



The School of Geosciences Newsletter

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Greetings from the Director



I am happy to report that 2015 brought with it record-setting enrollments in our Geology and Environmental Science Programs, as well as some wonderful accomplishments. Our Geology Master's degree program reached a high of 88 students in Fall 2015 and our undergraduate program in Geology pushed past 100 for the first time in more than 25 years. Since its inception in 2011, our Environmental Science Bachelor's degree program has grown to 75 students. Also in 2015, we were able to construct a new computer lab for teaching and student research.

Thanks to the generous donations we received in our 2014 fundraiser we were able to purchase all new tables and chairs and many computers for the lab. The new lab has 30 workstations and is being heavily used. In another bit of good luck, we recently received additional financial support for the computer lab from a grant supported by the University's student-assessed technical enhancement fees. We plan to make more upgrades in computers, monitors, software, and internet routing this semester. In other news, through a grant from the Halliburton Foundation (led by Dr. Gottardi), we have made some big advancements in expanding our recruitment of female geology graduate

students. Half of our incoming graduate class in Fall 2015 were female students. Our students recently formed a student chapter of the Association for Women Geoscientists (AWG). The "Ragin Cajun" chapter is the first and only AWG chapter in the Gulf-Coast region. Our Geology Museum downtown continues to grow and impress. Over 55,000 people have visited the museum in the last year and a half. Thanks to some generous donations we were able to excavate fossils of a giant camel and bring them back from the field site in Oregon to our museum in Lafayette. The fossil bones belong to a 12 to 14 feet tall camel that was native to North America around 7 million years ago. This and a huge variety of other fossil mammals will be on display at the museum in April 2016. In another development, last summer we received a \$42,000 gift from the Lafayette Geologic Society for the purchase of a portable X-ray Fluorescence (XRF) instrument. I am happy to report that five students are already utilizing this instrument for their thesis projects. The instrument is also being used for classroom instruction and in some high-school outreach projects. We also have some new faculty and staff. We recently hired Dr. Jennifer Hargrave, who is a paleontologist. Jen will teach a lot of courses for us and will work part time at the Geology Museum (see more about Jen in this newsletter). Dr. Aubrey Hillman recently accepted our offer to become our newest faculty member in the area of Environmental Science; however, she won't start until next year. Aubrey's background is in environmental geology and she specializes in investigations of sediments from lake cores.

One of our biggest challenges of 2015 was the economic downturn in the petroleum industry. These low oil prices make it more challenging for students to find permanent employment. However, despite the downturn, it is important that we continue to maintain a positive outlook, recruit students, sustain strong enrollments, and set ourselves up for success in the future. Please encourage prospective students to consider Geology and Environmental Science careers at UL! This year was also marked by the retirement of one of our instructors, Ms. Cathy Bishop. We wish her well. Dr. Brian Lock has also planned his retirement for May 2016. Brian has agreed to stay on as an Emeritus Professor and continue to teach a course or two to help ease us through this transition.

In summary, we had a great 2015 and, despite the obvious challenges in the job market, we look forward to continued success in 2016. Visit our new website (<http://geos.louisiana.edu/>) and make sure to check out the video on the front page. Thanks to everyone for your continued support and have a great 2016!

Sincerely, **David Borrok**

Faculty and Instructor Updates

David Borrok



2015 was another busy year for me. In addition to the typical administrative duties, I taught my graduate level Mineral Deposits and Petroleum Geochemistry courses and advised a lot of thesis research. I had two students, Ayokomi Lasisi and Ethan VanHazebroeck graduate with their MS

degrees in 2015 and hope to have several others follow this year. Komi's thesis topic involved the use of stable iron isotopes to characterize the cycling of iron at Valles Caldera, New Mexico, and compare and contrast it with what may have occurred on Mars. Ethan's work involved an in-depth petroleum geochemical investigation of the Eagle Ford shale. I managed to get several papers published in 2015, including one that deals with the geochemistry of the Chicot aquifer in Southwest Louisiana. This paper, in the Journal of Hydrology, is

openly available in case you want to check it out (doi:10.1016/j.jhydrol.2015.12.022). I was awarded a \$100,000 supplement to an existing grant from the National Science Foundation to expand current research on water resources in Louisiana. I've been collaborating on this work with a great group of scientists and engineers (faculty and students) from across our campus. It continues to be some of my most rewarding research work.

I made it out of the office this summer to take a trip to the fabled vertebrate fossil locations of South Central Oregon to check out the giant camel excavation. It was a remarkable trip with an excellent host in Dr. James Martin. I hope everyone can take the time this year to make it to the Geology Museum downtown and have a look at these fossils. The giant camel fossils will be on display starting in April, 2016. I was also fortunate to spend a week this summer with my family in the San Juan Mountains of Colorado. Earlier in my career I had worked in this area doing field work in the summers and now it is enjoyable to go back and practice one of my favorite pass times – visiting abandoned mining sites. There is certainly a rich history of mining in this region!

Katie Costigan

The year-in-review for 2015 has been full of a variety of activities. I taught three new courses, had four papers come out, applied for way too many grants, presented at a conference, traveled a lot for fieldwork, and attended a week long workshop on research, mentoring, and teaching. I am pretty settled here and am enjoying Lafayette.

Leslie Valentine is my very first graduate student and is doing her thesis work related to the restoration

efforts by The Nature Conservancy in the Atchafalaya Basin. TNC just acquired ~5300 acres in the basin and is planning a multi-disciplinary conservation and restoration effort to have a healthy and fully functioning ecosystem. I am excited to see what comes out of Leslie's work and TNC's efforts. Phil Vanbergen is an undergraduate in Environmental Science, and he is doing a meta-analysis with me trying to figure out what controls wood loads in rivers.

Jim Foret



*Big Bend NP and Chihuahuan Desert Exploration
January 2-11, 2016*

Throughout the 2014 school year I spoke to Tim D about helping him with the 2015 field camp in Big Bend NP. I told him I would help drive and whatever else he needed me to do. I had no idea how far that place was or how cool the desert is. Having not ever been very far west of Houston, I was feeling it was time to broaden my horizons. I was not prepared for the quiet and the space of that region or the star blanket or the chill of the desert night or the desert rain or desert pavement or the sunsets and sunrises of the Chisos basin. You can imagine my surprise when I also came to the realization that this was the scenery of all of those cowboy and Indian shoot-em-ups I watched as a kid.

Being a plant guy, the new palette of green beings was quite a change for me. Lots of verticality, few leaves, lots of thorns and spines and sharp edges and points and beautiful, delicate inflorescence. Very different. Very dry. Actually quite delightful.

Whenever I enter a strange ecosystem I always ask myself about just how these organisms make a living facing this particular set of challenges. Not an economic living like we earn, but just how do they get by, how do

they harvest enough energy to live and how are they not overconsumed by others. As you know, in healthy ecosystems everyone is someone's food and everyone's waste feeds another.

To me it is also interesting how a hunter gatherer or even an early European settler might make it on this especially harsh land. With rainfall generally under 20" per year it would seem impossible to my contemporary mind, I know, I know, lizard brain, some would say, to imagine. In the year just preceding our trip we measured 86" of rainfall at the ULL Cade Farm. 12 inches in November. I come from wet country, luxurious amounts of water, y'all.

I was taken aback by plant questions that began coming from the geology students, even before the first day afield, the questions started. These are rock and mineral people, why should they care? But they did and that excited me into action. Each day I prepared a plant lesson, just a simple talk, short and sweet. It was great, I had this 30+ member class of students who were a captive audience. Before they were allowed to crawl exhausted back into the van at the end of the long day they had to listen to Ol Jim's slant on things. Very cool y'all. Thank you Tim for encouraging me to tag along and allowing me to contribute.

This great trip also allowed me to get to know my fellow teachers in a less formal setting, Tim and Elisabeth I see daily but really did not know them. Raphael and Kristie camped next to me, we shared the same food prep area and table. I really became closer to them. This is really cool growth stuff y'all. I so appreciated this opportunity to grow with them.

All of this makes me think that we, in the School of Geosciences, are working hard to develop great geologists from these bright youngsters we are given to work with. I think we are succeeding. What I feel might be missing is an excellent course or concentration in Geoecology or hey even something along that line in our Master's degree program.

I would go again, if invited, except that my bride of 47 years told me that I could not, she said we have never been apart for that long in our entire marriage, and she needs me to keep her warm. Guess I'll have to bring her along in 2017 Tim. We'll talk.

Raphaël Gottardi

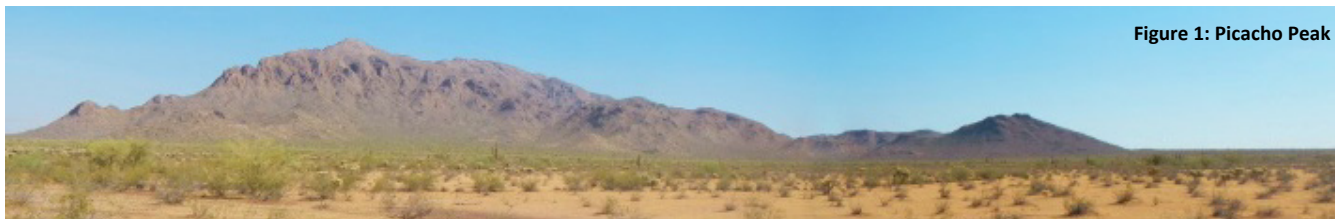


Figure 1: Picacho Peak

I had the pleasure to see four students graduate with their MS last fall. Daniel Sutton (now a geologist at Occidental Petroleum) conducted a structural and geophysical study of the Island of Roatan (Honduras). Scott Hamilton investigated the mass balance of oil and gas produced versus estimates in the A.W.P Field (Texas). Scott's work earned him first place at the Lafayette Geological Society student poster presentation hosted through the Louisiana Gulf Coast Oil Exposition (LAGCOE). Michael Berkland conducted a strain analysis of the Picacho Peak detachment shear zone (AZ, Fig. 1). Kyle Spezia (fluid optimization specialist at Halliburton) developed a numerical code model groundwater flow and heat transport in porous media.

I was recently awarded a grant through the Louisiana Board of Regents to investigate fluid-rock interaction and the effect and feedback of deformation and geochemistry during the evolution of a shear zone. This grant has allowed me to support several graduate students and go back out in the field! At elevated temperature, fluid-rock interaction is best investigated using oxygen and hydrogen stable isotope geochemistry. Graduate student Max Schaper, assisted by undergraduate student Byron Ebner, is currently working on elucidating fluid-rock interaction in the Picacho Peak (Fig. 1). To conduct the geochemical analyses, I have been collaborating with Dr. Jaime Barnes, who manages the stable isotope lab at UT-Austin. In the past few years, new high resolution techniques (Secondary Ion Mass Spectrometry, SIMS) have pushed the boundary of stable isotope analysis to a new level, allowing direct in situ measurement of rock samples, that can be correlated with textures (deformation) and imaging, offering the promise of new and fundamental information about patterns of isotope at the microscopic scale. Unfortunately, there are only about a dozen SIMS labs worldwide, and the cost of analyses is very high. I have been fortunate to have access to the equipment at the University of Lausanne (Switzerland), by collaborating on a project with Dr. Lukas Baumgartner. Graduate student Erica Lassen is currently investigating the effect of deformation on mineral geochemistry, and has been

traveling to Lausanne to use the SIMS and other analytical tools (Fig. 2).

Dr. Morra and I are pursuing our effort to build a robust numerical model for coupled groundwater and heat flow in porous media. Kyle Spezia's Master's thesis focused on benchmarking the groundwater flow model. Graduate student Daniel Conlin is currently benchmarking a model that couples groundwater and heat flow, in order to investigate fluid and heat fluxes, and the effect of buoyancy on groundwater flow.

Finally, I have been familiarizing myself with petroleum geology and the geology of the Gulf of Mexico, which I find very challenging. In particular, the nature of the crust in its northern margin is still poorly understood. I have been working with Dr. Gary Kinsland (UL-Lafayette), Dr. Robert Stern (UT-Dallas), and Dr. Kevin Mickus (Missouri State University) in an effort to mobilize the geologic community, in order to bring together academic, industrial, and government geoscientists in a coordinated effort to understand the geologic evolution of the Texas-Louisiana-Arkansas-Oklahoma-Kansas region. Dr. Stern, Dr. Mickus, and myself are organizing a workshop following the 2016 GSA Southcentral section meeting (March 21-22, Baton Rouge, LA). This workshop is intended to begin discussing possible topics for this research. If you are interested in joining the effort or take part in the conversation, please reach out to me!

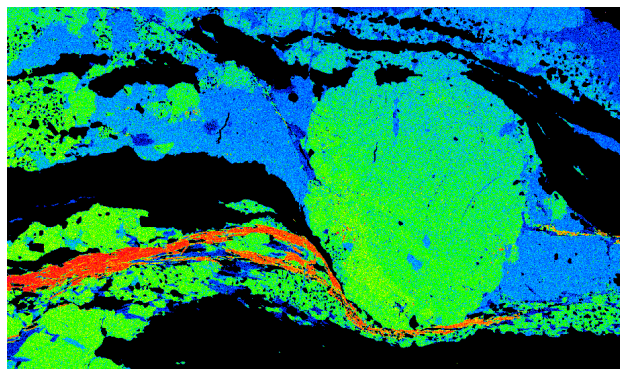


Figure 2: Elemental Map of Aluminum from a sample of the Bitterroot detachment shear zone, showing complex recrystallization and Al distribution in the plagioclase porphyroclasts.

Gary Kinsland

Three geological/geophysical accomplishments for this past year which might interest you are: 1) published a paper in the journal "Interpretation" about work done here on campus to interpret 3D geological data in true 3D virtual reality and how I think it is a superior way to interact with 3D data, 2) presented at South-Central GSA an hypothesis about the mode of deformation of the northern Gulf of Mexico (GOM) during the early phases of development of the GOM (you can find the PowerPoint online at the GSA and 3) actually dreamed up, organized and managed the collection of high resolution, surface-sourced seismic data in northern-central Louisiana... I have prepared a PowerPoint of this project and it is available at:

<http://geos.louisiana.edu/news-events/news>

Since my life consists of my career (see above), my family and being in the woods I will move on to the last two.

Our girls are now 17, Mikaila, and 15, Victoria... no you guys I am not sending pictures of them. They are each very successful students at Episcopal School of Acadiana (ESA) where they also play volleyball. Mikaila is now even a coach for the ESA Middle School team. Victoria is presently playing travel volleyball and was, as a sophomore, selected second team all-district at libero. She will start tennis again this year at ESA soon. Kellie still works at ESA but is now at the Lower School. Hunting required more patience this year than usual. I saw several deer for just moments before they disappeared... "ninja deer". Finally, got a couple with my 54 cal. Hawkins muzzleloader using a patched round ball... definitely old school. So, all in all, things are as they should be and it becomes clearer with each passing year that I and that cancer are no longer connected.

Brian Lock

I am officially retiring from UL at the end of the current semester, but will still be involved with the department. I shall teach a course or two most semesters as a way to ease into a life of excessive leisure.

Looking back on my tenure here, which started in 1977, and was preceded by 7 years on the faculty of Rhodes University in South Africa, my greatest satisfaction has been from working with over a hundred students completing M.S. theses (and some who never did finish). I have been involved in a lot of different research projects, including many with fieldwork in Mexico, Utah, and West Texas. I still have an interest in the Eagle Ford and other formations in the Texas Cretaceous. So far as I am aware, our 2006 paper was the first to suggest that the Eagle Ford had potential as an unconventional oil and gas play. Geology in the field has

always been my favorite aspect of this job, and when it can be combined with practical, economic applications, then it is at its most fascinating!

I am particularly proud of our students' success in the AAPG Imperial Barrel Award competition, which has brought a spotlight on our petroleum geology emphasis. We have been really fortunate to have as our industry sponsors Mary Broussard and Mike Quinn, of Freeport. They really are outstanding at guiding our young people. This year's team looks as strong as any we have fielded, and I hope that by the time most of you are reading this, that we will be able to add a footnote about another success. It is a great program and any student who has been on an IBA team, here or elsewhere, is well prepared to start work in the industry.

Jim Martin

For Jim Martin and the UL Geology Museum, 2015 was a very busy year. Much of the year was spent in the field in Oregon at Fossil Lake and elsewhere on the High Desert. In May, UL students and staff, including Cathy Bishop and Elisabeth Boudreaux, joined Martin in a field paleontology class to collect fossils and document the attendant geology. Cathy and Elisabeth collected samples for oxygen isotope studies to be conducted in collaboration with Brian Schubert. As a result of the expedition, thousands of scientifically important fossil vertebrates from the Pleistocene Fossil Lake area were added to the systematic collections at the UL Geology Museum. The students also participated in the excavation and documentation of a partial skeleton of a giant camel from Miocene deposits. The most complete skeleton ever found of this creature was collected by Martin and volunteers and brought to the UL Geology Museum housed in downtown Lafayette at the Lafayette Science Museum, thanks to private donations, principally from the membership of the Lafayette Geological Society. Preparation of the bones from the rock continues in the UL Preparation Laboratory, which is available for public viewing. Rhinoceros, rabbit, fish, elephant, and a horned ungulate were found with the camel bones. Activities now revolve around efforts to return to collect the remainder of the camel skeletons. If you wish to donate, please contact either David Borrok or Jim Martin.

Martin remained in Oregon through October and collected important specimens in the path of a major power line renovation. As a result, thousands of smaller fossils that allow determinations of the paleoenvironment on the High Desert from the Late Miocene and Pleistocene times were secured. The process of picking these specimens from anthills matrix and rock samples continues with the help of UL students who are paid from a grant awarded to Martin by the power company. Currently, 11 laboratory assistants have been hired, including undergraduate and graduate students, as well as four exceptional volunteers. By the end of the year, over 10,000 specimens were catalogued into the collections in the UL repository.

The Museum has benefitted greatly from the second exhibit in the Fossil Giants series. Cretaceous dinosaurs have been on display since April, and museum attendance has doubled again. The collaboration with the Lafayette Science Museum has been extremely beneficial, and many of our activities in the School of Geosciences can be shared with the public through the Museum. We are also excited about the arrival of another paleontologist, Dr. Jennifer Hargrave, who obtained her undergraduate degree from ULL. In addition to her teaching duties, she has become part of the Museum team.



Cathy Bishop and Elisabeth Boudreaux excavating a giant camel in Oregon.



UL Field Paleontology Class-2015-at Fort Rock, Oregon



Excavation of Giant Camel in eastern Oregon



Geosciences students working in the UL Geology Museum Preparation Laboratory in downtown Lafayette

Gabriele Morra

The year 2015 has been very intense for me. Teaching has presented me new challenges. In my calculus based Physics course in the Spring Semester I introduced a new approach for honor students. Before they were expected to solve some particularly complex physics problem using an analytical approach, while I have trained them to use computer programs to obtain the same results. This innovation has been very exciting for some students and quite challenging for others, but overall the response has been positive and inspired me to repeat the experiment. In the Spring semester I have also taught the graduate course "Computational Geophysics". This year the attendance has been minor, therefore next year I plan to change and teach "Multiphase Flow", which is more aligned with the priorities of the School of Geosciences and might attract more students.

In terms of research I continued the collaboration with Dr. Gottardi at the school of Geosciences and with Dr. Petculescu at the department of Physics. With Dr. Gottardi we develop numerical models of porous flow in crustal rocks. This year graduate student Kyle Spezia has completed his Master project using our tools. A new graduate student, Daniel Conlin, has taken over the project with the goal to fully model the coupling between thermal effects, pore pressure driven flow and surface deformation.

With Dr. Petculescu we supervise another graduate student, Brian Fischer, who initiated a new adventure by moving from geology to the department of physics where he is pursuing his second master. Our

Brian Schubert

The number of students conducting research in the lab has more than doubled in the last year, and we have expanded our analytical capabilities significantly. The lab group's first graduate student, Matthew Trahan, completed his Master's degree last year (Photo A) and his thesis was nominated by the Graduate School for the 2016 Conference of Southern Graduate Schools Master's Thesis Award. Matthew has since had his research published in the peer-reviewed journal, *Global Change Biology*.

Master's student Kristen Speice Grein has spent the past year diligently collecting and interpreting a large carbon isotope dataset from the pine tree samples she collected in early 2015 from near Lake Charles, LA. Her efforts earned her third prize at the Lafayette Geological Society poster competition at LAGCOE this past fall

project aims at understanding the dynamic causes of Strombolian activity, using a very innovative numerical approach applied to two-phase flow fluid, as gas plus magma, particularly efficient in 3D.

Another graduate student, Prasanna Mahesh Gunawardana, is now in the final part of his master project that focuses on the causes of deep earthquakes, down to 660 km depth. Coming from physics he had to work hard to quickly learn the basis of geodynamics and seismology while at the same time developing an innovative very efficient numerical solver that allows him now to calculate with high precision the stress inside tectonic plates.

In September 2015 it has been finally published, an AGU book on which I worked two years, for which I am the main editor and for which I wrote two chapters. It is available at <http://goo.gl/spga37>. In 2015 I have also published work on the dynamical effects of newly hypothesized viscosity hills in the lower-mantle due to iron spin transition. I contributed by writing software able to model the size of rising plumes in the lower mantle and by establishing a link between the size of the high viscosity regions and the size of the Large Igneous Provinces (LIPs).

From the personal point of view it has been a challenging year since I took a year leave to go stay in Switzerland for family reasons. I sincerely thank my departments and the College of Sciences for granting me this possibility. I plan to return this summer to work with more energy and enthusiasm than before.

(Photo B). She successfully passed her oral comprehensive exam and is now working on writing her thesis.

Collin Moore is wrapping up his lab work to painstakingly extract fossil cellulose from wood collected in far northeastern Siberia. Friend and colleague, Bill Hagopian, came all the way from the University of Hawaii to share his expertise with the chemical extraction procedure (Photo C). Collin puts in long days in front of the chemical fume hood in order to obtain microgram quantities of fossil cellulose for his analyses. With all of this effort, Collin hopes provide new data on Miocene climate in the East Siberian Arctic.

Steve Nevitt has continued with his highly interdisciplinary Master's thesis project with faculty in the Physics and Geology Departments as well as USGS researchers, and he presented his preliminary research

on the effects of tropical cyclones on sedimentation in the Louisiana Chenier Plain to the lab group this spring. For his thesis, he plans to quantify environmental change in this region using highly detailed chemical analyses of sediment cores taken from this region.

The lab also welcomed new graduate students, Rose Telus, Umatu Orike, and Taylor Chapman in the last year. Rose graduated from our department with her Bachelor's degree in 2015 (Photo D), and immediately transitioned into the Master's program. Umatu joined us after completing her undergraduate degree in Geology at the University of Port Harcourt in Nigeria. She has experience working in the lab of a drilling fluids company and will expand on these skills as a graduate student. Taylor received his Bachelor's degree at the University of Kentucky and has worked previously on black shales from the Midland Basin. Each of these students are taking classes this year, gaining lab experience, and actively participating in lab group discussions and research in preparation for their own thesis work.

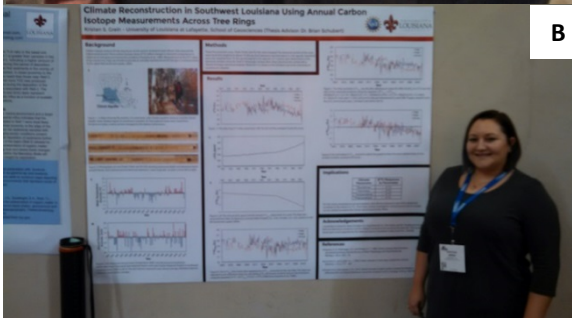
Ying Cui also joined the lab in 2015 as a Postdoctoral Research Associate after graduating with her PhD from Penn State University. She is working with me on several projects funded by the Department of Energy and is actively engaged in student research. She plans to teach an introductory geology class this summer and regularly gives guest lectures within upper-level classes. In her short time with the lab so far, she has published her work in the journal, *Geochimica et Cosmochimica Acta*, and has given multiple presentations at national meetings.

Yingfeng Xu continues to have an immense and multi-faceted impact on the early success of the stable isotope facility. She works daily with all the students and researchers who use the lab, and worked diligently in this past year to get the new High Temperature Conversion Elemental Analyzer and other equipment up and running. Please see her update for more details on the full year that she has had managing the growing technical capabilities of the School of Geosciences and developing a new instrumentation course.

As for me, I am teaching a new graduate-level stable isotope course this spring, and continue to teach geochemistry, clay mineralogy, and introductory geology courses each year. The lab continues to have researchers from across the university using our facilities and we look forward to more cross-department collaborations in the future. It is wonderful to have the lab so busy and I am invigorated by all the exciting new work coming from the lab group in recent months. Last, but not least, we welcomed a new baby boy, Alex Ryan, to our family this past fall. He and his big brother are getting along great and keeping us very busy!



A



B



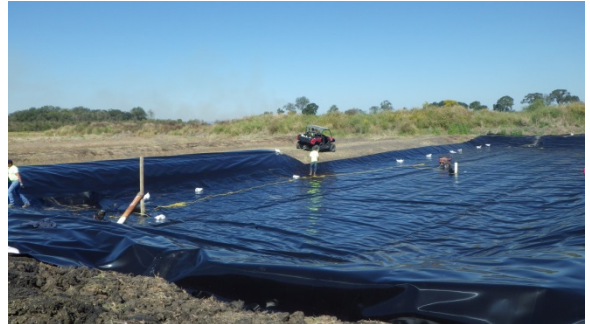
C



D

Jenneke Visser

In 2015, I have continued to work on my three research areas. The first is the continuing saga of the Cade wetland creation project and the struggle with weather related delays. But progress has been made. In November, the liners for the brackish ponds were installed with not a day to spare. The next day, we had a extreme rainfall which filled the ponds to the brim. Now we are waiting for another dry spell to refill the ponds and create an elevation gradient similar to that already present in the freshwater plants. In the meantime, we have multiplied our marsh plants with a group of UNIV100 volunteers. My second research area is the wetland vegetation modeling in support of the 2017 Coastal Master Plan. Our model is a sub-model in the Water Institute of the Gulf's Integrated Compartment Model (ICM). We were able to calibrate the model using the coastwide reference monitoring system (CRMS) data and were able to predict changes in the dominant species with greater than 80% accuracy. Currently, the ICM is used to evaluate the effects approximately 200 proposed projects to inform the selection of projects for the 2017 update of the master plan. The last project is the continued development of indices to summarize the CRMS data and provide succinct and easy to understand information to coastal managers. These indices are used both to evaluate the overall ecosystem health of the coast as well as aid in the evaluation of restoration project performance.



New Faculty and Staff

Jennifer Hargrave



Dr. Hargrave joined the faculty of the School of Geosciences this January as an Instructor for geology and a museum research scientist. Dr. Hargrave is a ULL alumnus, graduating in 2000 with a B.S. in Geology. She received her Master's in Vertebrate

Paleontology from the South Dakota School of Mines and Technology in 2004. She then received her Ph.D. from the University of Oklahoma in 2009 in geology with a focus in vertebrate paleontology. After graduation, she spent two years as a post-doctoral researcher at

Syracuse University, conducting a study on lacustrine carbonates on Lake Turkana, Kenya. Dr. Hargrave has travelled to every continent, conducting research in North America, Antarctica, Australia, and Africa. Upon completing her post-doc, she then made her way to Southern Utah University, spending the last five years as an assistant professor of geology and as the university resident paleontologist.

In addition to teaching, she will be splitting her time at the Lafayette Science Museum. Dr. Hargrave's current research includes the numerous Pleistocene fossil birds from Fossil Lake, Oregon. Additional research interests include paleontology, sedimentary processes, depositional systems, and geoscience education and outreach. She is very happy to return to her undergraduate alma mater and South Louisiana with her husband and son.

Research Highlights

Carl Richter

Carl Richter spent a busy year working on the magnetics of deep-sea cores from the North Atlantic and the West Greenland Margin, in addition to continued work on projects in environmental magnetism and participating in two research expeditions near the Deepwater Horizon site in the Gulf of Mexico on the R/V Pelican. He presented preliminary results of a major research project funded by the National Science Foundation into resolving centennial scale geomagnetic field variability and environmental change of the Mediterranean Outflow Water at the West Iberian Margin at the American Geophysical Union (AGU) Fall Meeting in San Francisco together with graduate student Oludamilola Adesiyun, Gary Acton from Sam Houston State University, Ken Verosub from UC Davis, and Chuang Xuan from Southampton Oceanography Center. Lindsey Horton has moved to Sacramento and is finishing her thesis project on the top part of Site U1389 from there. Graduate student Alex Dixon, is still in the process of analyzing the anisotropy of magnetic susceptibility of these cores with the goal of determining the current strength and direction of the contourite system. Carl just started working together with graduate student Sean Jensen on high-latitude records of the geomagnetic field recovered from the West Greenland Margin. Together with graduate students Othman Elhelou, and Delmetria Taylor, the long-term project on the environmental impact of heavy metal pollution using magnetic susceptibility screening, which was started with former student Hannah Vedrines and Bill Schramm from the LDEQ continues in Baton Rouge and surroundings. Othman presented his work at the AGU meeting in San Francisco, graduated with an M.S. degree, and now works for EnCana Oil and Gas in Denver. Together with Peter Clift from LSU Carl co-supervised Tina Hoang's thesis project on sediment processes in the Gianh River, Vietnam. Tina successfully defended her thesis and works for Denbury Resources in Texas. Carl is currently in his second year as president of the Southwest Louisiana Geophysical Society and hopes to find a replacement for this position soon.

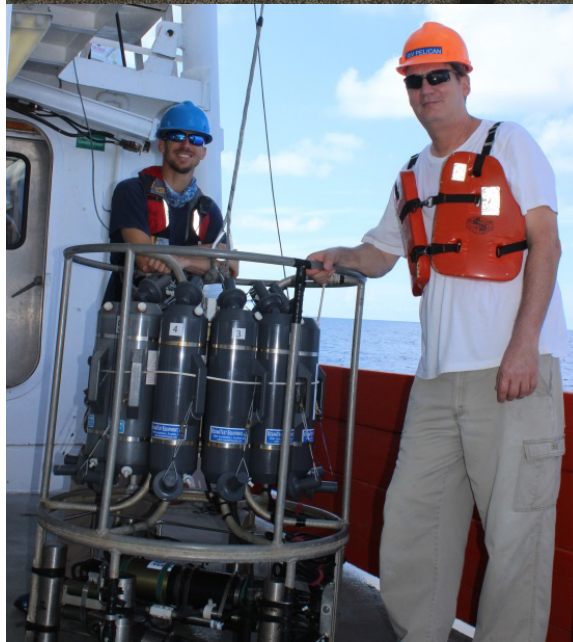
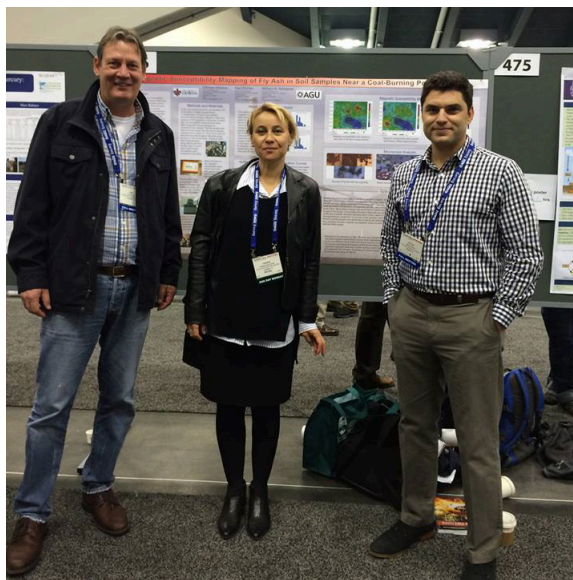


Figure captions: Top, Carl Richter, Natalia Sidorovskaia (UL Physics), and Othman Elhelou in front of Othman's poster at the Fall Meeting of the American Geophysical Union in San Francisco, December 2015; Middle, Alex Ren and Carl Richter with the CTD Instrument on the R/V Pelican before deployment; Bottom, Top, Dolphins following the R/V Pelican in the Gulf of Mexico.

Rui Zhang

Two graduate students (Jude Alekhue and Zachary Ghalayini) attended SEP program during SEG Annual meeting in New Orleans.

About the SEG/ExxonMobil Student Education Program

The SEG/ExxonMobil Student Education Program (SEP) (www.seg.org/students) is a focused, two-and-a-half day program focused on multidisciplinary subsurface integration aspects of geophysics, including lectures and exercises. ExxonMobil provides course materials and team exercises, along with top-notch instructors who facilitate the courses and provide individual attention to students. The SEP is held 3-4 times a year in the United States, Europe, and either Russia or the Middle East, and each session accepts 18-32 applicants to the SEP in their geographic area.



Jenneke Visser



Dr. Jenneke Visser was a member of STUDIO MISI-ZIIBI one of the three design teams named as winners of the international changing course competition (<http://changingcourse.us/competitors/studio-misiziibi/>). Changing Course is one of the

largest global design competitions ever conducted to find solutions to the most vexing problems facing coastal communities threatened by violent storms, rapid land loss and rising seas. It has brought together 21 teams of top engineers, planners, designers, scientists and coastal experts from around the world to create innovative visions for one of America's greatest, and most threatened natural resources. From the initial 21, eight teams were selected to develop proposals for how to approach the problem. From these, three teams were selected as finalists to develop ideas and concepts and these teams were ultimately declared the winners of the

competition. The state of Louisiana already has agreed to consider the technical innovations of the three winning Changing Course teams in its coastal planning. Changing Course is mentioned specifically in the RESTORE Council's draft Funded Priorities List—as a source of solutions and ideas for the \$9.3 million study of the Lower River by the State of Louisiana and Corps of Engineers. While each of the winning teams offered a different vision, all three identified the same key requirements as critical to sustaining the Mississippi River Delta today and into the future:

- Reconnecting the Mississippi River to its wetlands to help restore southeast Louisiana's first line of defense against powerful storms and rising sea levels.
- Planning for a smaller, more sustainable delta, including a gradual shift in population to create more protected and resilient communities.
- Protecting and maximizing the region's port and maritime activities.
- Increasing economic opportunities in a future smaller delta through expanding shipping capacity, coastal restoration infrastructure, outdoor recreation and tourism and commercial fishing.

Durga Poudel - Bayou Chene Water Quality Sampling Project Continues

The Bayou Chene and the Lacassine Bayou in southwestern Louisiana, both listed under 303(d) list of impaired waterbodies, flow through the Mermentau River Basin which is the focus area for USDA's Mississippi River Basin Initiative (MRBI). Both Bayou Chene and the Lacassine Bayou fully supports Primary Contact Recreation (PCR) and Secondary Contact Recreation (SCR), but do not support fish and wildlife propagation (FWP). The draft 2010 303(d) lists Fipronil, lead, mercury, and Dissolved Oxygen (DO) for Bayou Chene and it lists lead, mercury and low DO for Lacassine Bayou, as the causes of impairments. The suspected sources of DO impairment include irrigated and non-irrigated crop production for Bayou Chene, and irrigated crop production, managed pasture and natural conditions for Lacassine Bayou. To document water quality changes following the implementation of Best Management Practices (BMPs) through funding from the USDA NRCS under the (MRBI) and incremental Section 319 funds provided to LDAF for BMP implementation, Dr. Durga D.

Poudel and his research team, with funding support from LDEQ, started monitoring surface water quality in the Bayou Chene and Lacassine Bayou in 2012. The original nine water quality monitoring locations in the two waterbodies were later expanded to 15 locations. Various water quality parameters monitored included dissolved oxygen, turbidity, conductivity, pH, temperature, sediments, nutrients, and biological oxygen demand. Biological sampling was also conducted at predetermined locations within the watersheds on a semiannual basis. The time frame of the biological sampling events included late spring/early summer (May through June) and late summer/early fall (September through October). The biological sample collection was done for fish and macroinvertebrates. While water quality monitoring in Lacassine Bayou ended in June, 2015, water quality sampling in Bayou Chene will continue until September, 2017.

New Thermo Scientific™ Niton™ portable X-ray Fluorescence Analyzer in Geology

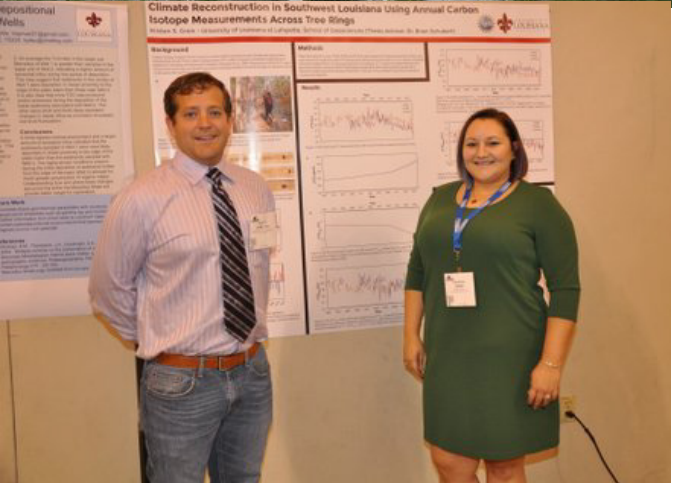
Thanks to a generous donation from the Lafayette Geological Society, our Geology program recently purchased a hand-held XRF instrument. XRF technology allows for the in-situ analysis of elemental concentrations in media such as rocks, minerals, soils, and even in biological samples and industrial materials. XRF analysis is rapid and non-destructive. The instrument has already been used for a variety of research projects. For example, graduate students Tim Shane, Ethan VanHazebroeck, Kody Shellhouse, and Hunter Lipman have used the XRF to analyze major and trace element concentrations in hydrocarbon source rocks, including the Eagle Ford Shale, Midway Shale, and Marcellus Shale. The inorganic chemical analysis of these rocks can be paired with organic chemical analysis via Rock Eval™ Pyrolysis (an instrument we also have in-house) for a more complete characterization. These data are most often used for chemostratigraphic comparisons

and/or to evaluate paleodepositional environments. Another graduate student, Delmetria Taylor has been using the XRF instrument to evaluate heavy metal contaminants in soils in the Baton Rouge area. The instrument has also been used in courses such as mineralogy to help identify unique mineral specimens.



2015 in Pictures





Gifts to the School

We would like to thank all those who donated to Geology in 2015

☞ Donations up to \$1000 ☛

*Insurance Management
Consulting and
Auditing Services, Inc.
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☞ Donations \$1000 to \$5000 ☛

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☞ Donations > \$10,000 ☛

Lafayette Geological Society

Edmond Solymosy

Student Honors and Awards

Graduate students Scott Hamilton, Tim Shane, and Kristin Speice won first, second, and third place, respectively, at the Lafayette Geological Society student poster competition held during the 2015 LAGCOE.

Geology Students

Bill Paine/LGS Endowment Scholarship

^(†)*Jude Alekhue*, ^(†)*Jade Bujard*, ^(†)*Feng Chen*, ^(†)*Ben Lissard*, ^(†)*Hunter Lipman*
^(†)*Umatu Orike*, ^(†)*John Reese*, ^(†)*Annalièse Rouse*, ^(†)*Austin Shotwell*

Eberhart E. Leschin Scholarship

^(†)*Michael Foster*

Imperial Barrel Scholarship Fund

^(†)*Duncan McIntosh*, ^(†)*Timothy Shane*, ^(†)*Logan Adams*, ^(†)*Jade Bujard*, ^(†)*Daniel Conlin*

Joe Battle/LGS memorial geology scholarship

^(†)*Kristin Speice*, ^(†)*Delmetria Taylor*

Marathon Oil Scholarship

^(†)*Kody Shellhouse*, ^(†)*Oludamilola Adesiyun*

Nolan Badeaux Endowed Scholarship

^(‡)*Peace Eze*, ^(‡)*Spencer Stelly*, ^(‡)*Rose Tellus*,

Paul Toce Endowed Geology Scholarship

^(‡)*Gage Seaux*, ^(‡)*Aro Terrell*, ^(‡)*Daniel Richard*, ^(‡)*Preston Caine*

Pogo Producing C. Scholarship

^(‡)*Joshua Cecil*

School of Geosciences Scholarship

^(‡)*Alexis Blair*, ^(‡)*Charles Doll*, ^(‡)*Eric Theriot*

Tim Dore Geology Scholarship

^(‡)*Ross Ledoux*, ^(‡)*Abigail Breaux*

The Walter Rudick Endowed Scholarship in Earth Sciences

^(‡)*Coty Dubois*

Bill & Heather Finely Non-Endowed Geosciences Scholarship

^(†)*Joseph Morris*

Sigma Gamma Epsilon Field Camp Scholarship

(*)*Rose Telus*, (*)*Matthew McLain*

Marvin & Hazel Harvey Morris Endowed Geology Scholarship

(*)*Amy Sylvester*

Hugh Allen Bernard Memorial Geology Scholarship

(*)*Joseph Chapman*, (*)*Byron Ebner*, (*)*Brittany Fuller*, (*)*Natalie Merrell*
(*)*Minh Nguyen*, (*)*Matt Richard*, (*)*John Williams*, (*)*Gage Seaux*

Fieldcamp Scholarship

(*)*Cari Creed*, (*)*Byron Ebner*, (*)*Michael Foster*, (*)*Natalie Merrell*
(*)*Minh Nguyen*, (*)*Fabiane Santos*, (*)*John Williams*,
(*)*Terri Bannister*, (*)*Michael Berkland*, (*)*Shanna Mason*

Southwest Louisiana Geophysical Society Scholarship

(*)*Terri Bannister*, (*)*Fabiane Santos*, (*)*Daniel Sutton*
(*)*Shanna Mason*, (*)*Daniel Sutton*

(†) Graduate Students, (*) Undergraduate Students

Scholarships Awarded to Twenty-Five Students in the Environmental Science Program

The Environmental Science Program in the School of Geosciences has ten endowed scholarships and one non-endowed available for full-time students. The endowed scholarships in the Environmental Science Program are South Louisiana Mid-Winter Fair Association Endowed Scholarship, Charles Joseph Miller & Vivian Melancon Miller Endowed Scholarship, Dr. S.L. Solymosy Memorial Endowed Award, Tommy Sander Endowed Scholarship, Mary Sandoz- Brown Endowed Scholarship, Farmers-Merchants Bank Endowed Renewable Resources Scholarship, Dr. Gonzales/Dean Fletcher Endowed Scholarship, Charles and Julia Walker Bourque Endowed Scholarship, Overton Cade Memorial Endowed Scholarship, and ULL Collegiate FFA Endowed Scholarship. The B. Lafleur/L. Soileau Memorial Scholarship is a non-endowed scholarship in the program. Applications are evaluated based on stipulated eligibility requirements in the Scholarship Endowment Agreement document and the scholarships are awarded to the students who best meet the criteria. At the beginning of the Spring, 2016 semester, a total of \$17,650 was awarded to twenty-five students majoring in the Environmental Science Program.

Dr. Durga D. Poudel
Coordinator, Environmental Science Program, School of Geosciences.

A trip down memory lane...



This picture, taken June 2002, shows most of the faculty at that time: Drs. Alan Bailey, Tim Duex, Brian Lock, Mrs. Melinda Tucker and Dr. Dan Tucker. The Tuckers retired May 2003 and live in Arizona. Dan keeps in touch with us, posting numerous nature and scenery photographs, his hobby.

Degrees Granted in 2015

Spring 2015

Bachelor of Science in Geology

Kaitlin M. Cummins

Bachelor of Science in Environmental Sciences

Matthew Greene, Terrance Boyle

Master of Science in Geology

*Othman Elhelou, Todd Landry, Ayokomi Lasisi,
Keith Moore, Matthew Trahan, Sydney Weikunaut*

Fall 2015

Bachelor of Science in Geology

*Ross L. Couvillon, Natalie Merrell,
Morgan E. Richard, Gage E. Seaux, Rose G. Telus*

Bachelor of Science in Environmental Sciences

Christopher Holland, Taylor Kall, Morgan Pellegran

Master of Science in Geology

*Michael T. Berkland, Jason D. Dayley, Jake M. Guynes,
Scott M. Hamilton, Jolie M. Helm, Kyle A. Spezia, Daniel S. Sutton*

Upcoming Events

Gulf Coast Association of Geological Societies



Meet us at the 66th Annual Convention of the Gulf Coast Association of Geological Societies hosted from September 18-20, 2016 by the Corpus Christie Geological Society.



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

FOSSIL GIANTS: Dinosaurs and Mammals opened to the public Saturday, April 1st, 2016. The Lafayette Science Museum is located at 433 Jefferson Street, Lafayette, Louisiana in the heart of Downtown. Call 337-291-5544 for more information.

School of Geosciences Annual Crawfish Boil

Saturday, April 30th
12:00 NOON
UL Lafayette Alumni House

\$35 per person
Call 337.482.6647 to reserve your tickets today!

How to support Geology or Environmental Science

We would like to call your attention to a special fund we are starting in honor of Brian Lock's retirement. The Student Technology and Research Endowment Fund will support student research-related travel, equipment, sampling, analysis, and other related costs. Undergraduate and graduate students will submit applications for research money that will be competitively awarded on an annual basis. If you would like to learn more and donate to this fund you can do so by using the following web address.

<https://ullafayette.ejoinme.org/geology>

Donations to other funds or general donations can still be made. Unfortunately our university foundation has made it uniquely difficult to donate directly to Geology or Environmental Science on their website, so we suggest 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 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 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. We suggest that donations greater than \$1000 be directed here.
3. **The UL Geology Museum Fund (#21683).** This is a non-endowed fund that supports our Geology Museum. We are currently raising funds for students to return to Oregon to collect additional giant camel fossils.
4. We encourage **Environmental Science** donors to use the **UL Lafayette Environmental Science Fund (#05681-2).** 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.