



The School of Geosciences Newsletter

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Greetings from the Director



Greetings from the Interim Director and welcome to the 2018 School of Geosciences Newsletter! The past year has seen many exciting changes in the School of Geosciences, and many more appear to be on the horizon. Dr. Borrok left the School of Geosciences after a five-year term as the Director of the School to join the Missouri University of Science and Technology as the Chair of the Department of Geosciences and Geological and Petroleum Engineering.

As the first director of the newly formed School of Geosciences, Dr. Borrok was instrumental in establishing the functioning and main logistics of the school. Amongst his accomplishments are the hiring of a full-time research technician, Dr. Yingfeng Xu, the establishment of a second full-time instructor position filled by long-time adjunct Kristie Cornell, a much-needed remodeling of parts of Hamilton Hall, increased geochemical analytical capabilities, and significant fund-raising efforts. We wish him luck with his new position and in his future endeavors! Dr. Jenneke Visser announced her retirement at the end of the Fall 2018 Semester. Dr. Visser has been with the

University for 15 years. She is a highly successful researcher and instructor and her presence and expertise will be dearly missed in the Environmental Science Program. We are also grateful to Elisabeth Boudreaux, who taught many classes for us in the past 10 years and left us at the end of the Spring 2017 semester. She was a highly effective and well-liked instructor and we wish her all the best for the future. We are conducting searches to replace Drs. Borrok and Visser, and to hire a permanent replacement for Dr. Brian Lock, who retired over two years ago. We are currently supported by two visiting Assistant Professors, Drs. Tara Jonell and Jonothan Rotzien, who are filling the voids, together with Dr. Brian Lock, who is still teaching essential sedimentology classes for us as Professor Emeritus.

We are excited about our newly established M.S. program in Environmental Resource Science. The program started in the Fall of 2017 and has already nine students enrolled. On the geology side, enrollment in both the B.S. and M.S. programs has still been strong in 2017 despite the continued downturn of the petroleum industry. Although we have seen a drop in enrollment lately, we are confident that 2018 will be a better year! Fundamental to the success of our programs and our students is the support from our alumni and friends. Our students benefit tremendously through interactions with our alumni, so please stay in contact with us and help us support our university.

I also bring you the sad news of Adir Goncalves' passing. Adir was an international geology student from Angola who passed away during a holiday vacation to his home country. He will be greatly missed.

Please stay in touch and don't hesitate to stop by in Hamilton Hall and see us whenever you are in Lafayette. Best wishes for a happy and fulfilling 2018!

Sincerely,

Carl Richter

Faculty and Instructor Updates

Katie Costigan



2017 was full of professional and personal growth for me in my third year at UL Lafayette. Professional travel took me to San Marcos, TX and New Orleans, LA (twice) while personal travel took me home to Rhode Island and on vacation to Hot Springs, AR.

I had a major breakthrough this year securing NSF funding as the PI for a Research Experience for Undergrads (REU) site. The REU provides ten students each summer the opportunity to participate in on-going

research at UL Lafayette on topics in watershed and coastal processes and resources of southern Louisiana. I am looking forward to this upcoming summer when we officially kick-off the program.

I continue to teach a variety of classes. I developed another two courses in 2017—a graduate-level fluvial geomorphology course and GIS II. In the summer of 2017 I also took UL Lafayette's training for becoming an online instructor and look forward to using those skills soon. My first graduate student successfully defended her thesis and graduated this year. I have a few more students wrapping up this spring and am always looking for bright, field-oriented students.

My husband, Joel, and I bought our first home this past year in Abbeville. I regularly consult Jim Foret for advice about our yard and garden—from dealing with broken pecan trees to frozen lemon trees. Jim is a great friend and resource, and we are very lucky to have him!

Aubrey Hillman

It's been a busy year in the Hillman sedimentology lab! In June we got some great news that our NSF proposal "Quantifying Human Forcing of Legacy Sediment and Metal Contamination Dynamics on the Yunnan Plateau of Southwestern China" was funded through the Geomorphology and Land Use Dynamics program. In conjunction with our collaborators at the University of Pittsburgh, we will be reconstructing historical metal contamination in lake environments to differentiate between sources. We will also be reconstructing lake levels through the last 3000 years to understand how climate variation impacts sediment remobilization. We hope this research will go a long way towards managing contaminated soils and sustaining agricultural productivity. This June we will be traveling to China to conduct fieldwork. The sediment that we return with will hopefully comprise many MS theses for the future.

In July and August, Dr. Hillman conducted fieldwork in northern Peru with collaborator Dr. Ben

Vining of the Anthropology department at the University of Arkansas. Several meters of sediment from two lakes were collected and will be analyzed to reconstruct Holocene climate variability (specifically precipitation and glacial mass balance) and link these changes to anthropological settlement. More fieldwork is planned for this summer.

Lastly, Dr. Hillman and graduate student Scott St. Romain continue to collect sediment from lakes in Southwestern Louisiana. It's nice to have field sites that are close to home for once! Scott will be measuring trace metal concentrations in these lakes over the last several hundred years to determine what are "natural" background levels and what are elevated levels from industrial activity. Future work will be to determine if these lakes can also produce records of past nutrient loading. As always, it's a busy time in the lab and in the field with these three main projects, but the research is exciting!

Jennifer Hargrave

The past year was filled with teaching, learning, outreach, and service. I taught several courses for the second (or third) time, as well as a few for the first time. I am currently teaching three new courses, Dinosaurs (a full class at 200 students!), Invertebrate Paleontology, and I am piloting a completely online version of the general education course, Geology and Man. There is a lot of interest in this online course, and we are hopeful this will be a successful endeavor. Prior to developing and teaching this online course, I completed 12 weeks of online and course design training. I am now recognized as a ULearn Certified Course Designer.

This past Fall, my first graduate student, Mark Roth, defended and graduated with his Master's degree. I am serving as the major advisor for two current students who plan to defend this summer, and as a committee member for several others. The topics are all quite diverse, including a lithostratigraphic study of fossil localities within a basin, descriptions of fossil fish, core description and interpretation, as well as characterizing "sweet spots" from outcrop, which is exciting to be a part of.

I undertook much community, university, and professional service over the past year. I visited local elementary schools to talk about rocks and fossils. One of my favorite responses was from a young girl named Autumn: "Thank you for helping me learn more about fossils, and now I might become a paleontologist"! I am the current Lafayette Geological Society president and had the opportunity to attend GCAGS in San Antonio this November on behalf of the Society. It was a great opportunity to network and learn more about Gulf Coast geology.

Finally, much time was spent at the UL Lafayette Geology Museum, including supervising volunteer students, prep work on the previously collected fossil specimens, and the development of a new energy exhibit. But I'll save the details on this for the UL Lafayette Geology Museum update.



Graduate student Kristin Ball is describing a stratigraphic section from the Fort Rock Basin, Oregon, this past May. This is one of several sections from her thesis work.

Kristie Cornell

After fourteen years of teaching in the department, I am happy to say that my Instructor position has finally been made permanent! I have been teaching a variety of courses, including Geology & Man, Historical Geology, Computer Applications in Geology, Invertebrate Paleontology, Micropaleontology, and Field Methods. I have also had the pleasure of assisting Dr. Duex and Dr. Gottardi in teaching Field Camp. In addition to teaching these classes, I have also been serving as an

undergraduate academic adviser for about a third of our Geology majors.

Outside of school, I have continued to pursue photography and travel as much as possible. Over the past several years, I have had the opportunity to visit such far-flung places such as Spain, Iceland, the Faroe Islands, and Namibia. When I'm not wandering the globe, I can generally be found enjoying the outdoors with my new dog, a Catahoula mix named Harper Lee.



Tim Duex

So, more and more lately, when I run into old friends and alums they look at me rather incredulously and say "are you still working?" I don't hesitate more than a minute or two and look right back at them and say "no, but I'm still teaching." I must be getting old or something, my memory and other things start to fade. I used to be young(er) and semi-energetic; what happened? I guess things change with time. But I'm still teaching, did I mention that? Same basic courses as before, even made it through field camp last summer with maybe more than just a little help from Kristie and Raphael. And TA's. And students. And Ms Pauline. And Ms Nadean. Not to mention (most importantly) my better half, chief caretaker, protector and guardian angel, Cathie. Field camp next year? Does a bear (redacted)? If, like now, I'm still teaching.

Actually things are going pretty well. As many of you may recall I was hired at U(S)L as a "hardrock" person and after only 30 some years I've already had my third grad student finish a thesis on igneous rocks, in this case the Sierra Quemada (Caldera) in Big Bend National

Park, Texas. Although not supported by reliable scientific data, other than my own opinion, it's quite possible, maybe even probable, that I could be one of the top ten volcanologists in southwest Louisiana. But I'm still teaching, in case you hadn't heard. I've also had a couple students who finished interesting theses on hydrologic studies, with the help of alum Steve Sinitiere at Kourco, who, like me, is still teaching for us.

Again, as some may remember, I started offering Hydrology and Environmental Geology not long after I got here, and those were probably the first courses at this university that used the "E" word in their content. Now everybody and their uncles have stolen the topic and, like yours truly, are still teaching Environmental studies. Even though they don't ever use the word "rock", they call it science; everything is "soil" as in "soil borings", even if it is 50 feet deep or more. Hmmp. That is indeed quite a bit of boring material. Hope all is well with all of you. Stop by some time (when I'm not teaching) and we can visit.

Jim Foret & Mark Simon Oaks

The UL Lafayette Cade Farm “100 Oak” beautification project was completed on February 20, 2018. The goal was to plant 100 live oak trees over a period of 10 years along the main corridor at the 600-acre UL Lafayette property near Cade, Louisiana. The Renewable Resources Department (present-day Environmental Sciences) initiated the task of planting oak trees in an effort to usher in the next century of majestic live oaks at the University. Soon after the University Centennial celebration in 2000, the concept of beautification at the “Cade Farm” campus was adopted.

Mr. Jim Foret (Instructor) and Mr. Mark Simon (Manager) are the current caretakers of the 100 oak project. Jim, Mark, and various staff, students, and volunteers began planting and caring for the oak trees in December 2005. Twelve years later, the project has been completed and the 100th oak has been planted. The 100 Oaks are strategically placed along the main corridor of W J Bernard Road, St. Martinville, as a majestic footprint outlining the unique landscape that is the UL Lafayette Cade Farm.

The vision and past leadership efforts of Dr. Edwin L. Stephens in 1901, Dr. James A. Foret in 1952, Dr. Ray P. Authement in 1978-2008, and others, at planting Live Oaks throughout the campus properties over the span of 100 years is carried on into the next century, and beyond, by the completion of this Foret / Simon beautification project. Many thanks for their dedication, vision, and perseverance in making the University of Louisiana at Lafayette a truly beautiful campus.



Jim Foret and Mark Simon pictured planting the 100th oak tree at the UL Lafayette Cade Farm on February 20, 2018.

Raphaël Gottardi

2017 has been a busy and exciting year in the Structural Geology and Tectonics research group. I had the pleasure to kick off the year by teaching our winter fieldcamp with Dr. Duex and Ms. Kristie Cornell. It didn't snow this winter in Big Bend, which was a nice change! Helped by two undergraduate students (Michael Mahley and Ryan Leonards), I took this opportunity to investigate the mechanical stratigraphy of the Boquillas Formation. During the Spring, graduate student Ashley Filkins won best poster award by presenting her research on the Miss Lime at the South Central GSA meeting in San Antonio.

I was lucky to receive a research grant from GCAGS, to investigate the natural fracture system of the Austin Chalk/Eagle Ford Formation. Graduate student Madison Miller was also the recipient of a research grant to explore migration pathways in the Austin Chalk/Eagle Ford combined petroleum system. To complete this research, graduate student Victoria Chevrot, Madison Miller and I performed some fieldwork along highway US 90, west of Del Rio during the lovely Texan summer.

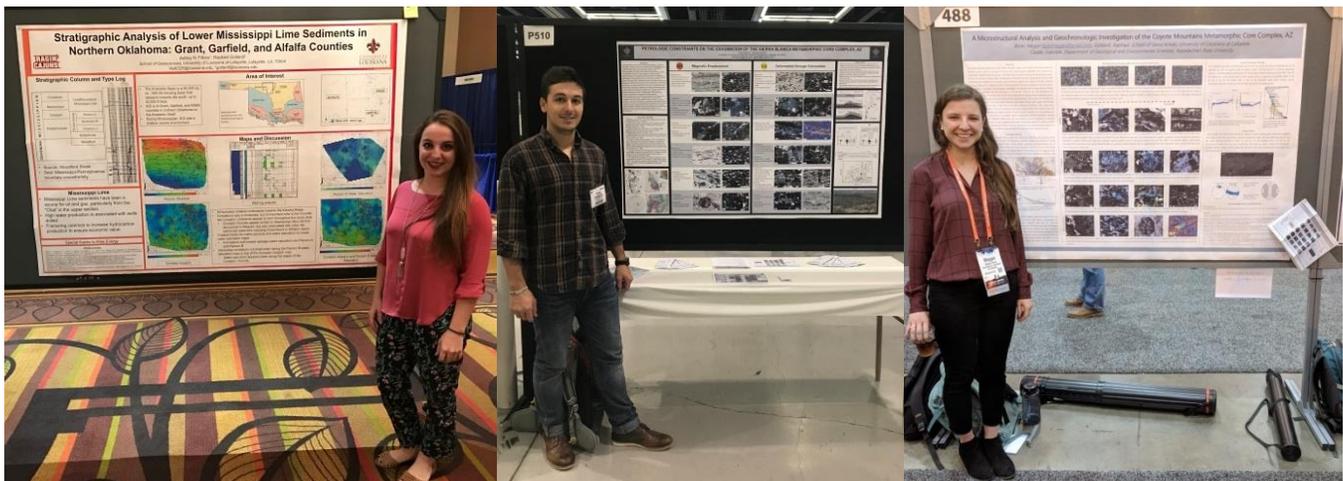
In the fall, graduate student Megan Borel, Kohl Koppens, and myself went to the GSA conference in Seattle, where we presented our ongoing research on metamorphic core complexes. I had the pleasure to see three MS students graduate last fall, Logan Adams (Stranded Oil), Ashley Filkins (Chesapeake Energy), Eric Wang (Halliburton), and recently learned that Megan Borel will pursue a PhD at the University of Florida!



Undergraduate students Michael Mahley and Ryan Leonards study fracture patterns in a pavement of the Boquillas Formation, Big Bend National Park



Victoria Chevrot investigates the sequence stratigraphy of the Eagle Ford Formation along US highway 90, near Langtry, Texas.



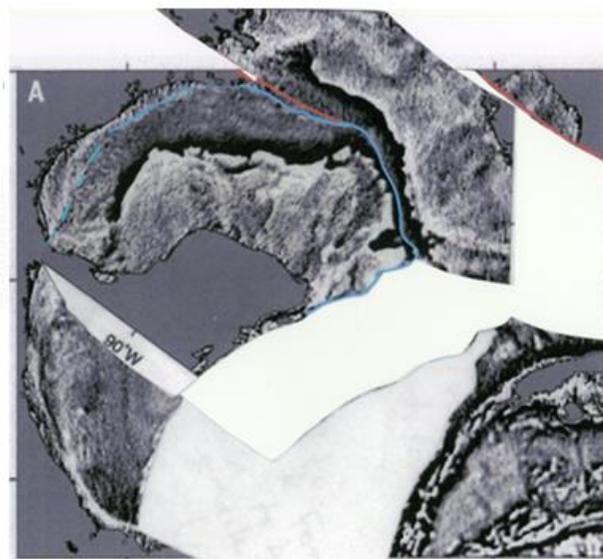
MS student Ashley Filkins (left) presenting her research on the Miss Lime at the South Central GSA meeting in San Antonio. MS students Kohl Koppens (center), and Megan Borel (right) presenting their research on metamorphic core complexes at the GSA annual meeting in Seattle.

Gary Kinsland

The past couple of years I have been involved in several research projects. Two are particularly interesting to the broader geological community. First, Justiss Oil Company gave me access to a core from LaSalle Parish, which starts in the Midway Shale, crosses the K/PG, includes the KPBD (Cretaceous-Paleogene Boundary Deposit...40 feet thick mass transport deposit) and bottoms in the Upper Cretaceous chalk. Several students and I have been investigating the 120 foot core (visual description, thin sections, ratio of 10% HCl soluble to insoluble, XRF and XRD) and correlating the data achieved to the effects (earthquake, tsunami and “fall back”) of the Chicxulub Impact. The figure below includes about 1 cm of the overlying Midway Shale and several centimeters of the uppermost Cretaceous.



Second, I have been presenting my arm-waving arguments to explain the opening of the northern part of the Gulf of Mexico. Many of you remember my “fault across the country.” The southeastern end of this may be related to opening of the Gulf while the rest of it to the northwest may be complete fantasy. I presented a poster at the AGU in New Orleans in December and a talk at the South Central GSA meeting in Little Rock this spring. In each case my ideas received a number of positive comments... my mechanisms, data and presentations may actually be beginning to make sense to others who are interested in the northern Gulf. The figure below is one which shows how I think the Yucatan Peninsula may have fit next to the Texas coast before the whole of the northern Gulf area, including the Yucatan, slid southeast by thin skinned faulting.



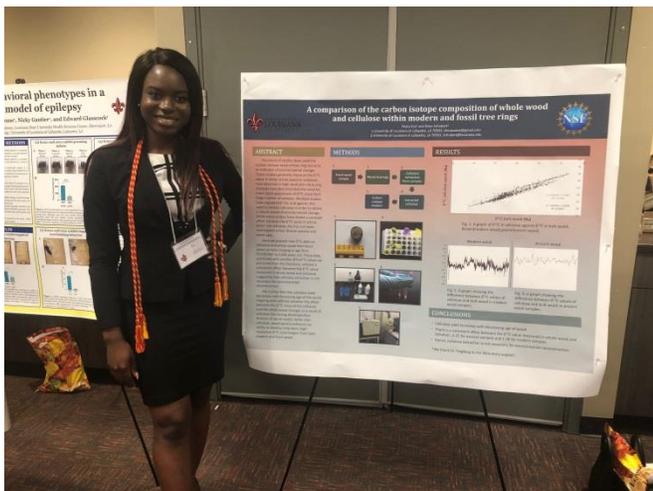
Brian Schubert

The big news from the lab this year is the graduation of six MS students from the lab! Taylor Chapman, Collin Moore, Steve Nevitt, Rose Telus, Leslie Valentine, and Umatu Orike Wosu all completed their theses and graduated in 2017. Additionally, Peace Eze, who worked as an undergraduate researcher in the lab for most of 2017, was awarded not only the Outstanding Graduate for the College of Sciences, but also won the university-wide award at the Fall 2017 graduation ceremony! What a fantastic achievement! We send our best wishes to all the graduates, and congratulations on jobs well done!

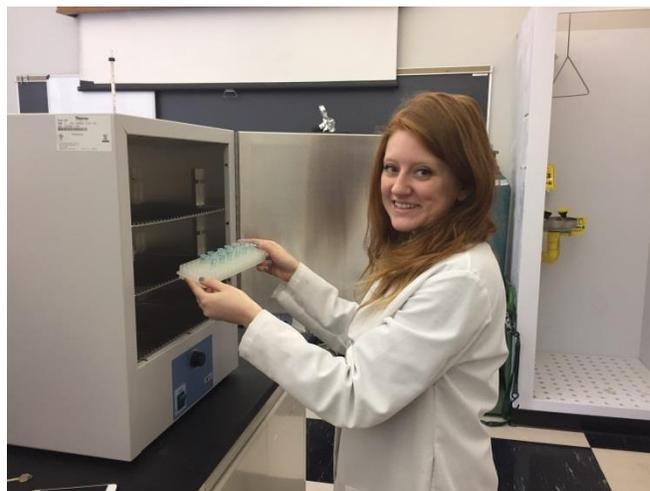
We have two new students joining the group: Jamie Vornlocher, who received a B.S degree in Geology with a minor in Chemistry from the State University of New York at New Paltz, and Robert Narmour, who graduated with a B.S degree in Geology from LSU. Jamie has begun work analyzing Oligocene aged wood from southeastern China in order to infer changes in the strength of the East Asian monsoon. There remains significant debate among geologists as to whether the monsoon even existed at this time, let alone its strength and stability. Jamie hopes to add some much needed data towards our understanding the geologic evolution of the monsoon during the Cenozoic.

Robert will be working on samples from closer to home, as he studies tree cores from southern Louisiana in order to identify a chemical signature of land-falling hurricanes within annual growth rings. This research arises from preliminary work done by Taylor Chapman and Collin Moore for their Stable Isotope Biogeochemistry course project. They found that land falling tropical systems do not always result in a significant decline in the ratio of $^{18}\text{O}/^{16}\text{O}$ in rainfall, as is generally assumed. Robert will extend this work towards identifying storm signals associated with the active Louisiana hurricane seasons of the 2000s, which could be used towards identifying hurricane signals in fossil trees.

None of this work would be possible without the help of Dr. Yingfeng Xu, who continues to train the students in the lab and makes sure all the data coming from the lab are of the highest quality. The lab continues to have researchers from across the university and world using our stable isotope facilities in Hamilton Hall and we look forward to continuing these collaborations. Last, sons Alex and Noah are now 2 and 5 years old, with Noah starting kindergarten this Fall! They both love dirt... Noah loves digging in it and Alex loves eating it... I like to assume he's just trying to determine the clay/silt content!



Peace Eze presents her research at the Annual Honors Undergraduate Research Conference at UL Lafayette.



Jamie Vornlocher loads her purified fossil cellulose samples into the drying oven after a long day of lab work.

Gabriele Morra

The past year, 2017, was probably the most productive that I have had since I joined UL Lafayette in 2013. In June 2017 finally Springer-Verlag published a book on which I worked for the past two years (<https://goo.gl/YYfvS3>). This pedagogical effort helped me gain international recognition, with an online webinar (<https://goo.gl/6PorYX>) and by being elected member of the Science Steering Committee of the "Computational Infrastructure for Geodynamics" (CIG). With Thorsten Becker from UT Austin and Ylona van Dinther from ETH Zurich, we organized very successful session at the AGU Fall Meeting in New Orleans, by filling two oral sessions, and one poster session. Thanks to the financial support of the travel grant of the Board of Regents, I participated to a special workshop at the University of Tokyo, that turned important for being invited to be coeditor of a new special volume of PEPI (Physics of the Earth and Planetary Interiors: <https://goo.gl/NpYrCH>). I was disappointed at my effort in obtaining grants. The majority of the proposals that I

have written were not successful. I am determined to improve on this aspect.

It has been a great satisfaction to see three of my graduate students complete their work and defending (all within a week!) in November. Alexander Beck, graduating in Geology, did a unique numerical work that is just waiting for another student to collect the fruits. Jason Cooper worked under the supervision of me and Dr. Gottardi on a new solver for Porous media flow. Finally Brian Fischer completed his dissertation on two-phase flow in volcanic systems on which he had been working for over three years. On my side, the Lattice Boltzmann Method, with its many applications in Geosciences, has become central in my research. Finally two students are now working under my supervision, Brian Dye, on machine learning applied to volcanology, and Brennan Brunsvik on the seismological signature of earthquakes swarms in Italy. On the family side, 2017 has been a very important year, as my wife and I bought a house near downtown in Lafayette, and we are very busy and committed to transform it into our dream home.

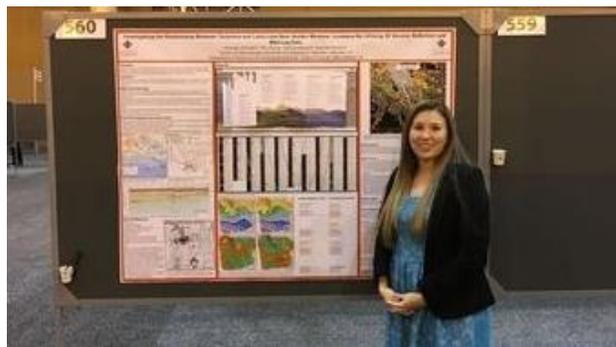
Rui Zhang

2017 was a very fruitful year for my research group. We have received two industrial grants for a total of \$440K, which will provide support to develop several geophysical techniques including depth domain high resolution seismic inversion and diffraction imaging technologies. We are also honored to be subawardee of a Restore Act project to map the shallow faults around South Louisiana and a project from the Department of

Transportation, which provides \$72K funding. All of these funded projects will allow for the expansion of our research team, such as new member Dr. Ming Ma (postdoc) and Mr. Yu Guo (MS), both come from the China University of Petroleum Beijing.



UL Lafayette group picture taken after the presentation of Jade Bujard (5th from left), at the SEG Annual Meeting in Houston.



Graduate student Amanda Johnston, who presented her research at the AGU annual meeting in New Orleans.

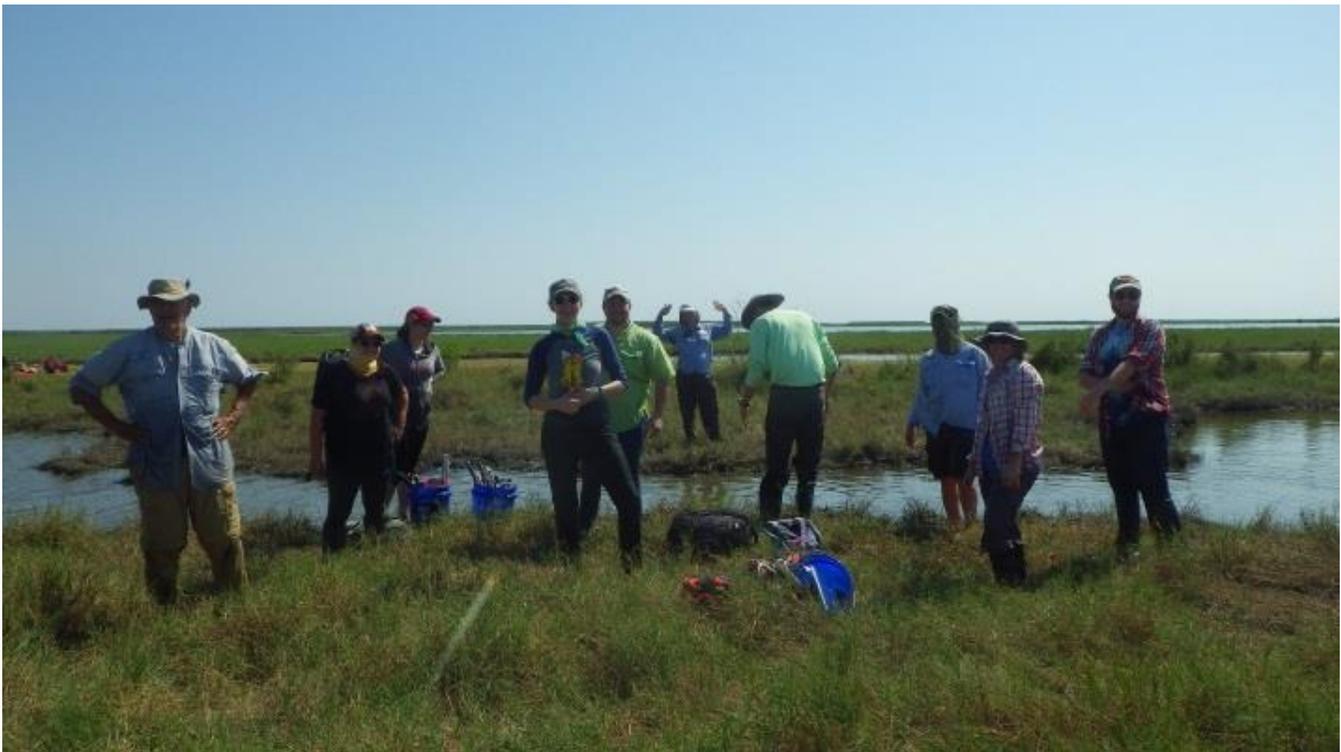
Jenneke Visser

I am very excited about our new Masters in Environmental Resource Science program. Two of the students in this program are very interested in coastal systems and I have agreed to chair their committee. This means that I will stay as a Professor for the rest of this year, but I will retire in December.

Last fall, I taught the Coastal Sciences course. With this course, we have several fieldtrips so that the students can experience the extensive beauty and variety in Louisiana's coastal systems. Students perform a long term vegetation experiment at Rockefeller Refuge and learn about Whooping Crane conservation at the White Lake Preserve. Currently, I am teaching the Soil and Plant Relationship Course. In this course students perform their own experiment studying the effect of soil

parameters on the growth and development of plants. They will go through the complete scientific process of designing, measuring, analyzing, and discussing the results of their experiments.

On a personal note, I started dialysis last summer. I use peritoneal dialysis and dialyze every night at home. The process takes 11 hours, most of them sleeping, and severely restricts my personal time. One of the effects of kidney failure is anemia and I receive monthly iron infusions to help combat that, but my energy level ebbs and flows with those infusions. I have been on the waiting list for a new kidney for almost 2 years now, so hopefully I will receive a transplant soon. In the meantime, I just keep plugging along.



Coastal Sciences Class at Rockefeller Refuge

Carl Richter

Carl Richter continued his work on the marine geology and geophysics of deep-sea cores from the North Atlantic and the West Greenland Margin, in addition to projects in environmental magnetism and participating in a LADC-GEMM expedition near the Deepwater Horizon site in the Gulf of Mexico on the LUMCON ship R/V Pelican in June and on a two-months long International Ocean Discovery Program (IODP) expedition to the Mentelle Basin and Naturaliste Plateau south of Australia in October/November – while also fulfilling his teaching obligations. The main objectives of the IODP expedition were to recover records of climate sensitive intervals from the Cretaceous and the Cenozoic, namely the Cretaceous oceanic anoxic events (OAEs), the K/Pg boundary, and the PETM, but the sites also recorded the early stages of the opening of the Tasman Gateway and will provide important information about the timing of the Gondwana breakup. Carl is currently in the process of re-evaluating the shipboard magnetostratigraphy, which consists of over 200 magnetic reversals and is making plans to sample the recovered cores, about 2.5 km in total, for detailed analysis. Sean Jensen successfully defended his thesis on the paleomagnetic analysis of high-latitude Quaternary records of the geomagnetic field recovered from the

West Greenland Margin in Baffin Bay. A presentation of the results at the AGU meeting in New Orleans generated great interest and provided ample discussion about some of the difficulties with the interpretation of the data set.

Morgan Canezaro successfully finished her thesis project on the environmental impact of heavy metal pollution using magnetic susceptibility screening in Baton Rouge, which was started with former student Hannah Vedrines and Bill Schramm from the LDEQ a decade ago. Morgan's emphasis was on collecting more geochemical data with the XRF, which revealed, as suggested by a smaller pilot study conducted by Delmetria Taylor, a statistically significant correlation between magnetic susceptibility and the concentration of several heavy metal pollutants. The results of this long-term study have reached maturity and will be published this year. Heather Brissey started a project on looking at the environmental signal of Site U1333 in the Equatorial Pacific using time-series analysis. Besides keeping up with a busy research, teaching and committee schedule, Carl is now in his fourth and final year as president of the Southwest Louisiana Geophysical Society.



Paleomagnetism team on IODP Expedition 369: Yong-Xiang Li (Nanjing University), Edwin Garrett (Texas A&M University), and Carl Richter standing in front of the cryogenic rock magnetometer onboard the R/V JOIDES Resolution.



R/V Pelican with Unmanned Surface Vehicle in tow leaving LUMCON port in Cocodrie, LA

Jim Martin

The past year has been busier than ever for Jim Martin, particularly as Curator of Paleontology. Most efforts have concerned curational activities and research. Curation was the major undertaking for completion of the \$350,000 grant project concerning the Miocene and Pleistocene fossils of southern Oregon. Over 100,000 specimens were collected from the Fossil Lake area and the Poverty Basin on the High Desert. Preparation of skeletons and cataloguing these huge collections was an enormous task, helped by students, staff, and volunteers at the University of Louisiana Geology Museum. In all, I curated an astounding number of 49,988 scientifically significant specimens into the systematic collections at the UL Lafayette Geology Museum during 2017.

In addition to curational activities, research was conducted on curated specimens derived from Oregon. A major contribution to the understanding of the evolution of the Fossil Lake area during the Pleistocene (Ice Age) was just published, which included amphibians and mammals that existed during the time the succession of lake deposits formed at Fossil Lake. The habits of these creatures indicate a slightly wetter and colder climate during the early Ice Age and a warmer, drier climate during the late Ice Age. A second publication concerned a very rare Miocene occurrence in North America of a water mole (desman) from the Poverty Basin area, Oregon, only its fourth known site of occurrence in North America. Also, I was invited as the second of six authors of a paper that is in press concerning a mammoth trackway at Fossil Lake. I was invited to participate as the result of my extensive knowledge of the stratigraphic sections and fossil types at Fossil Lake; I identified the fossil vertebrate specimens collected by the University of Oregon. Finally, Dr. Jennifer Hargrave is the principal author on a manuscript with me concerning bird paleoecology at Fossil Lake.

In addition to these publications, three University of Louisiana students are engaged in thesis work on the Oregon rocks and paleofaunas that repose at the University of Louisiana Geology Museum. One student is nearing completion of her Master's thesis concerning the Miocene Fort Rock Formation and its paleofauna, another is completing her research concerning the taxonomy of giant camel specimens from the Fort Rock Formation, and a third student has undertaken for his thesis the description of the fish assemblages collected from the Paisley Fish Locality near Summer Lake, Oregon.

Preparation and research also continues on the giant camel specimens collected from Oregon. One camel specimen that consists of the articulated front quarters has been prepared in the UL Lafayette Geology Museum and is on display. The second camel is being prepared; a news conference was convened in February, 2018, for the opening of the final plaster cast containing the rear portion of the skeleton. Preparation of this giant camel should be completed by the end of 2018.



Visiting Faculty

Jon Rotzien

The last 6 months have been an exciting time for students and faculty engaging in stratigraphy, sedimentology, basin studies, and petroleum geoscience at UL Lafayette. My academic year kicked off with two courses – Sedimentary Petrology and Unconventional Reservoirs. In Sedimentary Petrology, an intensive and collaborative, hands-on format was tested in which the students used real-life petrographic, geochemical and geochronological data to interpret the complex provenance of the Miocene Taranaki Basin – the only petroleum producing basin in New Zealand. At the end of the course and after many thin section point counts, these students had prepared a research document not far from those submitted to refereed journals like Marine and Petroleum Geology or AAPG Bulletin. In Unconventional Reservoirs co-taught by myself and Dr. Mokhtari, the students learned how to explore for and characterize source rock reservoirs and tight sandstone plays using 21st century risking and mapping methods. About one month into the course, it became apparent to us that our home state unconventional play – the Tuscaloosa Marine Shale (TMS) – presented an opportunity for refinement of its reservoir characterization, sequence stratigraphy, regional extent and geology, and chronostratigraphic age control. Geoscience and engineering students were paired together, and, as teams, mined electronic log data that they then digitized in Neuralog software and mapped in Kingdom Suite across parish, county, and state lines in Louisiana and Mississippi. The ~20-person class added new geological and business insight into the TMS play. The structure and isochore maps and stratigraphic correlations are now being used in multiple MS-level theses that highlight the geology of the TMS. Bravo to both classes for their hard work, creativity, and dedication to solving provenance and subsurface challenges pertaining to two potentially world-class petroleum systems. Be sure to ask the students about their contributions in these areas.

In 2017, several student leaders, Dr. Gottardi and I formed a petroleum geology and basin analysis research consortium on Upper Cretaceous mudstone and tight sandstone reservoirs in Texas and Louisiana. For Stage I of the industry-funded consortium that will run

from 2018-2020, we are studying the Austin Chalk, Eagle Ford, and TMS. We are welcoming corporate sponsorship at this time. Companies shouldn't miss this opportunity to get engaged – at least 90% of the funding goes directly to student research. We are sharing the status of our projects to oil and gas companies about once a week with our final investor presentation slated for mid-April 2018. Stage I will deliver about 6-12 MS-level theses that are directly applicable to informing oil and gas business decisions pertaining to these plays and other unconventional reservoirs more generally.

In 2017, along with collaboration from the Department of Petroleum Engineering and the Moody III College of Business, students and faculty successfully launched the AAPG and SEG Speaker Series that is only growing stronger and gaining more momentum into 2018. Our speakers were so enthusiastic to engage with students and faculty at UL Lafayette. Ray Abma (BP) kicked off the series while on his global SEG Distinguished Lecture tour. Soon thereafter, we listened and learned from Garrett Fowler (Tachyus), Ramil Ahmadov (New England Research), John Dribus (Schlumberger), Tony Salem (Shell), Loren Long (Talos Energy), Cheryl Collarini (Collarini & Associates), Rocky Roden (Geophysical Insights), the Pearl Energy team including Billy Quinn, and Alan Hough (Caelus Energy). Students gained valuable experience visiting with these executives from across the oil and gas value chain and more. Our very own President Joseph Savoie even joined us for lunch during one speaker's visit in late November. This winter and spring, guests will join us from Aramco Services Company, Paleo Data, GPT International, Rose & Associates, Vitruvian Exploration, Anadarko, Apache, BP, ExxonMobil, Pioneer, Wellington Management, Chevron, AAPG, and many others. Following on the success of the AAPG and SEG Speaker Series, we are in the planning stages for the Lafayette Leadership Forum in Energy ("Lafayette Energy Week") for 2020, which will highlight the work and achievements of industry leaders from around the Gulf Coast and the world as well as our students. If you'd like to participate, please don't hesitate to contact us! We are grateful for your participation and enthusiasm for our students and our educational programs at the School of Geosciences.

Research Highlights

Expedition IODP 369 – Carl Richter

Australia Cretaceous Climate and Tectonics: Oceanographic research cruise will hold answers about past climate and plate tectonics

During the Late Cretaceous (100 to 66 million years ago), when dinosaurs were still the dominant land vertebrates, atmospheric carbon dioxide reached concentrations at between 4 and 18 times current levels, as suggested by analysis of soil horizons and fossil plant remains. The reason for this was natural and caused by volcanic gasses from extreme levels of marine volcanic activity at plate tectonic boundaries. The high levels of carbon dioxide led to the heating of our planet the same way as they do today. At about 94 million years, at the Cenomanian/Turonian boundary, a critical point, marked by the sudden appearance of black shales was reached. Oceanic anoxic events (OAEs) were first discovered in the 70th and refer to times in the Earth's history when substantial parts of the ocean basins were depleted in oxygen, which led to the deposition of black carbon-rich shales. Most anoxic events occur in periods of very warm climate characterized by high levels of carbon dioxide in the atmosphere. Several examples have been documented in the warm Cretaceous and Jurassic periods and one hypothesis is that the deposition of vast amounts of carbon on the ocean floor removed carbon dioxide from the atmosphere and eventually led to global cooling. Is this Earth's natural response to extremely warm climates?

To find out, 31 researchers from eleven different countries, including Carl Richter from the University of Louisiana at Lafayette, set sail September 26, 2017 on a two-month ocean drilling expedition to search for clues to Earth's past climate and the timing of the final breakup of Gondwana.

Participants from the International Ocean Discovery Program (IODP) Expedition 369, funded by the

National Science Foundation (NSF) and its international partners in IODP, sailed from Hobart, Tasmania, to Fremantle, Australia, aboard the JOIDES Resolution, one of the world's most sophisticated scientific drillships.

IODP is an international research collaboration that coordinates seagoing expeditions to study the history of Earth recorded in sediments and rocks beneath the ocean floor.

Expedition 369 scientists joined more than 20 technicians and 100 crew members in drilling at five sites in the Great Australian Bight and the Mentelle Basin at water depths ranging from 850 to 3,800 meters.

At each site, the crew drilled from 300 to 750 meters into the seafloor to collect cores -- complete samples of sediments deposited over millions of years. The cores hold fossil evidence the scientists will use to assemble a detailed record of the Earth's climate and the tectonic events associated with the breakup of Gondwana over the last 100 million years. A total of 2,500 m of core material was recovered for future analysis.

In May 2018, the science party will get together at the core repository at Texas A&M University, where the cores are temporarily stored, to take samples before the cores get transferred to their permanent location in the core repository in Kochi, Japan. Together with fellow paleomagnetist Yong-Xiang Li from Nanjing University, China, Carl Richter will work on the chronology of the recovered sequences using magnetostratigraphy, the breakup of Gondwana using paleolatitudes, the relative geomagnetic intensity of the field, and the variability of ocean current strengths through time using the anisotropy of magnetic susceptibility.

More detailed information is available from the International Ocean Discovery Program at http://publications.iodp.org/preliminary_report/369/



JOIDES Resolution in Fremantle Harbor (November 2017)



Basalt cores recovered from Hole U1513E.



Paleomagnetism lab on the JOIDES Resolution. Cryogenic rock magnetometer in center of image

Giant Salvinia Weevil Collaborative Project

by Dr. Durga D. Poudel

In collaboration with the LSU AgCenter's biological control research and outreach programs to manage giant salvinia (GS), *Salvinia Molesta*, in Louisiana, we started mass rearing of the salvinia weevil (SW), *Cyrtobagous Salviniae*, on the invasive plant species (giant salvinia) at UL Lafayette research farm at Cade using open-earthen ponds in 2017. The invasive pest, GS, is one of the most severe aquatic weed pests in Louisiana. Plants were introduced to the U.S. during the 1990's from Brazil. This species is listed as a Federal noxious weed by USDA-APHIS and is prohibited for transport across state lines without permits. It has continued to spread by mechanical transport (flooding events and recreational boating). Based on a 2015 survey by the Louisiana Department of Wildlife and Fisheries, GS has infested water bodies in almost every parish across the state. Infestations of giant salvinia form dense floating mats of vegetation that block irrigation canals, reduce water oxygen levels, and disrupt ecological cycles of aquatic habitats. Louisiana's Department of Wildlife and Fisheries (LDWF) spends in excess of \$5 million each year on public water bodies to manage GS infestations.

Biological control has been demonstrated as a cost effective approach to manage giant salvinia in Louisiana. The SW was originally collected in Brazil, approved for release by USDA-APHIS in the US, and has been released across Louisiana since 2001. Under high infestations, plant damage from larvae and adults of this species results in loss of buoyancy causing the remaining plant material to sink. Based upon current issues with GS-infested water bodies in Louisiana, it is clear that we will need to develop sustainable strategies with multiple partners to manage this problem. The LSU AgCenter has been providing GS-infested material from managed insectaries on private property for nearly a decade primarily to LDWF. The LSU AgCenter recently established a series of pilot ponds to rear GS and weevils for a wider distribution network. Only by increasing the number of insectary ponds across Louisiana, there will be an opportunity to further facilitate the delivery of weevils to GS-infested waterbodies. This offers excellent public relations opportunities to public stakeholders (landowners, farmers, recreational sites) and could involve a broad range of researchable topics for faculty and students.

Two ponds were selected at the University of Louisiana at Lafayette's Cade Farm for the project after validating appropriate water quality and environmental conditions. Insect-free giant salvinia was established during the fall of 2016 to early spring 2017 and allowed to cover the surface of the pond applying management procedures according to LSU AgCenter protocols. Water levels were monitored and adjusted as needed by on-site ULL personnel. Mowing operations were used to manage the access roads and levees. LSU AgCenter personnel were granted access to ponds for the initial infestation of insects (weevils) which were applied during late spring 2017 and to monitor population development. The farm manager at Cade farm maintained security of the site and worked in cooperation with local farmers to mitigate the potential of phytotoxicity from herbicide applications to nearby fields.

An initial harvest of insect-infested material was accomplished on June 1, 2017. Partners representing the Louisiana Association of Conservation Districts, LDWF, Delta Waterfowl, and Louisiana Landowners Association were allowed on-site to participate in the harvest under the direction of LSU AgCenter personnel. An estimated 401 totes (20 gal. plastic containers) were removed from Pond 1. On June 8, another 178 totes of material were removed from Pond 2 and offered to partners from Delta Waterfowl and the Louisiana Association of Conservation Districts. Post-harvest, the site was cleaned up and repair made to scored headlands.

ULL personnel will cooperate with LSU AgCenter personnel to prepare the ponds for another generation of plant material, weevil infestation, and harvest event. Research/Outreach projects on GS and the weevil at the UL Lafayette site for graduate students will be shared resources between faculty at UL Lafayette and LSU AgCenter. The LSU AgCenter will continue to assist UL Lafayette personnel with weevil rearing manuals, on-site demonstrations of pond maintenance, weevil harvest, and field monitoring as needed to make the project successful. The LSU AgCenter has a cooperative MOA with partner organizations including Louisiana Association of Conservation Districts, Delta Waterfowl, LDWF, LDAF, CWWPRA, and Louisiana Landowners Association. Having a three-year MOA already signed, this project is expected to continue for 15 years or more.



University of Louisiana at Lafayette ponds with giant salvinia.



Giant salvinia harvesting on June 8, 2017 at Cade Farm

Geology Museum Update on Exhibits and Collections

The UL Lafayette Geology Museum (ULGM) continues to provide positive outreach to our community, unique research opportunities for our students, and visibility to our geoscience program. This past year, we developed a new exhibit in conjunction with LAGCOE and the Lafayette Science Museum, which focuses on our local petroleum industry. The exhibit, "Energy Unearthed", opened in October and details the exploration and production of oil and gas, focusing on the science behind it. We also updated the mineral and rock exhibits. If you missed the dinosaurs, be sure to visit the new Dino Lounge on the second floor. Come check it out.

The students, staff, and volunteers of the paleontology lab of the ULGM have been busy preparing and curating our fossil specimens. Nearly 50,000 specimens were permanently added to our collection this year, bringing the total number of fossils to nearly 150,000! Our backlog of collected specimens and larger field jackets is minimal. The last portion of our giant camel, *Megatylopus*, was opened in February and should be completed by the end of the year. The skeleton is on display as we work on freeing the bones from the surrounding rock. The results from the efforts of our staff

and volunteers are incredible, for just being around for five years!

The ULGM paleo lab offers a unique opportunity for our UL students – the ability to study vertebrate paleontology. We currently have three students completing these utilizing our museum resources, including the stratigraphic framework of our fossil localities, the description of our giant camel jaws, and a description of fossil fish. Research opportunities are endless.

The ULGM is currently working toward national certification with the American Alliance of Museums. This two-year process will acknowledge the quality and importance of our museum and collections. In concert with this effort, we will soon launch an endowment program to stabilize Museum funding.

With all of the positive feedback and visibility the ULGM offers to our School of Geosciences, it is no surprise that we are receiving inquiries from students all over the country about coming to UL to study paleontology. We hope to gain support to keep these efforts going. It's an exciting time to be part of such a great research and educational team.



Partial view of the new minerals exhibit. It is organized by how the minerals form and show everyday uses of common minerals.



The Dino Lounge. You can come take a break amongst the dinosaurs and even take a "selfie" with Selfiesaurus!

Research Experiences for Undergraduates



The National Science Foundation awarded UL Lafayette a new Research Experiences for Undergraduates (REU) site to study water and coastal processes and resources within watersheds and nearshore coastal environments in southern Louisiana. The project is led by Dr. Katie Costigan (School of Geosciences) and consists of an interdisciplinary team of faculty members, UL Lafayette Office of Sustainability, Bayou Vermilion District, Teche-Vermilion Freshwater District, and the T.E.C.H.E. Project.

Each participant will work for eight weeks directly with a faculty advisor in the departments of Biology, Civil Engineering, or Geosciences and with local environmental organizations. The program will include ten students each summer from 2018 to 2020. Students accepted to this competitive program will have the opportunity to spend 8 weeks in the heart of Cajun Country in Lafayette, Louisiana, working with leading researchers in interdisciplinary fields related to coastal and watershed science. REU investigations will fundamentally expand our understanding of watershed and estuarine resources and processes in an urban- and agriculturally-influenced watershed.

For more information please go to: <https://coastalresearch.louisiana.edu/student-opportunities>



2017 AAPG Imperial Barrel Award Competition

The School of Geosciences continues to be very successful at the AAPG Imperial Barrel Award competition. The team's presentation of the North Carnarvon Basin of Australia earned a second place at the 2017 Gulf Coast section competition, behind University of Houston. Team members Nick Jarrett, Amanda Johnston, Daniel Friedman, Sydne Workman, and Kevin Reece (from left to right) pose with the winning trophies in front of the Anadarko headquarters in the Woodlands, Texas.

2017 in Pictures



Students in Big Bend National Park



Students in Big Bend National Park



Students inspecting the Moab Fault (UT) during fieldcamp



Students learn about the geology of Arches National Park



The top of Sheep Mountains (WY). Who remembers?



Ashley Filkins with her best poster award at the 2017 south-central GSA



AAPG student chapter crawfish boil



Geology and Wine of France fundraiser



Minerals silent auction organized by the Lafayette Geological Society



Graduate students at the 2017 AAPG student chapter Christmas cocktail party

Gifts to the School

We would like to thank all those who donated to Geology in 2017

☞ Donations up to \$1000 ☜

*Linda Reif
Hazel W. Rudick
Scott G. Comegys
Kevin Jordan
Donald E. Burch
Mike E. Mathy
Brian C. Dye
Kenneth Miller
Aro Terrell*

☞ Donations \$1000 to \$5000 ☜

*BP Foundation Inc.
Christopher H. Bradley
Timothy Dore
Richard P. Thibodeaux
ExxonMobil Foundation*

☞ Donations \$5000 to \$10,000 ☜

*Apache Corporation
Halliburton Foundation Inc.*

Student Honors and Awards

Graduate student Ashley Filkins won Best Poster award at the 2017 South-Central GSA meeting.

Geology Students

Bill Paine/LGS Endowment Scholarship

*(†)Kareen Attia, (†)Madison Miller,
(†)James Pasley, (†)Ian Thomasset*

Eberhart E. Leschin Scholarship

(†)Eric Muchiri

Imperial Barrel Scholarship Fund

(†)Nick Jarrett

Joe Battle/LGS memorial geology scholarship

(†)Kohl Koppens, (†)Roxanna Vaught-Mijares

**Chevron Gulf Oil Foundation Endowed Geology
Scholarship**

(†)Taylor Dorn

Nolan Badeaux Endowed Scholarship

*Peace Eze, Alexandra Trahan,
Mattea Tingle*

Paul Toce Endowed Geology Scholarship

*Daniel Richard, Kristen Holmes,
Ryan Hood, Jonah Mallett*

Pogo Producing Co. Scholarship

(†)Eric Muchiri

Tim Dore Geology Scholarship

*Gabrielle Billeaud, Mandi Lalonde,
Johnny LaRocca*

**Bill & Heather Finely Non-Endowed
Geosciences Scholarship**

(†)Victoria Chevrot

Sigma Gamma Epsilon Field Camp Scholarship

Mandi Lalonde

**Marvin & Hazel Harvey Morris Endowed
Geology Scholarship**

Gabrielle Billeaud

**QEP Resources Education Foundation
Scholarship**

Ross Ledoux, (†)Brian Dye

Halliburton Geosciences Scholarship

*(†)Roxanna Vaught-Mijares,
(†)Daniel Locci-Lopez, (†)Sam Yun*

Fieldcamp Scholarship

Nicholas Griffin

**Hugh Allen Bernard Memorial Geology
Scholarship**

(†)Johnny LaRocca

**Walter James Rudick Endowed Scholarship in
Earth Sciences**

(†)Abigail Breaux

(†)Graduate Students

Environmental Science Undergraduate Students

Louisiana Garden Club/The Keith Russo Scholarship

Victor Bowler

A trip down memory lane...



Ms. Kristie Cornell, Reko Hargrave, and Dr. Tim Duex, field camp of 1999

Degrees Granted in 2017

Spring 2017

Bachelor of Science in Geology

*Alexis Blair, Daniel Bowen, Cameron Cambre, Joshua Cecil, Jacob Chicola
Ross Ledoux, Ryan Leonards, William Montesano, Hunter Privat, Matt Richard
Spencer Stelly, Eric Udick*

Bachelor of Science in Environmental Sciences

*Taylor Girouard, Sydney Manuel, Courtney Poirier,
Ray Reich, Paul Vondenstein, Logan Delcambre*

Master of Science in Geology

*Logan Adams, Alan Adkinson, Samuel Ely, Ashley Filkins, Lindsey Horton
Robert Ivy, Duncan McIntosh, Jr, John Reece, Samantha Robillard
Annaliese Rouse, Taylor Runyan*

Summer 2017

Bachelor of Science in Geology

Hayden Dugas, Michael Mahley, Daniel Slayter, Jeffrey Smith, Lisa Tanh

Master of Science in Geology

Joseph Chapman

Fall 2017

Bachelor of Science in Geology

*Abigail Breaux, Alayna Craft, Charles Delcambre, William Etzel, Peace Eze
Kyle Gibbens, Jake Martin, Eric Theriot, Victor Toce*

Bachelor of Science in Environmental Sciences

Matthew Meyer, Dominick Sparcella, Jacob Cohn, Tyler Soileau

Master of Science in Geology

*Alexander Beck, Cari Creed, Daniel Friedman, Ben Lissard, Collin Moore, Morgan Pellegrin,
Mark Roth, Gage Seaux, Fabiane Speyrer, Rose Telus, Eric Wang, Jesse Zwennes*

In Memoriam

Paul Toce, Sr.



Paul Toce passed away on November 27, 2017. Paul was founder and chief geologist for Toce Oil Co, now Toce Energy. Paul earned a BS in Geology from UL Lafayette (then known as SLI, South Louisiana Institute). Paul earned his first job in the oilfield at Royal Dutch Shell. After several years, Paul left Shell and founded Toce Oil Co. Paul was a benefactor to the Toce scholarship of the School of Geosciences.

Adir Evaldo Salvador Gonçalves



Adir, 24 years old, was an international undergraduate student from Angola majoring in Geology. His funeral was on January 4, and his body was laid to rest in Luanda, Angola. He was the son of Adriano Gonçalves and Vitorina Salvador. He left 3 sisters and 2 brothers, including his twin brother, Adelson. Adir was the fourth child.



Upcoming Events

Gulf Coast Association of Geological Societies



Meet us at the 2018 Annual Convention of the Gulf Coast Association of Geological Societies hosted from September 30th to October 2nd by the Shreveport Geological Society.

UL Geology Museum



Come to the museum! The Geology museum has moved to downtown Lafayette, to 3000 square feet of space within the Lafayette Science Museum.

Energy Unearthed: This new exhibit opened to the public on October 21st, 2017. The Lafayette Science Museum is located at 433 Jefferson Street, Lafayette, Louisiana in the heart of Downtown. Call 337-291-5544 for more info.

How to support Geology or Environmental Science

Donations can be made online using the UL foundation website; however, it is quite a challenge to figure out how to donate directly to Geology or Environmental Science using their site. Instead we recommend making a check out to the UL foundation with instructions for directing the money to a specific area or fund in the notes section of the check. Mail the check directly to the School of Geosciences and we can hand deliver it to the foundation to ensure it gets to the right place. Please contact us if you have further questions (geology@louisiana.edu).

We encourage **Geology** donors to use one of the funds described below. Please contact UL Geology directly if you have a question or if you require special arrangements.

1. **The UL Lafayette Geology Faculty & Student Development Fund (#21654)**. This is a non-endowed fund that is designed to support the immediate financial needs of the Geology program. We suggest that donations under \$1000 be directed here.
2. **The UL Geology Student Technology and Research Fund (#7201)**. This is an endowed fund that supports undergraduate and graduate student research activities.
3. **The UL Geology Growth Fund (#21676)**. This is an endowed account that is designed to grow over time to support the long-term needs of the Geology program.
4. We encourage **Environmental Science** donors to use the **UL Lafayette Environmental Science Fund (#05681)**. This is a non-endowed fund that will help to support the immediate needs of the Environmental Sciences program. We hope to develop and open an endowed fund for long-term growth in the future.