

eGEO TIGER

January 2016

Siccar Point, Scotland



More than ever before, the Department's students are experiencing Earth's geology, geography, and varied cultures first hand through Study Abroad courses and Geoclub trips thanks to the generosity of our alumni and members of our Advisory Board.



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eGEOTIGER

Greetings from the Chair!

I hope this message finds you all well! In 2015 the Department grew in a good many exciting ways. In keeping with our new strategic plan for progressively expanding and growing toward future establishment of a Ph.D. program, we are increasing our numbers of faculty and students, reconnecting with our alumni base, improving instrumentation, and providing new and exciting educational experiences for our students. In the Auburn Creed, George Petrie “believes in a practical world,” and so do we as we continue to provide the rigorous and practicable training in traditional geology and geography that is our hallmark and has served our graduates so well.

Speaking of practical changes, during the Spring of 2015, AU’s Board of Trustees approved the renaming of the Department of Geology and Geography to the Department of Geosciences. This name change was not something cosmetic but rather was necessary to reflect the truly applied nature of the geosciences and the ever-widening interdisciplinary expertise of the department’s faculty. Geology and Geography are diverse fields, and the expertise of our faculty spans a broad range of the natural and social sciences, bridging them perhaps as well as any other unit at AU. Our faculty’s expertise and research activities contribute to a variety of Auburn’s strategic research areas, particularly in the environment, health, economics, and energy, and we collaborate with faculty in many units across campus. Everything we have comes from the Earth, and its surface marks the interface upon which all human interaction takes place. Our programs are uniquely suited to explore, discover, and steward the coupling between Earth’s systems and human activity, and we warmly embrace the more encompassing department name “Geosciences.”

Our establishment of a Geoscience Advisory Board (GAB) four years ago continues to provide a huge boost in terms of reconnecting with our alums and contributing in many other ways that are helping us to achieve our strategic goals. The new GAB Distinguished Lecturer Series, which

is totally funded by the Board, provides exciting and practical enrichment opportunities for our students and faculty in the form of lectures and workshops. In 2015, the Board generated more than \$22.5K in awards and scholarships that were presented to deserving students at our annual departmental picnic and awards ceremony last spring (see article in this eGeotiger). Last May, the GAB initiated a \$250,000 endowment campaign that upon fulfillment will provide \$10,000 annually in perpetuity to support our students and programs. With more than \$122,000 pledged as I write this, we are well on track to fulfill the endowment within the next two years.

Our student service organizations, Sigma Gamma Epsilon and the GeoClub, have been working very hard for us. In the Fall of 2015 they hosted tailgate parties and open houses for every home football game. They set up awnings, tables, chairs, TV’s, and a BBQ grill, and all were fun and well attended affairs! In addition to reuniting with old friends and catching up on your careers and families, I personally enjoyed interacting with the parents and siblings of our students. Junior Kelly Kindgren’s entire family visited from Los Angeles, CA, for the homecoming game (San Jose State). Junior Sarah Ashley’s family visited from Daphne, AL, for several games and were kind enough to bring wonderful spreads of fancy cheeses and wines for all to enjoy! GeoClub students had been trained to lead informative tours of our displays in Petrie Hall that were enjoyed by many visitors. Please have a look at the photo collage of our 2015 tailgates in this issue (back pages), and please plan to join us next fall as we celebrate another year.

Our undergraduate enrollments are up! In Geology, we had 26 students in mineralogy this fall, up a full 125% from our previous 10-year average. Since mineralogy is a required sophomore-level course for our majors, it is a good proxy for the overall B.S. program - a very encouraging sign! Mineralogy labs can accommodate only 12 students, limited by the space needed for the petrographic microscopes, so



it required us to teach two additional lab sections over previous years. Enrollments in our core-science introductory geology course, now called "Dynamic Earth," are up a full 39% since 2013. Our second core-course, historical geology, now known as "Earth and Life through Time," shows an even higher percentage increase for Spring 2016 (up 83% from 2013). Likewise, on the geography side, enrollments in our third core-course, Global Geography, are up 72% over 2011. Last fall, 860 students took this social-science-core course, making it by far our largest student-credit hour generating course. These increases help to: (1) strengthen our position within COSAM, AU's second highest student-credit hour generating college; (2) provide more dollars to improve our programs through course fees, which are based on student credit hour (SCH) production; (3) require additional GTA and UTA positions with stipends that will further help us to grow; and (4) strengthen our position in anticipating the university's conversion to a new budget model in two years, which will be founded on colleges being funded on a per SCH basis. These increases are well above what would be expected from the larger AU freshman enrollments over the past two years. We attribute these successes to superb teaching by our introductory-level instructors (Thanks John Hawkins, Dan McGowin, Carmen Brysch, and Jim Norwood!), efforts by a Departmental task force that successfully won the hearts of college advisors across campus, a bounty of enjoyable and high-paying jobs out there (<http://www.auburn.edu/academic/cosam/departments/geosciences/Careers/>), plus studies showing that the geosciences have the happiest of all college majors (<http://www.forbes.com/sites/trevornace/2015/12/18/geology-students-happiest-college-campus-study/>).

We are growing our faculty, with three faculty searches underway as I write this. Thanks to funding from AU's first cluster-hire initiative, we are searching for an associate professor in paleoclimatology and an assistant professor in coupled human and natural systems. We are also seeking a lecturer in economic geology to temporarily teach courses that retiring Professor Jim Saunders ordinarily would teach; see the article on Dr. Saunders' retirement in this issue. We are anticipating approval from COSAM Dean Nick Giordano to begin a search in August of 2017 for a permanent tenure-track economic geologist.

We are growing our instrumentation capacity. Last year we got our Inductively Coupled Plasma Mass Spectrometer (ICP-MS) on line in a new facility located in the Auburn University Center for Advanced Science, Innovation and Commerce (CASIC). This Agilent 7900 Quadrupole ICP-MS system is excellent for high resolution multi-elemental analysis of liquid and solid samples. Dr. Hames acquired two additional mass spectrometers (a MAP-250 and a MAP-250-50) for analyzing noble gas isotopes in the Auburn Noble Isotope Mass Analysis Laboratory (ANIMAL) in Petrie Hall. Also, Haibo Zou got two instruments (MAT-261 and MAT-262) for dating rocks and minerals using U-Pb Isotope Dilution Thermal Isotopic Mass Spectrometry (ID TIMS) and for a host of other isotopic applications. If the paleoclimatologist that we hire is a stable isotope geochemist, which many of us hope for, then we would purchase two additional mass spectrometers using his/her start up funds. Many folks

around campus join us in our excitement for having such a powerful array of instruments, and talk has begun about us creating a regional center for isotopic research.

In 2015 we launched several exciting study-abroad courses through the AU office for International Studies. Our program in Iceland and Scotland last summer was the first study abroad course offered in the history of our department. I assisted John Hawkins in leading the Iceland-Scotland course and this was a great experience for all of us. A photo from that trip adorns the cover of this issue and an article herein describes our study abroad program, some of the adventures of our students last summer, and our plans for expanding the program in the summer of 2016.

In addition to our traditional geology and geography courses, a new course, Petroleum Geology, was added to the books and taught last Fall. The petroleum course was developed for several reasons. First, student demand for the course was high, both from our students and some who were looking into applying to our MS program. Second, Dr. Ashraf Uddin pushed to develop and teach the course to broaden students' backgrounds and to open better employment opportunities for them in the energy sector. Third, Dr. Uddin has had tremendous success in mentoring students for the annual Imperial Barrel Award (IBA) competition, which has brought much favorable attention to our department (see Dr. Uddin's update in his Faculty News piece), and the petroleum course serves to better equip our students for this competition.

I am happy to report that formal work has begun on developing a proposal for a Ph.D. program, which is something that we have desired for at least as long as I have been on the faculty here (since 1989). I am the chair of the committee that is working with faculty and deans from the following units to develop a proposal for an interdisciplinary Ph.D. program: the Graduate School; the Colleges of Engineering, Liberal Arts, Business, and Agriculture; and the School of Forestry and Wildlife Sciences. Improving interdisciplinary research and studies at AU is an overarching goal in the university's new strategic plan, and the applied and multidiscipline nature of the geosciences makes this a timely endeavor. COSAM Dean Nick Giordano is firmly behind us and if everything falls into place, as we expect them to, then we hope to accept our first Ph.D. students within the next two years.



Finally, our most exciting news is that we are getting a brand new building! The Athletic Department has plans for enlarging the north-end-zone of Jordan-Hare stadium and to build a locker room and reception area that will extend into the parking lot behind Petrie Hall; Petrie is destined to become a museum, as it well should be. Petrie Hall has been an endearing home for geology for more than 30 years, and we are all sad to be leaving, but its small and chopped up spaces and sub-standard infrastructure were never meant to house a science department. With all the growth that has taken place in recent years we are bursting at the seams, and with a Ph.D. program in the near future, we must have room to grow. An ancillary but crucial benefit is that the new building will be designed to accommodate Geology and Geography being housed under a single roof, which is required by our strategic plan. Following a faculty vote on November 11th in support of the university's plan, the AU Board of Trustees approved the new building on November 21st. The new building will house all of our current spaces in Petrie, the Haley Center, and in the Langdon Annex, plus room for future growth. Spaces currently occupied by biological sciences in Funchess Hall will also be included in the new building to help in the eventual

Replacement of Funchess. The new building will be built in the sciences-precinct area adjacent to Comer Hall, near the intersection of Roosevelt Drive and Mell Street. Construction related to the stadium expansion will begin during the summer of 2016 when geology will be moving out of Petrie Hall. Geology will move temporarily into Beard-Eaves Memorial Coliseum for the projected 2.5 years that is anticipated to design and build the new building. The temporary move will obviously be inconvenient, but the coliseum offers much more space than we have in Petrie Hall, and it is much better suited to handle the growth that we are experiencing. Of course, the pièce de résistance is a brand new, state-of-the-art facility that will serve Geoscience students and faculty much more effectively and far further into the future than we had ever imagined! War Eagle!

Mark G. Schetzle



Department of Geosciences Advisory Board

The Geoscience Advisory Board (GAB) has served the Department well since its establishment four years ago. We appreciate the interest, guidance, and financial support provided by the Board's members. As a token of our appreciation, last year we began featuring a member in each issue. This year we highlight Jill Johnson.

Jill (Whitmer) Johnson

Like many Auburn graduates, I grew up with Auburn in my blood. My father graduated from Auburn as a Civil Engineer, I have several uncles that graduated from Auburn, and my younger sister got her B.S. and M.S. at Auburn also. Originally I didn't plan to attend Auburn, but it ended up being the perfect place for me. I was introduced to geology, which led me to an interesting career, and I met my husband.

During the last quarter of my sophomore year at Auburn, as a Communications major, I took Physical Geology as my core science requirement and was immediately hooked. I followed that with Dr. Steltenpohl's Structural Geology class, which was a challenging, fun, and team-oriented class, and I never looked back.

While at Auburn, I completed an undergraduate senior honors thesis with Dr. Saunders about the effects of sulfate-reducing bacteria on groundwater contaminated with metals. I was awarded the Deans Medal for COSAM and graduated in June 1998. At that point, I wanted to live in a different area of the country and meet new people so I went to the University of Kansas for a master's degree in geology with a focus on hydrogeology. My research topic was the fate and transport of elevated levels of selenium and uranium in the Arkansas River and Ogallala Aquifer system. During my time at KU, I also worked at the Kansas Geological Survey and participated on a project team researching salinity contamination in the Upper Arkansas River Valley of southwestern Kansas.



In 2000, I accepted a job as a hydrogeologist with Geosyntec Consultants, an environmental consulting company, in their Boca Raton office. I transferred to our Jacksonville office with the company in 2004, then started the Pensacola office in 2007. I just celebrated my 15th anniversary with Geosyntec. My projects are focused on managing and providing technical expertise on sites impacted with chlorinated solvents, pesticides, and metals for private and public clients, including environmental site assessment and remediation, due diligence and environmental compliance, geochemical and hydrogeological site characterization, and monitoring program and remediation system optimization. I am a Licensed Professional Geologist in FL, AL, MS and LA.

I met my husband, Adam Johnson, while at Auburn, where he completed a Mechanical Engineering degree. We've been married 12 years and have 3 daughters, Parker (9), Amelia (8), and Ida (4). Parker loves to read, play guitar and listen to music. Amelia is great at gymnastics and plays the piano. Ida loves talking, singing, doing anything active and spending time with her family. In our free time, we go to as many Auburn football games as possible, work in our vegetable garden, and go to the beach.

I joined the AUGAB as a founding member in 2013. I'm excited to be involved, to support the department, reconnect with old friends and meet new ones, and give back to the university and department. It is also a great opportunity for me to meet students and look for potential future employees. As a member of the Development committee, I'm looking forward to helping plan activities and reach out to friends of the department to move us towards our goal of raising \$250,000 to support the Geosciences Department.



The Earth is a huge laboratory!

Faculty and students of the Department of Geosciences currently are engaged in field research on 3 continents - Europe, Asia, and North America. The Earth and humans are interacting everywhere, all the time, and the Department of Geosciences shepherds a variety of Study Abroad experiences aimed at exploring the Earth and its people interacting with it.

Sicily: Last summer we offered a Study Abroad experience in Taormina, Sicily, which was a collaborative one with Dr. Rosseta Caponetto, Department of Foreign Languages & Literatures, College of Liberal Arts. Dr. Caponetto has been directing AU's Study Abroad program in Taormina for five years, working through the Center for Italian Studies, Babilonia. Last winter, Dr. Caponetto approached our department about collaborating and providing course credit for a geology course that Babilonia would teach through faculty at the University of Catania, Italy. She explained that in previous years, her students studying the liberal arts had seemed most curious about Mt. Etna, less than 10 miles from Taormina. They wanted to understand why and how it spews steam, ash, and lava so often. In the summer, Dr. Steltenpohl helped teach the field components for the AU students who received GEOL 4930 Directed Studies credit



for the course. During the course, students made excursions to the active volcano on the island of Vulcano in the Tyrrhenian Sea, to recent lavas and ash flows on Mt. Etna, and to the amazing Alcantara Gorge National Park to examine lavas expelled in 1936. One exciting excursion was a two-night kayaking/camping trip along the shore of Vulcano during which students could watch the constant eruptions of Stromboli only miles away, which are truly spectacular at night! Sicily is an amazing place, geologically and culturally speaking, with historically deadly geological phenomena (e.g., volcanoes, earthquakes, tsunamis, and debris flows) that make it an exceptional area to teach about Earth systems and their interactions with humans.

Iceland and Scotland: Last summer (2015), 11 students participated in a Study Abroad course to Iceland and Scotland led by John Hawkins and Mark Steltenpohl. Students had the opportunity to receive credit for either GEOL

4300 Geodynamics or GEOL 4930 Directed Studies during this study abroad experience. Because of the multiple courses, a diverse group attended and benefitted from the experience. Participating students' backgrounds ranged from sophomores with intro-level experience to seniors about to graduate. This range in experience level provided an excellent environment for students to learn from their peers. While in Iceland, the students were able to observe a landscape that is actively being sculpted by volcanic, tectonic, and glacial forces along an active mid-ocean ridge. Students stayed in a hostel in downtown Reykjavik and enjoyed being immersed in Icelandic culture. They visited Thingvellir National Park, where they went on a snorkeling excursion that allowed them to swim between the North American and Eurasian tectonic plates. Students also visited the waterfalls at Gullfoss, the geothermally active area and the type geyser at "Geysir," the active glacier of Solheimajokull, the surging glacier at Myrdalsjokull, and the black pebble beaches and remarkable columnar basalts (and puffins) of Reynisfjara. These outings allowed students to observe and study many geological concepts that are difficult to accurately convey in the classroom.



The glacially active regions of Iceland provided an excellent transition to Scotland because many of Scotland's iconic landscapes and lakes were formed by glaciers during the last ice age. While in Scotland, the students started the experience housed in a hostel in Edinburgh. In addition to being the hub of Scottish culture, Edinburgh has a rich history of geologic discovery. While in Edinburgh, students traveled by train to the University of St. Andrews where they visited with Scottish students and faculty and received



A geothermally heated greenhouse in Iceland.

training on conducting fieldwork in ancient volcanic terrains. Students then performed field exercises in Edinburgh's magnificent central park called "Arthur's Seat;" Edinburgh's distinctive skyline is the result of volcanism and later glaciation. Students also did a field exercise at Siccar Point (see cover of this issue), arguably the most famous geological exposure on Earth. Siccar Point was critical for the development of James Hutton's ideas on an ancient Earth, an idea that is now a fundamental basis for geology. After leaving Edinburgh, students spent several days on the Isle of Skye. There they visited the Old Man of Storr, Kilt Rock, and Fairy Glen. At these locations, the main focus was on observations

and note taking. The Cenozoic volcanism on Skye was responsible for most of these spectacular landscapes and provided a unifying geologic theme from location to location. The last day on Skye was spent hiking high up into the Black Cuillins. Here students could observe the erosive power of glaciers on the roots of this large mafic volcano and its related intrusions. After leaving Skye, students spent a week camping in the town of Ullapool. From here, they did several mapping exercises that allowed them to work in Laurentian rift and rift-to-drift facies sedimentary rocks that are over a billion years old. Despite having been metamorphosed and deformed under amphibolite-facies conditions, outcrops still preserve sedimentary features like mud cracks and dune crossbeds.

We visited iconic exposures of the Moine thrust where arguments were first made by Peach & Horne to set into motion a worldwide heated debate on how thrusts disrupt stratigraphic order. The time spent in the Highlands of Scotland not only provided further opportunities to examine geologically historical exposures of ancient rocks but allowed for students to enjoy the culture of the Highland people. It also provided several students with the opportunity to collect samples for future research projects once they returned to Auburn. This Study Abroad experience was very successful, and we plan to offer the experience again in the summer of 2017.



Field experience at St. Andrews.



Field exercise at Arthur's Seat, Edinburgh.

Iceland-Scotland Study Abroad participants, left to right: Kenny Moss, Caleb Howard, Reed Stewart, Kelly Kindgren, Sara Speetjens, Morgan Barkley, Annabelle Kline, Wilfred Wolf, Sally Sundbeck, and Austin Russell.



Panama: Next summer (2016) Drs. Chandana Mitra and Dan McGowin will offer a Study Abroad course in the Republic of Panama. This course will be focused on climate change and environmental management. Students will explore the climatic variability and human vulnerability of Panamanians and compare it to global aspects. This two-week course is intended to give students a general understanding of the potential impacts of climate change on Panama's water and other environmental resources. Through a mix of lectures, hands-on laboratory exercises and field trips, students will explore direct and indirect effects of a changing climate on water-resources management. Throughout the course, students will learn and use appropriate technologies such as Geographic Information Systems and Remote Sensing to analyze environmental changes related to forestry, land cover and land use, and water resources. The course will mainly take place in the CATHALAC Institute in Panama. The acquired knowledge and interests developed by the students will lead to the implementation of their research capstone in GEOG 5720/6720. The course will be instructed in English, but students will be encouraged to participate in Spanish training administered by experienced native instructors.

Rome: In the Summers of 2016 and 2017, we will teach our core-course Dynamic Earth (GEOL 1100) at the University of Arkansas – Rome (UARK Rome) Center in Rome, Italy. Last June, Dr. Steltenpohl visited Dr. Davide Vitali, Founder and Director of the Rome Center, at their modernized facilities set in group of a 13th-century buildings and courtyards. These facilities afford an exquisite place in which to teach our lectures and laboratories. Field excursions for Dynamic Earth will be very exciting and will dovetail nicely with their emphasis on Roman culture, architecture, and sustainability. Students and faculty will take a train to Naples and spend a weekend visiting Mt. Vesuvius, which in 79 AD famously destroyed the cities of Pompeii and Herculanium by deadly pyroclastic flows (i.e., super-heated clouds of volcanic ash and cinder that thunder down the flanks of volcanoes at hundreds of miles per hour). We will also visit the Alban volcanoes and basalt mines outside of Rome that provided stone crucial to ancient and modern Roman infrastructure. It is perhaps ironic that only 400,000

years ago, a mere eye-blink in geological time, the prehistoric site of Rome was ruthlessly buried beneath pyroclastic flows precisely as Vesuvius had erupted in more modern times. Active travertine mines on the outskirts of Rome will be examined too, as these provided stone for enumerable buildings and sculptures in ancient and modern Rome. Last summer Dr. Steltenpohl mapped out those that are preserved in the Roman Forum and he is developing a walking geologic excursion for next summer's course, similar to the one that he developed for our campus excursion here in Auburn. This will be a great course!

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 -POLI 1050 - Global Politics and Issues (3 credits)

http://studyabroad.auburn.edu/?go=AU_Core **APPLY NOW!**

GeoClub by John Hawkins

The Geoclub enjoyed a successful second year by offering multiple opportunities for positive field-related student experiences and educational outreach programs. The year got off to a great start with our Spring Break trip that focused on the geology of the southwestern US and its cultural impacts. We spent time in the Grand Canyon, Zion Canyon, and Monument Valley, with cultural stops in between focusing on cliff dwellings and other indigenous ruins. It was a rewarding experience for the students to observe geoscience-themed ideas in the field rather than just in the classroom. This trip was graciously supported by funds from the Advisory Board, and with their help we plan to continue to offer field experiences to our students each year.

In addition to traveling, the Geoclub continued with its commitment to educational outreach in the geosciences. Calvin Stewart, Morgan Barkley, Sara Speetjens, and Wade Reeves participated in educational programs at the Wehle Center where they engaged with regional middle school students on topics related to geology. This program allows us to take our departmental dinosaur skull, known as "Stan," for the students to interact with. This has proved to be a very positive experience for the students, and we use Stan to teach note taking and observational skills to the young future scientists.

Continuing on the theme of outreach, the Geoclub again participated in the Jr. Mad Scientist program here on Campus, where students operated stations designed for elementary-aged students to explore and discover science in a visual and tactile way. The elementary students had a fossil hunt (fossils provided by Dr. Lewis), a working volcano, a rock-touching station, and, of course, Stan was a big hit! This is a very successful program and allows the Department of Geosciences to interact with hundreds of parents and children in the local area. This has become a yearly event for us.

The Geoclub ended the year with some regional canoeing and backpacking trips to Georgia as fall was coming to a close.

Spring semester will see this trend of outdoor activities continue. In Spring Break, we will go to San Salvador, Bahamas, with Dr. Lewis (this will be the 30th anniversary of his first field trip there with AU students!), and in the summer Geoclub students will go to Hawaii where they will have first-hand experience with volcanoes. Look for accounts of these trips in next year's edition of the eGeotiger.

Grand Canyon



Grand Canyon



Monument Valley, Utah

Spring Picnic and Annual Student Awards by Mark Steltenpohl

At our annual departmental picnic each Spring we hold an awards ceremony to honor our outstanding students. Thanks to gifts from our alums and other friends of the department, donations are used to support our students and our programs in many different ways. One way of recognizing students who distinguish themselves through their academics, research, service, and/or leadership is with scholarships or other types of awards, including plaques and cash. At the picnic we recognize students who received awards in various categories within our department.



Thanks to the hard work of our departmental Awards Committee (co-Chairs Phil Chaney and David King, and committee members Chandana Mitra and Chuck Savrda), we have established very well organized nomination, application and voting mechanisms to assure that deserving students are appropriately rewarded for their efforts. (Please visit our departmental webpage and take a quick glance at the online forms and guidelines for each of our various awards; <http://www.auburn.edu/academic/cosam/departments/geosciences/Student%20Awards,%20Grants%20and%20Scholarships.htm>). We invite our alums to attend each of the Spring picnic and awards ceremonies. Please let us know if you have not been receiving that email invitation and we will make certain that you do next time. I'm sure that you all would enjoy knowing about the awards and who received them last Spring, below.

(1) Geology Alumni Scholarship

Art Merkle and Herb Martin, both alums of our department, endowed this scholarship for undergraduate students some years ago. Art & Herb are long-time friends to our department, both having given their time and treasure far beyond endowing this Alumni Scholarship. They were the driving force behind endowing the Cook Professorship, which Dr. Ming-Kuo Lee now enjoys. Herb and Art are long-time friends and strong voices for our department on the Dean's Leadership Council and our department's Advisory Board. Annually, Herb also provides financial and mentoring support for our IBA team. Geology Alumni Scholarship recipients last year were **Ben Wernette** (GL), **Devon Verellen** (GL), **Sara Speetjens** (GL), and **Joseph Ward** (GL).

(2) Merkle Family Endowed scholarship

Carol and Art Merkle continue to graciously endow our programs. A new \$25K endowment was fulfilled just last spring, and it provides a perpetual \$1K scholarship each year for deserving students. **Ben Wernette**, an undergrad in geology (UG GL), was the first recipient.

(3) Vulcan Materials Scholarship

This annually renewed Scholarship is provided thanks to the efforts of Joe Howle of Vulcan Materials. Joe is a member of the GAB and he continues to assure that Vulcan's \$5K Scholarship is annually renewed. We are very thankful to Vulcan Materials for their support of our students. **Devon Verellen** (UG GL), **Avery Cobb** (UG Geography - GY), **Marcus Terrell** (UG GY), **Garrison Wetmore** (UG GY), and **Michael Waldrop** (UG GY) each received support from the Vulcan Materials Scholarship in 2015.

(4) The Endowed Dr. Charles E. "Chuck" Savrda Outstanding Graduate Student Award

This brand new endowment also provides \$1000 per annum in perpetuity, and was awarded for the first time last Spring. The endowment was established in recognition of Chuck's outstanding service to COSAM as its Interim Dean. It recognizes a geoscience graduate student for his/her outstanding achievements in the classroom or in research as determined by the faculty of our department. The first recipient of the Chuck Award was **Justin Cox** (MS in GL).



(5) David W. Icenogle Student Travel Grants and Outstanding Student Awards

This award was established in memory of Dr. Icenogle, who retired from AU after many years of service in Geography and as the faculty advisor to Gamma Theta Upsilon (GTU), the International Geographic Honor Society. The award is open to undergraduate and graduate students in Geography. Awardees last year were **Andrew Hug**, **Huixuan Li**, **Donna Holly Park**, **Mahjabin Rahman**, **Xia Li**, **Mitch Carter**, **Ting Du**, **Xia Li**, and **Brian Norris**. In addition, Icenogle funds recognize two outstanding geography students each year. Last year's recipients were **Avery Cobb** and **Holly Park**.

(6) Hargett - Dunston Undergraduate Field Research Award

The purpose of this award program is to foster research in the Earth Sciences by providing support to undergraduate students in geology who are engaged in independent projects that involve a substantial component of field geology and mapping. Award recipients must be Geology majors at Auburn University and in good academic standing. Awards are to be applied to expenses directly related to research tasks, including fieldwork, laboratory analyses, etc. Funds also may be used to purchase capital equipment and to attend conferences to present research findings. Hargett-Dunston awardees last year were **Julie Taliaferro** and **Miles Bunch**.

(7) Geosciences Advisory Board awards

Special thanks are given to the Geosciences Advisory Board (GAB for short) for their efforts that have added a whole new dimension to supporting our outstanding students. The GAB comprises 28 friends of the department who each donate \$500 annually in fees and provide additional gifts beyond that in support of our students and programs. Last year alone their total donations amounted to \$22.5K, and through consultation with our faculty a variety of award types were identified and are detailed below. Bob Fousek, a 1996 alum of our department and founding chair of the GAB, represented the Board in presenting their awards at the picnic last Spring.

GAB Research awards

These awards support research needs and activities such as equipment, lab supplies, and travel costs, and are open to undergraduate and graduate students. Students are required to apply on a competitive basis by supplying a research plan, budget, and resume. Our 2015 awardees were **Nur Ahmed** (MS GL, \$1500) and **Shakura Jahan** (MS GL, \$1500).

Spencer Waters and Dan Folse Memorial Award

Established in memory of Laura Folse's father and her husband, this award supports all types of geological research and is open to undergraduate and graduate students in AU Geology. Last year's awardees were **Kody Shellhouse** (UG GL, \$1500) and **Katherine Spyker-Cooper** (MS GL, \$2580).

GAB Outstanding Student awards

These awards are given to outstanding undergraduate and graduate students, identified by nominations and votes by the Geoscience faculty. GAB 2015 Outstanding Student awardees, each of whom received both a plaque and a check for \$200, were **Devon Verellen** (UG GL), **Michael Waldrop** (UG GY), **Erik Heider** (MS GL), and **Andrew Hug** (MS GY).

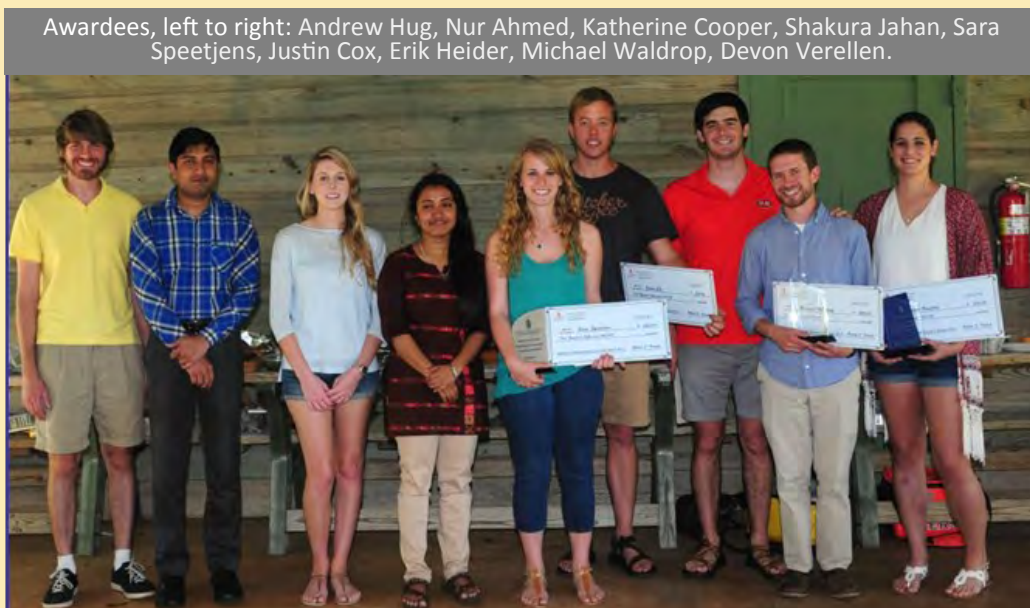
Chair's Leadership Award

This also is a new annual award, and was developed by the current and past chairs of both the Department of Geosciences and the GAB to recognize our outstanding student leaders. The present and former chairs are: Jack Carrington, former Head of Geology; Sonny Dawsey, former chair of Geography before our merger; Bob Cook, former head of Geology and Geography; Chuck Savrda, former Chair of Geology and Geography; myself; and Bob Fousek. Each of us contributed to funding this award. Each outstanding leader received a plaque and a check for \$250. Awardees were as follows: **Sara Speetgens** (UG GL), founding President of the GeoClub; **Justin Cox** (MS GL), 2013 President of SGE; and **Erik Heider** (MS GL), 2014 President of SGE.

GAB Student Travel awards

In 2015 the GAB also funded \$1700 in student travel for research. Students are required to give a presentation at a professional conference as a minimum requirement for a travel award. As the Icenogle award serves geography students, geology recipients of GAB travel awards last year were **Ruhollah Keshvaridoost**, **Mingjia Ma**, **Nur Ahmed**, **Khaled Chowdhury**, **Justin Cox**, **Ziaul Haque**, **Eric Heider**, **Josh Poole**, **Ziaul Haque**, **Devon Verellen**, and **Christopher Smith**.

In addition, as this was written, several other awards were in the making. These include, the **Goodwyn, Mills, and Ca-wood Scholarship**, which Nathan Sills helped to develop and is a \$25K endowment that should be fulfilled within the next year, and the **Geosciences Endowment Award** (see donors page for more on this).



Awardees, left to right: Andrew Hug, Nur Ahmed, Katherine Cooper, Shakura Jahan, Sara Speetgens, Justin Cox, Erik Heider, Michael Waldrop, Devon Verellen.

A Conversation with Jim Saunders by Ron Lewis

Dr. James E. Saunders retired at the end of 2015 after 24 years of service to the Department. Photos from his retirement party are followed by selections from a conversation between Jim and Ron Lewis, eGeotiger Co-editor, on February 12, 2016. Here Jim talks about his early career, discusses the origins of his major research programs, and briefly tells of his plans for continuing his research in retirement.



A VISIT WITH JIM IN HIS OFFICE



Ron: I guess we should start at the beginning. You were in high school with Sheila, is that right?

Jim: She was two years behind me. I knew who she was... Although I was going out with a few of her classmates [laughter] ...a couple of sophomores. So I knew her, not very well.

Ron: Mark said to ask...didn't you go out with Don Large's sister?

Jim: No, I went out with his wife! [much laughter]. A little bit, a little bit. It was before Don came to Auburn.

Ron: And you were a student here [at Auburn University]?

Jim: From 1971 until 1975. I think the department had maybe started in 1967 or '68, something like that. They had already graduated their first class.

Ron: Your father was on the faculty?

Jim: Yes.



Jim receives an ore specimen (Mississippi Valley Type) on an engraved pedestal.



Chuck presents Jim with his "Golden Hoe" retirement gift.

Ron: Did you ever take any classes from him?

Jim: No, I didn't want to have anything to do with the Chemistry department when I came here because he had hired everybody. He also got his B.S. and M.S. here at Auburn. His major professor was Cliff Hare, who the football stadium was named after.

Ron: No kidding? So, when you were here in college, who else was in the Department ...who was on the faculty.

Jim: There was DeRatmiroff...the infamous Venezuelan-Russian-American who taught mineralogy back then, and Carington. Cook wasn't here when I first started. My advisor was Ray Christopher, a micropaleontologist, a palynologist. Ron Taylor was the sedimentary petrologist.

Ron: So from here you went to...

Jim: To the University of Georgia...from 1975 to 1978.

Ron: Good memories from that?

Jim: Yeah, excellent...I mean in my area, hard rock geology, ore deposits. It didn't have the reputation, but looking back on it, it was probably the best school in the country. So by the time I made it to the Colorado School of Mines, where I worked on my Ph.D., it was just a piece of cake! I had learned it all at Georgia!

Ron: What did you do for your research work [at Georgia]?

Jim: My major prof was Gilles O. Allard, the French Canadian. The guy is still there...We just had his 50-year anniversary party for him last spring at Georgia. He's been retired for 25 years. I worked with him in northern Quebec, where he first found the ore deposits back in the fifties. I still keep in touch with him... great guy!.....So then when I left Georgia I got a job as a research associate at Boise State for a couple of years. And I actually taught mineralogy and petrology – and the labs -- for the undergrads, which is all they had then. Its been interesting to watch them grow from basically a junior college.

Ron: How did you get to Boise State?

Jim: They had a job add in Geotimes, and apparently they offered it to 4 people and they all turned it down because it only paid \$1200 a month. They didn't have money to bring me out for an interview. But I looked up all about the geology in that region and I said, yeah, I can do this.And then I left to take a job in Atlanta for three years with an environmental consulting company called Law Engineering. In fact, even when I was here they had the contract to do the environmental stuff here at Auburn. Enjoyed the work.

Ron: Then you went to Colorado?

Jim: Yeah. I started that in 1980. That was the start of the Reagan recession ...oil prices were droppin' and things were tough. I didn't particularly like living in Atlanta, so I was looking for someplace to call home for a Ph.D., and that's where I ended up. My boss had all three degrees from there.

Ron: So what about your dissertation work out there?

Jim: I worked on gold deposits out there in Colorado for my Ph.D. At the same time, I saw that as an up-and-down business, so I decided I would get some other training for "plan B," which is where I started doing environmental geochemistry, and they just happened to have a really famous environmental geochemist there named Don Langmuir, who really did "write the book" ... "Aqueous Environmental Geochemistry" ...which is just our class notes from the Colorado School of Mines, which a lot of colleges use for their textbook in that area.

.....So, I got hired at Old Miss to teach environmental geochemistry..but also I taught other stuff too....That's where I got to know Patricia Kelley.I got to know John Grisham some there before he was famous.

Ron: Did you really?

Jim: Yeah, John's daughter Shay was in pre-school with my son Greg, and he would have all the kids and all the families out to his house...where he later built a baseball field for all the kids that he coached. I remember at his house asking him what he did, because he was a really nice guy, and he said, "Well I'm sort of a lawyer and sort of a writer." And then, right when we left, he was at a book signing for "The Firm" and he was starting to get famous and was on the today show.

Ron: So you came here. What brought you to Auburn?

Jim: Well our kids were just getting to be school age, and we thought the city schools were a little better here. That was 1991.....I was offered the job in early August ... I'm startin' classes in 2 weeks...our kids were already in school. There was no way that was going to happen!...so I was able to put it off until the following year. So I actually submitted an NSF proposal through Auburn while I was there, which got funded when I got here.

So, I had been workin' at Ole Miss on a gold mine out in Nevada that ended up being the subject of this NSF grant. It gave

me some ideas about some things that were innovative at the time...Published in Geology about "nanoparticles" before the word was even invented; "colloids" we called them. And so, I guess parlayed that into the NSF grant. But, uh...And I'm just writing the final report for an NSF grant I have on nanoparticles in ores still. So it is just finished but anyway.

Ron: So that was a big...

Jim: Yeah, that was the start of it, I think. I think it was the start of it. And, all it came down to was, how do you make super-high-grade gold ores? It doesn't make sense from thermodynamics. In fact, I was just getting out some of these ores..Like that:



That's all gold! I mean there's nothing' else in there. There's somethin' fishy about this! [laughter]

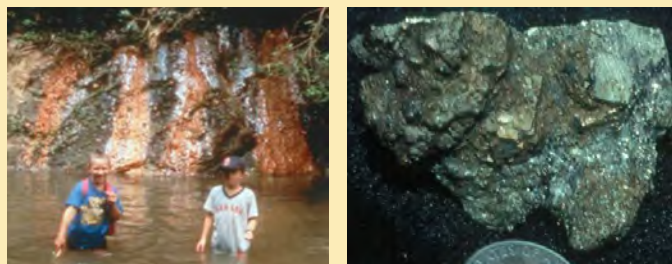
Ron: Yeah, wow! Jeez!

Jim: So that's what I came up with. I had no ruling hypothesis or anything. I was just sayin', well how do you make this sort of stuff? And what came about was colloid aggregation, both amorphous silica and gold. So, anyway, that has been part of my research off and on.....

And then I got the idea for this bioremediation thing that we're doin'.. back about '94 or so, and that was a patent for about twenty years that just expired.

Ron: I was goin' to ask you about that. What was the...what was the gist of the patent?

Jim: Well that's even a longer story, but when I was an undergraduate here at Auburn, I was tubing down Uphapee Creek, near the Tuskegee-Notasulga exit, with some other Auburn students...and I found a big lump of pyrite in the creek, right on the edge of the point bar. And I thought that was really cool. I couldn't really tell how it formed or why it formed. Anyway I collected some of that and had a bag full of it when I went to Georgia, and then I took Ore Microscopy over there where we made polished sections. And as soon as I made polished sections, I knew what that pyrite was. We had a required class in paleobotany at Auburn [laughter] with Christopher, and later I guess Gastaldo took his place, so I knew what wood textures looked like. We did these acetate peels from the



Amanda Savrda and Greg Saunders at Uphapee Creek; Pyrite lump.

coal fields in Alabama. So it was very clear that these big lumps of pyrite were replaced wood. You could see that in the polished section but not in the whole...you know, you saw crystals stickin' out – you didn't know what was causing it.

And my professor there, Bob Carpenter, who was teachin' the class, told me, "That's probably made by sulfate-reducing bacteria" (which I had never heard of). He said, "They need a source of organic carbon, and they need some sulfate, and they'll make pyrite. And that was the first that I had heard of 'em.. cause nobody taught anything about bacteria and geology back in those days. I took a whole year of biology back in Auburn, and I don't think I even saw the word bacteria back then.

So that was cool, but then I forgot about it for a while. And then when I came back to Ole Miss, I'm talking about sulfate reduction in terms of groundwater geochemistry. How it's a very important process in coastal plain aquifers and that sort of thing, and then it hit me: "I know where I've seen this. Let's go on a field trip. I know where I can show ya where this is happenin' right in the field..." So we came over, about ten students from Ole Miss, Cook showed us this pegmatite he had found with tantalum in it up in Coosa County, and I took 'em down to Uphapee and we found the layer, and now you could see a lot more of the wood fragments...so we collected some more and then I did some sulfur isotope work on them.

I tried to get money from NSF to study this process out here. Where do all these metals come from that are in here cause the water's not really all that contaminated. Nobody drinking it ..it's just very shallow groundwater. Never got any money. But I got into the computer with some interest in arsenic. And then people started writing proposals for arsenic in Bangladesh, and that's where I found out about that and understood that, heck, it's the same stuff that's goin' on out here. So that was the connection; so I already knew what was causing the problem in Bangladesh.

The proposal I wrote, they said you need a microbiologist if you're goin' to talk about bacteria. So I got a mircobiologist that I knew at Ole Miss..didnt get funded. At the time, all it was was a hydrology program at NSF, and it was headed by a civil engineer! He didn't know anything about groundwater or groundwater geochemistry. So ultimately, because of the complaints about that, that led NSF to set up this low-temperature geobiology and geochemistry division. So when that happened, the first year is when we got the funding to do the work in Bangladesh. When they actually set that up and had actually had people that understood this. So anyway, the patent mucked around there for a while. Auburn had it, couldn't license it to anybody. So I eventually convinced them to give it back to me, and then we licensed it..

Ron: So, what was the patent exactly? What was it to do?

Jim: We envisioned injecting –like we are going to do Monday – inject the chemicals that will feed those bacteria into the groundwater.

Ron: Molasses or...

Jim: Well, I said any soluble source of organic carbon. Molasses just happens to be the cheapest, it might actually be the best too, because molasses, as I've learned, has got a lot of nutrients in it that don't come out. When you concentrate that cane sugar, you're losin' sucrose but nothing else, your not losin' all those minerals, so it might actually be even better for bacteria than just usin' white sugar. But the first time we did it, we just bought 50 lb of sugar from Walmart and it worked great!

...None of those compounds that are in molasses, the sugars or even the alcohols and methanol, none of that stuff is really the food for sulfate-reducing bacteria..other bacteria have to munch on it....And you can smell it too; that's the cool thing! The first thing you smell after you put the sugar in there, after two weeks, even if its oxidizing to start with, it smells like old fraternity parties in Auburn (you smell the ethanol). And then you smell the acetic acid. You know, wine turns to vinegar, and you can smell that acetic acid, you know just like glacial acetic acid in lab. And then after that's been down there for a while, then you smell the rotten egg smell and then the water's clean [*laughter*]. It's amazing! You don't even need any instruments.

The iron gets released by bacteria, and it's the same bacteria that actually cause the problem in Bangladesh..Iron reducing bacteria take goethite that has sorbed arsenic and release it to the groundwater. But then it goes away once you get to sulfate-reducing conditions.

Ron: So are you going to continue this kind of work, do you think?

Jim: Well, that's what I plan to do in my retirement.

Ron: What direction do you think it will go?

Jim: There is a big Fortune 500 company who has the site where we're working. Our grant is kinda two-pronged. We still have this goal, and this is where Ashraf comes in, we still have this goal of being able to help people in Bangladesh and India, and other countries with their arsenic problems, because we think that maybe for fifty cents you can get enough molasses and ferrous sulfate (ferrous sulfate is an agrichemical that makes the soils more acidic). It's very, very cheap: we bought it from Amazon.com.... So that's everything you need to make pyrite. So the idea is that the bacteria make pyrite (or iron sulfides that are on the way to becoming pyrite), and pyrite has a tremendous capacity to absorb arsenic. In other places we've got the bacteria to remove lead and zinc and copper and cadmium just by makin' copper sulfide or lead sulfide minerals. The arsenic minerals that bacteria make are too soluble; they don't take out all the arsenic. When you make galena, all the lead's gone. I mean, you can't even find it!....as long as there's extra H₂S. But the arsenic minerals, which would be orpiment and realgar (the yellow and red minerals) ... you're still left with 100 parts per billion arsenic in the water when you make those minerals. But the idea is that the pyrite will take it all out ...we hope! [*laughter*].



Jim and wife Linda at his retirement ceremony.

Faculty and Staff News: New Faculty Members

INTRODUCING Carmen Brysch



This past fall I joined the faculty as a full-time lecturer teaching Global Geography and Cultural Geography. I am pleased to be continuing my academic career at Auburn University where I am able to teach. My goal as a geography instructor is to show students the same level of enthusiasm that was shown to me about the world in which we live. Coming into ge-

ography myself by accident, I am fully aware of what it takes to instill a passion for a subject that is applicable to daily life, but also has tremendous global implications. It is with an understanding of geography that students can answer difficult questions and make connections and predictions about Earth. Being a geographically literate person is crucial to being successful in our ever more interconnected 21st century world. Prior to joining the department, I served as the grant coordinator in the Gilbert M. Grosvenor Center for the Geographic Education at Texas State University, completed a one-year fellowship as the Grosvenor Scholar in National Geographic Society's Education Foundation where I worked directly with state-based Network of Alliances for Geographic Education, and taught geography and social studies at the K-12 level. I have also conducted geography, social studies, and Earth/environmental science professional development workshops for hundreds of educators. I am happy to also be in a position where I can pursue my research interests related to professional development delivery methods, pre-service teacher education, and the application of geospatial technologies at the K-12 level and beyond.

INTRODUCING Chong Ma



I joined the Department of Geosciences at Auburn University as a Postdoctoral Research Fellow in September 2015, right after finishing my Ph.D. in the summer at the University of Florida. My research interests lie in the accretionary, collisional, and post-orogenic extensional processes associated with mountain belts. I utilize geologic mapping, structural analysis, geochemistry, and age-dating techniques to study orogenesis from a combined spatial-temporal-compositional perspective. In terms of current research, I am working with Dr. Mark Steltenpohl on structural geology and tectonics of the southern Appalachian orogen in U.S. and Scandinavian Caledonides in Norway. This semester I am collaborating with the Geological Survey of Alabama mapping the Little River Quadrangle of northeast Alabama. I am also teaching Structural Geology this Spring. I will be teaching Field Camp in the summer of 2016, and am very excited about it.

Faculty and Staff News: Continuing Faculty

Phil Chaney

I am pleased to relay to all of our former students that **Kelly Ervin** (MS Geography, 2014) is now studying for her PhD at Washington University in St. Louis. She is following the path blazed by **Ryan Hile** who completed his master's thesis research (social vulnerability to earthquake hazards) at the University of Utah in Salt Lake City and is continuing on in the Ph.D. program. Two new graduate students that I have had the pleasure of working with this year are **Khalid Hossain** and **Nicholas "Nick" Barbre**. Khalid is from Bangladesh where he had experience with social vulnerability to flood hazards and is planning

continue working on that topic for his master's thesis. Nick hails from northern Alabama where he recently graduated from UNA and plans to work on water resources permitting and policy issues in the region.

On the teaching front, my new course on water resources has really taken off as enrollment essentially doubled in Fall 2015. The online version of my Global Geography course has also been a big hit. This coming year looks to be another busy one as I just received a grant to update the Lee County 911 address mapping system. I have recruited six of our majors to work on the project and they are itching to get started.

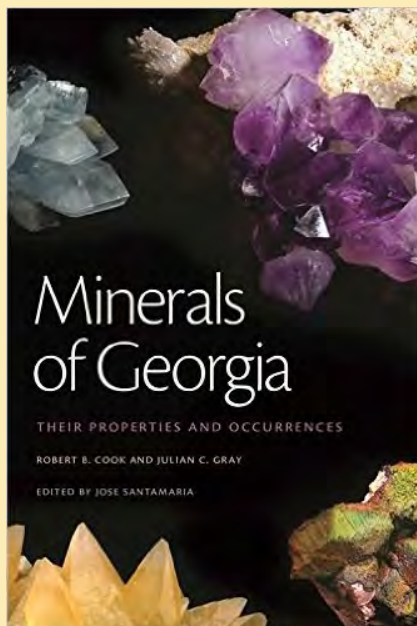
Bob Cook

The past year was highlighted by an annual February trip to Tucson to visit the Gem and Mineral show there. I shared a room with former student **Bill Warren** (BS 1979). Some relatively unsuccessful metal detecting was done at Leadville, once in July and again in September in conjunction with the annual Denver Gem and Mineral Show. Late in the fall, I spoke at a symposium held during the opening of the new New Mexico Mineral Museum at New Mexico Tech. Consulting included sinkhole remediation related to quarry dewatering, platinum-group metal occurrences in mafic and ultramafic rocks, rare earth exploration, and greenstone provenance for artifacts being recovered at a large village site at Oxford, Alabama.

The second edition of *Minerals of Georgia* went to press and was released February 4th, 2016.

Our son Lee and his family still live in Chattanooga and their oldest daughter, Ashleigh plans to enter Auburn next fall. I continue to struggle with failing eyesight but otherwise am in good health.

My interaction with the department has diminished greatly although I remain active on the advisory board and this has been a wonderful opportunity to see some of you. It is heartening to know that we have such faithful and generous alumni.



Li Dong

This is my second year in the Department of Geosciences at Auburn University as an Assistant Research Professor while holding a joint appointment in Forestry and Wildlife Sciences (SWFS). This year began with a good start as my IGP proposal got funded in early spring. Entitled "Causes and Impact Assessment of Drought in the Southeastern United States: An Integrative Approach," it is a collaborative project led by myself with contributions by Dr. Mitra in our department and Dr. Pan from SWFS. Based on the preliminary results derived from this IGP project, I am planning to submit proposals to NASA and NOAA for climate indicator related programs. But unfortunately, in the fall of 2015, I started experiencing several health issues. Upon my doctor's suggestion, I decided to take a 12-week FMLA sick leave so I could concentrate on my medical treatment. I am very glad that I was able to return to work in the middle of December when my health conditions improved. I look forward to a more productive year.

John Hawkins

My teaching duties have kept me very busy this past year. We have enjoyed a steady growth of enrollment for our intro Dynamic Earth class, and we have plans to grow even more in the upcoming year. The large enrollment is a great problem to have, because I do enjoy teaching my large classes. This past summer really kept me on my toes by teaching field camp and taking 11 students abroad to Iceland and Scotland. It was a rewarding experience for me to see our young geoscience students have the ability to gain field experience abroad. I believe it is important to offer as many field opportunities for our students as possible in addition to our traditional field camp course. I have often said that this past summer felt like I was herding cats on a daily basis, but it was only in jest. I enjoyed the teaching experiences probably more than my students enjoyed their travels.



I have continued with my regional structural research on a limited scope and was invited to speak at the University of Pittsburgh this past fall on the subject. I am currently working with undergraduate students on small structural projects in the area. However, my main research goals have shifted focus and are now centered on topics in geoscience education. I was proud to have one of my undergraduate students, Morgan Barkley, give an oral presentation at our national GSA meeting in Baltimore. The topics she spoke on were derived from her summer study abroad experience. I hope to encourage more undergraduates to take advantage of these field opportunities in the future, and get more students involved by presenting at professional conferences.

David King

During the past year, we obtained new funding from Belize Natural Energy and Big Creek Group of Companies for stratigraphic research in Belize. Also, we have new funding from NASA through the USGS Flagstaff for work on drill cores taken at Flynn Creek impact structure in Tennessee. We have new funding for research at Wetumpka impact structure in Elmore County from the Creek Indian Endowment Committee. A new NASA proposal for field work and modeling at Wetumpka will go in during February this year. Also, we have new funding for work with Alabama teachers on educational outreach at Wetumpka from the AU Outreach Program Office (in collaboration with the AMSTI office in Opelika).

I have three graduate students this year. David Adrian is in his second year working on the Flynn Creek impact structure. Karena Gill and Jason Fisher are in their first year working on Belize stratigraphic problems. Mr. Adrian hails from Auburn, but Ms. Gill and Mr. Fisher are residents of Belize. Erik Heider and James Markin, who works for

Chesapeake Energy in Oklahoma, finished their MS degrees this past year.

The Concepts of Science program, for which I am director in our college, is doing well. We have four instructors, four GTAs, and about 15 laboratory assistants who teach about 900 students per year in this core science class. A new Honors lecture section was successful this past fall term.



Ron Lewis

This past year, I began teaching my upper-level undergraduate and graduate course in micropaleontology again after a long hiatus, making use of samples of foraminifera from the Gulf of Mexico as well as from the Bahamas. As in previous years, the course emphasized foraminifera and ostracodes; Mark Pucket (University of North AL) visited in the spring and gave a departmental presentation, which helped to compensate for my meager knowledge of the latter. Graduate student **Chris Smith** (now a Ph.D. candidate at the University of Georgia) finished his thesis right on time, which is no small feat as many of you will remember. Chris investigated attached (encrusting) forams on reef rubble at Cat Island, Bahamas, in a study that was designed to follow up on the research done by **Ray Tichenor** (BS 2010) and myself on San Salvador. In general, he found the same onshore-offshore distribution, but in addition Chris showed convincingly that the density of forams (the number of forams per cm² of cobble surface) and specimen size both decrease offshore – observations that we feel will lead us to an explanation for the distributions we have been seeing in recent years.

I enjoy hearing from alumni and former students, so keep in touch with our department ... and me. Best wishes.

Ming-Kuo Lee

I was re-appointed as the Robert B. Cook endowed Professor in the Department. Along with James Saunders and Ashraf Uddin, I am working on a project funded by the National Science Foundation to investigate how bio-mineralization and geochemical sorption may work together to remove arsenic and other toxic metals from groundwater at an industrial site in Florida. The NSF grant supported three graduate students, **Shahzad Saffari**, **Eric Levitt**, and **Brian Miller** for their thesis research. **Morgan Shuman** (M.S., 2015) finished her outstanding thesis work on modeling the effects of sea-level rise on water resources and arsenic mobilization in Coastal Bangladesh. **Peter Starnes** (M.S., 2015) also completed his NSF-funded project on characterizing hydrogeology and geochemistry of arsenic-contaminated shallow alluvial aquifers in Florida and Alabama. With a small seed grant from the US Army, new graduate student **Allen Clements** started his Masters project on delineating the recharge zones and flow pathways of complex karst carbonate aquifers at Redstone Arsenal in northern Alabama. Allen has conducted a preliminary geological and geophysical survey with Dr. Lorraine Wolf and me to locate sinkholes and subsurface cavities for field-tracer tests.

The new ICP-MS research facility for multi-elemental analysis is now fully operational in the Center for Advanced Science, Innovation, and Commerce (CASIC). Among other things, this unit is used for advancing research and teaching in areas such as hydrogeology, environmental geochemistry, bioremediation, and nanotechnology. The new ICP-MS geochemistry facility will significantly increase our analytical capacity to explore elemental composition of water and geological samples.



Even though he had completed the thesis itself, Chris and I returned to the study area in June to take more samples for the subsequent publication(s). This time we went to the north end of island so that we could add barrier reefs to our reef types. From there we went to San Salvador to attend the natural history and geology conference at the Gerace Research Centre; Chris and I showed a poster based on his thesis, and I presented the research center with a drone financed by the contributions of 32 loyal researchers including **Loren Petruny** (BS 2003) and **Jason Schein** (BS 2000, MS 2004). This was an update of work I had done years ago attempting to use helium-filled weather balloons to take low-altitude photographs. For a YouTube video of the presentation, see <https://www.youtube.com/watch?v=7uLDOK7zCkA>



Luke Marzen

The past year, Art Chappelka (School of Forestry and Wildlife Science) and I received USDA Forest Service funding to begin a project mapping three-dimensional Urban Tree Canopies. We are co-advising a Ph.D. student, Tyler Jones, who is doing his dissertation work related to this project. We are conducting the project using a multi-scale approach ranging from individual tree metrics to citywide canopy mapping with a variety of instruments and procedures, including ground and airborne based LIDAR and stereo photogrammetry in a comparison study of point-cloud generation. The image above is an example of a 3-dimensional point cloud produced with very high-resolution oblique aerial photography of the area around Samford Hall.



Chandana Mitra

This past summer was most eventful for me. At the beginning of the summer, my students **Austin Bush** (Geosciences) and **Jeff Chieppa** (Forestry) and I conducted research in Auburn and Opelika using HOBO sensors to measure Urban Heat Island intensity. We had fun with a lot of planning where and when to place the HOBOs, then getting permissions, building the Stevenson screens and then measuring and monitoring. The results were interesting and will be published soon. Then in July I went to Toulouse, France to attend the International Conference on Urban Climate. Scholars came from all over the world with one goal in mind — to improve urban environment and ameliorate urban impacts. It was one of the best conferences I have attended. Not only because of the beautiful city of Toulouse, but also the discussion and idea exchanges we had.



Besides these, the other exciting thing was the signing of a contract with ABC-CLIO, LLC publishing house to co-edit and author 'Asia: An encyclopedia of culture and society' (3 volumes) starting in 2016. And the final feather in the cap was my student **Xia Li** winning the Auburn University Graduate School's 2015 Master's thesis award. Kudos to her for her sincerity and hard work! Overall 2015 was a very fruitful and satisfying year for me.

James Saunders

Jim Saunders (**AU Geology, 1975**) retired at the end of 2015 although he still has four graduate students who are yet to finish. Of those, one is from Thailand, one is from Iran, and another is from Turkey, perhaps attesting to our increased global appeal to students in Geosciences. Jim, Ming-Kuo Lee, and Ashraf Uddin have a big grant from NSF to work on bioremediation of arsenic-contaminated groundwater (both natural and anthropogenic), and Jim hopes to commercialize this process in his "retirement." He also plans to complete a couple of publications from research he, Bill Hames, and graduate students have done in the Silver City, Idaho historic mining district over the last 6 years or so (funded by another two NSF grants). For more on Jim, see the interview in this issue.

Charles ("Chuck") Savrda

Howdy, folks! I hope that this edition of the eGeotiger finds you well. Things are rolling along just fine for me. I continue to enjoy teaching my regular suite of courses, and, during the current term, I am teaching my Directed Studies course on Applied Ichnology. Hopefully, within the year, I will get this course established as a regular GEOL elective course for upper-level undergraduates and graduate students.

I currently have one graduate advisee, **Drew Daymond**. Drew worked as an undergraduate research assistant for me last year, helping to complete two ichnofossil-related Ingersoll shale projects. Papers resulting from these projects are now "in press" in *Palaios* and *Cretaceous Research*. Drew is now working on a Master's thesis designed to assess mudrock lithofacies variability and hydrocarbon source rock potential of the Middle Ordovician Athens Shale. Over the next few months, I hope to prepare a few more papers on topics that have been on the back-burner and to develop a new line of inquiry—bioerosion by insect larvae and other invertebrates in modern continental settings.

Back in the fall, I had the opportunity to join Dr. Steltenpohl on a whirlwind three-day tour to visit alumni and other friends in Houston, Oklahoma City, and Elko. It was great to see all those who were able to attend. Hopefully, similar opportunities will arise in the future, providing a chance to catch up with more of you.



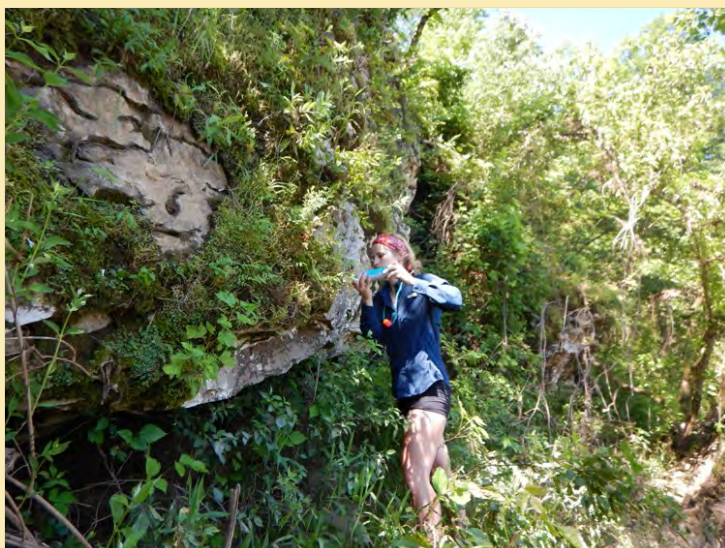
As usual, I haven't done much outside of work. My only real hobby has been gardening with my son-in-law in our 40 x 40 foot plot at the AU Community Garden site (our plot is adjacent to those of master gardeners Jim Saunders and Ashraf Uddin). On the family front, all is well. The most exciting news is the arrival of a second granddaughter on New Year's morning. CeeCee and Chad welcomed Edith Ann about an hour and half after the Moon Pie dropped. Now I can enjoy eating invisible food (or pretending to eat plastic food) with two little playmates.

Stephanie Shepherd

2015 was a big year for me professionally and personally. I spent the first half of the year ramping up my research program, developing collaborations across campus, and recruiting students. The Geomorphology Lab is up and running in Haley Center with the Malvern Mastersizer 3000 laser diffraction particle analyzer that can determine grain size from nanometers to millimeters. I have also acquired an Emriver Em2 geomodel stream table that I am using for teaching and outreach (<https://www.youtube.com/watch?v=Umt899bqrpM>).

I am collaborating with Eve Brantley, Thorsten Knappenberger, and other faculty in the Department of Crop, Soil, and Environmental Sciences on two new projects. We are studying stormwater problems in Auburn, starting with the routing of water around the CASIC building (which houses the new ICP-MS). I am currently documenting and monitoring the erosion gullies that are undercutting the parking lot. A little farther from campus, we are also developing research in the D'Olive Creek watershed on the east side of Mobile Bay. This watershed is experiencing accelerated erosion rates that appears to be related to urbanization. We are trying to determine the specific causes of the erosion in order to inform stream restoration and management efforts by local municipalities.

Over the summer I supported two undergraduate research students – **Sara Speetjens** (Geology BS 2016) and **Austin Bush** (Geography BA 2015). Sara and I spent a week on the Buffalo River sampling gravel bars and measuring the mechanical resistance of the primary lithologies exposed at river level. We were assisted by Mandolin Harris, a high school senior at the Arkansas School for Mathematics, Science, and the Arts. Austin explored the viability of using an automated method to identify terrace deposits in the Buffalo River watershed in ArcGIS. He will be presenting the results at the national American Association of Geographers meeting in April 2016.



Sara Speetjens sampling a bluff with the Schmidt Hammer.

For most of the Fall, I was on maternity leave. On August 31st my husband, Brad, and I welcomed Callum Shepherd Prater into the world. I can't wait to tell him he went on his first field research trip at minus 2.5 months.



Sara Speetjens, Dr. Shepherd, and Mandolin Harris getting ready to embark on their first day on the river to collect data.

Mark Steltenpohl



Greetings everyone! My family and I had a wonderful year in 2015; nothing too exciting happened, but we're very thankful for all that we have. Due to my busy schedule teaching Study Abroad courses in Italy and in Iceland & Scotland last summer (see article in this issue), for the first time in 27 years at AU, I did not co-teach our summer field camp course. I usually share the teaching of summer field camp with Dr. Savrda, but in

2015 John Hawkins filled in for me. I had an absolutely wonderful time with the Study Abroad students! Most of you know that I have been doing field research in the Norwegian and East Greenland Caledonides for over 30 years now, but last summer was my first experience with the Scottish part of the mountain belt. I thoroughly enjoyed seeing the rocks and digging into Scottish geology. My Caledonian background came in handy as John Hawkins walked us through the footsteps of James Hutton. We visited Arthur's Seat, Sillar Point, and Knockan Crag, and I made my own pilgrimage to Hutton's grave in Greyfriars Kirkyard in Edinburgh. These were once in a lifetime experiences. But the highlight for me was celebrating my 60th birthday with John and the students at Brewdog's Pub right next to Greyfriars! This was the evening of our last day before flying back to Atlanta. The students somehow found us a chocolate cake and we all sang Bodygetta Bodygetta while the Scots photobombed us (see photo)! What a thrill!

Closer to home, I'm happy to report that my M.S. students **Josh Poole** and **Nick Nuño** graduated in 2015. Josh worked nearby on my USGS-funded Brevard zone project, and he is now a lecturer at Columbus State University. Nick, currently with Hanson Aggregate, Inc. in Houston, Texas, worked on a project funded through the National Center for Asphalt Technology dealing with how regulated

test results for aggregate stone quality may be predicted based on petrography. My two new students, **Dane VanDervoort** (Georgia Southern University) and **Rylleigh Harstad** (Columbus State University) are also working on the Brevard zone. **Devon Verellon** wrapped up her Undergraduate Research Fellowship (URF) project and Honors Thesis on field and laboratory studies in Norway last Spring. In April she presented a poster at the annual European Geosciences Union (EGU) meeting in Vienna, Austria, and then in August she entered the graduate program at UGA. **Kelly Kindgren** is currently working on an URF project under my supervision. Kelly characterized outcrops and collected samples in the Scottish Highlands last summer and analyzed and dated detrital zircons using U-Pb isotopes in labs at Cal State University-Northridge in Fall 2015. Kelly will report her results at EGU in April 2016.

I was honored last spring when our faculty voted in support of my reappointment as Chair of the Department. I was very happy that Dean Giordano supported my request to hire a postdoc to help me maintain my research productivity over the next four years while I am mainly doing administrative work. After a serious search, Dr. Chong Ma, University of Florida, was hired, and he is doing a wonderful job! Chong is helping me with my two-year National Park Service grant to map the geology of Little River Canyon on Lookout Mountain in north Alabama. He will also help me this summer with a field-mapping project in northern Norway, where Devon Verellon and another of our undergrads, Greg Steltenpohl, and I discovered what we believe to be a thrust-silvered ophiolite fragment at the base of one of the thrust sheets there.

On the home front, all is well with me and my family. Greg (22) is wrapping up his B.S. in geology and is on track to graduate in August 2016. Natalie (23) continues to be a great mother to Adelynn (4) who was quite disappointed waking up one Saturday morning last fall only to find out that there were no more football tailgates to go to; she still battles accepting that tailgates are only seasonal. We hope that you will all drop by to visit us for a tailgater, or for any other opportunity, in 2016. WDE!





Ashraf Uddin

I proposed and taught a new course in Petroleum Geology (GEOL 5500/6500) in Fall 2015. The class was open to graduate and junior & senior students. We had several industry experts who taught their specialized topics in the course: (i) Joseph Beck of Energen Resources taught a short-course on Interactive Petrophysics (IP) on 09/23-25/2015; (ii) Neville Crowson of Energen Resources taught seismology on 10/1/2015; and (iii) Dr. Kevin Burdette of BHL Boresight, taught a short-course on Geosteering on 10/23-24/2015. Above is a picture of students with certificates after they completed a course on geosteering.

Khaled Chowdhury (MS 2014) started a Ph.D. program at Texas Tech University in August, 2014. Two students recruited in 2014, **Nur Ahmed** and **Shakura Jahan**, received grants-in-aid from GSA, Alabama Academy of Science, and the AU Graduate School. Jahan also received the prestigious Don R. Boyd Memorial Research Grant from AAPG. I recruited two graduate students in Fall 2015: (1) **Allen Clements** from Indiana University and (2) **Mustuque Munim** from Bangladesh, who is working on lithofacies and detrital geochronology of a Plio-Pleistocene clastic wedge in the eastern Himalayas, which is considered as equivalent to well-studied Siwalik deposits of the western Himalayas.

Some of our research was highlighted by the Auburn University newsroom when we in the Department changed our name from “Geology and Geography” to “Geosciences” because it involved the interactions between humans and water resources in Bangladesh, in particular the cause and effect between arsenic contamination in the groundwater and the population.

My daughter Nadia completed a Ph.D. in Clinical Psychology and is currently employed in a clinical position at the Marcus Autism Center at Emory University in Atlanta.



The Imperial Barrel Award team for 2015.



While in Houston to present the final IBA presentation, we were able to meet several AU alumni (Corey Hamilton, Jeff Kevan, James Taylor, and Brian Bourgeois) at a local pub .

Lorraine Wolf

Greetings from the East Wing of Petrie Hall! In the geophysics corner, we have a few things to roar about for this issue of the eGeotiger. **Justin Cox** graduated last year after finishing up his gravity and magnetic models for the Muckleshoot basin in western Washington state. His research question focused on whether two major fault systems interact beneath the deep basin sediments. Although the verdict is still out, his work brought us one step closer to answering this important question. **Trey Singleton** is now in the geophysical modeling hot seat with his project on the Black Warrior and Cahaba basins Alabama. He is making good progress and hopes to complete his modeling this spring. Joining our group this past fall semester was **Jian Chen** from China. Jian's project is focused on transient earthquake swarms in Alabama. Specifically, he will try to figure out what causes these swarms to "go off" and what structures are responsible for them. Finally, we have a new undergraduate researcher, **Caleb Eldrige**, who will be analyzing LiDAR data from the New Madrid Seismic Zone. In case you have the idea that the students do all the work around here, I will mention that I am continuing to work in the New Madrid Seismic Zone and recently co-authored a training manual titled, "Conducting Paleoliquefaction Studies for Earthquake Source Characterization." Please look for this on the N.Y. Times bestseller list soon. I continue to divide my time between the Geosciences department and the University's Undergraduate Research Program, both of which offer their unique rewards. I am looking forward to a great year and extend my best wishes to our former students, colleagues, and supporters.



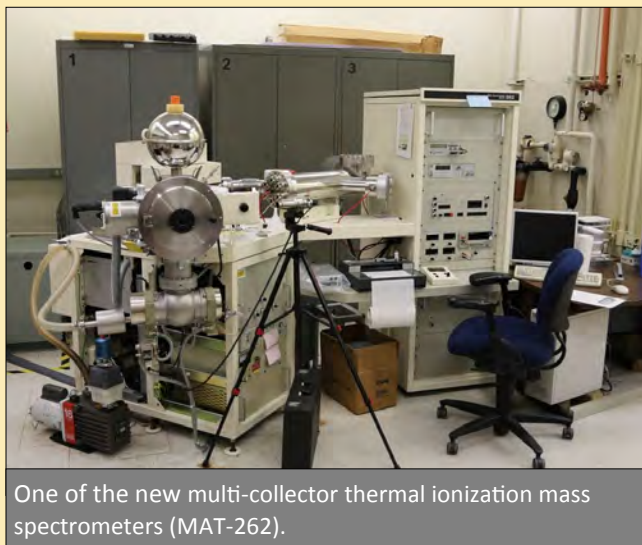
Haibo Zou

This past year was a very interesting one for my research group. Thanks to the generosity of Dr. Justin Simon and NASA Johnson Space Center, we now have two multi-collector thermal ionization mass spectrometers (MAT-262 and MAT-261). We worked on research projects related to active continental volcanoes with funding by the National Science Foundation of China. We expanded our research from young volcanism to Precambrian, Paleozoic, and Mesozoic magmatism and their geodynamic implications. Along with our collaborators, five papers were published in 2015, and an additional three papers had been accepted.

I gave three invited talks at an international workshop "From Melt to Igneous Rocks" at Trabzon, northern Turkey's green and lively Black Sea city. I presented a departmental seminar at the University of Georgia. I gladly accepted an invitation to serve as Associate Editor for the Bulletin of the Geological Society of America (GSA Bulletin), a leading international journal for major scholarly research in all branches of

the Earth sciences. I am grateful to the students of the Department of Geosciences for naming me the 2015 Geology Faculty Superhero awardee.

Graduate student **Katherine Cooper** received the Spencer Waters and Dan Folsie Memorial Award from the Department of Geosciences and a grant for thesis research from the Auburn University Graduate School. She travelled to the University of California at Los Angeles to measure ages of zircons from young volcanoes as part of her thesis research. Katherine has received a job offer and plans to graduate in Spring 2016. **Jennifer Cartwright** from Texas A&M University joined our group for graduate study in Fall 2015.



One of the new multi-collector thermal ionization mass spectrometers (MAT-262).

Sheila Arington

It has been a very busy 2015 in the Department of Geosciences. I think I have the new name down pat when answering the phone now. My duties are pretty much the same....continued interaction with students for registering and advising, serving as receptionist for answering the phone and greeting many guests this year (more visitors than ever coming in with rocks for identification and a big thanks to Jim Saunders for always being there for me), and lots of reimbursements since there are now more conferences and traveling, which is a good thing.

I enjoyed working with the GAB (Geosciences Advisory Board) for their fall meeting and seeing our alumni. Thank you for all your input and participation. Having the new student lounge in Petrie has really drummed up a lot of together time and getting to know one another as majors while studying, having meetings and meals together.....a real plus! As I have said before, this department is like a home away from home for me, and I seem to be putting in more hours than I used to, which is another sign that the department is growing! And as you will hear, Geosciences is moving out of Petrie to the Coliseum temporarily by summer then they will start constructing our new building. I sure cannot promise I will be able to work in the new building, as I am in my 41st year working here with these great colleagues and scientists. I believe I am to get my "rocking chair" at the Spring AU Awards ceremony in May! 😊

Also, I am happy to say I was one of the recipients for the Lilly-Lovelace Distinguished Service Award from COSAM in 2015. This was a pleasure and an honor for me to receive this award, especially since it was named after our own Eva Lilly.



Sheila receiving the Distinguished Service Award from Dean Giordano.

On the home front, I had the pleasure of attending an Aquaculture Conference in New Orleans with Stan, made several trips to north Alabama to visit our sweet granddaughters (5 and 10), and have started some overdue remodeling to our house. I look forward to hearing from you all and keep in touch. I am sure you will want to keep up with the exciting progress of the Department. WAR EAGLE!!

Anthony (Tony) Hall

This past year has been a rollercoaster of activity. Along with John Hawkins, I have been tweaking the Dynamic Earth lab times and lecture locations in order to enhance the course enrollment. In the Fall semester, we witnessed the largest enrollment in the Dynamic Earth course! Hopefully this will lead to higher enrollments in Earth and Life Through Time.

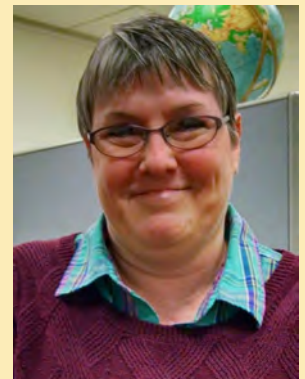


Earlier in the year, I took on a new challenge to comply with Dean Giordano's directive to develop more online core courses within COSAM. I was given the opportunity to develop the Distance Learning course GEOL 1103, Dynamic Earth, which will be taught in Fall 2016. I have started with organizing and outlining the course and working with book publishers.

After hours, I continue to teach night courses at Southern Union State Community College as an Instructor in the Math department and enjoy photographing sports for the Athletics department. War Eagle!

Audrey Hollis

The Geography Office was busy in 2015. The day-to-day operations of the office were filled with student schedule adjustments, reimbursements for faculty and graduate students, and assisting the seven geography faculty with copying of tests, syllabi, and research materials. I completed several management courses during the year. I also assisted with the Advisory Board meeting in October in the Eagles Nest in Haley Center. There was a tour of the observation deck of Haley Center that was very enjoyable. The enrollment in the Global Geography courses continues to be phenomenal, with a Spring enrollment of 800, and a Fall enrollment of 851.



On the weekends, I enjoy working on genealogy and spending time with family and friends. Alumni, please keep in touch. We love hearing what is going on in your lives.

Alumni News

Note to all alumni: Please let us hear from you so we can include you in the next eGeotiger!

Allyson Agerton (B.S. 2004), After graduation, I moved to Connecticut with my husband, who was a submariner in the Navy. Over the next five years, I would migrate to five different states due to my husband's military career. The demands of the military life didn't allow more than one to two



years at any one location, so establishing a solid career within the field of geology was always temporary and presented a struggle. When my father became severely ill and was, at one point, deemed by ICU doctors to be an anoxic patient who would most likely not survive his stay, I decided to change my career field and pursue nursing.

I enrolled in the Accelerated Career Entry program at Southern Connecticut State University and earned a Bachelor's in Nursing through a rigorous one-year educational endeavor. I graduated in the top 5% of my class and was shortly hired on an ICU step-down unit at Wyoming Medical Center (WMC) in Casper, Wyoming.

After three years at WMC, I moved to Denver and was hired into the ICU at Parker Adventist Hospital in Denver, which remains my current place of work. While I plan on pursuing a career as a nurse practitioner (NP), I value the experience I have gained and still am gaining at the bedside, so I plan on remaining at my current position for a few more years before pursuing my NP.

Although geology didn't pan out (pun intended), I still tear up a little when I pass the Colorado School of Mines on my way to Golden, CO. It should also be stated that my father is still alive to this day...thanks to nurses who responded immediately when his heart stopped beating.

Collins Aseto (M.S. 2011) is Senior Geologist at Acacia Mining (formerly African Barrick Gold). Collins wife Emily is teaching chemistry in Troy New York after getting her Ph.D. at SUNY-Binghamton. Collins comes back to USA when he gets time off in his job in Africa.



Collins (center) showing the Kenyan Minister of Mines some visible gold in drill core.

Tom Barry (M.S.1996). In addition to his bachelor's degree from East Carolina University in geotechnical sciences, Tom holds three master's degrees in environmental hydrogeology (AU), business management and public administration. He has worked in the private and public sectors and has experience at the federal, state and local levels. He holds licenses in three states, has authored many national papers and award-winning presentations, and is a nationally recognized educator. Tom worked for nearly a decade for two full-service public works departments in the greater

Seattle area before moving to Idaho in January of 2008. He is currently the Director of Public Works for the city of Meridian, Idaho, and is shown here with his wife Elisha.



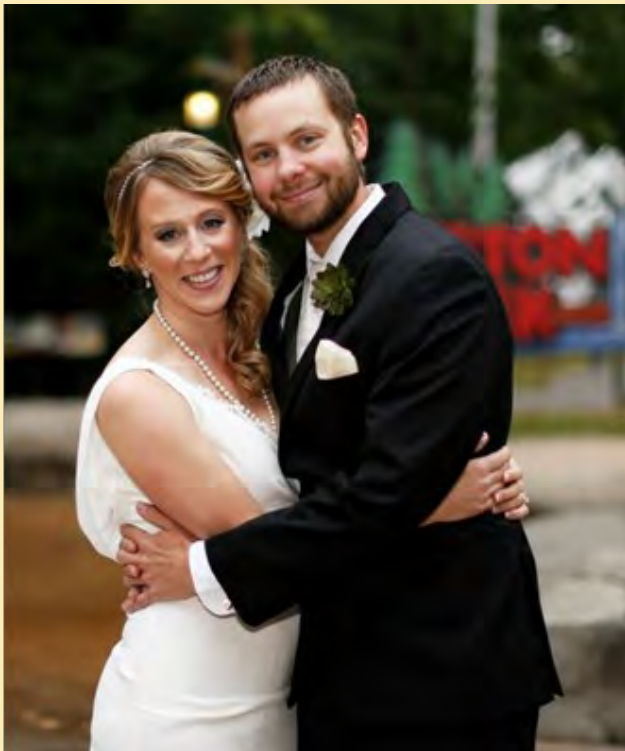
Rue Anne Chitwood (M.S. 2012). Mike and I got married on Saturday, October 3rd at the Memphis Zoo's Teton Trek venue. It's a gorgeous setting with a two-story alpine lodge, and outside in the front there is a working, man-made geyser, while out in the back is where the grizzly bears, wolves, and elk are kept. The grizzly bear enclosure is in the center area, and there is a walkway that wraps up around the bear enclosure. At the high point, there's a bridge overlooking the bear enclosure and lodge, with a waterfall coming down

behind and then beneath the bridge into the bear enclosure. We did our ceremony on that bridge at 7:00 at night, while the guests sat across the way from the bear enclosure in front of the lodge. We were pleasantly surprised to find that the zoo staff kept the animals out for the marriage. The wolves were howling along with the music, and one grizzly bear in particular sat down and intently watched us for the entire ceremony, and when the minister motioned for people to stand up in support of the marriage, the bear stood up too! Our reception was right inside the lodge and went on 'till midnight. It was a blast! Mike and I added our own special touch to the reception décor by bringing a selection of our best rock samples with good stories attached and some of our geology gear and my climbing gear. The whole wedding weekend for us was amazing, and it was so awesome to get to celebrate with our friends and family.

Work-wise, we're both doing well here in Elko, though we did go through some changes. Mike moved into brown-fields exploration on the Carlin Trend, and I got transferred up to the Carlin surface geology team. It's a whole different world than underground, but the experience will be good.

Verner Guthrie (B.S. 1977; M.S. 1980,UGA). I have retired after a long career with the Corps of Engineers. I retired from the Topographic Engineering Center of the Engineer Research and Development Center, Alexandria, VA. My career spanned both active duty time and Army civilian service. I was involved in remote sensing research using both satellite and airborne imagery. My wife and I moved back to my family home and farm in Notasulga, AL. My young adult children remain in Virginia.

Shown below is a newspaper photo (~1975) showing our Department's delta beta charter of SGE being presented. I was a charter member and later was voted president.



GEOLOGY SOCIETY CHARTERED—The Delta Beta Chapter of Sigma Gamma Epsilon at Auburn University received its charter this quarter. Dr. Thomas Waller (left) of the University of Mississippi and vice president of the Southeast Division of Sigma Gamma Epsilon presented the charter to (continuing from left) Paul Kislando of Mobile, Dr. Ronald Taylor, assistant professor of geology at AU, Rory Waters of Moulton, and geology instructor and SGE advisor Robert W. Pierce.
Verner Guthrie

Wayne Holt (B.S. 1981). All is well with me and the family. We now have grandchildren and are getting to play the role of “Disneyland Parents” resulting in spoiling them. It’s quite enjoyable really! Patricia and I are living in Pensacola and love it here. Pensacola was in our hearts after having been in the service here 30 years ago.....and it just stuck in our minds to one day move back. The weather is very agreeable to us, complete with a short winter, and it is a big enough town you can obtain most material things. The children and grandchildren live in Atlanta, so it’s really convenient for them to come down to see us. Patricia retired after 38 years as a dental hygienist. We have both worked our butts off, and now we get to enjoy some of the fruits.

I recently retired from Marathon Oil after 18 years with them. I spent 12 years with Unocal, time in the Army, and a few years with Lockheed Martin. Now, I’m consulting overseas in Senegal, West Africa, on a development project for a joint venture company. The oil business is struggling right now, so this may be the last assignment for a couple of years. Fortunately, I was ready to retire anyway, so the timing is not so bad for us, but others in the industry are really beginning to struggle. This business is very cyclic (having been through 3 of these) and one must be ready for the downturns along with the good years.

Three pieces of advice for undergraduate students:

1. The Co-op program is one of the best things I ever did, and though it delayed my graduation for another year, it taught me things I could never learn in school. The Supervisors at my first two jobs loved the fact that I arrived already knowing what to do and what they wanted in work product. Reese Mallette was a firm but fair Co-op boss and I am forever grateful for his guidance of what it means to be a professional.

2. Minor in tougher subjects such as Mechanical, Civil, Geological, or Chemical Engineering. Though my GPA wasn’t terrific, the fact that I took tougher courses for a minor did stand out, and it was appreciated by my early employers. This knowledge also came in very handy in several job assignments as you understand what the engineers are speaking of.

3. Don’t forget to have some fun! Take school seriously, but don’t forget to enjoy some time at Chewacla State Park, Ft. Walton, Atlanta, and of course at Tiger games!

Well, I wish the best to all my fellow Alumni and current student population.

War Eagle!
Wayne



Kelly Irwin (M.S. 2014). A lot has happened since graduating from the Auburn Geosciences Department in 2014. I was hired right out of the program as a project manager and GIS specialist for an environmental consulting company in Corpus Christi, Texas.



I recently left Texas to begin the PhD program at Washington University in St Louis. As a member of the Geoarchaeology and SAIE (Spatial Analysis, Interpretation, and Exploration) Laboratories, I reconstruct past landscapes to understand human-environment interactions. My adviser from Auburn, Dr. Chaney, has been a major influence in my research choices and also a motivating mentor. My experiences in the AU Geosciences program helped me get my first job out of school and acceptance into a premier PhD program. I have been very lucky to stand on the shoulders of such giants. War Eagle!

Rob Locklair (M.S. 1998). I took a position as Drilling Engineer with Schlumberger in 1998. Overall, it was a good experience working in various parts of East Asia, but the assignment was lean on geology. In 2001, I started work on a Ph.D. at Northwestern University. My dissertation research at Northwestern continued along the mudrock path that I started at Auburn with Dr. Savrda. During my dissertation research, I also worked as an independent contractor for EnCana and El Paso. Those experiences were worth the distraction from graduate school that came with them. I did a lot of field work for EnCana and El Paso to better understand the distribution of properties for a number of unconventional oil and gas targets in Rocky Mountain sub-basins. My dissertation turned out to be a bit of a mélange that addressed topics like organic enrichment of Permian siltstones in the Delaware Basin, Phanerozoic evolution of seawater chemistry and alkalinity, and orbital-scale forcing of Cretaceous mudrock cycles in Colorado. Upon completing my dissertation in 2007, I had brief post-doc assignments at Northwestern and Johns Hopkins University. In 2008, I started in the Exploration and New Ventures group at Chevron. Most of my work involves investigation of subsurface barriers and baffles to fluid flow, but I also work on chemostratigraphic projects and teach internal courses on the topics of top seal, fault seal, and overpressure.

The photo below shows me at Torres del Paine National Park in Chile. The dark rocks are Cretaceous mudrocks of the Cerro Toro Formation; the white rocks are a Miocene granitic sill.



Tara Peavy Mitchell (M.S. 2008). We are doing great! We both still work for IMERYS here in Andersonville, GA. Will (AU graduate in Civil Engineering) was promoted this past Spring to Operational Excellence Manager and 5S Manager. It is a lot more responsibility, but he enjoys the involvement and challenge it brings.

I am still Senior Geologist in the Mining Department. I am responsible for geologic data management and geologic models of our deposits, which include approximately 320 properties spread among middle Georgia, Andersonville, and Henry and Barbour counties of Alabama.

Our daughter, Helen, just turned two years old. Will and I recently went to France together in May for a week. It was the first time both of us were that far away, and gone for so long, from Helen. We had a wonderful time, exploring Paris and spending four days in South France along the coast in the town of Aix-en Provence. Will had a conference to attend the end of that week, so I just tagged along to explore.



Steven Pfeifer (B.S. 2012). Soon after graduating Auburn I took a job with a gold exploration company out of Anchorage, Alaska. Living in a tent in remote Alaska for four months out of the year, using a helicopter to get between sample areas and drill rigs, and running into bears, moose, and other critters daily was an absolute blast and something I'll be talking about for a long time. After my second field season up there, a job opened up close to home with an environmental company.

I've been with American Environmental & Construction Services for over two years now. We are a small, but growing, company in Alpharetta, GA. As a small company we do a little bit of everything, from investigations and sampling to soil removals and injections. It doesn't provide the same rock-hound satisfaction that I had in Alaska, but the experience is great and it is nice to be close to home (and Auburn). War Eagle!

Jordan Sayers (B.S. 2011). I was born and raised in Auburn, and once I graduated in 2011, I was tasked with my first move away from my home town. I packed my things into a U-Haul, grabbed my cat, and towed my car to Houston, TX to pursue a master's degree in geophysics. I wanted a better understanding of the ways seismic data was used in exploration geology, from the acquisition through the processing and the many different ways to interpret the data. I studied under Dr. John Castagna at The University of Houston, specializing in reservoir geophysics. Dr. Castagna was also an advisor for the Houston IBA team, which I joined as the seismic interpreter for the 2012 IBA competition. Our team was assigned a dataset offshore of Nova Scotia with 3D seismic, which I received permission to use as my thesis data. It was great for me, as I had already spent a taxing several weeks interpreting the data and learning the history of the basin for IBA. Around the same time, I received an offer for a summer internship with Southwestern Energy in Houston.

I worked on the Fayetteville Shale, attempting to correlate reservoir properties and production data to seismic attributes. I had a great experience, and at the end of the summer, returned to the reality of "oh no I have to write an entire thesis before I'm allowed to go to work, don't I?" In the fall of 2014, I received a job offer from Chevron to work in their Southern Africa Business Unit. I managed to complete my thesis and graduate in May of 2013. At this point, I had never left the country, and wouldn't have imagined that I would travel to three other continents within that year. Before starting work, I took vacation to Germany with friends (continent #1), and took a road trip to some U.S. National Parks. I then began work on assets in Block 0, offshore of Angola, as an Earth Scientist. My work was a combination of geology and geophysics, ranging from seismic attribute analysis to well planning.

As per our training program, I switched jobs in May of 2015, and moved to my current home in Midland, TX. I'm now experiencing a completely different area of Chevron as an Operations Geologist in the Permian Basin. I've been able to visit the field to observe our operations (the rig pictured was in the process of coring the vertical section of

a well in one of our unconventional assets). I recently went on the Permian Basin field trip with Chevron, which is the first time I've done field work since field camp! During the trip, we stopped by Carlsbad Caverns (picture), but spent most of the time in the Guadalupe Mountains. I was able to get some laughs when we went to study our core before the field trip, using my massive Auburn University "Do Big Things!" hand lens. At home I adopted a



golden retriever, Eli, who gets along fantastically with my cat, Bianca. Since moving into a house with a yard, gardening has become my newest hobby that consumes most of my time (and money). One thing I miss most about Houston that I haven't mentioned was the amazing Auburn Alumni club we have there. I spent every football Saturday with fellow alumni, cheering on our Tigers. So far, I've made it home for at least one football game each year since graduating, and hope to continue that tradition for many years. Lastly, War Eagle from Midland, Texas!



Dr. Mohammad Shamsudduha ("Shams") (M.S. 2007). Greetings from London! I am currently living in England (UK) with my family – my wife, Shonima and nearly a year old boy, Safeer. I now work as a Research Fellow at the Institute for Risk & Disaster Reduction at University College London (UCL). I completed my Ph.D. in September 2011 at UCL Geography in the field of Hydrogeology. I came to UCL as a PhD student in September 2007, soon after I completed my M.S. in Geology at Auburn University and a summer internship at ConocoPhillips in Houston. I went to Auburn University in July 2005 as a graduate student to work on arsenic contamination of groundwater in Bangladesh —

where I am originally from. I had my bachelor's and my first master's degrees both in Geology in 1998 and 2000 respectively from the Geology Department of Dhaka University. After my graduation, I worked with a group of scientists from Lamont-Doherty Earth Observatory of Columbia University for about two years on arsenic problems in Bangladesh; I then headed towards the Down Under where I studied Hydrogeology & Groundwater Management under an



Australian Government's prestigious overseas scholarship, AusAID. I completed my studies at the University of Technology Sydney in the summer of 2004. Later in the year, I returned to my home country and worked for an Australian Consultancy company for about a year. I got in touch with Dr. Ashraf Uddin early in 2005 to discuss the possibility of joining Auburn University. I should mention here that, at that time, the Geology Department of Auburn University was considering developing a PhD program, and I thought of becoming the first doctoral student; however, the effort was not realized, and I ended up earning my third masters degree in geosciences. Because of passing on from one degree to the next one for a number of years, I was nicknamed the 'serial student' by some friends!

I very much enjoyed my academic career at Auburn University—teaching undergraduate students was a challenging job, but I think I managed it well. Three of my undergraduate students took geology as their major subject—which made me feel proud. I enjoyed my thesis project. I am glad that my study area was in Bangladesh and I got to see my wife twice during my tenure at Auburn University. At the department, I was also engaged in social activities; I served as the president of several student organizations, such as the Bangladesh Student Organization, Auburn's Sigma Gamma Epsilon chapter, and Auburn's American Association of Petroleum Geologists. My master's research went very well, and I received a Dean's Research Award, and the Geological Society of America and Sigma Xi Outstanding Research awards. I am very grateful to Drs. Uddin, Saunders, Lee, Hames, Marzen and other professors at Auburn University for their support and encouragement.

Derick Unger (M.S. 2008). After five years working in gold exploration in Nevada (Newmont Mining, Victoria Resources) Derick has spent the last two years working as an exploration geologist for the European mining company Nyrstar. Derick has been exploring for new zinc ores around the company's six existing mines in central and east

Tennessee. Those ores have significant byproduct concentrations of gallium and germanium which are used in I-Phones and other high-tech applications including photovoltaics. Derick was promoted to Senior Exploration Geologist for Tennessee this summer by Nyrstar.

Jamie Webb (B.S. 1992, M.S. 2001). War Eagle from the World's Most Beautiful Beaches! My last year as an undergraduate at Auburn was milestone filled. I married my long-time sweetheart, Cheryl Brewer, graduated from Auburn, and got my first "real" job with Roy F. Weston, Inc. That first job opportunity was due, in part, from the great people in Petrie Hall! In 9 plus years at WESTON, I held a variety of positions including Quality Control Coordinator and Lab Manager and was able to work on a variety of site-investigation and site-remediation projects for clients throughout the South. While at WESTON, I decided to return to Auburn to pursue a Master's Degree, working under the careful guidance of Dr. Robert Cook. Although I spent a little longer than I expected, the time I spent in graduate school was one of the best experiences of my life.

After graduation, I left my position at WESTON and began to work for Bhatte Environmental Associates, Inc. in their field office in Ft. Walton Beach, Florida. That position allowed me to enhance my field, site safety, and project management experience on various site-investigation and site-remediation projects at Eglin AFB. During this time in Ft. Walton, our first daughter, Blakely, was born in 2001.

In 2003, my family moved to Panama City Beach, Florida and I began working at Gulf Coast State College and, in 2005, our second daughter, Brewer, was born. At Gulf Coast, I teach a variety of courses in traditional and online formats, including Physical Geology, Fundamentals of Oceanography, Earth Science, and Natural Disasters. I have also been able to sponsor student trips to both the Galapagos Island and Costa Rica and have been involved with many club organizations and STEM-related activities in our local school district.

Since our daughters are a little older now, our family is looking forward to spending more time traveling and that traveling will definitely include many, many Auburn football games! WAR EAGLE!

Jerry Wylie (M.S.-Geology, 1987). Greetings from upstate South Carolina! Dr. King graciously invited me to give the Auburn geosciences family an update on what I've been up to. It's almost incomprehensible that I left Auburn almost 30 years ago! In so many ways, it seems just like yesterday...

I began working in the environmental engineering/sciences field directly upon graduating from Auburn. I've been with big companies, small companies, and even owned my own company for a short time. Currently, I'm the Hydrogeological Sciences group manager at SynTerra, a privately owned firm of about 70 professionals in Greenville, SC. After completing a strat/sed/paleo thesis under the guiding hands of Drs. King, Lewis, and Savrda, I've done a complete about face and spent my entire career working as a hydrogeologist assessing and remediating impacted sites all over this country and even other countries. I've had the

pleasure of working on remediation projects in Canada, England, Chile, Argentina, Brazil, Guatemala, and Colombia. The last few years have been some of the busiest of my career as I've worked for a very large utility company on one of the biggest environmental projects in the Carolinas.

In my spare time (ha!), I've served as a professional mentor to the Clemson University Chapter of Engineers Without Borders. This student-led organization works with the national chapter on engineering projects that benefit needy communities around the world. I traveled to Nicaragua in early 2015 to supervise the drilling and installation of a drinking water well for a community that had no water supply. It has been quite gratifying to use my experience and expertise to help others in need. Plus, I get to help the next generation of engineers and scientists prepare for the real world. I'm just amazed that they let in a real-life geologist amongst the engineers!

Many of you will remember my wife Amy (AU teaching grad, 1986). We recently celebrated our 27th year of wedded bliss. Our boys are (mostly) grown and gone, so we're enjoying an "empty nest". Justin graduated from Clemson with a degree in Audio Engineering and then earned a Master's degree in Interactive Media at Elon (NC). He's employed as a web developer here in Greenville. Our youngest, Jacob, will graduate from Furman University this coming May. He's a double major in Music-Performance (Percussion) and Music-Composition. We're doing the graduate school search now, and he's looking at some very prestigious universities for his Master's and Doctoral work. He's very talented and very dedicated to his art. We couldn't be more proud of the fine young men that our boys have grown into.

Finally, let me send my regards to all those who remember me from my years at Auburn. It was a special and rewarding time in my life and I reflect on it often. Being separated (physically) by 250 miles has not allowed me to stay in contact with the Department like I wish I could have. But, as I reflect on the past and look forward to the future, perhaps I will change that! I am certainly proud to let people know that I am an Auburn Geology grad! War Eagle!



Mark Zwaschka (M.S. 1986) did his Masters with Bob Cook, was a mine geologist at Brewer gold mine in South Carolina until 1995, and then went to Homestake Mine until it closed down. Now he writes to us....

I have been employed with JBR [JBR Mining and Exploration] for over eleven and a half years doing reclamation work at the former Homestake site. Hard to believe it has been that long. I have done nearly \$20 million in reclamation work. I tell my son I am a large-scale landscaper. It has been interesting work but I still miss the exploration\mining gig. I started out with the demolition of the Mill Complex; some of the buildings were built in 1901. One of my favorite parts about it was all of the gold we recovered after the buildings were taken down. The plant superintendent and I calculated we would recover 900 oz of gold, but after it was all said and done we produced 9000 oz!. The refinery area was a 0.75 opt ore body, while the original sand dam yielded 4-25 opt material that was "lithified" sand, amalgam, mercury, and metal debris. It was one of the neatest exploration programs I have ever worked on!

Over the years, I have constructed new stream channels, re-shaped waste piles, sealed near-surface tunnels, and last year covered 53 acres of the Grizzly Gulch Tailings Facility, then seeded it. Because Barrick is getting hammered by cost overruns on the Pascua Lama project in Chile along with other issues there, money became tight this year and I had two \$1 million-dollar-plus projects delayed. I wasn't too happy about us being penalized for upper level mis-management. The money I have spent has done a lot of good, and I am close to completing it. It is a drop in the bucket compared to what they waste. Heck, we even won a reclamation award this past December at the Northwest Mining Association meeting in Spokane. However, I didn't know about it until after the fact, and Barrick never acknowledged it. Made me mad. But enough ranting.

The big thing for me was that JBR was acquired by Stantec Consulting. I went from a 140 person company to over 14,000 along with more bureaucracy. It has been interesting and we'll see where it leads. Besides the Homestake work I do, I am involved with a couple of energy projects in Wyoming that I review since they require a Wyoming Professional Geologist and I am one.



I have included a couple of photos. One is a family photo taken in May after my son's confirmation, and the other is me near the finish line of a half-marathon trail race in the Black Hills. I have been running for many years. I started entering races in 2001 and began trail racing in 2005. I pretty much trail race now — anywhere from a 10K to 50K.

Those who know me might realize I shaved off my beard. I had one for over 33 years and decided last November to shave it off. This was the first my wife and kids saw me beardless. I doubt if it will make a comeback.



Where are they now?

I think most of us would agree that the time we get to spend together in the field provides for some of our best educational experiences and the most memorable life experiences as well. Witness the student trips and study abroad theme emphasized in this issue of the eGeotiger and recall the memorable field trips from your days at Auburn University. Over the years, I have had the good fortune to lead many trips to the island of San Salvador in the Bahamas.



One such trip was in May of 2007. Geology junior Jessica Morgan had won an AU Undergraduate Research Award to study the effects of different substrates, such as seagrass and cobbles, on benthic forams. Her friend Chris Ploetz, a Geography major, and Justin Goggins, a senior with a keen interest in marine biology, went along to help. Freshman Geology major Ray Tichenor also went along on the first of what were to be many trips to the island to do his own research. I have had many groups of students who got along well with each other and worked efficiently together, but this team, captured here in a chance photograph... "Would you like me to take your picture?" someone asked after we returned from a boat trip to one of the outer keys... this team was really special. I include it here to start what I hope will be a new feature in the eGeotiger and a new way to keep up with our increasing number of alumni.
— Ron Lewis



Jessica Morgan (M.S. 2008). After graduating from Auburn in the class of 2008 and spending my days picking foraminifera with Dr. Lewis, I packed up and moved to Austin. I got my masters at the University of Texas under Dr. Lesli Wood in the Quantitative Clastics Laboratory.

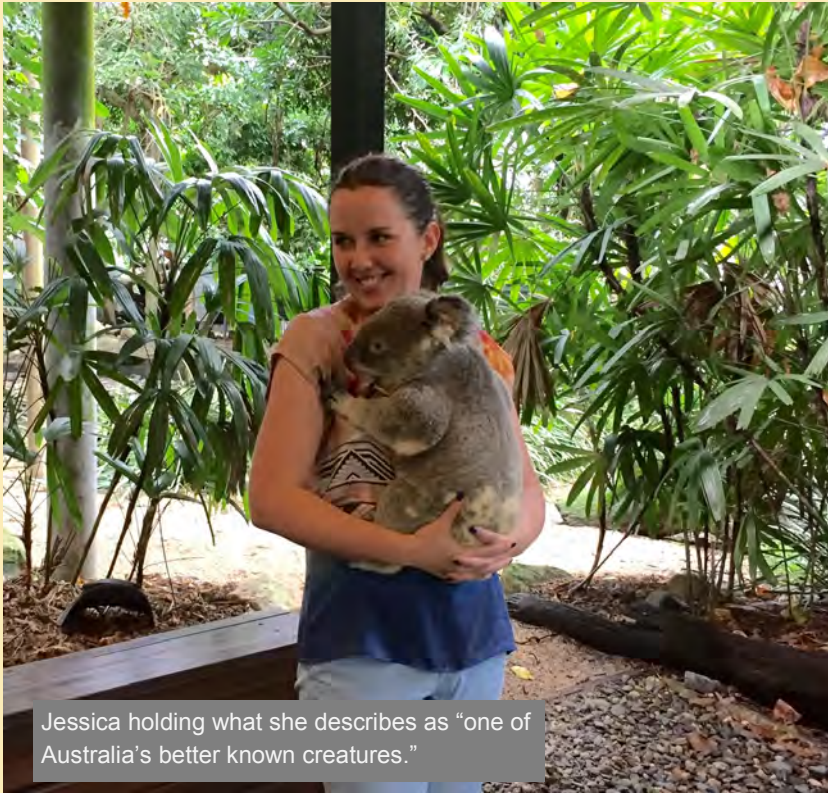
My thesis was based on seismic interpretation of a deep-water Gulf of Mexico dataset from an energy consortium. The interpretation was aimed at using seismic geomorphology of channel systems to determine timing of salt emplacement. After school, I moved to Houston as every good UT grad does, and started working for a major oil company.

My job isn't in a typical interpreter role, but an embedded geoscience computing support role, primarily supporting the Schlumberger Petrel package. I teach geophysical and geological interpretation methods and promote new tools to other geologists to make their workflows more efficient. I spend a large amount of my time working on improving geoscience data integrity. It isn't a very glamorous job, but I'm really loving it. I've taught training in Germany, Calgary, Kuala Lumpur and Houston and worked with some of the best geoscientists in the oil and gas business. A year and a half ago, I was transferred to our Melbourne, Australia office for my dream assignment. I've been coordinating one of our big data management projects, teaching classes and learning new geophysics packages, but I'll be ready to move back to Houston in the middle of the year to prepare for my October wedding – to a non-geologist Auburn grad. At least I say I'll be ready, but leaving Australia will be one of the hardest things I'll ever do.

It's certainly a tough time to be working in the energy industry, but it's also a time when companies are looking for efficiency and new ideas, so there is a lot of opportunity space now. I just hope it's a short-lived opportunity space. War Eagle!

Attached is a picture of me with one of the more famous rocks in this island nation.





Jessica holding what she describes as “one of Australia’s better known creatures.”

Shortly after receiving my M.S. in Geography, I began working at the National Geo-spatial Intelligence Agency (NGA) in Washington DC. Much of my work involved collaboration on various classified projects involving remote sensing and GIS.

As exciting and fun as it might sound, after about a year I grew restless and applied to the Japan Exchange and Teaching program (JET). To my surprise I was selected and spent the next 2 years teaching English in a remote fishing village in Nagasaki prefecture.

During my time in Japan, I was selected to appear in a film and was bitten by the acting bug. Since returning to the United States, I have been working as an actor, voice actor, and stunt performer. In fact, I have been working 14-hour days on set in Atlanta the past few weeks. My story might not be the most straightforward or traditional, but I wouldn’t have it any other way. WAR EAGLE!



Chris Ploetz (B.A. 2007). After graduating from Auburn in 2007 with degrees in Anthropology and Geography I worked briefly as a crime analyst for the Montgomery city police department before continuing my educational pursuits at the University of Georgia (UGA). While at UGA, I studied sand dunes, paleo-environments, and geo-archaeology in Namibia with my adviser Dr. George Brook. I used optical stimulated luminescence techniques to determine sedimentation rates for pan fringing lunette dunes to construct a paleoclimate record to correlate with Antarctica ice-core date.

Clockwise from top left — Chris sampling the local Namibian cuisine...a caterpillar; as an American dignitary in the Rouroni Kenshin movie; participating in a Christmas reenactment in Japan; and as Klaus, the German henchman.



Digging the vehicle out after getting stuck in the middle of the Namibian Desert.



Ray Tichenor, Jr. (B.S. 2010). After leaving Auburn, I continued working with foraminifera while getting my Masters at East Carolina University in North Carolina. My thesis focused on how foraminifera were responding to increased periods of hypoxia off of the Mississippi Delta.

We reaffirmed the usefulness of the PEB index, but pointed out that *Epistominella vitrea* populations were correlated to rates of sedimentation. This work was just published in the January issue of the Journal of Foraminiferal Research.

While I still love micropaleontology, I left school to pursue a job in the oil business. My first job was mudlogging on oil rigs in Kansas and Oklahoma. I still got to analyze the occasional microfossil, but finally moved away from the recent sediments and into the Carboniferous. After working on a rig for a year, I opted to move to a cozy city office working for SandRidge Energy. Here the only forams I see is the fusulinid packed Beil Limestone I have displayed on my desk. But I've taken a new love in mapping, petrophysics, and occasional core analysis I do at my current job.



Justin Goggins (B.S. BIOL 2010). After our Bahamas trip, I went to the University of New Haven and earned my MS in Environmental Science with an ecology concentration. I conducted my research on salt marsh dynamics - investigating an erosion zone vs. an accretion

area. I then worked for the Connecticut Department of Environmental Protection as a seasonal employee, assessing the water quality of Long Island Sound. From there I became a New England Fisheries Observer. I spent about 200 days at sea in less than a year and then moved back south to work on the BP Oil Spill. I was part of a team that went to explore the "bathtub ring" which has been in the news recently. We used an ROV to take water and core samples around the well head and along the salt domes. It was an amazing trip! I then did some pelagic fishing surveys. One time we had a fire onboard and had to abandon ship, later to be picked up by the Coast Guard.

After the BP funds were finished, I returned to Connecticut to resume observing fish. The boat fire had fortunately provided me the opportunity to meet and debrief with the NOAA's National Marine Fisheries Service (NMFS), and the day I arrived back to Connecticut, they called and offered me a job. So I officially resigned from observing and moved south.

Over the next two years, I worked as a Fisheries Biologist in Pascagoula. I worked on fish stock assessments in the Data Analysis Unit. I went to sea a lot doing ground-fish

trawl surveys and plankton/shark/pelagic fish surveys. I went shrimping to test new experimental TEDs (turtle exclusion devices). Here I got to be a part of all kinds of great projects and made many great friends including Sarah, who is now my wife. Sarah was a NOAA Corp officer who got stationed and moved there on the same day I started. So she was the officer and I was the gentleman. She drove the RV Oregon II, which I sailed on maybe five times and eventually we renamed the Love Boat. She had already planned making Pascagoula her last assignment, retiring from NOAA, and going back to school for her MBA in Hawaii, which leads us to now.

So we moved to Oahu, Hawaii, and have been here for two and a half years. It was a hard first year because of how funding works in our field. But I finally got hired with NOAA CRED (coral reef ecosystem division), and I participated on the 2014 Marine Debris Cruise to the Paphanaumokuakea National Marine Monument. We collected the largest single removal of derelict fishing gear in all of their years in marine debris. We were featured in National Geographic for removing a monster 11.5 ton net ([Hunting for 11-Ton Fishing Net in the War Against Ocean Trash](#)).

Currently I work for the State DLNR (Land and Natural Resource) DAR (Division of Aquatic Resources). I am the team leader for the "Super Sucker" project, which vacuums invasive algae off the coral reefs in Kaneohe Bay. It's an awesome job! The pay is embarrassing, but I'm getting to do conservation biology and feel like we're really making a difference. We also conduct the field monitoring and rapid assessment of bleaching events, disease outbreaks, and ship groundings, etc. My wife just finished her MBA a few weeks ago and just started a new job as a Housing Coordinator for a non-profit helping homeless people. She oversees nurses and staff at these homes that help people get back on their feet. Oh yeah, we got married on March 21 of 2015.

P.S. I have carried the buoys I collected on San Sal to every place I've lived and look at them and think of our time very often.



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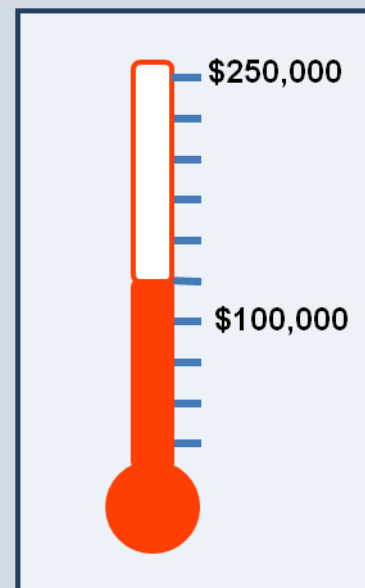
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