

The Department of Geological Sciences

2022 Newsletter



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From right to left, Chairs Steve Culver, C.Q. Brown and Scott Snyder on the occasion of C.Q.'s 80th birthday.

Cover image: The R.V. *Beggar Tom*, Geology's first coring barge in the late 1960s

We would like to give a special thanks to all those who contributed time and effort to this newsletter.

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A Word from the Chair

Brave New World

I've made a few (usually awful) literary references in the titles of my articles over the years. So here is another one that reflects my thoughts as I prepare to step down from the position of Chair of the Department of Geological Sciences in August 2022. All good things come to an end and it has certainly, from my perspective, been a good 23 years (a little more than half of my career). I look forward to continuing my contributions to the department as a faculty member.

So this is a big change and the idea of change, once more, is reflected in the theme for this year's newsletter, "Then and Now." The editors of this volume have commissioned articles from current students who write about how they got interested in geology and how their ideas about possible careers changed as they learned more about this science that underpins all of human civilization. They have also commissioned articles by recent and not so recent alumni who discuss how their careers have developed through time.

We have articles from three Chairs of the department, C.Q. Brown, Scott Snyder, and myself (this message), whose service encompasses 45 of the 54 years of the department's existence. On the occasion of the first departmental Newsletter in 1985, C.Q. Brown, the founding father of the department in 1967, wrote: "We hope that this newsletter will provide you with another means of keeping in contact with your former professors and classmates.... The alumni are worthy of a special thanks for their continuing success in maintaining an excellent reputation for our Department. Your accomplishments persist in stimulating faculty members to educate to their potential and in motivating students to perform at their best academically." His thoughts still resonate today.

In the 1995 Newsletter, Scott Snyder announced the arrival of a newfangled thing called email! "It is a wonderfully convenient and inexpensive way to communicate, no matter where you are." I think this also resonates today!

The department was not always located in the Graham and Flanagan buildings. Stan Riggs, who joined the department in its first year (1967), tells us about the Old Austin Building, which no longer exists. Jim Watson, for many years the sole technician in the department, describes Terrania, the department's research labs, located in the Old Cafeteria Building, that were replaced by our facilities in Flanagan in 2005.

The front cover of this Newsletter speaks for itself. We have come a long way from that primitive, home-made drilling barge (the *Beggar Tom*) in the last half century. Although we have lost some faculty members to transfers and retirements in recent years we still offer much to our students. Guaranteed employment for Master's students is one thing. An excellent education for our undergraduates in basic geology, but with a modern perspective, is another. Our continuing attention to the needs of our students is exemplified by a new undergraduate curriculum that will commence in fall 2022. This curriculum will have more emphasis on technology (including GIS),

A Word from the Chair (cont.)

research and current geologic issues, but it will not ignore the basics. I know the latter is of great importance to alumni because so many of you have told me so over the 23 years I have been Chair.

Research, and the associated external grants that make it possible, have always been of great importance to the department. Obviously, the departure of a few faculty colleagues in recent years caused a hiccup in our research productivity but that turned around in fall 2021 with the award of three NSF grants worth over \$7 million. These projects, involving teams of people from ECU and elsewhere, are described in this Newsletter by our colleague Stephen Moysey, who conceived of these projects and has the lead role in the research.

We had one change in our personnel this year. Departmental Head Technician, Marah Dahn, returned to her home state of New York to become a teacher. We had a ready-made replacement waiting in the wings and I am happy to welcome Scott Rose to his new role. And welcome back to Alex Manda whose Fulbright visit to Zambia took a little longer than expected due to COVID-related travel complications.

This will be my last Newsletter message as Chair to you, the alumni, who have achieved so much in your careers and who have done so much over the years to support your department – the place where your geologic careers started. I leave you with a final, simple request, keep up the good work, and a final simple acknowledgement, thank you!



Steve Culver



Then and Now: Steve Culver (right), with his long-suffering mother and siblings, collecting fossils in a Carboniferous Limestone quarry in 1962.

Then and Now

Then and Now: The Founding and Growth of the Geology Department.

C. Q. Brown

At age 93 and in the twilight of my life, I am invited to render views of the founding of the ECU Geology Department. This will not be a timeline of experiences but rather a collection of memories and milestones significant to the founding and growth of the Geology Department.

The story begins in 1965 when I was employed as an Associate Professor of Geology at Clemson University. Through an arrangement made by Dr. Robert Holt, Vice-President and Dean of the College, I visited ECC and was shown around the campus by Dr. Cramer, Chair of the Geography Department. The early 60s were a very exciting time for ECC as it was the fastest growing college in North Carolina and I was very impressed with the spirit of the faculty and campus. Under the leadership of Dr. Leo Jenkins, ECC was seeking university status and an additional academic science program was needed.



*C.Q. Brown
(center) on board
a departmental
research vessel in
the late 1960s.*

Based on the report made following my visit, Dr. Williams, Dean of Arts and Sciences, called to thank me for the report, agreeing with the plan I put forth for a Geology Department. Dr. Williams expressed his hope I would join the faculty and implement the plan. In addition to establishing a Geology Department, the plan included: emphasis on coastal processes, including the off-shore shelf waters; providing expertise in addressing regional needs and opportunities; identifying start-up needs for space, equipment and faculty.

I accepted the challenge offered by Dr. Williams to found the Department of Geology and began the most exciting time of my academic career. As I reflect upon that very busy first year of

recruitment of faculty and getting three degree programs approved (BA in Geology, BS for career geologists, BS for science teachers), it feels like a fairy tale

The most exciting job was recruiting faculty. Surprisingly, our new department received an allocation for five faculty including my position as department chair. The recruitment process was very encouraging, resulting in faculty with degrees from highly regarded universities including Harvard, Yale, Texas, Montana and Virginia Tech.

Dr. Stanley Riggs, University of Montana, was the first to accept my offer to join the newly formed ECC Department of Geology. His enthusiasm for geology, evident from our first interview, has never wavered. Through his long tenure, he has become widely recognized as an expert on coastal issues, leading to recognition and resources for the department.

It is with fatherly pride that I note that from the beginning, the geology department has attracted well-qualified faculty who are committed to both teaching and research, leading to state and national awareness and to the growth of the department.

Back to 1967, the same year in which ECC became a university, the fledgling Geology Department opened its doors for students in old Austin. Our geological coastal setting dictated an emphasis on coastal environments leading to significant milestone events, including:

- 1) bonding with biology faculty members leading to interdisciplinary endeavors,
- 2) development of a highly successful semester-in-residence program in Manteo,
- 3) development of the hydrogeology program
- 4) receipt of a \$219,000 grant from the Sea Grant Program –a minuscule amount by today's standards but truly a milestone event in those days which gained resources and sparked confidence, enthusiasm and recognition for the department,
- 5) In 1970, Gov. Bob Scott appointed me to the newly formed N. C. Marine Science Council. I served on the Facilities Planning Committee which resulted in the building of three laboratories known today as Aquariums at Fort Fisher, Bogue Banks and Roanoke Island.

The way in which the department has grown and progressed from 1967 to the present is like a dream come true. When I visit the department today, everything is “store bought” and state of the art – a far cry from the early years of constantly seeking resources and “making do”. Under the leadership of Dr. Steve Culver, whose management style is a source of inspiration for both students and faculty, the department has gained international recognition – along with my respect and gratitude.

Over the past two years, however, the pandemic has created new challenges for not only our beloved geology department but for the entire university. Faced with reduced resources, it is a time for renewal and rebuilding. Because of my exposure to leading guest scientists who lectured and mingled with students when I was earning degrees at UNC-CH, my current dream is to have that same opportunity provided for ECU geology students. To that end, I have endowed the C.Q. and Barbara Hedgepeth Brown Lecture Series to bring outstanding guest scientists to ECU to inspire students and stimulate interest in the wonderful world of geology with its limitless possibilities.

Then and Now: Geology

Scott W. Snyder

For those whom I may not have known, I joined the ECU Geology faculty in 1972, served as Department Chair from 1988-1998, and finished my ECU career as Senior Associate Dean of the College of Arts and Sciences. I taught my first college-level lecture course at age 26 and my last at age 74, so my comments are based on nearly 50 years in the profession. Just as many phenomena that we study in the geological sciences are cyclic, so too are the economic circumstances and job market opportunities that influence our careers. Things change ... sometimes rapidly.



Scott Snyder soon after arriving at ECU

Most who have enjoyed a long career will admit that many of their “big breaks” were serendipitous, coming from unexpected sources and sometimes at unexpected times. Conversely, one’s ability to capitalize on such opportunities is anything but simple happenstance. The old adage that “luck is where opportunity meets preparation” rings true. I outline some of my personal experiences to illustrate.

When I left graduate school in 1972, the job market was severely depressed. Industry jobs were scarce and academic positions were almost non-existent. I was invited to interview for an academic position at ECU in part because a fellow PhD student at Tulane University knew a faculty member at ECU, and he called to suggest that they give me a look. I was offered the job and I never looked back. I know I was not ECU’s first choice. The department’s first choice declined its offer in late spring, and there was great pressure to fill the position. Ten years after I had such a challenge finding work, our MS graduates were getting multiple job offers from oil companies at starting salaries higher than their professors. A few years later big oil was scaling back and the job market shifted to environmental firms. Cycles!

One of the great opportunities I had while at ECU was to participate as a scientific crew member on two deep-sea drilling cruises. In 1981, I was invited to join Deep-Sea Drilling Project Leg 80 largely because a fellow PhD student at Tulane was a co-chief scientist on that leg, remembered me from graduate school days, and offered me the spot. As an outgrowth of my work on Leg 80 materials, I co-authored a paper in *GEOTIMES* with a scientist from Rutgers University. In 1993, I was offered the opportunity to join the scientific crew on Ocean Drilling Program Leg 150 by my colleague from Rutgers. Another opportunity came with the chance to serve as editor of the *JOURNAL OF FORAMINIFERAL RESEARCH*. My professional association with board members of the Cushman Foundation, one of whom is your current chair, Stephen J. Culver, was a major factor. Finally, my association with fellow ECU faculty member Stan Riggs dramatically influenced my career. My collaborations with Stan were a major factor in whatever distinction my research record may have.

What are the lessons to be taken from my experiences? 1) Work hard and treat your associates at all levels with respect. You never know whose impressions of you may later influence your career. Make sure those impressions are positive! 2) Be a person of your word. If you tell someone you will do something, make sure you do it. 3) Do not have thin skin. Do not be offended if you are not someone's first choice for an opportunity. Just make sure they never regret having given you a chance. 4) Learn to take criticisms of your work in the context that they can improve the final product. Early in my career I was sometimes angered by criticism of a submitted research article. Later in my career, I was disappointed if the reviewer failed to be critical. 5) Recognize the talents of your colleagues and welcome collaborations that will ultimately benefit your career. 6) Do not be afraid to fail. Although I have highlighted successes, I also have had failures in my career. I often told students that the only people I know who have never failed are those who never tried to do anything challenging. Some of the best lessons are learned from mistakes.

“Intelligence is quickness to apprehend as distinct from ability, which is capacity to act wisely on the thing apprehended” (Alfred North Whitehead). The former is meaningless without the latter, and my experience is that ECU geoscience students are very able.

No one can predict the future. But I am confident that the future of geological sciences is bright, and associated career opportunities will be plentiful. Geological resources to support our life style will always be in demand, as will expertise to solve environmental problems. Opportunities will arise, often from directions you do not anticipate and involving people you would not expect. If you are prepared and ready to seize opportunities, I think your futures in the geological sciences are every bit as promising as at any time in my career.

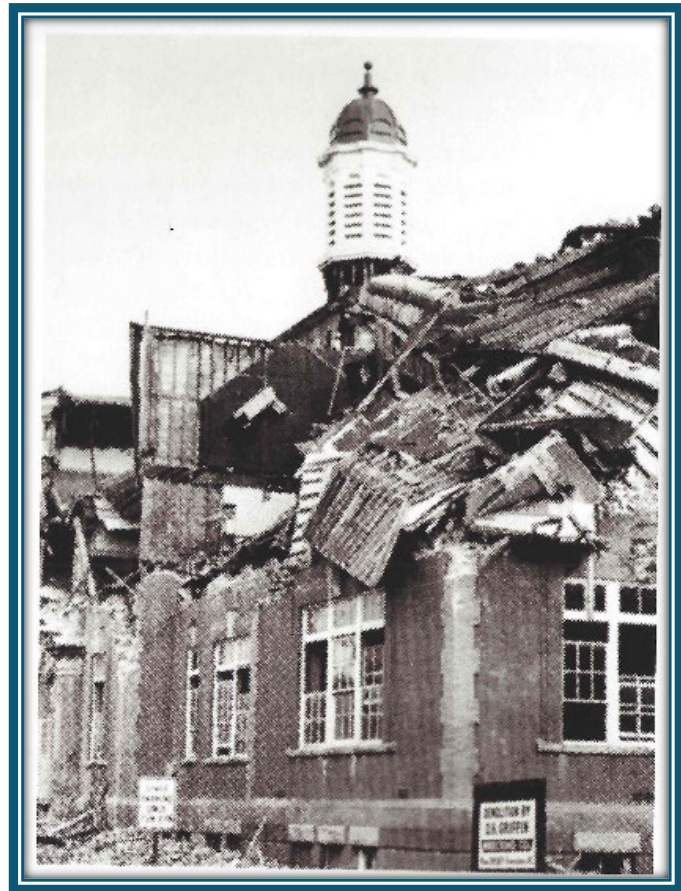
Then and Now: From the Bottom Up

Stan Riggs

In 1967, Dr. Leo Jenkins, the Chancellor who stood up against the power structure within North Carolina, succeeded in turning East Carolina College into East Carolina University. Leo was as tough as nails, an ex-marine with a “can do” attitude who loved a good fight. Chancellor Leo Jenkins hired Dr. Charlie Brown, a geologist from Clemson University, who convinced Leo that his new University needed to establish a Geology Department to help beef up existing science programs. Charlie proceeded to hire a rag-tag team of geologists for his new department. But there was no place to house a new department on a small and old college campus.

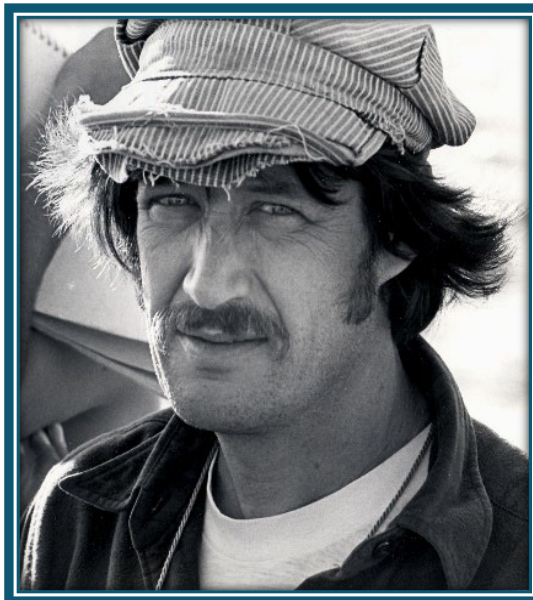
Charlie and the departmental office, along with Bob Bishop and Percy Crosby, were initially housed on the second floor of Erwin Hall, the old living quarters for single female teachers during the ECTC (East Carolina Teachers College) days. Jean Lowry was still located in the Geography Dept. For me, I was assigned to an office in the third-floor attic of Old Austin, the original building for ECTC. To get to my highly weathered desk, I had to take a rickety old elevator on an arduous five-minute trip from the ground floor to the attic, step off onto a worn wooden floor that creaked loudly its objections to being walked upon, and head to the open space beneath the cupola where pigeons roosted at night. My brand new PhD dissertation, samples, and microscope were spread out for work in my research office located under the open cupola, a model of which rises today in an honorable location on the ECU Mall. Much to my chagrin, every day I was honored with special treasures from my pigeon compatriots. Better yet was the unfinished basement of Old Austin which had a mysterious center structure around which existed a square of long, narrow space with red clay floors and a few head-high windows. This “world-class” empty space was turned into a series of luxurious partitioned rooms for our geology labs. Weathering was an easy topic to cover being surrounded by many great examples!

Old Austin Building being demolished (from Ferrell, H.C., Jr., 2006, No Time for Ivy, East Carolina University, 1907-2007, Image from the Archives of ECU)



By the middle of our first year, it was determined that Old Austin would be demolished. This sent our leaders scurrying to find another space to relocate Geology. Our new digs turned out to be in the basement of Ragsdale Hall, an existing woman's dormitory, built as a three-sided square with a large center courtyard. One arm of the building with even longer and narrower rooms was designated for all geology faculty offices and laboratories. However, the development of a new ECU Medical School meant that space had to be found for that initiative; by 1971-72 Geology had to relinquish Ragsdale basement to medicine. The next move for our growing Geology Department (Michael O'Connor, Richard Mauger, Scott Snyder, and Pei-Lin Tien) was into 1½ floors of Old Graham Building, home to Foreign Languages who were slowly transitioning out as Geology transitioned in. With our new facilities in Graham, we also became proud occupants of the School of Art's underground in the basement of Old Cafeteria. This, with all of its space and nuances, became Geology's Terrania, complete with access to an underground tunnel system that provided an endless supply of raccoons, possums, and feral cats. Our research office was in the big and exquisitely tiled shower. Everyone who remembers the hours, days, and even years spent in the underground, raise your hand and smile!

Following the renovation of the old Chemistry building, Geology gave up Terrania and moved our underground to one more basement—this one had little character but was state-of-art, refurbished lab space in Flanagan. Along with the research labs and core storage came the unforgettable offices for Jim Watson and John Woods, as well as the inner courtyard. Jim was responsible for staking a claim on the courtyard as the ancient heating/cooling system was lifted out with a humongous crane. Jim was there with truckloads of big quarry rocks to be planted as a rock garden in this otherwise under-utilized space. In the last few years, even old Graham got a face-lift when Steve Culver was able to leverage some funds for 1) rebuilding a few offices and a new first-floor classroom complete with massive tables and work-space made out of polished slabs of exotic rocks from around the world and, 2) turning the second floor into the new Water Institute for Director Stephen Moysey and associates. STILL NO ELEVATOR!



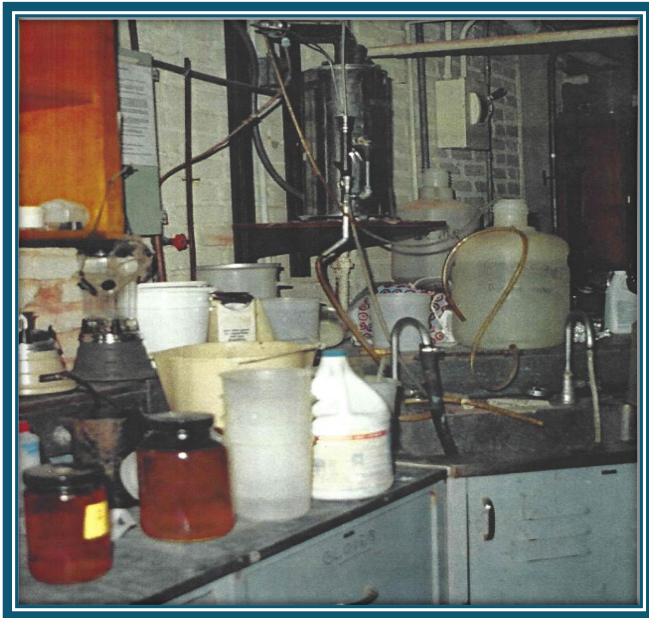
Stan Riggs in the 1970s at the end of extensive ship-time

Then and Now: The Story of Terrania

Jim Watson

When I joined the department in August, 1980, most of the lab facilities were located in the basement of the since-remodeled Old Cafeteria Building. It had been a service area for the long-defunct cafeteria that had been located above. It was some pretty rough space that had been creatively acquired by the department upon their eviction from what was probably some similarly rough space in the basement of Ragsdale. It was space that no one else wanted in its then present state, but it actually served the needs of Geology quite well. There was a bank of formerly refrigerated food storage lockers that had been converted into core and sample storage areas. Nine interconnected rooms of varying sizes served various functions including grad offices (and mine), a workshop, a core cutting and storage area, a mineral separation lab, a general chemistry and sedimentology lab (with a fume hood), and a rock sawing and thin section prep lab, including Ro-Taps. We built a section to install the rock crushing and pulverizing equipment that Dr. Mauger had acquired with his NSF grant, and I was able to acquire some cast-off lab furniture from Chapel Hill to replace the cafeteria sinks that were there when I arrived. An unheated annex had been built in the courtyard area to house a wave tank that had been constructed using a series of large glass tanks and a large food mixer that propelled the wave-creating paddle. And of course there was the Stanleyville Jail, a focus of intense work by Dr. Riggs' students.

Many feet of vibracore were sawed open, logged and processed. As cores and samples proliferated, additional storage facilities were constructed. The department accepted several mineral collections all of which were cataloged and stored in Terrania. A compressor for filling SCUBA tanks was located in the workshop area, which also happened to have a large, high volume exhaust fan.



Sample preparation lab in Terrania

And then there were the tunnels. A small one in the largest room leading toward the Jenkins building required periodic attention due to large rodents and other creatures that made their home there. At the other end of the complex was an entrance to the steam tunnel system. Just inside the small, chest-high entrance behind the rock saws resided the “Queen of Terrania”: a life-sized Egyptian statue that had at one point occupied the stage of the McGinnis Theater. And beyond the Queen.....well, some of you who read this may be among the intrepid explorers of that time.

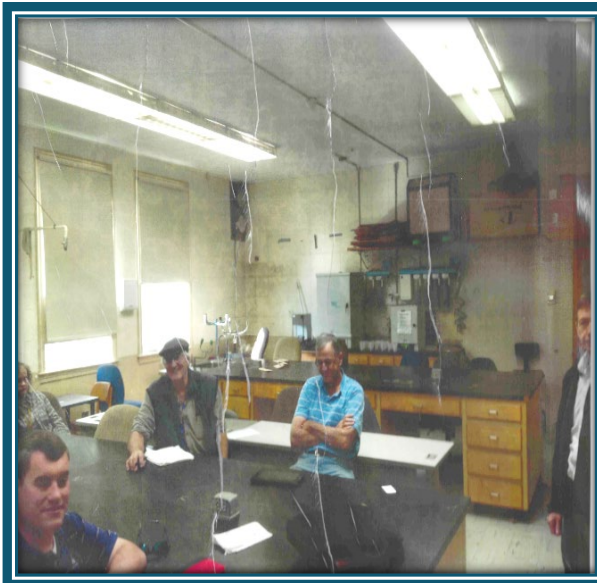
When the Flanagan building was declared unfit for a Chemistry department, and a new building constructed for them and the Industrial Technology folks, the University chose to gut and rebuild Flanagan to be the new home for departments that had occupied the Old Cafeteria building. We met repeatedly with the architects to try to fit the functions of the sprawling Terrania complex into the discreet room functions perhaps more fitting to a modern lab-oriented department of geological sciences. The moving process was epic, and could not have succeeded without the heroic contributions of student Jason Jomp.



Sample preparation lab (micropaleontology) in Flanagan

The adaptation to the new facility has been largely successful, though a few functions did not translate quite as well as we had hoped (core cutting, for example.) And of course, with the transition to the new space, some of the bootstrap feel of the first decades of ECU Geology was left behind. Many a successful geologist received an important part of his or her training via their work in Terrania while teasing from the Earth its many secrets.

Note added by Steve Culver: Jim (wearing a hat in the before picture, with technical colleague, John Woods) helped us refurbish teaching labs as well as research labs – see the before and after pictures of Graham 106!



Then and Now: Early Alumni

Then and Now: Embracing Change: From Exploration Geologist to State Regulator

Tricia Beaver

I started college at ECU fall quarter of 1974, at age 16, not really knowing what I wanted to do for a career. I enjoyed hiking and was always curious about how the landscapes around me were formed. I had a great experience in my 8th grade Earth Science class and was inspired to take a General Geology class as my science elective that first quarter. I was fascinated by how much I learned in that class and just how much it increased my curiosity, so I followed up with a Historical Geology class the next quarter. That was the class that made me think geology could become my major. Subsequently, I had a discussion with the department chair in which he advised me that companies were highly motivated to hire female geologists, so I decided to declare my major. I realized that there were interesting opportunities and attractive salaries in the various fields of geology, and those were important factors for me.



While attending field camp in Salida, Colorado in 1977, I decided that Colorado was the place I wanted to live. After graduation in December of 1978, I moved to Denver to look for work in the petroleum industry. I began working as an entry level geologist for a midsize independent petroleum company and was there about four years before a swift downturn in the industry occurred. After being laid off, I consulted for a year with three small independent companies, all at the same time, to get through the downturn. It was a hectic pace, being at two different companies two days each week and a third company one day each week, but I was determined to stay in Denver. Toward the end of that year, a friend told me about an opening at the State of Colorado Oil and Gas Conservation Commission. The position was responsible for reviewing all applications for permits to drill wells for oil and natural gas exploration and production. It would mean that I would become a regulator for the industry I had been working in for the past five years, but at the same time, securing a position that would be less affected by the cyclic nature of the oil and gas industry. I was ready to give it a try!

I was the first female geologist hired by the Colorado Oil and Gas Conservation Commission (COGCC) since its 1951 inception. When I came to the job in 1984, it was during a time the agency was ramping up its staff and taking advantage of the petroleum industry downturn to hire technical folks with oil and gas expertise in both geology and engineering. I had to become familiar with the Colorado laws and COGCC rules governing oil and gas operations in the state so that I could not only perform my duties but also constantly communicate with industry geologists, engineers, landmen, attorneys, mineral owners, surface owners and concerned citizens. This was a quite a different role for me who as an exploration geologist was

used to generating prospects mostly on my own. I found though that I actually enjoyed explaining the processes, rules and rationale to the varied audiences who were impacted by petroleum exploration and production. It was especially important to me to educate citizens who had little to no experience with oil and gas operations, from the question of why do companies have to drill in certain areas to how mineral and surface rights are conveyed to well construction and so on. I tried to demystify the industry to these folks by explaining the laws and rules that companies were required to follow, and some basic geologic and engineering concepts to help in their understanding.

Six years after starting at the COGCC, I took on a new position managing the technical and legal aspects of the agency and its Board of Commissioners. I was the liaison between the COGCC staff and its Board of Commissioners, who acted as judge and jury over matters presented by parties interested in participating in these processes. My responsibilities included recommending revisions to statutes, rules, policies and specific field orders, functioning as a hearing officer, and leading stakeholder groups in the drafting of new legislation and rules to address the increasing issues within the State of Colorado's petroleum industry.

Around this time, I was starting to think about going back to school and was leaning in the direction of law school as my new position involved working with just as many lawyers as geologists and engineers, and I felt like a law degree would be most beneficial for me. Luckily, I had some insightful advice from a few attorneys along with the head of my department, who suggested I pursue another direction. It happened that in the late 1980's the environmental aspects of petroleum exploration and production were getting lots of attention in Colorado. Folks were moving to the state and many had no idea that Colorado had a vibrant oil and gas industry. Newcomers were purchasing homes and property, mostly surface rights, in close proximity to oil and gas operations, without an understanding of what impact it might have on their lives. The COGCC decided that our agency with staff expertise in the technical aspects of oil and gas operations was the best fit for implementing environmental rules to address these operations. We did not, however, have specific environmental expertise and it was becoming clear that would be required if the COGCC wanted to maintain autonomy for the industry it regulated. Coincidentally, I found an Environmental Policy and Management Master's degree program at the University of Denver that I could attend in the evenings after work that would be the perfect complement to my job and to a future position as well.

Just as I completed my Master's degree in late 1993, the COGCC decided it was time to establish an environmental program and I was asked to lead this effort. In my new position, I was responsible for hiring staff and for the development and implementation of programs to monitor and evaluate environmental compliance during all phases of oil and gas operations. It was important to me that I had gained the perspective from real life work experience to choose the direction I would go in my post graduate education.

I came to Colorado in 1979 looking for my first job as a geologist in the petroleum industry and assumed that would be my profession. Being a victim of the infamous "boom and bust" cycle of the petroleum industry, I knew I would be happier working in a more stable segment of the industry, applying my education, experience and interest. I could not have predicted in 1984 that I would spend 25 years in Colorado state government, however, I understood the need to be flexible and adapt to changes in the industry. I feel lucky to have had a truly enjoyable and gratifying career with the State of Colorado. I feel proud to have provided meaningful contributions to the petroleum industry and the citizens of Colorado.

(Tricia Beaver is a major donor to the Department of Geological Sciences – SJC)

Then and Now: My Life and Career in Geology

Jeff Brame

I am a 1974 BS graduate from the East Carolina University Geology Department and have recently retired after a very enjoyable and rewarding 45-year career as a geologist. This article will highlight my initial entry into geology and the evolution of my thinking concerning what my geological career would be as I progressed through my higher education and job experience. I will also discuss my perception of current and future geological career opportunities.

I selected ECU as my undergraduate university in January of my high school senior year and wanted to designate my major curriculum early so I would increase my chances of graduating in four years. Accordingly, I browsed through the hard copy ECU catalog viewing various possible major options for me and the geology page captured my attention. I reasoned that my long-time childhood rock collecting hobby suggested that I should major in geology, and I declared that major prior to high school graduation. Simple as that.

I attended summer ECU freshman orientation and was welcomed into the Geology Dept. by geology professor Bob Bishop. Then I started my ECU education in Sept. 1970 as a declared geology major with absolutely no idea or concern about what my intended geological career would be like. I just thought it would be cool to be a geologist working outside in the field, whatever that entailed.

During my first two years at ECU, I proceeded through my geology curriculum sometimes in a seemingly aimless fashion still with no thoughts about future employment options. Near the end of my sophomore year, I was hired by ECU geology professors, Stan Riggs and Mike O'Conner, to work on their NOAA-funded northern Outer Banks geological study. After three summers in field residence and two school years of lab work on this project, I could finally envisage and embrace a career in coastal geology. This work experience with Riggs and O'Conner changed everything for me and I was on my way to graduate school and beyond.



Jeff Brame (Brame GeoScience, LLC) hiking in Zion National Park

I pursued my passion for coastal geology at the University of South Florida where I obtained an MS in geology and completed a thesis on west Florida coast barrier islands. I decided on a career in geological coastal zone management and mailed dozens of requests to companies for employment in that field. After no success with that career option and nearing my graduate school completion, I reluctantly applied to one oil company in Texas. I quickly received an interview in Houston and was offered a position in their Midland, TX office. I needed geological employment, so I reluctantly accepted the job I really didn't want in May, 1976 and my idea of a geology career changed dramatically.

I remained in the petroleum industry and worked for various oil companies in Texas and Louisiana over the next 22 years. I overcame my initial reluctance and started enjoying my forced petroleum geologist career as I rigorously applied my detailed geological science knowledge to location of petroleum deposits. I stepped out and formed my own Houston-based geological consulting company in 1998 mostly working contract jobs for various petroleum companies. In 2003, I really took a risky leap and moved my consulting business to Durango, CO where I had wanted to live for a long time. It worked out and I have been a successful southwestern US geology consultant for 18 years on my terms before retiring recently and continuing my ever-evolving geology pursuits mostly as a hobby these days.

So, my time as a working geologist is behind me and all you current geology majors have your entire career ahead of you. Great news! From my broad perspective and experience, I believe there is a multitude of geological career opportunities waiting for you upon completion of your education. First, you must work hard in school and always remember that you are becoming a geological scientist. Start your science learning process in college and continue that learning process throughout your employment career. Geological knowledge evolves through time and you need to keep current. Always apply the scientific method in whatever type of geology job you choose and you will do well.

When I began my career, the petroleum industry was the largest employer of geologists. Now, with the escalating move to green renewable energy sources and gradual phase out of fossil fuel usage, there are fewer petroleum geology jobs available. However, there will be continuing opportunities for petroleum employment for a long time, so if you want to pursue that career, go for it and it may work for you. Mining geology will continue to offer employment opportunities exploring for precious and base metals, uranium, helium, CO₂ and other commodities. Increased electric vehicle manufacturing requires large amounts of lithium, cobalt and nickel, which mining geologists will discover. The technology industry uses large amounts of rare earth elements which must be located by geologists. There are still geology job options in federal and state government. Finally, geology teaching positions are always available from high school earth science to university level geology instruction.

Stay committed to your science and be flexible about geology career options as employment opportunities are changing and will continue to change. I recommend obtaining an MS degree for higher level geology knowledge and advantages in securing employment. Rewarding geology careers are out there for you, so apply yourself, be very dedicated to your curriculum, and go get the jobs. I wish all of you great success.

Then and Now: P → Au ... ? (“When you come to a fork in the road, take it.” – Y. Berra)

Pat Mallette

As a kid growing up in the ‘60’s and ‘70’s, the only reasons to be indoors were because it was either too dark or it was raining. I was curious about nature and spent my free time outdoors around my hometown of Raleigh and our summer home on the Pungo river near Belhaven. I found and collected rocks (Raleigh) – flat-sided beige and black ones (k-feldspars and hornblende, I later learned); translucent ones that would peel apart like paper (muscovite); round ones like baseballs, rusty on the outside and black on the inside (diabase from Triassic dikes). Shark teeth and other fossils came from spoil piles where Texas Gulf was conducting phosphorite exploration by the Pungo River. I’m convinced that curiosity is a necessary element in any scientist’s repertoire. Yes, there is the warning that curiosity killed the cat but that’s why the cat gets nine lives.



*Pat Mallette
prospecting,
Kuskokwim region
of Alaska.*

My academic path in geology began in Graham building, room 301, during an introductory course in Physical Geology with Dr. Scott Snyder presiding. The subject matter and Dr. Snyder’s enthusiasm and approachable personality that made me quickly decide that I would major in geology. In May of 1980, I was invited on a research cruise with Dr. Riggs aboard the R/V *Eastward* vibra-coring and running seismic profiles on the NC continental shelf. During that cruise, Mount St. Helens erupted and we put discovery holes into a bonanza phosphorite deposit that Dr. Riggs had been envisioning for years. Heady stuff for a twenty-year-old rising junior.

Graduations – a BSc in '82 and an MSc in '86 – were timed to coincide with sharp downturns in the petroleum and minerals commodities markets. No one was hiring; most companies were laying off their geological staff. In spite of the bleak economic climate, gold was holding steady. In fact, an exploration boom was underway in the western US. With good words from Dr. Riggs and ECU alumnus John Maddry, I secured a staff geologist position with Newmont Mining Corporation based in Reno, NV. The transition from academics (sedimentary phosphorites) to industry was abrupt. I well remember my first field trip as a real professional geologist. We were in the Mojave desert, Darwin district, of southern CA, surrounded by 100's of square miles of calc-silicate-altered rocks and skarn occurrences. Dorothy was right, I wasn't in Kansas anymore - the learning curve was vertical.

Stepping back for a few words ... When I was still a student at ECU, someone once asked, 'What would be your dream job?' I thought it would be to work in exploration, in minerals, to essentially be a paid prospector, to do Field Camp for a living. I didn't believe that job existed, though, so I'd likely be looking at some other, then-unknown positions. Fortunately, I had a wanderlust so I didn't have a problem with relocating.

I found that in Nevada, geologists are not the rarities that we are in eastern North Carolina. Several of my neighbors were geologists. To the non-geologists, many of whom also worked in the mining industry, we were "pebble pimps" and "rock lickers"; all good humor provided they didn't confuse us with mining engineers! We lived and worked in the field. Shifts were ten days on and four days off. It was permissible to be in the office only on the first Monday and the last Wednesday of the shift. There was no GPS, no high-resolution satellite imagery, no laptop and no Google Earth. Digital technology grew through the years and became a larger part of how we worked but we held to the tenet that discoveries were made in the field and not in the office. The best way to get ahead of the competition was to turn off the machine and go out for a long walk in the field.

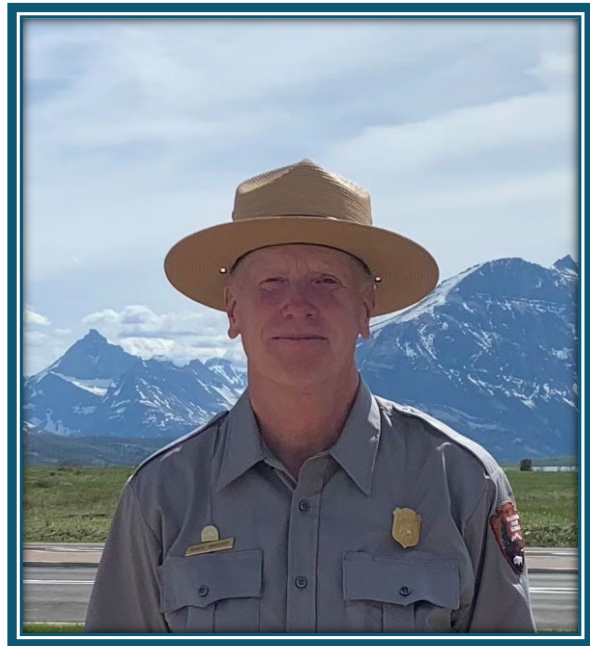
A few years ago, I retired from Newmont – the same company that I'd started with 30 years prior. That is some "dinosaur stuff" right there. No one spends 30 years with the same company anymore and very, very few of my contemporaries did either. The ups and downs of commodity cycles, layoffs, changing interests and life events diverted most into other jobs and careers.

I look back on very rewarding career in geology. Not many people get paid to shoulder a backpack and spend work-days out hiking with the crows and coyotes, searching for treasure. The 16-year-old kid who dreamed of being a rock star got his wish. It may not have been the type of "rock" I'd originally envisioned but it was way better. We had some spectacular economic successes, many more near-misses and some outright failures. That said, the best discoveries and memories, by far, were the people and places along the way.

Then and Now: What I did on my summer vacation

Bob VanGundy

This summer I finally fulfilled a career dream, working as a seasonal Ranger Interpretation for Glacier National Park. I had to wait until I had retired from full-time work before I had enough time available in the summers to work for the National Park Service. Glacier is an exceptional park for a geologist, containing a wide variety of features, including some of the best Proterozoic sedimentary deposits found on the planet. This job was close to what I had envisioned for my geologic career - working largely outdoors, and sharing a love of geology with other people. It turns out, my career path had many more twists and turns than I had pictured, but my hike along it has been fun nonetheless.



I first became interested in geology in my junior high school Earth Science class. When beginning a unit on rocks and minerals, my teacher brought in a quartz crystal and described how crystals could grow. It was only a few inches long, and I know now it wasn't even an exceptional piece, but it had never crossed my mind that any non-living thing could grow - especially in the ground.

In a bit of serendipity, not long afterward a friend told me about a store in Charlotte called Science Hobbies. The store carried telescopes and other optical equipment, RC aircraft, model rockets, all kinds of equipment and supplies for the sciences, but the bulk of the floor space was devoted to rocks, minerals and fossils. I came home from my first visit not only with some rocketry supplies, but a geode and a small specimen of azurite and malachite from Arizona. I also came home with a burning desire to work there as soon as I was old enough. I ended up working there part-time from 10th grade through college and beyond - 11 years in total. That is where my geology career really began. My specimen collection began there too. I'm not sure I broke even financially working there, after work expenses and buying rocks and minerals.

I have to remind myself sometimes that my BS from East Carolina was in Science Education with an Earth Science concentration, rather than straight-up geology. The geology department was my home on campus. The emphasis on field experiences made every class memorable. I didn't always know exactly where we had gone, but I always came back with better understanding of the subjects, and outstanding memories too. What I didn't know at the time was how much of my training at ECU would crop back up later in my career.

As I said, my career path hasn't been linear. I worked for Charlotte-Mecklenburg Schools for a couple of years before returning to graduate school. The decision to do graduate work in paleontology was directly influenced by my undergraduate experiences with Dr. Scott Snyder. After graduate school, I worked for Shell Offshore, Inc as a biostratigrapher. It was a great place to work, and we had resources available that many universities only dream about, but it was there I first noticed the work wasn't exactly what I had pictured myself doing. I had seen myself out in wilderness, seeing things rarely seen by others, and finding all sorts of geologic curiosities. Instead, I sometimes would look out the window from my office in downtown New Orleans at the layer of pollution lying over the city and ask that age-old question "How did I get here?"

I left Shell after nine years to move back to mountains. I worked a variety of places (including part-time at Virginia's Natural Tunnel State Park) before eventually spending the last few years of my career teaching geology at The University of Virginia's College at Wise, a small college in the southwest corner of Virginia. In 2011, a friend got me involved in volunteering as a park interpreter at Grand Teton National Park. It was in doing these that I came to a true appreciation of my ECU education. I modeled my class field trips on those I had taken as an undergraduate. One of my trips even included many of the same stops I had made as a student in Dr. Stan Riggs' oceanography class. I've tried to emphasize practical exercises in my classes, because those I had as a student taught me how to look at a problem from many directions. I had professors at ECU that could explain geologic concepts clearly and well. I use similar techniques when talking to the public.

Another thing I didn't appreciate as much during my time as a student but have come to value, is a broad-based geologic education. When I was in college, I sometimes wondered why I had to take courses in so many different areas in geology. I knew what I liked and didn't see why I should spend a lot of time learning things I figured I'd never need. It turned out my parents were right- you don't always know what skills or knowledge you'll need in later years. My career shifted largely to environmental work while working at the college, and the need to teach outside my area of expertise. My work with parks requires versatility in a broad range of geologic and environmental topics. Exposure to a wide range of geologic fields as an undergraduate has, I feel, given me the flexibility to shift focus as needed, and the framework to pick up new knowledge quickly. In today's climate (ahem...) anyone planning a career in geology should plan on change... it will pay to be versatile.

I'm planning to head back to Glacier this coming summer, where I'll have the chance to continue a career in which the ECU Geology Department has had such a large role. Should anyone be out that way, feel free to look me up. I usually work at the St Mary or Logan Pass Visitor Centers.

(Bob VanGundy initiated and funds the VanGundy field course scholarship— SJC)

Then and Now: Recent Alumni

Then and Now: A Very Short Summary of a Pretty Long Journey

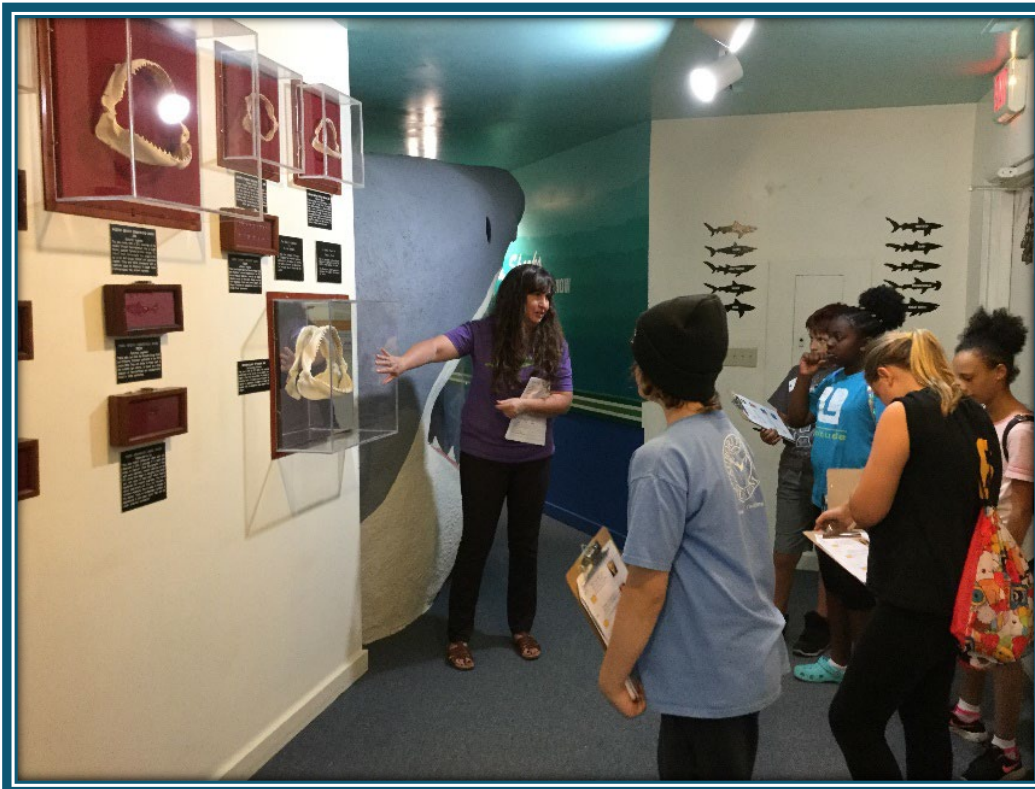
Cynthia Crane

Growing up in central Ohio, I was always interested in the natural world. A plus for this curiosity was the long history of miners, explorers, educators, and volunteers that created my lineage's fabric. I have fond memories of my late uncle and the mega-machine, Big Muskie. My maternal grandfather was a mining engineer for a local cement company, and my paternal grandfather also worked in the mine. My parents fostered and supported my love of the outdoors through camping trips, visiting state and national parks, traveling, and spending every Sunday afternoon at my maternal grandparent's farm. Programs like the Girl Scouts and Junior Rangers were activities that further honed my love of nature, and from a very young age, I collected rocks and fossils from various places I visited.

Fast forward to my transition from Coastal Carolina Community College to East Carolina University (Fall 2005). Initially, I planned to continue my studies in Computer Sciences as my AAS degrees are in Computer Programming and Internet Technologies. As a nontraditional college student, raising two sons as a single mother and working while pursuing my degrees, it was not at all easy. The first class I enrolled in at ECU was *Earth and Life Through Time* with Dr. Steve Culver. Even though I was taking on even more with the transition to a major university, I felt that I would be fine if I took that class. If you ask Dr. Culver, I was "one of those students." You know, the student who was first in the classroom, one of the last to leave, and the one who would "ruin the curve." Working for the Department of Geological Sciences as a Technology Assistant under the Federal Work-Study Program, I enjoyed interacting with department staff, professors, and students. I liked the environment so much that I decided to change my major to Geology.

From that point on, I felt like I had found my "second family." The inclusive, nurturing environment that defines the Department of Geological Sciences was a key component of my success as a BS Geology and MS Geology graduate of East Carolina University. Those of you reading this know what I mean when I say that there are unique characteristics of geologists who attain their degree at East Carolina University. I am fortunate to be cut from that mold.

After graduation (December 2011), I worked as a Geologist I for the North Carolina Geological Survey. During my 18-months at the NCGS, I utilized knowledge and skills from my degrees to assist with the State Map Project and develop a high-resolution core photography method. From July 2015 to today, I am the Executive Director of the Aurora Fossil Museum Foundation, Inc. in Aurora, North Carolina. This position has allowed me to reconnect and work with colleagues at ECU and fellow alumni on various STEM-related outreach and educational initiatives. I also teach an occasional course as part-time faculty (lecturer) in the Department of Geological Sciences. My professional career came full circle when I had the opportunity to teach *Earth and Life Through Time* at East Carolina University. Looking back over the past ten years, I am proud of my path and am fortunate to have had the opportunity to learn from some of the best geologists in the world.



Cindy Crane teaching school children in the Aurora Fossil Museum

Then and Now: Took a Chance on Geology and it Panned Out.

John DeLoatch

I came into East Carolina University (ECU) in 2003 with no idea of what I wanted to do with my career except to have a job where I could be outdoors. The thought of sitting behind a desk for eight hours a day did not sound too appealing. After a couple of years of kicking around different ideas of what major to choose I decided to take a geology course. I had never had any exposure to geology but had heard that it was very interesting and could land me a job outdoors. The first day of Dr. Neal's Earth and Life Through Time class, taught at 8 am, he asked each student their intended major. I told him I was undecided but was thinking about Geology. The next day of class he met me with a smile. He informed me that I was now a Geology major and he would be my advisor. I was a little caught off guard but I went with it. I thought why not...I wasn't having any luck deciding on my own.

I found all the entry level geology courses very interesting but was not completely sure what I was getting myself into and how I would find employment after college. Toward the end of my undergraduate studies, I met Dr. O'Driscoll. He got me involved with some of his field research in the Greenville area sampling groundwater, installing monitoring wells, and even running the Geoprobe. It was then that I really understood what a career in geology might look like and realized that it was not all just about rocks and minerals. As I was approaching graduation Dr. O'Driscoll approached me about graduate school. It seemed like a great opportunity. I took him up on his offer and that turned out to be one of the best decisions I have ever made.



Graduate school came easier to me than my undergraduate studies, I think simply because I could see where I was headed with my career. I especially enjoyed the environmental-related courses and was beginning to understand how all the geologic principles were intertwined and that all the curriculum that was taught to me in undergraduate was important, some of which I probably took for granted. Graduate school exposed me to so much from managing data, public speaking, and even writing. Those skills acquired through the ECU Geology department have proven to be priceless as I have continued my career in geology.

After completing graduate school, I thought sure I would focus my career in environmental geology. My first job was with a local municipality managing water and wastewater for the Town of Conway, NC which happened to be my home-town. I decided to move on from that job to the NCDOT where I took a position as an engineering geologist completing geotechnical projects in every county east of I-95 in North Carolina. That was an awesome job. I worked on a drill rig everyday completing relatively deep geotechnical borings through all the Cretaceous aquifers and confining units that I had learned about in hydrogeology. From the NCDOT I took a position with Iluka Resources, a mineral sand mining company in Southeast Virginia. At Iluka I had the opportunity to meet and work with so many great professionals many of which were former ECU Geology graduates. It was those connections that really landed me where I am today.

I now own and manage Geo Solutions Ltd., a geological consulting firm based out of North Carolina which specializes in shallow subsurface geophysics. We mostly work with other consulting firms providing geophysical evaluations to augment their environmental, geotechnical, engineering, water resources development, and construction projects. In this job, I am involved with a real variety of geological projects which I have found is really the best place for me to be. Geology is such a broad science and without the diverse training through the ECU geology department, there is no way I would be prepared for this role.

Looking back to 2003 when I started ECU, I could not have envisioned that I would be where I am today in my career. I cannot imagine what I would be doing today if I had not stumbled into Dr. Neal's class but, I know that it would not be as much fun or rewarding as a career in geology. For the most part I still meet my personal prerequisite for a career, I'm outdoors for most of my work. I have found that as you progress into a career in geology it is inevitable that you spend more time in the office than you want but, I think it's important that we remember that good geologists belong in the field.

Then and Now: Path of a Coastal Geologist

Alisha Ellis

As a coastal geologist at the USGS, I must say, some days I am surprised that this is where I find myself. As an undergraduate, I changed my major six times, including in, out, and back into geology. I took my first geology course to fulfill the undergraduate science hours requirement despite not even knowing what geology meant (I grew up with the term Earth Science in school). I enjoyed the classes and after changing my major, received support from my family who thought a degree in geology would be a safe bet for getting a job after college.

During undergrad, I had a hard time picturing what type of work a geologist did since the courses covered such a large spectrum of material. I suppose I pictured myself working with engineers, ecologists, and environmental policy makers on job sites like construction sites or parklands but without any clear context of what that meant or what I would be doing on an hourly or daily basis.

I started working for Dr. Culver in the micropaleontology lab during the summer of 2010 following field course and found myself applying for the Master's program that fall despite never previously considering graduate school - I had been so preoccupied with the present that I forgot to create a future-plan for myself.



Alisha Ellis installing field instrumentation.

Anyways, I made the cut and started working on my Master's in Geology in 2011. While teaching and assisting with a variety of geology labs, I started picturing myself becoming a professor and teaching at a small college. However, as time went on, I started to realize that I didn't want to spend that much more time in school, working towards a PhD, and resigned myself to looking for work after graduating.

After many unanswered applications and failed interviews (primarily due to my lack of GIS experience, which at the time was zero and now I highly recommend taking!), I was finally put in touch with a research geologist who had also gone to ECU (and had met at a conference during graduate school). Meeting him turned into the job opportunity I had been waiting for, a mix of field and lab work, at an office based in Florida. The process of applying and starting was slow and confusing (welcome to working for the government!) but all worked out well.

As I approach eight years at the USGS office in St. Petersburg, FL, I can say my job has evolved quite a bit. It has morphed from a lab technician and field assistant to a field lead that spends time training new workgroup members on field sample collection, sample and task management, maintaining field equipment and sensors, working with lab equipment I'd never heard of before starting at USGS, publishing data, and analyzing datasets for presentations and publications.

Of all the things I thought I would be doing when I started out in the program, I cannot say that I expected to be where I am today, but I am glad I ended up here. There are still many things I'd like to dig into more from GIS, to coding for modeling, to geological sample archive and curation, and other branches of paleontology, but I'll see where my current path takes me for now. After all, the scope of my work has changed every year so far, and I don't expect that to stop anytime soon.

Then and Now: From Student to Teacher

Jessica Kegel Hoy

I took my first geology class at ECU as an elective in spring 2010 and was hooked from the start. I was intrigued not just by the variety of topics there are to study in geology but by the variety of jobs that were available after graduating. At the time I had no idea exactly what I wanted to do with a degree in geology but it was exciting just to be in the program. During my undergraduate program I worked part time teaching at a local after-school program, which was my second love. I graduated with my B.S. in 2013 but was still feeling uncertain about what I wanted to do. I didn't have to debate long though as I had the opportunity to jump right into the M.S. program at ECU. Going into the program I knew I would be working to gain experience that would only increase my job prospects.

My thesis work at ECU centered on a sea level reconstruction of eastern North Carolina, using salt marsh foraminifera, spanning the last ~2,200 years. After graduation in 2015, the department offered me the opportunity to teach a few sections of Dynamic Earth and Oceanography as an adjunct faculty member. During this time, I was able to continue the work on my thesis project and I was second author on an article published in the journal *Quaternary Science Reviews*. After a few years teaching at ECU and a local community college, I accepted a position teaching geology at Aims Community College in Greeley, Colorado. After eight years in North Carolina, it was time for a cross county move.

My experiences at ECU have allowed me to spend the last six years of my life combining my two passions, geology and teaching. However, in 2020 the pandemic really shook things up. With teaching on hold, I reconnected with a fellow ECU graduate on the east coast. In the summer of 2021 I accepted a new position as a staff scientist at an environmental consulting firm. Happily back in the field, my new career allows me to use the experiences I've gained both in research and teaching in a new and exciting way.

Without the faculty-student relationships and culture that is cultivated by the geology department at ECU, I would not be where I am today. Now, my career focuses on the environment and helping local companies. I am so excited to see where my new path takes me!

*Jess Kegel Hoy
teaching summer
Field Course in
2019.*



Then and Now: Five Years Into a Career, Many More To Go

Haley Martin

Like many students who go to university, I went to school with one career path in mind and left with one that was completely different. As an intended nursing major, my friends and family were surprised when I switched my major to geology. Not surprisingly, the most common question received after the change was, “What can you do with a degree in geology?”. At the time, I did not have an answer.

As a typical undergraduate geology student, I was obsessed with rocks, loved weekend field trips, and just wanted to pass sedimentology. Professors and guest speakers suggested careers in the petroleum industry, environmental consulting, the US Geological Survey, and teaching to name a few. At the conclusion of my time as an undergraduate student, my career path was still to be determined, but knew I needed a Master’s degree.

I was given the opportunity of a lifetime to undertake my graduate field work with Dr. Culver in Malaysia. After our return to ECU and during my time as a graduate student, I realized that the sense of pride and ownership the graduate program affords would be a motivating factor in my future career.

After graduating, I secured a field geologist position with an environmental consulting firm. As a field geologist, I learned sampling techniques, how to interpret analytical data, and technical writing skills. I am now a project geologist at an environmental consulting firm out of Charlotte. I assist project managers and commercial real estate developers evaluate, assess, and manage risk for potentially impacted properties. We help clients navigate through regulatory programs, provide remedial solutions, and assist with implementing engineering and institutional controls to allow for safe redevelopment of contaminated sites.

Environmental consulting is fast-paced, diverse, and constantly evolving. With new and emerging contaminants, there is not a day that goes by that I do not learn something new from my teammates or the industry. A career in geology led me to an exciting and motivating workplace with diverse projects that are changing the landscape of the Charlotte area.



Then and Now: Not Expected, but Grateful it Happened

Bailey Donovan

People struggle in college to find a major that they can be truly content with. Some know what they want to do with their lives as children and follow through into adulthood (although I have yet to meet this kind of person), and some will change majors as if it is a hobby to do so. I was the latter.

I was a student with anxiety issues (who doesn't have those nowadays?) and wanted to fade into the background and just get through college at Western Carolina University (WCU). The problem was finding a major where I could fade into the background and the university could just mail me my degree and I could find a job from home and be content. This was, of course, unrealistic. It did not stop me from switching majors until I exhausted all my liberal studies courses and had to settle on a final major - Geology.

The one thing that stood out from the other majors was a sense of camaraderie between all the students, and the faculty were easy to talk to. The biggest issue for me though, was the number of field trips. This was the opposite of what I wanted out of a career at this point; to spend so much time outdoors with people. As it turned out, I had some of the best times in the field with my peers and today that is one of the best aspects of geology. Going from WCU to East Carolina University (ECU) for my Master of Science degree proved that the strong community aspect did not change in geology, regardless of location or a different group of people.

One of my biggest fears was social anxiety and being out in public and being a geologist has helped me realize over time that I was missing out on so much. This career has taken me to do research all over the United States, the Bahamas, Malaysia, and even took me out to teach study abroad students in Italy. I now teach at ECU and WCU and look fondly at the irony that my job has me traveling and speaking in front of crowds almost daily. I am grateful that the geology community has shaped me into the person I am today, even though my younger self would tremble at the thought of public speaking!



Bailey Donovan with Italian valleys in the background.

Then and Now: Curiosity to Career

Mike Twarog

I graduated from East Carolina University in 2018 with a Master's Degree in Geology. I worked under Dr. Culver, Dr. Mallinson, and Dr. Leorri, studying the environmental response to late Pleistocene and Holocene sea-level rise on the Sunda Shelf, South China Sea. I suppose my story in Geology begins like that of many scientists, with the inquisitive mind of a young child. I grew up in a very rural part of Eastern North Carolina, surrounded by farmland, pine forests, marshland, and a rock quarry. My childhood was spent exploring my surroundings, scraping up my legs running through the briar patches in the forests surrounding the nearby quarry (on the appropriate side of the chain-link perimeter of the quarry, of course), and researching all the interesting things I would find in the woods. I fostered a deep love for nature and became passionate about our environment's protection as I watched the quarry continue to encroach on the forests I so deeply loved.

It wasn't until I was sixteen that I even heard of a career in Geology. I was looking to gain some college credits while I was in high school, and enrolled in an introductory geology course at the nearby community college. As I heard the teacher, another ECU Graduate, speak of all the possible careers for a young geoscientist, I was hooked! I felt like I found a marketable career that would allow me to spend time outside. After a few years, I progressed through the Geological Sciences program at ECU, ultimately writing an Honor's Thesis for Dr. Culver focusing on the foraminiferal assemblages of Bogue Inlet, NC. For reasons still unknown, Dr. Culver decided he was satisfied with my performance and invited me to accompany him on a trip to Kuala Terengganu, Malaysia to further my career in Geology. This trip resulted in my graduate research project.



*Mike Twarog on
the job - 2021*

Towards the summer of 2018, I realized that my tenure in the Geology Program was going to end and my student loans were not going to pay for themselves. I applied for every job that I thought I was even remotely qualified for. I knew I wanted to work in Geology, but I had yet to select a real career path. I continued applying until ultimately landing a position as a Maritime Geologist in Frederick, Maryland. I was incredibly excited to begin a career that I spent five years working towards. But unfortunately, I found myself trapped in an office building - a far cry from my deep love for tramping around forests, beaches, and mountains. I suppose I imagined my career in Geology being more exciting. Ultimately I found myself once again looking for jobs.

Moving forward to 2019, I thought I found my dream position, working for an Environmental consulting company as a staff scientist. I was looking forward to a healthy work/life balance, splitting my time between office and fieldwork, and learning more about Geology as a whole. Oh was I surprised when the long hours, hard work, stress, and extensive hotel stays became my regular life! Ultimately, I realized that I was never going to have the time to pursue what was right for myself, careerwise, while I was working myself to the bone and I resigned in the spring of 2021. For the past few months, I've been taking a breath of fresh air splitting my time between working for an outdoor retailer and reinvigorating my personal life, and I took the time to get married!

I have no regrets and if I was to boil down my experiences to a few sentences it would be this. Young people should absolutely pursue the things they are passionate about. Don't be afraid to make mistakes - a career path does not have to be a linear thing. Learn to ask the right questions in a job interview, consider the actual type of life you want to live (don't just think of what might be "good" for a career), and finally, take rejection in stride. Life is a long ride and sometimes, it's going to be a bit bumpy! Moving forward, I'm taking the time to enjoy life and thinking to the future about what my career in Geology is going to look like. I started in Geology because of my love for nature and this is very much still alive. Now I am looking to pursue my passions and make my geological knowledge work in tandem!

Then and Now: Current Students

Then and Now

Shannon Brink

When I started studying geology, I had no idea where it would take me. Initially, I was taking classes only because I enjoyed them, then I got involved in a research experience for undergraduates and traveled to the University of Texas at El Paso where I spent the summer immersed in field work and wonder as I completed my first research project. After that, I took on geology as my major and transferred from the community college I had been attending to a school better suited for my new interest. I began attending classes at the University of Wisconsin Oshkosh with the goal of exploring as many facets of geological studies as I could to allow myself to find the one that was most

inspiring. I worked on research projects in igneous petrology, metamorphic petrology and paleontology, the latter of which excited me most and resulted in publication in an academic journal (*PeerJ*). I was interested in getting involved in hydrology, but the year that I gained interest was the same year that the hydrology professor took a leave of absence so I focused my attention elsewhere.

I didn't plan on attending graduate school, but was encouraged by my field camp professor to, "just apply," as I could always turn down the offer if I decided I didn't want to follow through, "at least this way you will have the opportunity," he encouraged me. I debated back and forth for months, and almost pursued a MS in biology working under my paleontology professor but ultimately decided to attend East Carolina University where I would focus on hydrology and water quality improvement. I am currently working on completing the requirements to earn my MS degree and for my Hydrology and Environment Certificate. My thesis research is focused on the assessment of performance of green water treatment technologies (denitrifying bioreactors). Where this experience and degree will take me, I won't know until I get there and I have learned better than to guess, but at this point, I would love to be heavily involved in field work and am interested in continuing to work on improving water quality. I've always been interested in helping underserved communities and if the opportunity to use my degree for something aligning with that interest arose, I would certainly jump on it!



Then and Now

Tess Johnson

I chose to become a geology major because I have always loved physical science and learning how the Earth works. I grew up and attended my undergraduate university in Southern Utah, this provided me many opportunities to experience geology throughout my life. I was surrounded by red rocks and mountains, within four hours of six geologically amazing national parks, and could see examples of geologic processes from my front door. Attending college in this geologically diverse setting gave me opportunities to develop a wide range of scientific interests and to explore them deeply. Living there sparked my passion for geology, research, and education and has pushed me to continue to learn more about the world we live in. My experience as a geology major as an undergraduate student helped me to expand this passion and the desire to share it with others. My professional goals lie in the field of education. I want to teach at the college level to help students develop a knowledge and appreciation for geology and geoscience. As a master's student at ECU, I feel I am gaining knowledge, skills and experience to be a qualified and effective educator.



Tess Johnson in the “mineral mountains”, near Milford, Utah

I went into geology because I wanted to be a teacher. Through my experiences in the field of geosciences, that desire has expanded to include secondary education as a high school teacher as well as higher education and teaching at a community college or small university. ECU allows me the opportunity to make those dreams happen and hopefully make a difference to the lives of young scientists.

Then and Now

Emma Owen

My love for geology started when I was just a toddler. You would often see me outside playing in the dirt and rocks only for my mom to call me inside and proceed to shake me down and search every single pocket I had for rocks. Another contributing factor to my fascination with rocks most likely stemmed from my Aunt Jeannie. Jeannie is a now retired geologist who worked for the government for many years. Every time I got the chance to visit her house she would show me her expansive rock collection from her many years as a geologist, and every single time I was just completely in awe of everything she showed me. In high school, my interests had shifted to astronomy and math and I was completely convinced I was going to major in applied mathematics or astrophysics. That was until I took an AP Environmental Science class. I absolutely loved everything I learned about in that class and it reignited my love and interest in the environment and earth sciences. I know for a fact that it was because of this class that I decided to major in geology.

Upon being accepted to ECU, I wasn't too keen on going here. That all changed when I toured the geology department with Dr. Culver. As soon as I walked through the department and was shown all the different activities that students get to do and work on, I was hooked. I immediately started to plan for my time at ECU. My introductory geology classes were very enjoyable and I loved to attend class. My second semester here was when the Covid-19 pandemic hit and we switched to online classes. It turned out to be quite a struggle for me to learn this way but still being able to learn about topics such as mineralogy, petrology, and oceanography was very enlightening.

ECU has offered me so many great opportunities and experiences. Being back on campus has been so much fun with being able to experience more hands-on work as compared to being online. Some fun opportunities I have been able to experience include going on field trips to places such as quarries and parks. My favorite geology class so far has been Field Methods with Dr. Horsman. All of the outdoor labs and being able to work in teams with classmates was such a fun experience and everything I learned in that class has been very useful. With everything I've learned and will learn at ECU, in the future I hope to have a career either working as a field researcher or for a company that works on improving the environment all around the world. My love and interest in geology has only grown and prospered through the time I've spent at ECU and I hope it continues to grow well down the road and into my future career.



Then and Now

Danielle Shackleford

During my second year at East Carolina University I decided to make a drastic change in my field of study. I chose geology. As a previous business accounting major, I took many financial business-based courses, but it all changed when I took GEOL 1500 and 1501 as a required science and lab credit. During that course, I enjoyed staying after class to examine each rock specimen identifying and familiarizing myself with the mineralogy and geologic processes that were represented by each sample. Petrology was very interesting to me.

Before COVID made my main geology classes online, most included field trips. I loved going into the field to collect and examine samples. For example, we took a couple of trips in GEOL 3050 and 3150 to different quarries throughout North Carolina. During these trips, we collected lots of samples of rocks and minerals. It was very intriguing using my hand lens and observing minerals as I did in GEOL 1501 but this time it was in the field.

I began a lab assistant job in the Physics Department during my third year. In this job, I worked with Dr. Dewitt in an Optical Stimulated Luminescence Lab assisting in density separation and slicing of rock samples. I had to cut samples of rocks from Antarctica precisely with a diamond cut saw. I enjoyed this type of work in a lab. At the beginning of my geology career, I always thought I would enjoy mostly fieldwork, but after working in a lab I realized I enjoy working in that setting more. After completing field course in the summer, I plan on looking for jobs or internships. I want to get work experience before going back to school. I plan on returning to East Carolina University in a year to work on my Masters.



*Danielle Shackleford
at Gardner Quarry,
Bunlevel, NC*

Then and Now

Stalin Rosero

My name is Stalin Alexander Rosero. Currently, I am a graduate student at East Carolina University. I come from Ecuador, a tiny country that has five morphotectonic regions: the Coastal region, the Western Cordillera, the Interandean depression, the Eastern Cordillera and the Oriente Basin. Ecuador is at a convergent margin where the Nazca Plate is subducting eastwards beneath the South American plate. Ecuador has both active and ancient volcanoes. Thus, I was amazed by the geomorphologic diversity of my country, and I became interested in studying geology. At the late stage of my undergraduate studies at University, I had the opportunity to study the Sofia fault which is located in the north of Ecuador at 3,000 m above sea level. I realized that I enjoyed studying the ductile and brittle fabrics of strike-slip shear zones.



Stalin Rosero in the field

Now, I look forward to doing research on different geoscience topics. For instance, geophysical methods are important to figure out underground structures and understand the tectonic development of a particular geologic setting. Magmatic fabrics are interesting features that could provide a geologist with insights of regional tectonics. My final goal is to study the structures of another planet with different analytical methods. After a semester at East Carolina University I realize the great opportunity to do research because the university has several crucial resources. I have enjoyed meeting and getting to know my colleagues and professors even during the disruptions caused by the pandemic.

Then and Now

Regan Styers

My journey within the geology realm started with my inherent curiosity about the physical world around me as an elementary, middle, and high school student. I asked myself and others questions like: Why are there mountains? How did they get so big, and why is the topography where I live so flat? Why are there tides? Why does the beach look different every time I walk out there?

I began my undergraduate studies at a community college studying biology with intentions of going into the medical field. I quickly concluded that I did not enjoy learning and looking at bacteria and viruses; and did not want anything to do with studying the human body so I reconsidered my interests. One thing led to another, and I enrolled into the geology program at ECU. Fresh into the program I had no idea what specific area of geology I wanted to study. I just knew I was fascinated with geological processes and had to learn more.

My first love in geology transpired during Mineralogy and Petrology I with Dr. Heimann. I enjoyed learning about how to identify minerals and how they formed and why. The field trip to Gold Rock Quarry inspired me, and I thought why not be an exploration geologist or mineralogist? Then, a year later I took paleontology with Dr. Culver and fell in love with the subject. I am still interested in paleontology; however, my current love is my sedimentology course with Dr. Rigsby. After field trips to the Tar River in Greenville, NC and Shackleford Banks, in Beaufort NC, I enjoyed making field observations to interpret processes in each depositional environment. The Shackleford Banks trip particularly interested me in coastal sedimentology and geology. My current goal is to finish my Bachelor's degree in Summer 2022 and apply for graduate school. In the coming months, I hope to narrow-down my interests and define a specific project to which I can focus my attention.



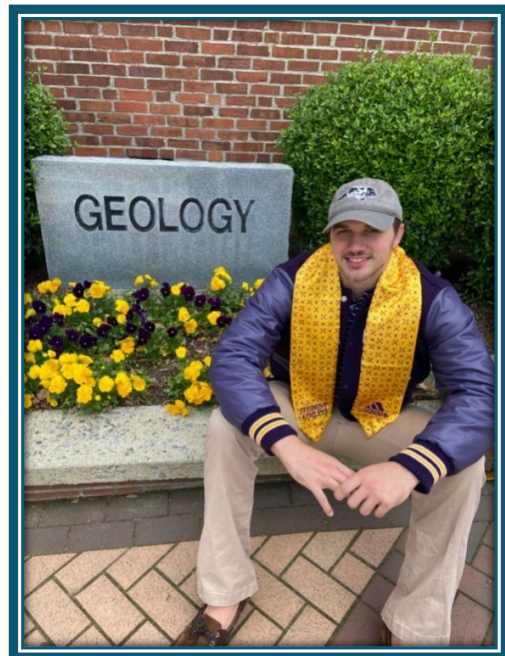
*Regan Styers at Wormsloe State
Historic Site, Savannah, Georgia*

Then and Now

Patrick Tomasic

The first geology course I took was oceanography in the spring semester of my first year of undergrad. I was in a different major at that time. Although I thought the class was exciting, I did not take many more geology courses. Over a year later, and unhappy with the major I was currently in, I decided to switch to geology. At first, I want to do something with coastal geology and oceanography. I then finished my undergrad with a concentration in coastal and marine geology. However, I had some other interests in sedimentology and economic geology.

While graduating during the pandemic and not attending field courses in person, I felt I had unfinished business with my education and wanted to return for the certificate program. While discussing with different professors, I was set on getting a master's in Geology. Instead, I found a passion for mineralogy, petrology, and geochemistry. Once done with my degree, I would like to pursue a career as an exploration geologist to find resources and reserves of economically essential industrial and critical minerals.



Patrick Tomasic in front of the Graham Building April 2019

Then and Now

Sherri Williams

I have always been a little torn between environmental and economic geology but saw them as polar opposite. I chose to pursue my bachelor's degree to work in the environmental field. I was interested in understanding the detrimental effect of discarded plastic in the environment with particular attention to microplastics. I chose this as my senior thesis project, microplastic deposition in coastal sediments. However, as my education progressed, I became intrigued in structural geology. I mean, rocks bend! And minerals change. And the coolest looking rocks are the deformed ones. Near the end of my junior year, I had the opportunity to tag along on a geologic mapping project in the eastern Piedmont of Georgia. I tagged along so often that I was able to do a second research project on a highly strained outcrop that we had located.



I am now, for my Master's thesis, working on a mapping and structural project, and have added geophysics to my interests. I do hope to work in these fields - perhaps remain in academia, work for a federal or state entity, or in exploration geology. However, I still have interest in environmental geology and that is why I chose to come to ECU for my graduate education...still a little of both worlds but not necessarily polar opposites. I think that I could be happy and content in either or any subdiscipline, as long as field work and geology are involved.

*Sherri J. Williams, Wake Stone –
Nash County aggregate quarry, NC*

New grants prepare students and communities for changing environments in eastern North Carolina

Stephen Moysey

Three new grants from the National Science Foundation have been awarded to faculty in Geological Sciences to create programs preparing students and communities to deal with environmental change in Eastern North Carolina (ENC):

- The WaterCorps project (\$350k) will prepare ECU undergraduate students to become leaders in our region's environmental workforce.
- The Coastal Community and Environmental Data Scholars NRT Traineeship (\$2M) will train graduate students in applied data science methods applied to real-world community problems.
- The Coastlines and People grant (\$5M) brings together seven universities to understand how communities can work together to address water-related problems in the Tar-Pamlico basin, with an emphasis on supporting community-based science to address environmental justice issues.

All three projects are led by Geological Sciences professor Stephen Moysey through ECU's Water Resources Center with faculty co-leaders from the Department including Eric Horsman and Sid Mitra.

Building the environmental workforce through WaterCorps

The WaterCorps project is striving to create a sustainable, student-based organization that would operate much like an environmental consulting company to meet the project needs of faculty, community, and organizational partners. Services provided will span technical activities, such as environmental water quality analysis and geophysical surveying, to the development of science communication materials and implementation of educational programs for partnering clients. The program will create structured pathways through successively more involved geoscience-related activities and leadership opportunities as students take on the role of intern, staff member, or project manager. The goal of these pathways is to allow students to explore and eventually commit to a professional identity related to the geosciences. Students will not only build technical skills, but also gain soft skills working with clients, managing teams, and implementing projects that will set them apart as they enter the workforce. The team is working with ECU's Miller School of Entrepreneurship to also help the WaterCorps students develop business skills, thus perhaps even encouraging future environmental startups to provide services and support the economy of our region!

Understanding change and opportunities for our region through data science

The Coastal Community and Environmental Data Scholars (or CCEDS) NRT Traineeship program is the first award that the University has ever received from the prestigious National Science Foundation Research Traineeship program. This grant will develop data science skills applied to real-world community problems in Eastern North Carolina. Some key elements of CCEDS include the establishment of a new graduate certificate program for applied data science, expansion of ECU's Engagement and Outreach Scholars Academy to graduate students, science communication training and funding for 18 PhD students, though the program is open to all graduate students at ECU including MS students in Geology! One of the most innovative aspects of the CCEDS Traineeship is that it will include a peer and faculty mentoring program that addresses imposter feelings that many students (and faculty) have when entering a new field, like data science. The program will help Trainees work confidently in a wide range of academic, community, and industry settings.



Dr. Stephen Moysey, Professor of Geology and Director of the ECU Water Resources Center

Adapting to climate change and addressing regional environmental justice challenges

Communities throughout ENC are grappling with how to adapt to our changing environment, but often lack the support and scientific resources needed to inform adaptation planning. We are therefore working to create a network of communities, support organizations, government agencies, and academics that will collaboratively advance adaptation planning at a regional scale through collaboration and community-based science. The project will advance both an improved understanding of environmental processes and risk as well as the socioeconomic and institutional barriers to enhancing resilience at a watershed scale. Community-based science projects will be used as a mechanism to identify and inform planning that is of most importance to community members, especially in lower-income and otherwise disadvantaged communities.

Awarded in the very first competition of NSF's Coastlines and People (CoPe) program, ECU is the lead institution on one of only three regional CoPe Hubs throughout the country. Along with Moysey, the core faculty of the Water Resources Center, i.e., Mike O'Driscoll (Coastal Studies), Natasha Bell (Engineering), Jacob Petersen-Perlman (Geography, Planning, and Environment), and John Hoben (Biology) will lead over 20 faculty from six other universities (UNC-Greensboro, NCCU, UVA, Clemson, Virginia Institute of Marine Science, and Manhattan College) in the project. The Hub is working to develop and implement programs that encourage the exchange of knowledge, experience, and data at a regional scale, including the expansion of monitoring capabilities through the Tar-Pamlico basin and creating linked watershed-estuary models to aid communities in understanding future change and risk.

These three interrelated projects create an exciting new opportunity for ECU to integrate education, research, and community outreach in a new and impactful way – particularly for the Department of Geological Sciences. Though geology programs have often emphasized the ability to work outdoors as an attractive feature of our discipline, recent research has suggested that students are more motivated by careers that provide an opportunity to give back to society. By building pathways for students to engage in real-world problems and contribute to their solutions, the WaterCorps, CCEDS, and CoPe projects present a strategic opportunity to ignite the interests of students in geology as a major.

To learn more about these new grants, check out the “Get Involved” section of the ECU Water Resources Center website at <https://water.ecu.edu/>. If you are interested in getting involved with mentoring WaterCorps students or getting involved with community science, please reach out to Dr. Moysey!



2021 Graduates

B.S. Graduates

Blake Butcher
Isaiah Cogdell
Robert Collier

Xavier Farmer
Lucas Fazzari

Michael Fountain
Robert Gerald

Jennifer Plaisted

Lindsay Sims

Eric Teabo

Sara Selby

M.S. Graduates

Laura deSousa
Whittney Spivey
Rachel Wheatley

Congrats Class of 2021!

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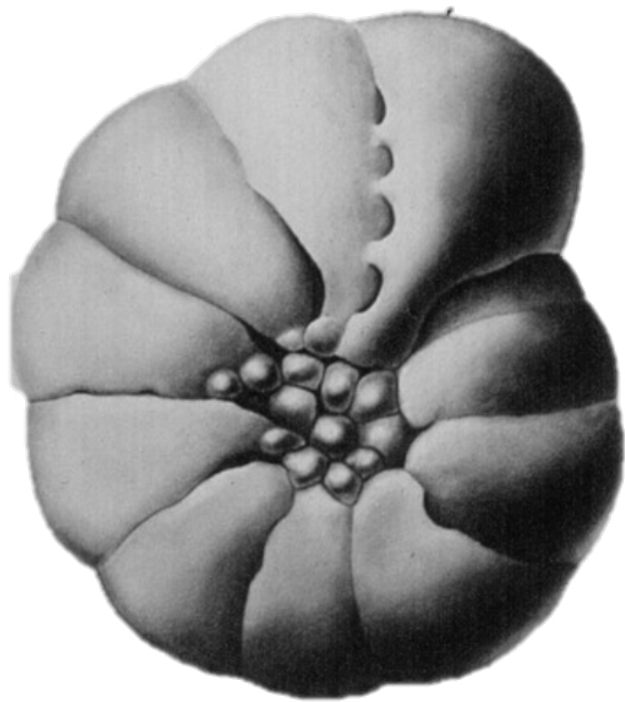
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Pencil sketch of the foraminifer Elphidium mexicanum by Larry Isham