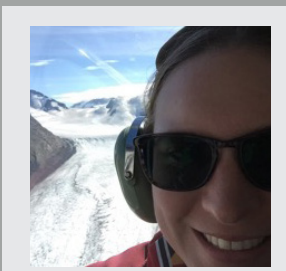
Rachel Mohr, Ph.D.

For my dissertation, I'm undertaking a taxonomic revision of Late Cretaceous ammonoids in Alabama and refining the local ammonoid biostratigraphy.



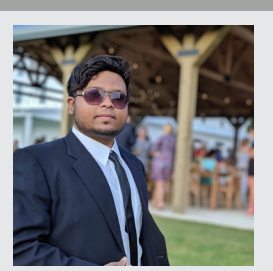
Christine Bassett, Ph.D.

My research interests focus on developing novel proxies and archives of oceanographic and climatic conditions and using them to reconstruct Holocene paleoceanography and paleoclimatology in the North Pacific ocean.



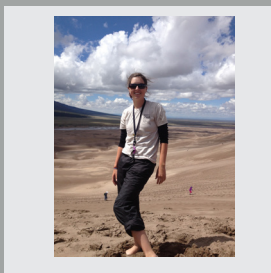
Elizabeth Bollen, Ph.D.

My research is focused on understanding the meaning of age discrepancies between multiple isotopic dating techniques used to date metamorphism, which has implications for pressure-temperature-time paths and tectonic interpretations; systems I employ include garnet Sm-Nd, garnet Lu-Hf, zircon U-Pb, and Ar-Ar.



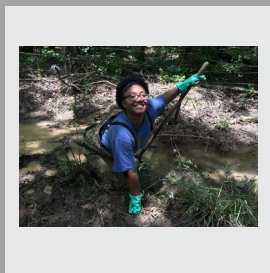
Mashrekur Rahman, Ph.D.

My research focuses on the calibration of hydrologic models over large domains using machine learning based techniques. I'm also working on science communication and information dissemination by involving the stakeholders of my research.



Taylor Woods, Ph.D.

My dissertation aims to analyze the chemical alteration of ash, lightning-induced volcanic spherules, and pumiceous material generated through simulated lightning experiments.



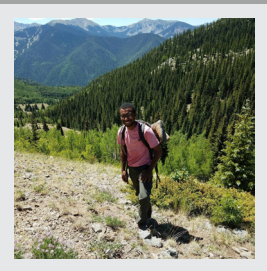
Jamekia Durrrough-Pritchard, MS

My thesis entails accessing stream fidelity of the Sipsey River and Bogue Chitto Creek (both located in AL) by using nitrogen isotope records to analyze anthropogenic changes over time in both ancient and modern freshwater mussels.



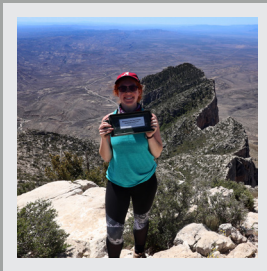
Johnathan Frame, Ph.D.

My dissertation will be focused using machine learning (data-driven models) to aid and inform process based modeling of dynamic systems in earth science, specifically hydrology and land surface processes.



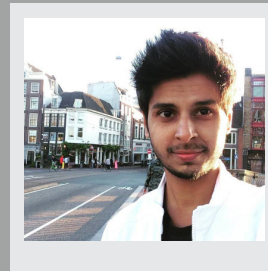
Mark Henry MS

My thesis research is to create a global regression model of fresh submarine groundwater discharge (FSGD), which will be able predict FSGD flux at a given location using the location's porosity, permeability, groundwater recharge, topographic gradient, and possibly a few other hydrogeological parameters.



Bridget Murray, MS

For my thesis, I am interpreting the deposition environment and paleoclimate of Late Cretaceous terrestrial sites in the Deccan Traps, Central India using sedimentary geochemistry.



Ashish Kumar, Ph.D.

My thesis aims to assess the crustal and upper mantle structures which are important to understand the tectonic evolution of the continent as well as behavior of the overlying ice sheets. The three dimensional shear wave velocity model will be used to resolve the existence of old rift system within East Antarctica in relation to prominent sub glacial basins.

Geo Club

Last spring there were several discussions amongst many of the graduate students about the numerous clubs within the department and the overall organization of student social events. As a result of these conversations, there are some significant proposed changes coming to the Geology Club ("Geo Club") in the upcoming semester.

Geology Club will be transitioning from being one of many independent geology-related clubs in the department to being the overarching organization representing all DGS graduate and undergraduate students and DGS student social events. All graduate students and undergraduate majors will be considered members automatically.

Geology Club's main goal will be to provide structure and continuity to DGS student life. Therefore, its new roles may include:

- Facilitating a regular (monthly) 'town hall' forum for students
- Organizing seminar snacks and donations (as it has in the past)
- Partnering with the other geology-themed organizations (AAPG, AIPG, SGE, etc.) to make sure all DGS students are aware of their sponsored events and meeting times
- Organizing traditional student events, such as the August Grad Student Picnic
- Establishing and organizing new traditions and initiatives, including the grad student peer mentoring program (new this fall), a mid-week coffee social hour, etc.
- Organizing occasional social events (as it has in the past), including movie nights, trivia, bowling, etc.

In response to student feedback, Geology Club will be transitioning away from traditional club leadership roles (President, Vice President, etc.), and will instead be governed by a board of student members each with equal responsibility. The board will consist of 3 graduate board members, 1 undergraduate board member, and 1 graduate treasurer. Board members will be elected on a rotating basis to allow for continuity of leadership. Nominations and elections for the first board members will held early in the upcoming fall semester.

Finally, to reflect Geology Club's new role within the department, a new name for the organization has been proposed: UA Geology Society, or "GeoSoc." -- **Rachel Mohr**



Welcome Our New Graduate Students!



Zach Yates, MS
BS from Radford University 2018
Advisor: Dr. Çemen

Fun Fact: Since graduating I have been working as a geologist for a mining company in Alabama.



Stephen Andersen, Ph.D.
BS in Chem. Eng., Univ. of Alabama
Advisor: Dr. Natasha Dimova

Fun Fact: Both of my parents graduated from The University of Alabama in 1991 and 1992!



Alyssa Mills, MS
BS in Astronomy & Geology, Univ. of Maryland
Advisor: Dr. Alain Plattner

Fun Fact: I play board games competitively at the World Boardgaming Championship every year. (E.g. Settlers of Catan, Ticket to Ride, etc)



Ioannis (John) Kouvatsis, Ph.D.
MS in Earth Science, Univ of Bern
Advisor: Dr. Cartwright

Fun Fact: I like spending time outdoors (especially in deserts) searching for meteorites. My longest field work was in the desert of Oman, where we camped for 15 days straight.



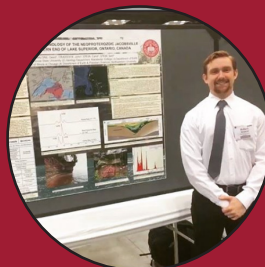
Hesam Saeidi, Ph.D.
MS in Earthquake Seismology, SRBIAU, Iran
Advisor: Dr. Samantha Hansen

Fun Fact: I like hiking and mountain climbing



Jessica Clarke, MS
BS in Chemistry, Fort Valley State Univ.
Advisor: Dr. Andrus

Fun Fact: I've done geophysics research in South Africa.



Robert (Rob) Wencel, MS
BS in Geology, Illinois State Univ.
Advisor: Dr. Çemen

Fun Fact: I had never taken a geology course or other Earth science class before coming to college. I became a geology major on a whim because it sounded interesting and ended up loving it.



Savanna Gutapfels, MS
BS in Env. Geosc., Valdosta State Univ. Advisor: Dr.Stowell

Fun Fact: I like being outdoors and love to run with my dog!



Chelsea Comans, MS
BS in Geology, Auburn University
Advisor: Dr.'s Ikejiri, Lu, and Tobin

Fun Fact: I spent several weeks this summer on a vertebrate paleontology dig in Dallas County, Alabama with the Alabama Natural History Museum.



Mark Boyd, MS
BSc, Durham University
Advisor: Dr. Cartwright

Fun Fact: I play the trumpet!



Ryan Culp, MS
BS, West Virginia University
Advisor: Dr. Wielicki

Fun Fact: I have walked on a glacier in Iceland!



Ivy Do
Advisor: Dr. Cartwright

Asmara Lehrmann
Advisor: Dr. Rebecca Minzoni

Yilmaz Yagmur
Advisor: Dr. Çemen

Burcu Barin
Advisor: Dr. Cemen

Tyler Wood
Advisor: Dr. Rebecca Minzoni

Alumni Spotlight

**Name:**

Rue Beyer (Chitwood)

Year Graduated from UA and degree:

2009, Bachelor of Science in Geology

Current Job Title:

Project Geologist

Current Employer:

Nevada Gold Mines (Joint Venture with Newmont and Barrick)

“What are your main duties and responsibilities at your current position?”

In my current job I’ve got a multitude of responsibilities.

I help with ore control, which is how we decide to route our gold. This involves getting out in the field to map blastholes in addition to assessing the grade and chemistry of the blastholes to determine what processing method is best for a given chunk of gold-rich material.

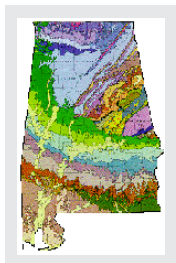
I am also responsible for overseeing, designing, planning, and executing drill programs. This is the most time consuming part of my job. It involves managing multiple budgets, generating targets by field mapping, staking out and field checking drill sites, checking the rig as it turns, logging the core or RC chips, assessing the assay and geochemistry data when it comes back, running QAQC on the data, approving the data, and finally incorporating the data into 3D geologic models. The modeling process is another big responsibility I have. The drillhole data (assays and geology logs) are used to build these models. I build resource/reserve gold shapes based on the assay data in addition to mine-scale geologic models. I use known geochemical signatures in the drillholes to help interpret where I am in the strat column along with visual logs. Those are my overall main responsibilities, but I do get to also work on other side projects with other departments/mine sites. It’s a good balance of office and field work and no day is ever the same, which keeps it fun.

“How did the Department of Geological Sciences prepare you for your career?”

The Geology Department helped me tremendously to get to where I am today. I have to personally thank Dr. Andrew Goodliffe since he knew I wanted to go into economic geology and he just so happened to know Dr. Jim Saunders at Auburn (I know, it’s taboo to say, but it’s where I got my Masters). Dr. Saunders, in turn, helped me to get an internship/thesis work with Newmont and from there I was able to get a job right out of grad school. I feel incredibly lucky and grateful that my name happened to come up in a conversation and Dr. Goodliffe said I should contact him. I also have to thank my undergrad advisor, Dr. Andrus, for supporting me through undergrad. My last two years at the Capstone were tough for me, personally, and I’m so thankful for everything I learned from the Department from real world practical advice to building resilience and finally to a good foundation in geology.

“What advice can you give to current students who wish to pursue a similar career?”

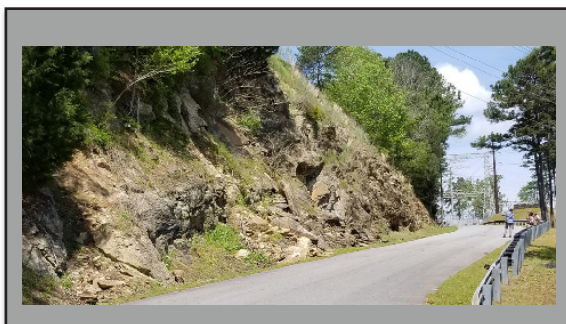
Talk to people. If there’s one thing I can definitively say that helped me it was talking to people. You never know who is listening and who will come through with an opportunity if you have good relationships with people.



Undergraduate Field Trips!



We enjoyed camping at Wind Creek State Park



Students sketching an outcrop of the Lay Dam Formation



A core sample extracted during our visit to Hog Mountain



Students checking out a former mine at Hog Mountain

Undergraduate students enrolled in Dr. Genareau's Igneous and Metamorphic Petrology class this spring took a field trip to examine metamorphic rocks in the state. We visited the Lay Dam (Clanton), the Jordan Dam (Wetumpka), Omya Marble Quarry (Sylacauga), and Hog Mountain Gold Mine (Goldville). Students were able to practice their geologic mapping and rock examination while also visiting areas where important geologic materials are extracted.

Another Successful Field Camp



Departing the campsite in the Bandelier National Monument prior to our final day of examining pyroclastic deposits from the last major explosive eruption at the Valles Caldera near Los Alamos, New Mexico



At the conclusion of our three-day exercise in the Rio Grande Gorge, examining basalt lava flows

This past June, we completed another successful season of the summer field course (GEO 495) out in New Mexico. This was my inaugural year as field course director. The 13 undergraduates learned methods of detailed field mapping and stratigraphic analysis as they spent five weeks examining sedimentary rocks and structures with Dr. Delores Robinson, igneous rocks with me, and metamorphic rocks with Dr. Harold Stowell. Our two graduate teaching assistants, Liz Bollen and Lucas Nibert, did a wonderful job encouraging the students to analyze and interpret rocks in several challenging locations.

Department Highlights!!

Undergraduate Students

- End of the year enrollment was 65 majors (15 BA, 8 BS, 37 BS in Geology, 5 Marine Science/Geology) and 22 minors.
- DGS students participated in 30 formal research experiences, 27 of which were research guided by faculty, and 3 were internships at the Geological Survey of Alabama.
- The DGS Chapter of Sigma Gamma Epsilon honor society remained active and initiated a new class of students.
- Geology majors established the first student chapter of the American Institute of Professional Geologists (AIPG) in state history. This is the premier professional organization supporting the professional environmental geoscientists. Alumnus Caryl Orr serves as its professional sponsor.
- Nearly \$40,000 in undergraduate scholarships and awards were made to Geology majors from Department funds including the Geological Sciences Advisory Board (GSAB), Douglas Jones Scholarship, Jen Ho Fang Scholarship, Gary Hooks/GSAB, Tom Joiner/GSAB and Walter B. Jones Scholarship: Major winners include:

Jen Ho Fang Scholarship

Stephanie White

Outstanding Senior Award

Mark Henry

Samuel Walker

Walter B. Jones Scholarship

John Capp

Isabelle Evans

Katrin Friesen

- Stephanie White was selected to be an ExxonMobil intern for Fall 2019. She is the first undergraduate selected for such as internship in well over a decade. This is a remarkable achievement considering the sharp decline in energy industry hiring over past 5 or more years
- Recent graduate Nick Ellis published a paper in the journal *Paleontology* stemming from his undergraduate research project under the direction of Tom Tobin.
- 3 undergraduates presented their research at national conferences.

Graduate Students

- For the first time in our history, the majority of full-time graduate students are pursuing the Ph.D. rather than MS degrees, achieving a long-time department goal.
- DGS graduate students wrote 18 lead author peer reviewed papers. This is a new department record.
- Graduate students made 34 presentations at major conferences including the Geological Society of America, American Geophysical Union, American Association of Petroleum Geologists, and other organizations.
- New Ph.D. student Victoria Fitzgerald (Becky Minzoni, advisor) is the only National Science Foundation's (NSF) Graduate Research Fellow at the University of Alabama and the first in Department history. These are perhaps the most competitive and prestigious graduate fellowships offered by the US government.
- Souvik Bhattacharjee, Raleigh Koeberle, Lauren Parker, and Leah Travis Taylor won highly competitive research grants from the Geological Society of America.

- Geological Sciences led all other departments in Alabama's 3 Minute Thesis (3MT) competition for the second year in a row, with 2 of the 12 finalists (tied with Biological Sciences), and one of the top 3 finishers, Ph.D. student Kaydee West (Tom Tobin, advisor).
- Karena Gill (Marcello Minzoni, advisor) was selected as a summer intern by Chesapeake Energy, an increasingly rare feat after the collapse of energy jobs over the past 5 years.
- Ph.D. candidate Elizabeth Bollen (Harold Stowell, Advisor) was elected the Geological Society of America Geochronology Division Student Representative.
- Ph.D. candidate Christine Bassett's (Fred Andrus, Advisor) was selected as an American Geophysical Union's (AGU) Voice for Science, a highly competitive and prestigious group dedicated to bringing science to the public and policy makers. She was also chosen to attend the competitive 16th Urbino Summer School in Paleoclimatology and as a finalist for the NOAA Knauss Fellowship. Her research was research profiled in the Wenner Gren Foundation's Sapiens and in a press release from Boston University.
- Ph.D. candidate Hao Wu defended his dissertation earlier than any student in department history (~3 years) and has been offered a tenure-track position in a major university in China.
- MS student Jamekia Durrough-Pritchard was selected for an internship with the National Water Center.
- More than \$100,000 was awarded to graduate students through endowed funds and gifts to the department.
- Graduate students won the following awards on campus:

Outstanding Research by an PhD Student Award

Bingqing Lu
Daniel Montiel

Outstanding Research by an MS Student Award

Joe Booth
Shawn Dawley

Outstanding Service by a Graduate Student Award

Kaydee West

Outstanding Teaching by a PhD Student Award

Gourab Bhattacharya

Outstanding Teaching by an MS Student Award

Joe Booth - also won College award
Shawn Dawley

Outstanding Thesis by an MS Student Award

Taylor Woods

Philip E. & Bunnie LaMoreaux International Student Award

Hao Wu

Geosyntec student paper award

Jonathan Riddle
Rebecca Greenberg

- The Department of Geological Sciences supported a team for the International Imperial Barrel Award of American Association of Petroleum Geologists (AAPG). The team, advised by Ibrahim Cemen, participated in this competition in Houston, TX where students are required to assess a potential hydrocarbon prospect.
- The Student Chapter of the AAPG was active and hosted alumni tents on the quad, industry-sponsored workshops, and several speakers to club events.
- Graduate student outreach was highly active, especially through the Alabama GeoKids Initiative, with Christine Bassett, Taylor Woods, and others participating in formal teaching and tutoring events at Arcadia, Magnet, and other local schools. Faculty member Natasha Dimova oversees many of these

Faculty and Staff

- Faculty published 83 refereed journal articles and book chapters (~4 per faculty) and a department record 139 refereed abstracts. It is noteworthy that absolute and per capita publication productivity has more than doubled in the past 5 years.
- One of Dr. Kim Genareau's papers was selected as the cover story for the journal *Atmosphere*, showing true interdisciplinary impact.
- The Department welcomed a new tenure-track faculty member: Dr. Alain Plattner (Ph.D.: ETH Zurich) as assistant professor specializing potential field geophysics. He was previously assistant professor at Fresno State and a post-doctoral fellow at Princeton.
- Dr. Delores Robinson was inducted as a fellow in the Geological Society of America, joining 8 other active and emeritus faculty.
- Dr. Yong Zhang and Alabama Water Institute Director Patty Sobecky traveled to Hohai University, China's leading water-focused university, to continue development of UA's relationship with them. This was a follow-up to visits Dr. Zhang led in prior years with Drs. Fred Andrus, Geoff Tick, and Yuehan Lu.
- Dr. Becky Minzoni and her PhD. student Victoria Fitzgerald conducted an NSF-funded expedition to Antarctica that received major international press attention, including story series by Public Radio International, *Rolling Stone*, and *National Geographic*, among others.
- Dr. Rona Donahoe served her first year as Faculty Senate President.
- Diversifying funding sources was a goal of the department in recent years in order to stabilize against future cycles in traditional sources such as NSF. Several faculty received funds from new sources: Dr. Kim Genareau won a grant from the US Air Force; Drs. Geoff Tick, Yong Zhang, Rona Donahoe, and Grey Nearing have all received funding from private environmental consulting companies; Drs. Bo Zhang and Ibrahim Cemen both received funding from international energy companies; Dr. Grey Nearing won funding from the University Corporation for Atmospheric Research; Dr. Becky Minzoni was recently notified that she will win the first USGS EdMap funding in our history.
- Two new energy company research consortia were approved by the University of Alabama Office Sponsored programs to begin marketing and operations: The Jurassic Norphlet-Smackover play: an integrated approach to depositional and diagenetic control to reservoir quality (Multiple faculty led by Marcello and Becky Minzoni) and Artificial intelligence in assisting geological interpretation (Bo Zhang). Nick Tew of the Center for Sedimentary Basin Studies is instrumental in both efforts.
- Capstone International approved Geological Sciences' first ever education abroad program in the Bahamas led by Marcello Minzoni. It will begin next year.
- Office Associate Beth Partlow has announced her intention to retire summer 2019.
- The department mourned the loss of Dr. Gary Hooks, a legendary faculty member who taught tens of thousands of students in his active years from 1954-2013. He educated and mentored generations of leaders in industry, government, and academia.

Please keep in touch! and be on the lookout for the next newsletter!



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Department of Geological Sciences