



East Carolina University®

Department of
Geological Sciences

2016 NEWSLETTER

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Students enjoying a day at Jockey’s Ridge.

Cover Photo; Bailey Donovan, mangrove ecosystem from the east coast of the southern South China Sea

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Emily Harrison

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Dr. Stan Riggs

Four Legs Good, Fieldwork Also Good!

Our new and improved annual newsletter is produced for the second year by a team of undergraduate and graduate students mentored by Stan Riggs. I thank them for their enthusiasm and energy and I also thank all of the persons who contributed articles to this newsletter. We have a great mix of articles this year, but I want to mention one theme in particular in this message — fieldwork.



Culver with Malaysian colleagues in the South China Sea showing their connection to ECU.

One undergraduate writes about his life-changing *Summer at the Coast* experience and several write about their experiences at the summer 2015 six-week field course in Colorado and New Mexico. A former student in our department, Bob VanGundy, now at the University of Virginia's College at Wise, VA, also writes about the importance of fieldwork. And Bob is serious! His very generous \$40,000 donation to the department will fund scholarships, in perpetuity, to help students attend the summer field course.

Steve Harper, of course, organized and ran the summer field course once more with help from long-time, invaluable contributors to our department, Steve Campbell and Jay Holley. More than 40 students from eight universities around the country attended. I visited too, with my new boss, Dean Bill Downs. Bill is a

political scientist, and so I thought I would get him out in the field to see first-hand the physical and mental challenge of fieldwork and the complexity of geological mapping and other field activities. Bill passed his challenge with flying colors and now wields a mean hammer!

Our two technicians, Jim Watson and John Woods have very complicated jobs. Jim and John have been amazingly valuable contributors to the department for many years. They help the department run smoothly on a daily basis, but their articles in this newsletter are about some of their contributions to fieldwork on land and on the water. Several graduate students also describe their field experiences in this country and overseas in SE Asia and in South America. International experiences are being increasingly emphasized in Harriot College of Arts and Sciences, and the more students who get to travel out of the US, the better. Funding is, of course, tight, but each year we manage to include perhaps two or three of our graduate students in overseas travel.

Enough of fieldwork, I'll finish by congratulating Alex Manda on his promotion and tenure and by thanking Dare Merritt and Kim West for running the front office so efficiently and cheerfully.

I hope everyone has a great year! See you at the pig-picking (thank you in advance to the Spruills!) on the 30th of April.

My very best regards,

Steve Culver

Steve Culver
Chair, Geological Sciences

Annual Pig Picking

Come enjoy a day filled with great food and comradery!

The annual Pig Picking on Spruill's back 40

Noon, Saturday, April 30th 2016.

Please contact the office for directions at:

Phone: 252-328-6360

Email: westk@ecu.edu



Photos from past Pig Pickings

NORTH CAROLINA'S COASTAL SYSTEM: A 185 MILLION-YEAR RECORD OF DYNAMIC CHANGE

A View from the Coast: Stan Riggs

North Carolina's coastal system is ~185 million years old and has produced a geologic record of changes that occur in a cascading time scale beginning with the opening of the Atlantic Ocean. The resulting sediments of our Atlantic continental margin record a dramatic climate history that started with the Mesozoic and Early Cenozoic "hot house" through the bizarre transition zone of the Late Cenozoic, and finally, into the highly cyclical climates of the Quaternary "ice house."

The newly formed coastal environments of the narrow Atlantic Ocean were characterized by "hot house" climatic conditions. Initial Jurassic sedimentation occurred in shallow-water salt flats that graded into carbonate mud flats and coral reefs. The coastal system transitioned into deltaic and coastal marine deposits during the Cretaceous, and back into fossiliferous carbonate sequences during the Paleocene, Eocene, and Oligocene epochs. By the end of the Oligocene, the tectonic plates continued to open the Atlantic Ocean, started closing down the equatorial Tethys Ocean, and moved Antarctica into its polar location, surrounded and isolated by the Southern Ocean. This transition period from "hot house" to "ice house" conditions represents the Miocene-Pliocene epochs. Global climatic cooling resulted in Antarctic glaciation and development of our modern Atlantic oceanic circulation system. NC's coastal system experienced extensive nutrient upwelling that led to deposition of the highly productive and fossiliferous deposits of chemical sediment sequences (phosphates, glauconites, dolomites, etc). By the Quaternary, the climate had shifted into "ice house" conditions dominated by multiple cycles of northern hemisphere glacial and interglacial episodes. As the climate alternately cooled and warmed, the ocean shoreline receded seaward and advanced landward, respectively, across NC's continental margin, creating the modern topography.

During the last glacial maximum (~35,000 to 18,000 years ago) NC had an arid to semi-arid, extremely stormy climate with the shoreline located up to 410 feet lower than present and from 20 to 60 miles seaward on the present continental slope. During the subsequent interglacial episode, the NC climate warmed to our present temperate conditions causing the continental ice sheets to recede and sea level to rise to its present location. Native Americans began inhabiting the NC coastal zone ~11,000 years ago with the Europeans and Africans arriving after 1584 AD. Sea level continues to rise as the present day coastal system migrates slowly landward.

The sediment wedge that constitutes the Atlantic continental margin grades from 0 feet thickness at the Piedmont-Coastal Plain boundary (Fall Line) to ~40,000 feet thickness in the offshore Carolina Trough. Deposition of coastal sediments that built our continental margin not only substantially increased the size of NC, but also left a 185 million-year record of climate change. As long as we have an Atlantic Ocean, North Carolina will have a coastal system—it just won't be in the same place or be characterized by the same geologic or climatic conditions. "Change is the only constant in our dynamic coastal system!"

The ECU Geology 50th Anniversary Planning Committee

Dear Esteemed Alumni of ECU Geology,

Believe it or not, Geology at ECU is coming up on its 50th anniversary in 2017, and we are planning festivities beginning in the fall of 2017 to celebrate this momentous milestone! We hope that you can find some way to be a part of the celebration. We are also looking for any input from you regarding what you would like to see as far as activities and events, and how you would like to participate, so speak up and let us know! We are considering multiple events coordinated with homecoming festivities, including a high profile speaker, a graduate student poster session, and a field trip to PCS Phosphate mine followed by a reception at the Aurora fossil museum. Other field trips to the Piedmont and Appalachians are also being considered (Hiddenite mine? Pegmatite mines? Etc.). Let us know if you would be willing to participate in extended (2-3 days) field trips like those. Other things being tossed around (and we would like your opinions on these as well) include: a 5K run (too long or too short?), a kayakathon on the lovely Tar River, and a geology art-work/photography contest. If you have other ideas for activities, let us know. We are also hoping to sell some 50th anniversary T-shirts, coffee mugs, hats, etc. If you have a suggestion for a design, again, please let us know. We are really hoping for your input to make this a memorable occasion.

We will try to keep you informed as things develop and plans gel. In order for us to keep you informed, please make sure your contact information, including your current email, is up-to-date on the Alumni website (<http://www.ecu.edu/geology/Alumni.htm>).

Also, we have set up a Facebook Page for the department (“ECU Geological Sciences”) and will be posting updates there about the 50th Anniversary/Reunion.

Go Pirates!

David Mallinson (mallinsond@ecu.edu)

Richard Spruill (spruillr@ecu.edu)

Terri Woods (woodst@ecu.edu)

Sigma Gamma Epsilon, Epsilon Phi Chapter – 2015-2016 Year

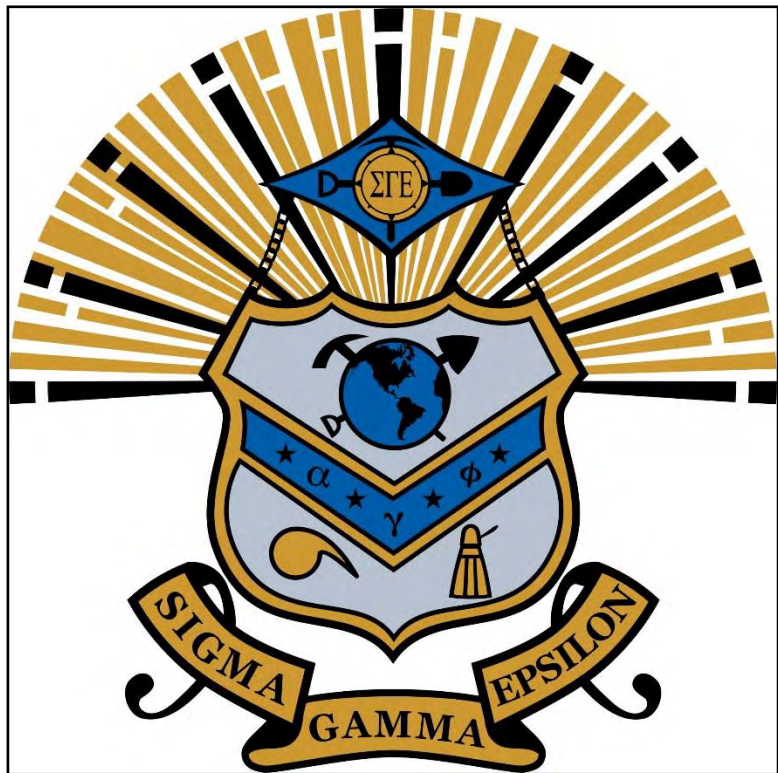
Ivy Culver, SGE President 2015-16

The Sigma Gamma Epsilon (SGE) chapter of East Carolina has had a busy year. Along with the initiation of new members in the fall, SGE held the annual rock and mineral sale and had a non-profit bake-sale supporting the Humane Society of Eastern North Carolina.

The rock sale proved to be a success, with hot-ticket items being the department t-shirts and stickers, nautical charts and, of course, rock and mineral specimens. The nautical charts are a new addition to the sale since last year. The collection consists of variant beautiful nautical charts of areas along the east coast and attract people from all departments across campus. Jim Watson salvaged them from the dumpster and SGE has benefited greatly, as well as the people that buy and enjoy them. The specimens of rocks and minerals sold attracted a lot of attention, as always, with people buying them as gifts or for personal enjoyment. The best part of the rock and mineral sale this year was the number of people who wanted to know the history of the specimens sold, with most being donated from personal collections.

The bake-sale for the Humane Society of Eastern North Carolina was a first for the club. Members provided baked goods that were sold in Wright Plaza. SGE raised \$129.05 and the club was featured on the Humane Society's Facebook page, where we were recognized and thanked for our donation.

In the Spring of 2015, SGE threw the annual chili cook-off, which raised \$140 and was quite a success. First prize winner (Haley Hindes), received a \$20 gift card to Walmart and the glory of having this year's best chili. Now, SGE is excitedly planning the annual departmental pig picking, an event all members look forward to every year.



Thoughts from an Alumnus

Erik Anderson, BS Geology Class of 2015

After graduating from ECU in 2015 with my B.S. in Geology, I accepted a graduate school position at the University of Maine's School of Earth and Climate Sciences to work towards a Masters degree. My studies so far have taken me to field areas at the Bay of Islands Ophiolite Complex in Newfoundland and Norumbega Fault System in south-central Maine. I am currently studying the effect of mechanical dispersion of phyllosilicates on bulk rock strength within a dextral transcurrent fault exhumed from depths corresponding to the frictional-to-viscous transition in the middle crust. ECU prepared me for graduate school by presenting the knowledge and background to conduct field work efficiently, as well as introducing me to analytical equipment that I now use on a daily basis such as the optical and scanning electron microscopes.



Erik Anderson at one of his field locations.

“The great aim of education is not knowledge, but action.” Herbert Spencer
 Dr. D. Reide Corbett

Well, it has been a year of action...so, I must be educating someone! Seriously, we have been working hard to create new educational opportunities for undergraduate and graduate students, design new research projects, and expand our own personal goals! This year has taken me to Italy, San Francisco, and fieldwork right in our backyard of coastal North Carolina.



Dr. Reide Corbett doing fieldwork on Hatteras Flats in Pamlico Sound behind Rodanthe.

headed into the NC estuaries on the RV *Stanley R. Riggs* to demonstrate sampling procedures for coastal sediments and water chemistry. Plenty of action!

J.P. Walsh and I continue to work closely together. We have several on-going projects related to coastal processes. Projects include beach dynamics and sediment transport on the NC Outer Banks, tidal creek sedimentation history along the central NC Crystal Coast, wetland sedimentation along the estuarine coast, and continued estuarine observing in the Albemarle-Pamlico Estuarine System. These have been great projects that have provided us the opportunity to fund and work with many new Master's students.

Always happy to talk with our alumni! If you are interested in our work and want to hear more, just let us know. Hope to see you soon...Pig Pickn' is right around the corner!

Just a couple of the highlights from the year...I took part in a small research conference in Italy to present some work on meltwater in Antarctica and wrap up the last year of this project. Multiple manuscripts are in progress and we are still hoping to get another proposal funded that will send our group back to Antarctica! Jared Crenshaw, who was the primary student working on this project, finished up his thesis and is now working with NC Department of Transportation.

As the 3rd Summester Program was about to kick off, David Hawkins and Jessica Strand completed and defended their MS theses; a good start to a busy summer. The Summester brought a new group of excited and energetic undergraduates to UNC Coastal Studies Institute. We educated them on coastal processes in NC, SC, and VA. It was a fun, fact-filled 3.5 weeks! But the field-based education didn't stop there...no way. As you all know, we strive to get our students in the field. As part of the Coastal Geoscience course I taught in the fall, we



Dr. Reide Corbett and students in Coastal Geoscience class aboard the RV Stanley R. Riggs.

Elephants, Orangutans and Crocodiles... Oh my!

Bailey Donovan, MS Geology Candidate

Most people have experienced wild animals at the zoo. They are viewed from a safe distance, usually with large fencing or thick glass to protect them from the unpredictable wild and vice versa. Experiencing animals in Borneo was a bit different than in zoos in the US. Traveling to Borneo during the summer of 2015 was the result of an opportunity for Emily Harrison and I to work on MS theses in the southern South China Sea with Dr. Culver's research program.



Bailey Donovan in Malaysia.

while we stood in awe at our luck to spend a day with elephants.

Our luck didn't end with the elephants. We had one chance to see orangutans, but not a guarantee. The ranger said "we have not seen them in days and you need to be very quiet or they will not come". We stood patiently waiting for the slightest shake in a tree while two children cried behind us and we fought wasps buzzing around our heads. Our hope began to sink as time went by with no trace of an orangutan. At long last we heard a shuffling in the distance. Then the trees began to shake and a flash of orange fur occurred amongst the green jungle. Soon an orangutan and her baby descended from the trees to munch happily on fruit the ranger handed to them. And then the

We encountered elephants in a park dedicated to their conservation. My colleague Emily, and Dr. Culver were asked if we wanted to ride an elephant to which Steve replied "no thank you; it's a bit too uncomfortable for me." since Steve had ridden one the previous year. However, Emily and I did not miss the opportunity. After an uncomfortable, yet thrilling, ride, we were handed sugar cane and shuffled over to a pen where two baby elephants had their trunks reaching out to be fed. They greedily snatched the sugar cane from our hands, one elephant was a picky eater and kept stealing cane from her friend's mouth)



orangutans posed for hundreds of pictures. Again, Emily and I were stunned at our luck and a tad pensive as we remembered what the ranger had told us: "If the orangutans try to steal your things, do not fight them. They will win."

We had one more beast to encounter. I normally feel safe when I see crocodiles, because they are usually on a television screen. This was not the case as we visited a crocodile farm and walked through the exhibits of a multitude of animals (peacocks, 6-foot long fish in ponds, etc.). But the rotten boards and chicken wire fencing holding the animals had us on edge, while Steve remained cool as a cucumber. In another pond, we watched the crocs gather around two men sitting in a tree house as they attached raw chicken to strings. It was the strangest kind of "fishing" I've ever seen and will never forget

the resonating "POP" as each croc slammed its jaws around the chicken supper.

Figuring out how to get to where you want to go and then realizing you're there...

Alisha Ellis, MS Geology 2013

My name is Alisha Ellis and I earned both my B.S. and M.S. degrees from the ECU geology department. I finished my M.S. in March of 2013 for May graduation, and the fact that it's been three years since then blows my mind; the time seems to have slipped away without recognition. My thesis work concerned the impacts of a fish farm on the environment in a small fishing community in Malaysia using foraminifera, stable carbon and nitrogen isotopes, sediment characteristics, and side-scan sonar surveys. The project was great as it granted me my first international travel experience to collect samples in Malaysia; then to process samples in multiple different labs using various techniques; and then the sometimes rigorous task of processing, analyzing, and understanding the data.

I'm not going to say finding a job after graduation was quick and painless like I'd hoped it would be, but it was definitely easier than it could have been without a Master's degree. After four months of searching post-graduation, I landed my first job at an engineering company in Saint Charles, Missouri. The lab and field experience I gained in graduate school proved to be invaluable and it is what got the job for me. Most of my time at the engineering company was spent performing sediment tests. Some tests I learned in school and others I had no experience with, but I did have a knowledge base that allowed me to understand the concepts behind the methods. In addition, I described sediment and rock types, created core-logs for engineers, cored in the field, and performed land elevation surveys. I found, after months of lab and field work, I was ready for more responsibility and to see a project through to the end.

I spent a couple of months searching for a new job that was more suitable for my growing desire for more responsibility and for my interests in coastal geology. I was lucky enough to land a job at the U.S. Geological Survey as a geologist at the St. Petersburg Coastal and Marine Science Center in Florida. I believe that there is a combination of factors that allowed me to be considered for this job: most specifically the experience with foraminifera, grain-size analysis with the Sedigraph, analyzing data and writing my thesis, and strong, positive references from the professors I worked with during graduate school. Having worked at the USGS for the last two years, the biggest difference I see between the work as an employee with a Master's degree and my coworkers with bachelor's degrees is the increased responsibility for data analysis and writing.

My work isn't just routine sample processing anymore but attempting to put the big picture together. I still get to work in the lab, which is a great change of pace from analyzing data all day, and it really helps build confidence when it comes to writing up lab methods for a project. Similarly, I still get outdoors and do field work occasionally for the projects I am working on, but the experience and environmental knowledge gained from the field trips is more significant, beneficial, and satisfying than reading scientific papers alone.

I suppose the main reason I enjoy my job is that I do get to work on a project every step of the way from start to finish. The completion of a project as a whole provides a sense of responsibility, and gratification that I wouldn't get from working on little pieces without seeing the big picture. Had I not continued my education and pursued an M.S. in geology I would not be as fortunate in my career as I am today.

Adventures from the Other Side of the World

Emily Harrison, MS Geology Candidate

Hello from the corner cubicle in Graham 305! It is my pleasure to share with you my experiences from the other side of the world. In the summer of 2015, my partner in crime (Bailey Donovan), my advisor (Dr. Stephen Culver) and I began our trip to Peninsular Malaysia. You need to understand that I despise flying, so the thought of spending over a full day in the air (both ways!) was not my favorite thought. The trip started off with me accidentally taking 130 mg of caffeine before our second flight. The entire 14 hour trip was spent shaking and twitching while secretly wondering why humans had ever taken to the air in the first place. Finally, after almost two full days of traveling, we arrived in Malaysia.



Emily Harrison (left) and Bailey Donovan (right) with Ebbu, in Malaysia

Once we arrived I was instantly relieved and in awe. Malaysia is a beautiful country with pleasant people and gorgeous countysides. The city of Kuala Terengganu, the capital city of the state of Terengganu, is located on the northeastern Malaysian coast of the South China Sea. This location was chosen because it is conveniently located to both our field site and our colleagues at the Universiti Malaysia Terengganu (UMT). On the third day of our arrival we boarded the *Discovery II* with its crew in tow. Our destination was about 90 kilometers offshore of Kuala Terengganu in the South China Sea. The purpose of our trip was to collect two cores each for Bailey and I to undertake paleoclimate work. Unfortunately, I have never been on a boat bigger than a kayak, so about an hour into a 16 hour day I was extremely sea sick. So needless to say I was useless the entire day. But at least I can say I've thrown up in the South China Sea. It makes for a great story to tell the colleagues back home and the grandkids someday.



Bailey and Emily on a tropical beach in Malaysia

Once the crew (with no help from me) collected the four cores we spent the next three days processing them for transportation back to the United States. While the main purpose of our trip was to collect and process these cores, we also got to see and experience many exiting and spectacular sites. We played with baby elephants, rode an elephant, travelled to Borneo and saw a momma orangutan and her baby, and hiked through some of the most beautiful parks in the world. On one day trip we saw a *Rafflesia*, the largest and one of the rarest flowers in the world. Even though the flower had bloomed a couple days before and was already rotten it was still a most cherished memory. I feel so honored to have seen such a rare and fading beauty.

While the trip had its ups and downs (literally on the boat) it was an experience of a lifetime, and the memories I have from that experience are ones not to be traded for anything in the world.

Summer Fun (and Hard Work) to Look Forward to

Dr. Stephen B. Harper

I am now in my 5th year as Director of Undergraduate Studies/Advising. The geology department now has ~70 undergraduate geology majors. I directly advise about 60 of our majors and get some help from Dr. Woods with the remaining ~10, and I also coordinate the graduate students who teach Geology 150I labs.

On the teaching front, typical duties still include two sections of Geology 1500, Physical Geology/Dynamic Earth, one section of Geology 1700, Environmental Geology each semester, Geology 3250/51, and Introduction to Geomorphology every other year. In October 2015, several members of the Geomorphology class and I went on a very challenging field trip to Raccoon Mountain Cave near Chattanooga, TN.

As Director of the North Carolina Summer Geology Field Course I will be teaching in New Mexico and Colorado in May-June, 2016 for the 18th straight year. For 2016, the enrollment in the field course will be 42-43 students. Twenty-two of these students will be from the ECU geology program, indicative of the recent growth in Geology Majors in our current program. Currently, the visiting students from other universities hail from UNC-Chapel Hill, UNC-Charlotte, Appalachian State University, University of Pittsburgh, Virginia Tech, Mississippi State University, University of Southern Mississippi, University of Texas-San Antonio, Grand Valley State University, Missouri, and University of Tulsa.



Summer 2015 Field Course students and staff.

The field course will spend about two weeks in Abiquiu and Cochiti, NM and then head north to Sipapu-Taos, NM for 13 days. After completing the long-standing Copper Hill/Rattlesnake Gulch mapping exercise, the slope stability exercise will be done in the Rio Grande Gorge. Then the group will head north for a two-day field trip to Great Sand Dunes National Park with two nights in South Fork, CO with a visit to Creede, CO to tour the Silver Mine and the Slumgullion Landslide. From Creede, CO, the group will head over to Gunnison-Almont, CO for the last 12 days to do two mapping exercises with side trips to Black Canyon of the Gunnison and Crested Butte, CO.

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Eric Horsman from the ECU Department of Geological Sciences will be helping with the field course instruction this year as well as faculty from Groundwater Management Associates (Steve Campbell and Jay Holley), SMK Geoscience (Sabina Kraushaar), UNC-C (John Diemer), and NC Geologic Survey (Rick Wooten). Also, Samantha Kofroth will return as Head Camp Manager for her 7th time in the past 10 years of the field course. I plan to attend the National GSA Meeting in Denver, CO in September of this year and hope to run into those of you who will be attending this meeting.

Hard Work Pays Off

Dr. Adrianna Heimann

Greetings everybody! I hope this 2016 Newsletter finds you well.

It has been a busy and productive year on all fronts. In the teaching arena, I worked with several graduate and undergraduate students in various research projects. Three M.S. students worked on mineralogy, petrology, and geochemistry studies and graduated in the summer and fall of 2014 and spring 2015. Jason Yonts worked on granitic pegmatites and rare-metal (Li) mineralization and Erica Serna and Heather Lancaster worked on the genesis of Precambrian iron formations from Australia and Uruguay, respectively. Erica and Jason are both happily working as geologists in environmental companies in Indianapolis (soon in Seattle) and Greenville (SC), respectively. Three new graduate students (Tiffany Cummings, Nicolas Mitchell, and Alex Hammerstrom) are currently working on the geochemistry of the Skaergaard intrusion and with pegmatites. Involving undergraduate students in research has continued to be a priority. Two undergraduate students are currently working alongside graduate students. Undergraduate student Erik Anderson graduated in the summer, and worked with me before heading for graduate school at the University of Maine.

Last semester I taught Physical Geology (~90 students) and this semester I am teaching Economic Geology lecture and lab. Since all my labs and exams are essay questions that I grade this keeps me busy! One piece of good news is that I obtained funding from the National Science Foundation to investigate the geochemistry of the Skaergaard intrusion in Greenland (~\$248,000/3 years). This research has implications for economic geology and planetary formation processes. I have also been busy setting up a clean lab in the Science and Technology Building to prepare samples for Fe isotope analysis. The other good news is that a paper about the color of beryl in pegmatites from Argentina, written with ex-post doc Fernando Sardi (Argentina), won the prestigious Hawley Medal awarded by the Mineralogical Association of Canada for the best paper to appear in 2014 in *The Canadian Mineralogist*. We were in the news in several places for this. My students and I traveled to present results at the national GSA meeting in Baltimore in November.

In the service front at ECU I oversee, along with a student committee, the first Graduate Student Research Symposium. Students will present their research result at this event on March 22nd. I also organize the Geological Sciences Seminar Series, which takes place at noon almost every Friday. All are welcome to attend both of these. If any alumni would like to come and talk about their work in the Geosciences please don't hesitate to contact me (heimanna@ecu.edu).

On the personal side. Nicolas, who will be 6 in May, started kindergarten last fall. We went to Uruguay for a nice visit after a lapse of three years and Nicolas picked up the Uruguayan accent (even though he sometimes sounds German, I am told, as he rolls the "r" a lot) and expanded his vocabulary considerably. Manuel is also doing well teaching physics, working on his research, and publishing interesting papers about magnetism. I hope you will each have a fantastic year and see you at the pig picking!



Alex Hammerstrom (left) and Tiffany Cummings (right) hard at work.

My Personal Take-Away from the East Carolina University Geology Field Course

Joe Hill, BS Geology Candidate

In the Fall semester of 2013, I became a geology major at East Carolina. I was enrolled in just a few classes in the department including Earth and Life Through Time with Dr. Donald Neal, Mineralogy and Petrology I with Dr. Richard K. Spruill, and Environmental Geology with Dr. Alex Manda. As I walked through Graham building every day to class, I would admire the pictures that Dr. Stephen Harper had pinned on the bulletin boards on the first floor from each prior year's field course. These pictures made me anxiously and excitedly await my turn to go out west to New Mexico and Colorado.

As I continued to learn more about the different aspects of geology, I finally attended field course this past summer. I remember arriving on campus at about 4:45 a.m. on the day we left with two giant duffel bags packed with gear essential to surviving and conquering the two-month mapping experience. After three days of driving, we arrived in Abiquiu, New Mexico to map Mesozoic sedimentary rocks in the Chama basin.

Throughout my time mapping in the field and compiling data, I enjoyed applying what I learned in classes and labs to the real world. I could see in the folds, faults, and composition of the strata what had happened over geologic time; that is what struck me the most. I also enjoyed collaborating with geology students from other schools and learning from their outlook and knowledge-base of geology.

Field course taught me many valuable lessons including how to work with others in real-world settings and share geologic knowledge. I am thankful to the faculty and staff of field course that made this experience invaluable to me. Professors Dr. Stephen Harper, Dr. Steven Campbell, Mr. Jay Holley, Dr. John Diemer, Dr. Stephen Culver, and staff Sabina



Students viewing an outcrop in New Mexico.

Kraushaar, Rick Wooten, Sam Kofroth, Amy Cressman, Ruth Tull, Justin Alford, Will Strayhorn, and April Kelley all helped to enhance my field course experience and let me know what it means to be a geologist.

Thoughts from the Structure Professor

Dr. Eric Horsman

2015 was another busy year!

2015 was a great year in terms of the number of graduate students working with me who finished their degrees. Erik Thornton studied a superbly exposed sill and dike network and its relationship to an underlying laccolith in the Henry Mountains. He is working in the Raleigh area now and Liz Maurer studied the construction history of a large tongue-shaped igneous intrusion in the Henry Mountains and is also working in the Raleigh area. Rich Burns studied the Contentnea Creek granite pluton, which is exposed in the Wilson area just west of Greenville, and its spatial and temporal relationships with the late Paleozoic Eastern Piedmont fault system. Rich is teaching introductory geology to ECU students studying abroad in Italy.



Students viewing a fault in the Appalachian Mountains.

and maps as the basis for their final project in the course. I basically “inherited” this field trip and project from my predecessor at ECU, Dave Lawrence – I’ve modified things a little bit, but the experience remains very similar to what students have seen and worked on for quite some time.

In the Spring 2015 semester, students in Structural Geology once again braved wintery weather while camping near Boone, NC in late March. One day was spent looking at Proterozoic and Paleozoic igneous and metamorphic rocks inside and outside the Grandfather Mountain window. Another day was spent looking at folded and faulted Paleozoic sedimentary rocks in the foreland of the orogen. This trip is modified a little bit each year, trying out new outcrops and regions. There’s so much to see in the area that I’ll be able to keep exploring with the students for a long time to come.

My wife, Beth Thompson, continues to study maize genetics and teach in the ECU Biology Department. Our son, Elias, is six and half years old and will be taller than me pretty soon. He already eats more than I do.

During the Summer of 2015, I spent about two weeks in the Henry Mountains of southern Utah, studying Oligocene-age laccoliths with colleagues. We are working to better understand how igneous intrusions grow and evolve in the very shallow crust as they are assembled from multiple pulses of magma.

As usual, I led two big field trips for undergraduate students. In the Fall 2015 term, students in Introduction to Field Methods enjoyed perfect camping and field work weather in Hot Springs, NC. We spent two and a half days looking at rocks inside and outside the Hot Springs window. Students used their observations

Busy as Ever!

Dr. David Mallinson

This last year has been busy and productive. In addition to teaching Oceanography, Marine Geology, and Advanced Stratigraphic Analysis, I've spent a fair portion of this past year wrapping up our Coastal Hydrodynamics and Natural Geologic Evolution (CHaNGE) NSF project (with Drs. Culver, Leorri, Mitra, and Mulligan). We've shown how Pamlico Sound and the Outer Banks co-evolved and responded to sea-level rise and variations in storm patterns. The research results will help in forecasting what conditions and problems that might be encountered within the coastal system as it evolves in the near future. It's been a fun and enlightening project that contributed to the research projects and graduation of six graduate students (Jeff Minnehan, Nick Zaremba, Caitlin Lauback, Greg Clunies, Kelli Moran, and Caroline Smith) with one more in the works (Brian Querry) and included the participation of numerous undergraduates. It's been particularly pleasing to see these students go on to get good jobs in geology. Additionally, I've been working with Drs. Culver and Leorri, and several graduate students (Anna Lee Woodson, Alisha Ellis, Devon Reed, Haley Hindes, Sam Martin, C.J. Whitley, Bailey Donovan, and Emily Harrison), on the Malaysia project that is concerned with understanding variations in Holocene climate and oceanographic conditions in the South China Sea. Other projects include one with Dr. Culver, one graduate student (Nina Shmorhun), and two undergraduate students, characterizing subenvironments on the inner shelf off of Bogue Banks, NC: a project with Drs. Walsh and Corbett and graduate students (Brian Gallagher and Ryan Gibbons) to characterize sand resources along the inner continental shelf of NC: a project with Dr. Poppeliers to monitor wave energy using seismometers; a project to understand the tsunami potential and its geologic record associated with the Cape Fear slide off the continental shelf of southeastern NC. I'm also still involved in ground-penetrating radar (GPR) surveys on the NC Coastal Plain, which meshes nicely with understanding groundwater work being done by Drs. O'Driscoll and Manda.



Caroline Smith and Nick Zaremba.

Another consumer of my time is serving as co-chair of the Science Evaluation Panel for the International Ocean Discovery Program. This program oversees deep sea scientific drilling; the descendant of the DSDP, ODP, and IODP (Integrated Ocean Drilling Program). During this last year I attended meetings in France, Germany, Japan, California, Texas, and Washington D.C. This coming year, I'll be heading to Japan, Brazil, Belgium, and Germany, in addition to various U.S. sites. It's an amazing program, and this opportunity has provided good publicity for ECU. I'll be stepping down this year; the science and the travel have been great, but it's exhausting.

On the home front, my oldest daughter is now at NC State, majoring in engineering. I couldn't convince her to stick around G'ville and ECU. That was a major change that I'm still trying to wrap my head around. My other daughter and son are doing well at D.H. Conley High School, and Hope Middle School, respectively. My wife, Lisa, now works at Vidant Hospital as a dialysis nurse, and loves it. We were able to take off on a relaxing cruise to the Bahamas over the holidays; the first time I've been aboard a large ship without doing work!

Oh How Time Flies

Dr. Alex Manda

It seems like only yesterday that I started working at East Carolina University, and now here I am, a tenured Associate Professor in the Department of Geological Sciences! It has indeed been a wild and thrilling ride that I have thoroughly enjoyed and I look forward to the next chapter in my career, which means more administrative work, projects, and articles to write! If the past is any indication of the future, then this new chapter promises a lot of adventure, excitement and discovery as current projects continue while I embark on new directions and initiatives.

Speaking about projects, the Bogue Banks work focusing on assessing the influence of groundwater levels on storm water flooding on the island comes to end this year. My graduate student, James Owers has been working diligently to install groundwater wells, collect groundwater data from the wells, and work with citizen scientists. We will be reporting on the findings from this project at the next meeting of the Southeastern Section of the Geological Society of America in Columbia, SC, March 31 to April 1. Perhaps we will get a chance to see you there or at the pig picking in May to fill you in about opportunities and challenges of involving citizen scientists in research of groundwater resources on barrier islands. Anyway, duty calls, I have some administrative work to do, projects to complete and articles to write, so I have to run along!

Cheerio!

Passing the Baton

Dr. Don Neal

How time flies when one is having fun. I guess that is the reason this past year has flown by or maybe time moves faster as you get older. It is still fun interacting with students in class or mentoring them with their research. Mallory Stevenson finished her thesis on Marcellus Shale stratigraphy in southern West Virginia. Still in the throes of writing are: 1) Brian Klipp who is working on the structural diagenesis of some Paleozoic sandstones from eastern West Virginia; 2) Emily Adams working on Marcellus Shele stratigraphy and gas production in northern West Virginia and its relationship with a regional unconformity; and 3) Scott Brinkley working on the stratigraphy and petroleum geology of the Ordovician Utica Shale/Point Pleasant Formation unconventional hydrocarbon resource in southeastern Ohio. A bit behind them in the process are: 4) Jonathan Prevatte who is working on the petroleum geology of the Clendenin gas field with special reference to the Marcellus Shale that has seen a dramatic decline in production over the last few years; 5) Kelsey McGee working on the diagenesis of the Devonian Onondaga Limestone in New Jersey with particular reference to the prevalent silicification; and 6) the newest, and last, grad student is Jonathan Noles working on the stratigraphy and petroleum geology of the Devonian Gordon Sand in southern West Virginia, a little studied clastic unit offshore of the Catskill delta. As you can see, I remain busy.

After 15 years as Secretary-Treasurer of the Southeastern Section of the Geological Society of America, I have decided to pass the baton. The section meeting this spring in Columbia, SC, will be the last where I have any official function. I have had the opportunity to work with a lot of good people over the years and will miss that aspect of the job more than generating reports and shepherding the finances. I believe the section is in better shape than when I began.

Time for a little more fun.



Water your Thoughts

Dr. Mike O'Driscoll

Greetings from Greenville! I hope you are having a great year. First I would like to congratulate Rob Howard and Sarah Hardison for graduating and earning their MS degrees this year. Best of luck in the future! This year my students and I have been fortunate to work on a number of water research projects across the NC Coastal Plain and Piedmont including Bogue Banks, White Oak River, Falls Lake, and more recently Long Lake in South Carolina. A lot of this work is on nutrient inputs to coastal streams and estuaries, which has been gaining interest as population density in our coastal watersheds grows.

As Director of the Coastal Water Resources Center (CWRC), a lot of my time is spent helping ECU increase our capability to engage in water research and encouraging science-based water management in the NC Coastal Plain. With the large number of water quality and quantity challenges that our region faces, we are always looking for solutions and to focus our research so that it can help support water resource decisions. Recently, the CWRC co-sponsored (in partnership with the North Carolina Water Resources Research Institute) a conference that focused on freshwater in the NC Coastal Plain. Over 30 ECU students attended and enjoyed the experience. We hope to do more conferences in the future.

This year I was involved in efforts to quantify nutrient inputs to coastal watersheds nationally on the US EPA Chesapeake Bay Nutrient Attenuation Expert Panel and at the state level on the North



Carolina Nutrient Criteria Development Plan-Scientific Advisory Council. Internationally, I gave a talk at Trinity College in Dublin, Ireland during the summer. They have similar issues that we face in coastal NC with septic system nutrient and bacteria inputs to coastal waters. It was interesting to learn more about the Irish approaches to mitigating these critical water problems.

Enough about me, I am always interested to hear from former students on what we can do better and ways to help our state better manage our precious water resources. You can always send me an email with questions or comments at odriscollm@ecu.edu. I hope your 2016 is off to a great start. Keep in touch and take care.

Well, Well, Well

James Owers, MS Geology Candidate

I am James Owers, a second year graduate student from Athens, Georgia working under Dr. Alex Manda. I graduated with my bachelor's degree in geology from the University of Georgia in May 2011. My master's thesis involves characterizing the water table under all of Bogue Banks, a North Carolina barrier island, and determining how predicted, long-term sea-level rise impacts flooding throughout the island. This project installed 29 monitoring wells in the surficial aquifer of Bogue Banks and surveyed elevations of these wells over the course of last summer and fall. I would like to briefly thank everyone who has helped throughout the course of this project.



Dr. Alex Manda (left) and James Owers (right) stand next to a newly completed monitoring well.

ECU Geology Field Course 2015: Knowledge from an Adventure

Rebecca Peruso, BS Geology Candidate

As I sat in my first geology class in 2012, I never imagined where being a geology major would take me. In every geology class, I have been told that you become a true geologist when you attend field course. Field course is where you get to apply what you learn from concepts over the course of four years by mapping field sites in New Mexico and Colorado. It teaches the importance of team-work and adapting to all situations and circumstances, whether expected or not. The field course confirmed, for me, that I am meant to be a geologist.

Over the six-week course, we traveled to New Mexico and Colorado, stopping along the way to look at geologic features and outcrops such as the Jemez Volcanic field, the Great Sand Dunes and the Creede, CO Silver mine. At each of our five mapping exercises, we were given descriptions of the geologic formations found and a brief history of the area. After three days in the field area, we wrote lithologic descriptions and created a final geologic map. We also got the opportunity to do a slope stability exercise, where we examined a section of the Rio Grande Gorge in New Mexico. These assignments gave us the opportunity to learn proper mapping skills and field methods, including how to take strike and dip and how to describe and identify rock types in the field.

We were assisted throughout field course by many distinguished faculty. Dr. Stephen Harper of East Carolina University led the whole trip, and many others assisted with various mapping exercises, such as Dr. Steven Campbell (ECU), James Holly (ECU), Sabina Kraushaar (SMK Geosciences), Dr. John Diemer (UNC-Charlotte), and Rick Wooten (NC Geologic Survey). Each faculty member brought a wide variety of experiences they used to assist us in the field. We also had two special guest faculty members join us for our Picuris range exercise, Dr. Stephen Culver, the Chair of the Department of Geological Sciences at ECU, and Dr. William Downs, the Dean of the College of Arts and Sciences at ECU. With the help of the amazing faculty, we were able to experience what it is to be field geologists.

I never truly understood the magnitude of an anticline until I was standing in the middle of one, or the importance of always having a rain coat in the field until a day-long rainstorm came on the first day of the first mapping exercise. I made lifelong friends and was able to experience once in a lifetime field work. I honestly wish it would have been longer than six weeks and would recommend this field course to anyone interested in learning on-site and willing to experience geology in its truest form. I am better prepared for what is to come in my geology career because of the knowledge I gained on this adventure.



Summester at the Coast

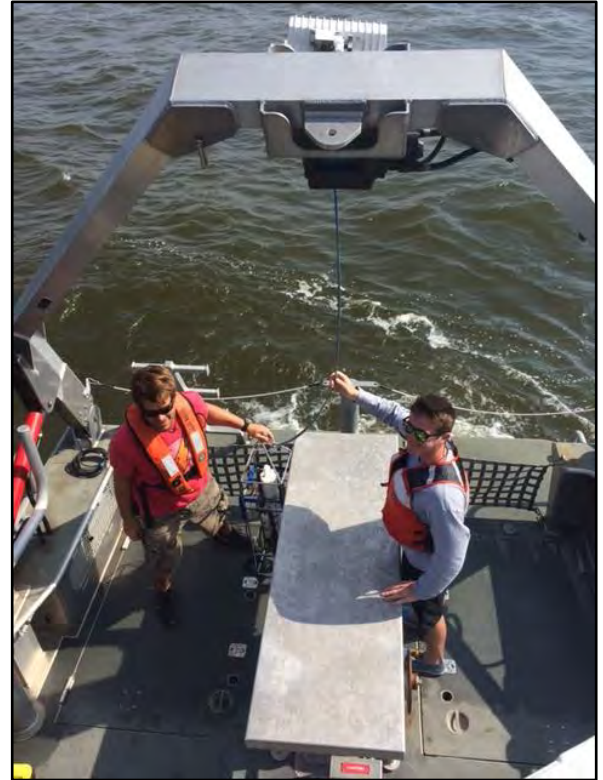
Daniel Pilgreen, BS Geology Class of 2016

Field experience is where we develop our passions, implement what we learn in the classroom, and hone our geological skills. In 2014, I was fortunate enough to go through a defining field experience as a geology major by attending *Summester at the Coast*. *Summester at the Coast* is a month long program that focuses on advanced oceanography and the coastal processes that affect the northern Outer Banks of North Carolina. This program was much more than just a learning opportunity for myself in many ways.

Once I reached the crest of the Croatan Sound Bridge for the first time that summer and saw Roanoke Island, I knew I was about to have an amazing experience. The course was based at the University of North Carolina Coastal Studies Institute on Roanoke Island, nestled tightly against the Croatan Sound. This facility is a state of the art science campus complete with a small marina and boat house. The hallways and laboratories of CSI would become one of my favorite places to be and still is to this day.

The classes began with a general overview of oceanography of the Atlantic Ocean, and quickly evolved to be coastal process oriented. However, learning in the classroom was not the primary focus during this program, field experience played a large role in day-to-day activities. Each Friday offered a new field trip experience, first beginning with bathymetric mapping of the Croatan Sound followed by completing CTD transects from Oregon Inlet to Wanchese. The third week brought our first open ocean experience, with a trip to sea to understand wave dynamics, swells, and fishing. The final field trip tested all of the knowledge and skills students' acquired over the duration of the program. Students participated in a trip to the entire northern Outer Banks, from the Army Corps of Engineers station in Duck to Cape Hatteras Lighthouse. The purpose of the trip was not to observe the grandeur of the Outer Banks alone but involved taking transects and sediment samples that would later be used for creating beach profiles. We spent the last week of the *Summester at the Coast* processing all data collected from the field trips and compiled it into a presentation for the use and benefit of the general public.

The *Summester at the Coast* program is where I found my passion for coastal processes and oceanography. It is where I created life-long friendships and learned how to communicate science to the public. It was my first experience with many instruments such as RTK, GPS and Ro-Tap sieving. Most importantly, the *Summester at the Coast* is where I found my niche as a geologist. I am beyond thankful for the experience on the Outer Banks, and plan to utilize the knowledge I gained from the field skills and knowledge it offered for many years to come.



My Field Course Experience

Max Robinson, MS Geology Candidate

In January 2014, I walked into Graham 309 for my first day of class at East Carolina University in Historical Geology with Mr. Jay Holley. After his introduction and a flurry of passionate monologues about his love for paleontology and B.B. King, Mr. Holley came to the topic of the North Carolina Geologic Field Course.

“Field course was a life changing experience for me,” Holley said,
“It was when I learned what it meant to be a geologist.”

At the time, this statement was not entirely tangible to me. I had yet to complete my first semester as geology student, and spending six weeks doing mapping exercises in the desert was still a long way away. However, Mr. Holley’s words stuck with me until I was able to witness the experience firsthand.

This past summer I hopped into a rental van with Dr. Harper and a variety of personalities and headed hastily for the skyline of the southern Rockies. The next month and a half was a whirlwind of rainy camping, enduring road trips, beautiful mountain landscapes, and all of the geological knowledge my brain could consume. However, what I took away from the experience was much more holistic than just understanding how to take strike and dip on



Max Robinson and others at this summer’s Geology Field Course, Rio Grande, NM.

a hogback. I learned how to integrate Dr. Harper’s and Dr. Campbell’s lectures on the regional geologic history into my interpretation of a field area. I saw the importance of detailed note taking when recreating field observations on a topographic map. I grew to understand the weight of welcoming uncertainty, unlevelled picnic tables, and nightly work by headlamp. Most importantly, I experienced the significance of being able to empathize, communicate, and work with diverse individuals.

While I agree with Mr. Holley’s statement from two years ago, I would like to expand upon it. You don’t just learn what it means to be a geologist at field course; you also learn what it means to be a good scientist and person.

Well Fields Aplenty

Dr. R. K. Spruill

Hello Friends and Alumni,

Things continue to roll along in a positive way for me here in Greenville. I am hoping to survive my 36th year as a member of the Geological Sciences Department. This year I have taught my very favorite courses: Mineralogy/Petrology and Applied Hydrogeology. The students in both classes have been awesome, and this year ranks among my favorite in terms of working with young people with a strong desire to become geologists.

After 15 + years, I resigned my position with ASBOG, the National Association of State Boards for Licensing of Geologists. The travel took its toll on me last year, and I decided to focus my energy on some of the most interesting local groundwater resources projects. Professionalism and Licensure are two concepts which are near and dear to me, but I have not abandoned them because I retired from ASBOG.

I am working on some fantastic groundwater projects in Hilton Head, SC, Wilmington, NC, and Brunswick County, NC, to name just a few. We continue to hone our skills on the program called Aquifer Storage and Recovery (ASR), and we have now worked on multiple wells in multiple states. Some of the most interesting and challenging work deals with solutions for salt water intrusion in our coastal aquifer systems. For example, we have completed a new well field on the west end of Bogue Banks, NC which supplies approximately two million gallons per day to a newly constructed reverse osmosis plant on the island.

Lisa and I are enjoying our free time by riding our gaited horses in the high country near Wytheville, VA. Last year we purchased a lovely mountain farm in the Cripple Creek area, a stone's throw from the Virginia Highlands Equestrian Trail System and the New River Trail. Stop by for a trail ride if you are in the area.

As in previous years, we will host the annual Pig Pick'n at our place and we look forward to seeing you there! Details are in this newsletter. And please plan to participate in our upcoming 50th Anniversary celebration in 2017--we need your support.



A pig in need of pickin'

East Carolina University to SandRidge Energy

Hanna Thornberg, MS Geology 2013

I currently work as a geologist in the oil and gas industry at SandRidge Energy in Oklahoma City. I graduated with an MS in Geology from East Carolina University in May 2013. Many of my peers in the oil industry come from schools that have geology programs focused on oil and gas. This certainly was a benefit to them when they began their careers, but I feel like I have an edge coming from ECU, where the geology program has a very different focus. Having studied modern coastal and shelf processes in graduate school, I can often provide a unique perspective when it comes to studying the rocks we drill.

The most useful and applicable class that I took at ECU was Advanced Stratigraphic Analysis. Not only did I get a taste of how to read logs, something that I spend a majority of my work day doing now, but also I learned about sequence stratigraphy, a topic of which some of the older geologists, who have been out of school for some time, do not have much knowledge. In order to expand our inventory of drillable locations, it is incredibly important to understand the geology behind our oil prospects.

Another very important skill I acquired while at East Carolina University was how to efficiently and effectively present my work to a large group of people. On a weekly basis, I present oil prospects, maps, cross-sections, and PowerPoints to various groups of my coworkers, including upper management. It is essential to give organized and concise presentations and to be able to answer questions without getting flustered or frustrated to gain the trust and respect of my bosses. Defending my thesis at East Carolina greatly prepared me for this aspect of my job.

When applying to work in the oil industry, having connections is by far the easiest way to get in. Through a previous student of Dr. Culver, I was able to find an internship at SandRidge, which led to my being hired as a full-time employee. If not for ECU, I would probably have taken a different and much more difficult path into the oil industry.

Thoughts from an Alumna

Ruth Tull, BS Geology Class of 2015

I graduated from ECU in May 2015 with a Bachelors in Geological Sciences and a Certificate in GIS (Geographical Information Systems). The GIS is what actually got me my job straight out of school; I work for a Drilling and Pump company based in Sanford, NC. The owner of the company wants me to put about 60 years of water well records into a usable database. While there are some technical difficulties with that particular project, I do use my Geology degree on a daily basis. Since I work for a company that supplies irrigation and municipal water wells for the Sand Hills and Coastal Plain of North and South Carolina, I've done quite a bit of research on the aquifer systems in the Atlantic Coastal Plain. The class that best contributed to the work I do today is Dr. Spruill's Groundwater Hydrology class. I still use the textbook (USGS paper 2220) and I wish I had the chance to take more of his classes. It's a big world out there and I'm learning a lot on the job about the water well industry and how NC and SC regulate groundwater. The favorite part of my job is when I get to travel to conferences. This past December I went to the National Ground Water Association in Las Vegas and saw the Grand Canyon.

My fondest memories of the ECU geology department were spending late nights in the labs while ordering Jimmy Johns and studying with friends, and obviously Field Course. I still keep in touch with my field course buddies and I hope those friendships last forever. The ECU field camp is unique in that it accepts applications from other schools, so there is a diversity of student backgrounds and experiences. Needless to say, I loved it so much the first time that I went back as a TA this past summer!

Right now I am trying to balance work and studying to take the ASBOG licensing exam in March. I look forward to seeing some fellow pirates at GSA in Columbia!



Working on a drill rig in South Carolina.

Reflections in the Amazon River

Sage Wagner, MS Geology Candidate

In the high elevations of an Andean valley, an eager native tongue calls out to me. “Disculpe, dónde está el baño?” I pause my office commute to reply “uhhh, perdón, yo hablo poco espanol, mas esta...” and point a freshman student to a recently built uni-sex bathroom. “Oh, it’s OK! I speak English too!” he proclaimed as he found his way around an old sugar-cane plantation, retrofitted into Ecuador’s research-focused, Yachay Tech University.

On assignment in the “Ciudad Del Conocimiento” (City of Knowledge), I juggled my many tasks of research endeavors and university contributions during my Fall 2016 semester. Commencing this trip I not only completed a presentation at the annual GSA meeting in Baltimore, but also successfully transported and built two research-grade “super-computers” for the future students of a developing country. In this time, working with Dr. Catherine Rigsby, I have had the very good fortune to travel to three different countries in South America, be quoted in Science Magazine (“I think we are in luck!”), and gain a new-found perspective on life with some of the most passionate, genuine people I’ve ever had the chance to meet. Rewind to my Spring semester thesis proposal defense and I hadn’t even left my home country for a family vacation.

A little bit of luck, passion, hard-work, and humility, brought me floating down a full-day boat ride along the Peruvian Rio Madre de Dios with our Andean/Amazonian research group. Finally, approaching a deeply weathered, vegetation-covered outcrop, the fact that so little is known about the evolution of the Amazon River became more apparent. Honing in on my skills of writing descriptions, accompanied with a keen-set of trained-eyes, my observations of fluvial sedimentary structures contradicted a previous claim that that exact outcrop holds information regarding a proposed Miocene marine incursion. Everyone who is curious to what I saw is welcome to come to my thesis defense in April!

Prior to my excursion into the Peruvian jungle, I had the opportunity to work out of a Brazilian university, providing a necessary subsurface framework for a proposed trans-Amazon drilling project aimed to recover ~1 km of Cenozoic sediment in the Brazilian Amazon. These learning experiences with great people were very fulfilling; however, my greatest take-away from all these experiences was an appreciation for other culture’s food, music, festivities, and bilingualism, as well as a newly-found faith and love in people. A small dojo in the heart of where Brazilian Jiu Jitsu (BJJ) originated, my life-long obsession in the martial arts brought me to an all Portuguese-speaking BJJ academy. It is truly amazing how the physicality of attempting to isolate and control your training partner’s body movements, breeds a friendship that is everlasting. Not all of my new friends were able to speak my language, but they were able to speak Jiu Jitsu. From my first day of training, I walked into this small dojo in the North Zone of Rio de Janeiro as a gringo, but left with 30 of the most savage, yet most humble brothers and sisters that I have ever met.

From the lucky to the misfortunate, from the happy to the sad, and from the fulfilling to the detrimental, these experiences have led to my growth as a young scientist at ECU. And yet, this is just the beginning of my journey.



Life is Good

Dr. J. P. Walsh

Time flies when you're having fun, and this is certainly true for my last 12 years at ECU. A wide variety of ongoing research and service activities have kept me on my toes recently. Geology graduate students C.J. Cornette, Luke Stevens, Nick Kelly, Ian Conery, Ryan Gibbons and Brian Gallagher are all doing some exciting research! Lab technician Keith Garmire has been a superman, keeping Reide Corbett and me on track with various endeavors. I have really enjoyed interacting with Paul Paris, a post-doctoral research scientist whose been working in our lab at the Coastal Studies Institute. Also, visiting student Emeric Bourineau (Université de La Rochelle, France) brought a lot of energy to the Outer Banks during his 6-month stay last spring. Personally, I'm very proud of a special issue of Earth Science Reviews for which I served as the guest editor, and it is now in press... finally!

This past year I taught Advanced Oceanography (Spring 2015), Atlantic Ocean and Mid-Atlantic Coast with its lab (Summer), and Sedimentology (Fall). I enjoyed everything, especially having the chance to teach Sedimentology again; it was a great group of students. I have tried to make sure students are not only learning fundamental geological knowledge, but also are thinking about why geoscience is important and what they want to do in their future. I believe it is important for students and faculty to be looking forward and developing a plan for where we want to go in life. It is important that we enjoy the journey as it won't last forever. This past year I was reminded of this reality when I found that I have prostate cancer (thanks to a PSA test). I underwent surgery in December and am hopeful I won't see a return. Regardless, this was a good reminder of how life is special and finite.

Student and Water Interaction

Jim Watson

I want to take this opportunity to thank all my fellow faculty, staff and students for making my ongoing academic adventure at ECU so enjoyable and giving me support when I've needed it. Indeed, I'm also fortunate to have a wonderful family and good friends. Certainly my best days are not spent sitting in front of a computer! Have a happy and healthy 2016.

It has been an interesting year for us here in the tech support department. Thanks to John, we are all up to date on the boat situation. The biggest event for me has been getting heavily involved with Mike O'Driscoll and graduate student Adam Trevisan working on a project looking at groundwater-surface water interactions and potential subsurface nutrient flows at the Meher Spiritual Center in the Myrtle Beach area. As part of this project, we have been fortunate to have the involvement of alumnus Will Doar (BS, MS 1998) in his role with the South Carolina Geological Survey. I am looking forward to seeing Will at Southeastern GSA in Columbia, SC this spring.



Some Advanced Oceanography students and I gather for a selfie at the Oregon Inlet.



ECU-GEOLOGY: Boat Use Information

John Woods

For Jim Watson and me, working with boats and helping students and faculty with boating- related research has always been part of our job. Frequently, I am asked what qualifications a student needs to check out and use an ECU boat. So here goes, starting with a “captain’s license” and ending with ECU requirements for general research boat use.



Using a boat at ECU generally does not require a captain’s license. It does require taking the Motorboat Operator Certification Course (MOCC), proof of certification in Cardio-Pulmonary Resuscitation and First Aid, six days operating the type of boat you need to use with an ECU qualified operator, and a final check out with the ECU Boating Safety Officer, or designee. Specific approval from the ECU Diving and Water Safety Office and a captain’s license is required to operate the R/V *Stanley R. Riggs* or the *Cutting Edge*.

The MOCC course is also the U.S. Department of Interior boating safety course. Taking the course at ECU will meet the boating safety course requirement to operate a boat for the USGS, National Park Service, Fish and Wildlife Service, or any other Interior Department branch, as well as many state agencies and other universities. The MOCC will be offered in spring 2016 (May) and again this fall. Any current students or faculty that are interested in taking the course contact me or the Diving and Water Safety Office.

The following prerequisites are for the base OUPV (Operator Uninspected Passenger Vessel) credential. This is basically a license to carry up to six passengers for “hire”. Other licenses have additional requirements, like more sea time, near shore or off shore sea time. How large a vessel a credential is good for will be determined by the Coast Guard based on the size (tonnage) of the boats you listed with your sea-time document).

- You have to get a TWIC (Transportation Worker Identification Credential) <https://www.tsa.gov/for-industry/twic>
- Current Coast guard approved CPR and First Aid training
- You must pass the physical
- Drug screening is required (within 6 months of submitting the application package and at random times after obtaining your credential)
- DUIs, drug and felony convictions are reviewed by the Coast Guard and may require a 1 to 10 year hold before you are eligible to apply for a credential
- You must be over 18
- You must document 360 days of experience on a vessel since your sixteenth birthday. (When calculating qualifying sea time, you must have been underway on the water for a minimum of four hours to count as one sea day and only one day's credit is allowed per date.)
- You must have 90 sea days within the last 3 years

The Coast Guard exam is several hours long and covers aids to navigation, vessel lighting requirements, navigation and chart plotting, maritime rules of the road, the use of CFRs (Code of Federal regulations), tides and currents, and boating safety.

“The Augmented Reality Sandbox Epoch”

Dr. Terri Woods

For me, May through December of 2015 should be known as “The Augmented Reality Sandbox Epoch”. If you’ve never heard of it check it out (https://www.youtube.com/watch?v=EETkn5_qrhM). It is an awesome teaching tool for topographic maps and surficial processes and it’s really cool. The saga of the sandbox actually began in the spring of 2014 when John saw a YouTube video about this new application of augmented reality to teaching earth sciences. John emailed the URL to me and I immediately sent it to Steve Culver, who got back to us a few minutes later and asked John if he could build two for the geology department. The answer was yes and by fall of 2014 John had built two, and with the help of my oldest son Michael (the computer wizard), they had loaded the free open-source software and gotten the sand boxes up and running.

In spring of 2015 we used the boxes in the first topo-map lab with the grad students presenting a 45 minute demo of contour lines, topo profiles, water running downhill, etc. The TA’s had been given a detailed lesson plan and everything was demo’d ahead of time. Then in April I started my preparation for teaching GEOL 150I in Ist Summer Session. I wanted to use the sandbox for labs on topo maps, rivers, and coastlines, so I designed lesson plans, demonstrations, exercises, etc. All of the ideas had to be tried out ahead of time to make sure they worked and could be completed in a reasonable amount of time. The relatively small lab class was the perfect scenario for trying out new ideas. The long and short of it is the students really liked it. It was the first time in my 28-year career that teaching topo maps was fun. The required permissions were obtained from the students and I administered pre- and post-tests and surveys to get their input. It was universally positive.

Writing the manuscript on the sand box began in June and the paper was submitted to the Journal of Geoscience Education (JGE) in November. Co-authors include Terri, John, and Michael Woods, along with three scientists/educators from California universities who worked on the development team for the sandbox (<http://idav.ucdavis.edu/~okreylos/ResDev/SARndbox/>). Besides lots of demos to visitors in Graham we have also taken the sandbox out to multiple events including Rose High School, a Science enrichment Expo in Raleigh, other ECU departments, and to our most ambitious venue – the Geological Society of America Meeting in Baltimore last fall. It was a huge hit, by the way. We are now working with Academic Computing to make a sandbox video to enhance ECU’s image as a STEM (Science, Technology, Engineering, and Mathematics) educational institution, which will be linked to the paper in JGE.

Other education activities include submission of an external science outreach proposal to get funds for summer earth-science camps for K-12 age kids. I also chaired the search committee to hire a science education specialist for each of the four ECU science departments and the science-education department.

Last but not least, Mark Akland is writing his thesis now and, along with Mark, I am learning more about PHREEQ than I ever wanted to, so we can model the results of his data collection. Dr. Heimann and I are also resurrecting the “ilmelite chemistry” project we started about 18 months ago.



Prospective students viewing the sand box at this annual GSA meeting in Baltimore.

2015 Geology Graduates

Spring 2015

B.S. Geology

Ashton, Korey M.
 Dobbs, Zachariah R.
 Fierst, Dylan T.
 Hartman, Matthew L.
 Noles, Jonathan R.
 Pilgreen, Daniel G.
 Robinson, Max G.
 Strand, Raymond L.
 Thompson, Zachary S.

M.S. Geology

Dietsche, Andrew
 Hardison, Sarah E.
 Smith, Caroline F.
 Stevenson, Mallory F.

Summer 2015

B.S. Geology

Alston, James I.
 Bukoski, Isaac S.
 Perry, Joseph L.
 Vierheller, Amanda L.

M.S. Geology

Burns, Richard W.
 Hawkins, David W.
 Howard, Robert J.
 Kegel, Jessica J.
 Maurer, Elizabeth A.
 Strand, Jessica M.

Fall 2015

B.S. Geology

Alford, Justin W.
 Anderson, Erik K.
 Harrison, Emily I.
 Rustico, Emma M.
 Tull, Ruth L.
 Van Noske, Theresa M.

M.S. Geology

Crenshaw, Jared K.
 Lancaster, Heather N.
 Serna, Erica
 Thornton, Erik D.



EARTH VIEW

Stan and Ann Riggs Geology Endowment Fund

I. EARTHVIEW NEWSLETTER FOR ALUMNI

A. A program is being developed for production of an annual student-led newsletter to either stand alone or be incorporated with the annual faculty newsletter for geology alumni. The student component would feature their individual thesis research projects, field work, and major earth science issues and societal conflicts that represent the direct application of their course work to the real world.

B. This requires a student committee (through SGE) with strong student leadership and faculty advisors. The student-faculty committee would manage a small production budget with the students in charge of developing the topics, assigning specific articles, ensuring progress, and compiling the final document.

2. EARTHVIEW WORKSHOPS

A. The Endowment will fund annual or biannual workshops around specific global to local issues concerning the interaction of earth sciences and society. The workshops will be organized by a student-faculty committee that brings in one or more experts concerning a relevant, inter-disciplinary earth science issue of local to global-scale. The workshop will define the topic(s), invited speaker(s), and associated program, as well as manage the budget to cover the costs.

B. For example, the ECU Department of Geological Sciences will be celebrating its 50th anniversary in the fall of 2017. The endowment can help support a major topical workshop as part of the anniversary shindig, which could then become an annual or bi-annual affair.

3. EARTH VIEW FIELD PROGRAM

A. An ultimate goal of the Riggs Geology Endowment Fund is to establish an annual, broad-based, regional program of field trips and associated natural laboratory experiences (called Earth View) that will incorporate and integrate five concepts.

- a. Time and Scale: geological, biological, and human aspects
- b. Energy and Water: drivers of process-response
- c. Earth Materials: the building blocks
- d. Tectonics: building mountains, coastal plains, and ocean basins
- e. Role of Humans and Civilization: resources and environmental impacts

B. For example, each year or semester this program would focus on one of the regional provinces (Appalachian, Piedmont, and Coastal Plain Provinces) and then rotate through the years to ensure maximum geologic exposure and integration. A mechanism will be set up to ensure active student involvement, in concert with the faculty advisor(s) to plan, organize, write the field trip guide book, and participate in the program. Each of the three programs would culminate in an extended field trip during fall or spring break or after semester finals to allow maximum participation. This program could have formal course credit through pre-existing 3-hour programs such as directed studies, seminar, or honors.

The Bob VanGundy Field Course Scholarship

Bob VanGundy donated \$40,000 to the department this year to establish a scholarship that will help students attend field course. This article from Bob explains why he made this very significant donation.

My undergraduate geology education at East Carolina was excellent, in no small part because of the field trip experiences I had in many of my classes. However, when I was there ECU did not have its own field camp. Students had to find their own. I chose to go to one in Salida, Colorado, co-administered by Texas Tech and West Texas State (now West Texas A&M). It was my first opportunity to visit the west and turned out to be one of the seminal experiences of my life. Field camp is where my geology courses really came together. That experience, along with the education I received at ECU, laid the foundation for my career in geology.

For me, the other half of the story is East Carolina itself. I was a first-generation college student and East Carolina offered me a full scholarship. Without that, I don't know if I ever would have made it to college. Now that I'm nearing retirement, I wanted a concrete way to show the college I appreciated their help. I knew that ECU had started its own field camp. Providing some assistance for students attending field camp is a fitting way to show my appreciation to the geology program and to East Carolina University.

Bob VanGundy

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