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The School of Geosciences Newsletter

Inside This Issue

Greetings from the Director

It is my great pleasure to present to you our 2014 newsletter! 2014 was a really exciting year for the School of Geosciences. Our student enrollments were the largest we've had in about a quarter century. We had 69 graduate students and 98 undergraduates in our Geology program and 69 undergraduates in our Environmental Science program. Our geology graduate students won the American Association of Petroleum Geologist's Imperial Barrel Award Competition at the national level for the second time. UL Geology is the only two-time winner of the international competition (2012 and 2014). I think we can say without a doubt that we are one of the top academic programs in the nation in the area of Petroleum Geology.

2014 also marked a number of "firsts" for the Geology program and the School of Geosciences. With the help of our Advisory board and some generous donations, we held our first ever alumni reception/event at the AAPG convention in Houston. This was a great event, attracting close to 100 alumni and friends. We had a blast and hope to do it again soon! In 2014 we opened our inaugural joint exhibit with the city of Lafayette and the Lafayette Science Museum in our new geology museum space downtown. The "Fossil Giants" display focused on Jurassic dinosaurs. The presence of this enormous display more than doubled the attendance at the Lafayette Science Museum in 2014. We hope to get similar numbers when we switch to a new Cretaceous dinosaurs exhibit in April 2015. In addition to the amazing displays (both fossil and mineral), we opened a new research space in the museum and established a federally-certified fossil repository. Last summer alone our paleontologist, Dr. James Martin, and students returned, prepared, and curated over 900 fossil specimens from Oregon. This year, if we can secure the funding, Dr. Martin hopes to lead an expedition to unearth 7-million year old giant camel fossils. Finally, in 2014 (with help from our advisory board) we held one of our first-ever organized fundraising events for the Geology program. The "30-in-30" campaign was held through the month of October with the goal of raising $30,000 in 30 days. With your help, we were successful in reaching our goal! We are using this money to make badly-needed upgrades to our computer lab.

We further strengthened our programs in 2014 by adding two new faculty members (see the faculty spotlight sections within the newsletter for more details). Dr. Rui Zhang is an exploration geophysicist that we hired for the Geology program. Dr. Zhang specializes in seismic processing and uses these skills to address a variety of problems, including petroleum exploration and CO_2 sequestration. Dr. Katie Costigan is a fluvial geomorphologist that we hired for the Environmental Science program. Dr. Costigan specializes in the hydromorphology of intermittent rivers, as well as the links between ecology and river function.

In summary, 2014 was a really big, successful, and groundbreaking year for us – one that we are likely to reflect on for many years to come. With the continued success of our students, faculty, and alumni, our Geology program is becoming a widely-known and premier destination for students from all around the U.S. Our Environmental Science program is similarly growing and looking to be equally successful as it moves forward.

Sincerely,
David Borrok

Faculty and Instructor Updates

David Borrok

2014 was a really fun and busy year for me. I enjoyed developing and teaching a new graduate-level course in Mineral Exploration. The course included a field trip to tour 3 giant porphyry Cu deposits to New Mexico and Arizona (Chino, Safford, and the Mission Mine). I had worked in this district as an exploration geologist many years ago and was able to use some of these old connections to organize the trip.

I managed to get quite a bit of research done in 2014 as well. I published 3 new journal articles and 5 conference proceedings. I was also invited to talk at several professional meetings, including a graduate seminar at the University of Southern Mississippi. The National Science foundation awarded me (and a great group of collaborators from UL and McNeese State University) a $600,000 grant to investigate ways to sustain surface and groundwater resources in Southwestern Louisiana for the future (http://www.nsf.gov/news/news_summ.jsp?cntn_id=132501). Komi Lasisi and Nick Geyer are finishing up their thesis projects dealing with iron isotope geochemistry and petroleum geochemistry, respectively.

Ethan VanHazebroeck is working on a petroleum geochemistry project, looking at the organic and inorganic geochemistry of the Eagle Ford. Christian Monlezun and Daniel Conlin are working on thesis projects dealing with water resources and geochemistry.

UL Geology graduate students from the Mineral Exploration class posing for a photo outside the Globe-Miami mining district in central Arizona.

Timothy Duex

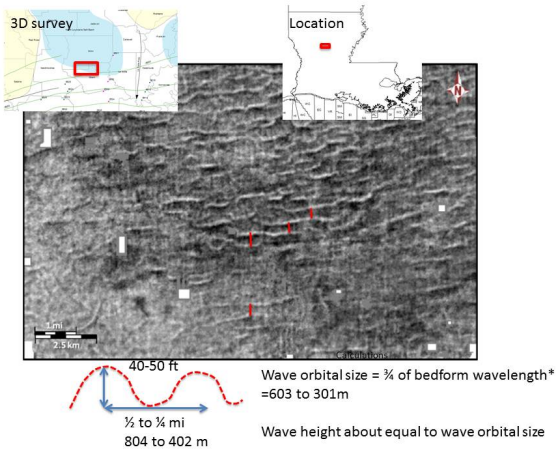
Here's a brief summary of last year's events which includes continuation of many projects started previously, such as work in Big Bend and hydrology studies in Louisiana as well as the Nepal project (see Research Highlights). I continue to teach many of the same courses as before, including Physical Geology, Mineralogy, Petrology, and Environmental Geology, all of which have the largest enrollment in my 30 years at this school, as well as graduate level courses. Field camp was offered this past winter in Big Bend and those of you who have gone in the winter know that it can be quite cold. This year was no exception and a sleet storm closed the roads and iced us in the campground. As you probably guessed the students were extremely disappointed and had to spend time in the coffee shop re-drafting notes and making cross sections. We are taking our usual swing through the western U.S. in the summer of 2015 and are planning to offer field camp again in 2016 and possibly also in 2017 due to the increased number of students, as noted above. If you're going to be in the vicinity of where we are (check the itinerary on the Geology web site) let us know and we can get together and trade stories.

In terms of the family, all is going well with only a few problems. Cathie and I both had some back problems but hers was a bit more serious. Last November she had a cyst removed from her spinal cord and has gradually recovered since then. Back to her old self, doing yard work, planting flowers, cutting tree branches and trying to keep me in line. We try to get together with relatives as often as possible, including our five grandchildren who continue to amaze me with how fast they are developing, or is it how rapidly we are aging? Hmm. That's all for now, but keep in touch and come by and visit sometime as did many alumni during the GCAGS convention which was held in Lafayette last October. It was good to share with them many of the changes that have taken place recently, not the least of which is the new Geology Museum which is housed in the Lafayette Science Museum in the old downtown part of the city. If you haven't had a chance to see it you should plan on visiting soon because the displays change regularly. There's a lot of stuff from the old museum which we never had space to display and some pretty amazing dinosaur replicas. I hope all is going well with everyone.

Gary Kinsland

On the research side, the northern Louisiana coal mapping effort is winding down as most of the area of coal concentration has now been mapped, detailing the thicknesses of the two main coals: Reynolds and Russell. It's good that we are finishing up as the feds cut funding for coal projects and we have no more funding through the National Coal Resource Data System. Dr. Rui Zhang and I are continuing the relationships with northern Louisiana explorationists which developed during the coal studies. We are pursuing surface sourced high resolution seismic studies to image the shallow Wilcox Group strata from which oil and gas have been produced for decades without the benefit of being properly imaged with seismic data. Dr.Raphaël Gottardi and I are engaged in regional structural studies of the northern boundary of the Gulf of Mexico Basin (GOMB) in Texas, Louisiana, Arkansas and Mississippi. It is amazing how little is known about this plate tectonic boundary from the Neoproterozoic to now.

I include an image of the top of the Cretaceous from a seismic volume donated to us by Devon. Three students have studied this volume; Dan Han for Wilcox Gp. coals, Kaare Egedahl flattened the volume to study stratigraphy and found this image and Martell Strong sought explanations for the image. Note that the "ripples" are on the order of one-half mile wavelength and more than 50 feet (compacted) in height. Our



working hypothesis is that the features are the result of the Chicxulub Impact tsunami. (See publications by Egedahl et al. (2012) in GCAGS and Strong and Kinsland (2014) GCAGS abstract and on line here.

On the personal side, surprising as it seems, at least to me, Mikaila is now 16 and Victoria is 14 (she insists "and a half"). They are both students at Episcopal School of Acadiana (ESA), both volleyball players on the varsity. Victoria is the starting libero and is honing her skills in travel volleyball. Mikaila's passion is scuba diving. She has been to Roatan Island in Honduras the past two years and is certified to 100 feet. This summer they will both spend some weeks there. Kellie works in the development office at ESA.

Carl Richter

Carl Richter spent the past year working on deep-sea cores from the North Atlantic, the West Greenland Margin, and the West Philippine Basin. In addition, he continued working on projects in environmental magnetism and magnetic anisotropy. With Jason Ali, a colleague from the University of Hong Kong, he published results from geomagnetic investigations into the movement of the Philippine Sea Plate during the past 50 million years in Earth and Planetary Science Letters.

He presented first 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 in Tarifa (Spain) and the AGU Fall Meeting in San Francisco together with graduate students Lindsey Horton and Gary Acton from Sam Houston State University. Graduate student Oludamilola Adesiyun has taken on the task of finishing the analysis of the deeper part of the recovered section. Graduate student Alex Dixon, is 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. Results from this project were published by Carl and a team of 35 scientists from 14 countries in the journal *Science*, which was well received by the local media.

Carl has been working together with graduate student Sarah Maxwell on high-latitude records of the geomagnetic field recovered from the West Greenland Margin. Sarah is in the process of finishing her thesis research and results will be published shortly.

Together with graduate students Othman Elhelou, Lauren Stiles, 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. Lauren presented her work at the Lafayette GCAGS convention, graduated with an M.S. degree, and now works for the Bureau of Ocean Energy Management.

Jenneke Visser

I have several research projects that are ongoing including the development of a wetland research facility at Cade, vegetation modeling for the development of the 2017 State Master Plan for Coastal Restoration and Protection as well as feasibility studies for some of the projects in the 2012 Master Plan, and working with the analytical team for the Coast-wide Reference Monitoring System (CRMS).

The wetland research facility at Cade will be completed this summer. This project has suffered some serious delays, because we are waiting for the right weather to install the liner that will separate the brackish wetlands from the local groundwater. In the meantime, electricity work has been done so that the pumps for the tidal flow among the ponds can be installed as soon as the groundwork is completed. Institute for Coastal Ecology and Engineering personnel with undergraduate student assistants installed the support posts for the hydrology gauges which will measure stage, salinity, temperature, pH, and dissolved oxygen in the water column. These barely used gauges were donated to UL Lafayette by Coastal Protection and Restoration Authority (CPRA) and Aqualab Scientific donated the dissolved oxygen sensors. In addition, sediment elevation tables have been purchased and will be installed when

Post installation team at the wetland research facility

boardwalks to access the center of each wetland are installed. We are planning to use these wetlands for teaching about wetland processes, wetland monitoring, and student research projects.

Last summer, my graduate student in Biology David Horaist and I collected sediment and vegetation cover data from 16 sites across the coast. David has completed a seedbank study on the collected sediment and we are using this information for estimating plant dispersal for our vegetation model. Dr. Scott Duke-Sylvester (Biology) and I have been working with a large team lead by the Water Institute of the Gulf to integrate updated hydrology, wetland morphology, barrier island morphology, and vegetation models into one integrated compartment model (ICM). The ICM will be used to evaluate coastal restoration and protection projects for inclusion in the 2017 Master Plan.

CRMS is the monitoring program for the Coastal Planning Protection and Restoration Act (CWPPRA) program. CWPPRA has constructed over 100 coastal restoration projects in Louisiana. CRMS collects stage, salinity, temperature, vegetation, elevation, accretion, and landscape change information at 392 stations. CRMS stations were installed in 2006 and have been continuously monitored to the present. This provides a lot of data, which may not be easily interpreted by CWPPRA agency personnel. The CRMS analytical team is led by the USGS with input from CPRA and I am the only University Scientist on the team. The team analyzes the CRMS data and has developed and is continuing to develop indices that assist managers with the interpretation of the data. These indices are displayed in report cards for individual sites as well as for each CWPRRA project. Check it out at http://lacoast.gov/crms2/Home.aspx

Brian Schubert

Brian Schubert returned to Russia last summer to collect modern and fossil wood samples from far northeastern Siberia (picture A). Brian and his colleagues are working on a National Science Foundation funded project to better understand past climate change. The team has successfully extracted cellulose molecules from the fossil wood pieces, which can be analyzed for their carbon and oxygen isotope values. These values reflect changes in atmospheric chemistry, temperature, and precipitation during the tree's growth. This summer Brian plans to return to Russia to explore new field sites in western Siberia with potentially older plant fossils.

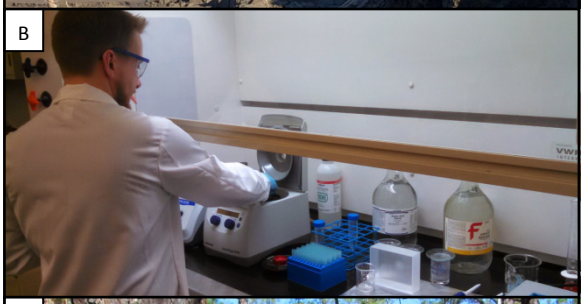
The samples collected during the 2013 and 2014 field campaigns are now being used by graduate students Matthew Trahan and Collin Moore to understand how the Arctic environment has changed in response to natural and anthropogenic forcings. This work entails long hours in the lab in order to subsample and prepare the samples for stable isotope analysis (picture B). Yingfeng Xu, our dedicated lab technician, is carefully helping to train everyone in the lab on the geochemical methods used. She was also instrumental in getting our new High Temperature Conversion Elemental Analyzer up and running, allowing us to expand our capabilities to measure oxygen isotopes in organic substrates.

Several students are working on samples from closer to home. Master's student Kristen Grein spent time in a native prairie habitat near Lake Charles collecting tree cores for her thesis project (picture C). She will be using these new samples, collected from old growth pine, to study how climate has changed in southwestern Louisiana over the last 150+ years. Rose Telus (picture D), who has worked in the lab during her junior and senior years, plans to graduate this year with a Bachelor's degree in Geology. Rose is working on an independent undergraduate research project through the McNair Research Program to collect high-resolution geochemical data to be used in a model for better understanding variability in precipitation in south-central Louisiana. Master's student Steve Nevitt (picture E), who has been working with USGS researchers during the past year, will be beginning work in the lab to develop a carbon isotope chronology from sediment cores he collected from near the Louisiana gulf coast. Steve spent the past semester dating the cores using ^{137}Cs with Dr. Meriwether in the Physics Department. Last, Ying Cui joined the group as a postdoctoral research scientist this January. She graduated with her PhD from Penn State University and will be working on a project funded by the Department of Energy to study terrestrial organic matter preserved in the fossil record.

We are excited for all the new student projects and are looking forward to another productive year!

A

B

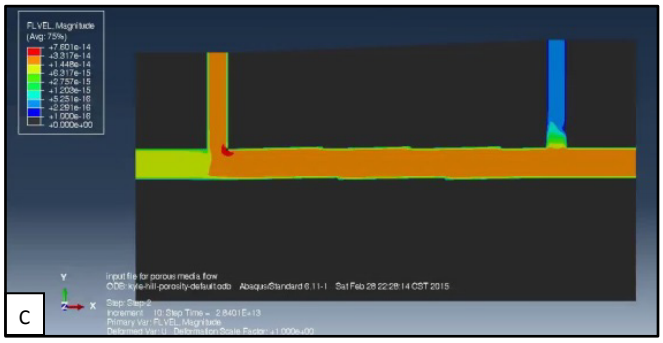


C

D

E

Raphaël Gottardi



It has been a busy year for me at the School of Geosciences. I am pursuing my research on metamorphic core complex. Graduate student Michael Berkland and I traveled to Southern Arizona last summer to do some fieldwork and collect samples from various detachment shear zones (photo A). The first goal of this project is to investigate the thermomechanical evolution of shear zone at the ductile/brittle transition. Structural and microstructural analysis will yield critical information about the parameter that control the deformation and kinematic of the shear zone (temperature, stress, strain rate, fluid activity).

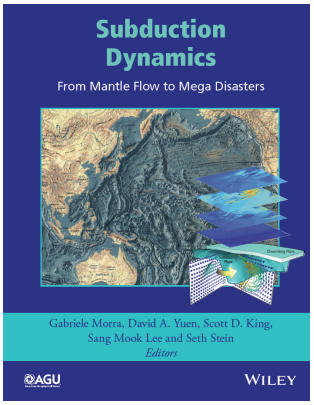
The second goal of this project is to investigate fluid/rock interaction in extensional systems. Graduate student Max Shaper will be analyzing the stable isotope composition of various metamorphic minerals to identify exhumed fluid pathways, recharge, and discharge areas, and provide a better understanding of crustal-scale fluid flow in areas of crustal extension.

On the same research trend, Dr. Morra and I are developing numerical codes to model fluid flow and heat transfer in porous media. Graduate student Kyle Spezia has been hard at work benchmarking the code, and we have now a stable running model (C). Results from this project will improve the understanding of crustal-scale fluid flow, fluid pathways, heat transfer, and fluid-rock interaction in areas of crustal extension subjected to normal and/or detachment faulting. We are hoping to develop additional dynamic models that will include kinematic deformation, i.e., nucleation, and propagation of fractures. Combined with fluid flow and heat transfer, such model will shed new light on the evolution of porosity, permeability, fault networks, and fluid pathways during tectonic events.

Finally, graduate student Shanna Mason and I traveled on US 90 north of Del Rio last summer to conduct a structural analysis of the Eagle Ford Formation. We looked at fractures and vein systems, and measured fracture orientation, spacing, and density in relation to lithology variations (photo B). The goal of this study is to reconstruct paleo- and contemporary stress fields, establish a mechanical stratigraphy and characterize calcite-filled veins in order to determine their origin, spatial distribution, and age relationship with the fracture systems.

In addition, Dr. Borrok and I obtained a grant from the Halliburton Foundation to “Increase the number of female geoscientists in the oil and gas Industry”. The goal of this grant is to attract more female graduate student in our program. The first step of this proposal was to create a chapter of the Association for Women Geoscientists (AWG), organize a prospective student visit, and a speaker series. If you are interested in sharing your experience as a woman in industry and/or academia please let us know; we would love to invite you on campus!

Gabriele Morra



Since I joined UL in 2013, 2014 has been my first full year as a faculty. It has been a very intense period during which I taught to a large number of students, Algebra Based and Calculus based Physics. In the Spring semester I have also developed a new course in Computational Geophysics. Combining this effort with the development of a computational physics extra course for the honor physics students gave me enough material to structure a new textbook on computational geodynamics that is taking much of my working time. There is a great need for such a book (see EOS 95-37), so I am really committed to it.

From my research point of view, the main accomplishment has been the completion of a long project, started two years ago, of an AGU book on Subduction Dynamics based on a conference that I organized in S. Korea before joining UL. Besides being chief editor, I contributed to the volume with two chapters. In 2014 I have also published on the dynamics of super plumes and their relationship with the iron spin transition in the lower mantle on EPSL and on the role of elasticity in subduction systems, on Geochemistry, Geophysics, Geosystems. I have also started to supervise some graduate students, in physics and in geosciences. One of them, Brian Fischer, is at an advanced stage of his research on volcanology, and should complete his graduate research project this year, and continue to work on the same subject while studying for a second master at UL, this time in physics. Prasanna Mahesh Gunawardana, a physics graduate students, is instead working subduction and deep earthquakes. He has been developing his own Finite Difference code, entirely written in Python, and next year he will apply his approach to geodynamics modeling. Finally, together with Dr. Gottardi, I have been supervising Kyle Spezia who has been developing numerical models of hydrated fault zones and their associated geothermal circulation, all using ABAQUS.

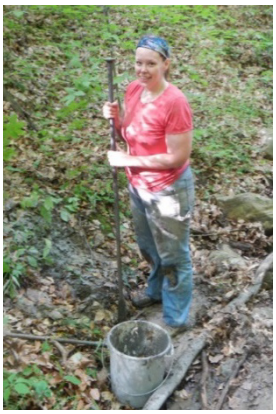
Since my position is shared between the department of Physics and the School of Geosciences, my main challenge in these 1.5 years at UL has been to combine my commitment between them. Duplicated faculty meetings, department seminars, and courses are contemporarily an opportunity and a temptation that can drag away time to research. Any suggestions from colleagues on how to better deal with this novel type of positions is certainly welcomed. On my side, my main effort is to continue to supervise at least one graduate student from each of the two departments/schools and to teach at least one course for each department. Next academic year, in particular, I plan to teach multiphase flow, with the aim to align with the exploration oriented direction that characterizes the School of Geosciences at UL Lafayette.

New Faculty and Staff

Rui Zhang

I joined the School of Geosciences at the University of Louisiana at Lafayette as an assistant professor in August 2014. I received my PhD in Geophysics from the University of Houston in 2010. After that I worked at the University of Texas at Austin and Lawrence Berkeley National Laboratory as a postdoc fellow. My research interests are focused on the applications of seismic techniques on various energy issues, including petroleum exploration, CO_2 sequestration and geothermal reservoir. One of my current projects is to collaborate with Dr. Kinsland on a project to improve the coal reservoir mapping by using seismic attributes in north Louisiana, which was conducted by two graduate students. I am also continuing a collaborative geothermal project with my previous colleagues from Lawrence Berkeley National Laboratory funded by Department of Energy (DOE). My task in this project is to model and analyze the seismic response regarding the CO_2 flooding through fracture dominated geothermal reservoir.

Katie H. Costigan



Dr. Katie H. Costigan joined the School of Geosciences faculty as an Assistant Professor in January 2015 for the Hydrological Sciences position for the Environmental Science program. Dr. Costigan is a hydrologist and fluvial geomorphologist but also dabbles in stream ecology and is an all-around "river scientist" of sorts. She is from Rhode Island but obtained a BS in Natural Resources and BA in Geography from the University of Connecticut, MS in Hydrology from the University of Nevada, Reno, and PhD in Geography from Kansas State University. She completed a post-doctoral position in the Division of Biology/USGS coop at Kansas State University after her

PhD then went on to complete an additional post-doctoral position with the School of Environment and Natural Resources at The Ohio State University and the Ohio Agricultural Research and Development Center in Wooster, Ohio. Dr. Costigan studies rivers of various sizes from small intermittent to large continental sized river systems and her research primarily focuses on aspects of open channel hydraulics, hydrology, and morphology.

Rajith Mukundan

Dr. Rajith Mukundan joined the Environmental Science program as a Visiting Assistant Professor in Fall 2014. After completing his Ph.D. in Soil Science in 2009 from the University of Georgia. Dr. Mukundan worked as a Postdoctoral Research Associate with the City University of New York. His postdoctoral work in collaboration with the New York City Department of Environmental Protection focused on modeling the potential impacts of climate change on water resources in the New York City water supply system. His primary research interest and expertise is in environmental problems related to soil and water resources and addressing these problems with technologies such as GIS and computer simulation models along with field work and statistical analysis of data. Dr. Mukundan has a strong research interest and expertise in identifying and quantifying erosional sources of suspended sediment (fingerprinting) in streams. This work is of great importance for environmental management, since increased sediment loads are the cause of many environmental problems, including the degradation of water quality and aquatic habitats. Since 2010 Dr. Mukundan has published over 15 international peer reviewed journal articles, served as a reviewer for more than 10 international journals, and is currently on the editorial board of the Journal of Soils and Sediments.

Since Fall 2014 Dr. Mukundan has taught several courses in the Environmental Science program including Introduction to Environmental Science (ENVS100), Plant Science (ENVS150), and Air Quality (ENVS377). He is excited about teaching the Soil and Water Conservation (ENVS390) course in Fall 2015 that closely aligns with his research experience and expertise. Besides teaching Dr. Mukundan took the lead in developing and submitting a grant proposal to the USEPA partnering with local environmental stakeholder groups in the Lafayette region.

Dr. Mukundan enjoys spending free time with his family, and playing tennis at Thomas park and Beaver park in Lafayette.

Adjunct Faculty

William R. Finley

This past fall semester I participated in the seismic interpretation class with Cathy Bishop and sat in on Dr. Lock's subsurface class. Dr. Lock asked me to take over conducting the subsurface mapping project, an advanced study for the subsurface class. I took on this task and begin developing a schedule and lesson plan, inviting nine students to participate.

In the past students were paired with sponsors that had full control of the project specifics including field assignment and instruction of technique. This led to inconsistency in the skill sets being taught and learned by the student. To maintain a semblance to the original class objectives, I recruited mentors, as opposed to sponsors, as outside assistance for the students. My intention then was to make the project more instruction oriented and to be sure of consistency in teaching techniques related to industry job skills.

An additional objective was to transition these techniques to current technology and teach the students how to use today's tools to accomplish the same results. Progress on this front has been problematic, and I realize my original schedule was overly optimistic. As a consequence, developing the lesson plan is and has been an ongoing process. Nevertheless, progress is being made as both the students and I adapt to the teaching/learning process. The end result will be a better understanding of the skill sets I need to teach to improve future classes.

Research Highlights

Brian E. Lock - Short Course on "Introduction to Seismic Interpretation: A Free Course for Graduate Students"

This course was again hosted by the School of Geosciences, for students from eastern Gulf Coast universities, on January 8 and 9, 2014. The course was taught by Dr. Bruce Hart, of Statoil, and Dr. Carl Fiduk, of Schlumberger, and was attended by 41 graduate students from University of Alabama, Auburn University, LSU, Mississippi State, South Alabama, ULL and UNO. The course was held at the LITE facility on campus and was organized by Dr. Lock. This was the third time the program has been held, under the auspices of the Gulf Coast Section of the SEPM.

Carl Richter
IODP Expedition 339: Gibraltar Currents Show Proof of Past Climate Changes

Examination of core samples extracted off the coast of Spain and Portugal shows definite proof of shifts in climate change since about six million years ago, and also provides new evidence of a deep-earth tectonic pulse in the region, according to a team of international scientist that includes Carl Richter, a School of Geosciences researcher.

Richter is one of 35 scientists from 14 countries who participated in Integrated Ocean Drilling Program Expedition 339. From November 2011 to January 2012, they worked on board "JOIDES Resolution," a research vessel. The team's findings were published in the June 13, 2014 issue of "Science" magazine.

Working on board the research vessel JOIDES Resolution, the team took core samples from a three-mile stretch near the Strait of Gibraltar, which is a gateway between the Atlantic Ocean and the Mediterranean Sea. They then examined the sedimentary record produced there by strong ocean currents, commonly called Mediterranean outflow water through the Gibraltar gateway.

Leaving the Azores: Carl Richter (left) and Chuang Xuan (right), a paleomagnetist, Southampton Oceanography Centre, on the roof of the bridge deck of research vessel JOIDES Resolution during (Photo Credit: Gary Acton, SHSU)

"Our initial goal was to understand how the Strait of Gibraltar acted first as a barrier and then as a gateway over the past 6 million years as the currents passed through the area," Richter said. "Because the Mediterranean outflow water is saltier and heavier than the Atlantic waters, it plunges more than 3,000 feet downslope, carving deep-sea channels, and building up mountains of mud in these unique underwater landscapes. We now have first results for understanding the history of these currents through the Gibraltar gateway."

Richter said the sediments collected during the expedition indicate that "oceans and climate are closely linked."

Further analysis showed that the sediments contained far more sand than expected. A sheet of sand extends about 60 miles from the Gibraltar gateway; it is evidence of the strength and velocity of Mediterranean currents.

The research team's findings could impact future oil and gas exploration, according to the geologist.

"The thickness, extent, and properties of these sands make them an ideal target in places where they are buried deeply enough to allow for the trapping of oil and gas," he said.

The research team's abstract notes: "These sands represent a completely new and important exploration target for potential oil and gas reservoirs."

Expedition 339 was funded by the U.S. National Science Foundation and implemented by the Integrated Ocean Drilling Program – U.S. Implementing Organization.

Durga Poudel, Tim Duex and graduate student Terri Bannister Travels to Nepal

Ms. Terri Bannister, one of the graduate students in the School of Geosciences, travelled to Nepal this past summer with two Geoscience Faculty members, Drs. Tim Duex and Durga Poudel, for her thesis research in Nepal. Ms. Bannister is studying geo-hazards and land degradation using GIS and Remote Sensing in the Chure region of Nepal. Nepal consists of primarily five physiographic units which run parallel from east to west. From south to north they include, the Indo-Gangetic Plain, the Chure Range or Siwalik Range, the Lesser Himalaya, the Higher/Tethyan Himalaya, and the Tibetan Plateau. These physiographic units are separated by east-west running thrust fault systems. The Chure Region rises steeply from the flat lands of Indo-Gangetic plains and these hills are geologically young (12 million years and older), and are frequently comprised of rocks/minerals that are structurally weak and have a high potential for erosion hazards. The Siwalik Range consists of Miocene to Pliocene age upward-coarsening successions of fluvial mudstone, siltstone, sandstone, and conglomerate known as the Siwaliks Group that have been highly tilted by the Himalayan Orogeny. The relatively young age, steep inclination, and fine-grained makeup of the rocks contribute to their ease of erosion.

The Chure region has experienced recent rapid fluvial erosion, high sediment loads in braided streams, destruction of agricultural lands, deforestation, and loss of properties and life. The thesis study aims at understanding the extent and magnitude of land use changes over time, land degradation, slope failures and landslides, debris deposition, gravels and mining and identification of the river bank areas that are geomorphologically stable for agricultural or other uses. Extensive field work and detailed geohazard surveys were conducted in the Bara and Rautahat districts of the Chure region. This visit also allowed her to do ground-truthing of vegetation indices and land use types that she had developed and had detected through satellite images and other available data. In addition, gravel shipping and mining data, topo maps, and other necessary data sets were collected for the thesis study. The team was also able to visit government officials and share their preliminary findings in relation to Chure degradation and Ms. Bannister's thesis work in Nepal. The government officials were very supportive and were keen about Ms. Bannister's thesis results. Terri will defend her thesis in the Fall of 2015.

Tim Duex and Terri Bannister doing fieldwork in Nepal (bottom). The research team gathered field information from Bara and Rautahat districts, verified landslide information obtained from landsat images (middle), conducted key informant survey, visited several locations in Chure range (top), observed land degradation by Chure rivers, and collected data on gravel and rock exports.

Imperial Barrel Award Competition.

This is an update from our last newsletter, in which the continued success of the UL team in winning the Gulf Coast IBA competition for the fourth time in seven years was reported. Subsequent to that success in March of 2014, the team participated in the International phase of the completion at the AAPG Annual Convention in Houston in April, 2014, and won first place. About 120 universities participated. UL is the only program to win the competition more than once, and a great article appeared in the AAPG Explorer about the success, reprinted below.
See more at: http://www.aapg.org/publications/news/explorer/details/articleid/9495/once-was-not-enough-ul-lafayette-makes-iba-history#sthash.EnClfgxD.dpuf

The University of Louisiana at Lafayette has won the 2014 Imperial Barrel Award.
(Re-printed with permission of the AAPG)

If it sounds like you already have read this story once before, perhaps you have.
Back in 2012, the school also won.
That's not supposed to happen. Check that. It doesn't happen. No school has ever won twice, which brings us to a school in southwest Louisiana with a little under 18,000 students, a school that would appreciate it if you got its name right: The University of Louisiana at Lafayette.
The team adviser then, the team advisor now, is AAPG Brian Lock, an award-winning professor of geology and the department's graduate school coordinator, and he was confident of this year's victory all the way – except for the moments he wasn't.

It Takes a Team
As mentioned, UL Lafayette is the only two-time recipient of the IBA, an award started and sponsored by AAPG since 2007. The school has competed in the global tournament every year since the program was expanded in 2008. This year the school was one of 122 schools from across the United States and six international regions that entered the contest.
"Being the first team to win the competition twice is really special, but I am sure there were many people not familiar with the program who have been continually surprised by our performance at the Section level," said Lock, who has won an A.I. Levorsen Award for his work, plus AAPG's Distinguished Service Award and the Grover E. Murray Memorial Distinguished Educator Award.

"I had seen several other presentations, possible because our team went early, and I had been particularly impressed by the Colorado School of Mines presentation – really professional! – and had hoped for a second or third place for UL Lafayette," Lock said of the global competition.
"So when CSM was announced as third place winner, I would have taken bets that we were out of the money," he continued. "Then Oklahoma was announced second, and I was even more convinced we were going home empty handed."
And then …
"The announcement of first place seemed to be in slow motion and it really took a moment to sink in," he said. "University of Louisiana at Lafayette! What a euphoric feeling!"

One of the reasons for the surprise is the school's size. UL Lafayette has approximately 150 geology students. By contrast, the University of Texas has about 600, a fact not lost on Lock's students.
"Our continued success in the IBA competition not only does a great job of getting global exposure for our university, but it proves that we can compete with the larger, better funded programs and win," said AAPG member Jordy Babineaux, a member of the team.
"Our students," Lock added, "had really worked hard – eight- or nine-hour days, seven days a week throughout the eight weeks – and I was really pleased with the quality of their work and the strong sense of a team."

You can almost hear Babineaux mutter, “Tell me about it!”
“The Dutch North Sea data set that our team was given included 13 previously drilled wells, 12 of which were dry holes,” he said. “That was when we first realized this project was not going to be a cakewalk.

Efforts – and Intangible Dynamics
Another student on the team, AAPG member Jolie Helm, said those 25 minutes were all-consuming. The judges, in fact, select the winning team based on technical quality, clarity and organizational skills.
"In preparation, we set timelines and goals for ourselves and literally lived this dataset every day for two months, and I think it showed in our presentations,” she said. “It was grueling at times when we were working 50-plus hours a week, but the outcome was extremely rewarding."
As to the award itself, she said, "It felt very surreal that we won the competition; it definitely took some time to sink in."
Adding to how impressive this all is, Lock pointed out that his Region, the Gulf Coast, is a perennially strong arena (the University of Texas won the IBA in 2011), so it’s not just enough for a team to do well – every school will do that – it has to do something special.
“In each round, though," Lock said of his students, "they pulled out everything they had and it turned out to be enough, although I doubt there was much room for the judges to choose between the top teams.”
Often that distance between teams comes down to the intangibles, even the inexplicable, like the swimmer who eats the same meal before games, like the towel on which former UNLV basketball coach Jerry Tarkanian used to gnaw.
“One of the students had made a comment indicating he was somewhat superstitious – didn’t want to change anything about our approach from the success,” Lock said, referring to that first victory back in 2012, so he tried to replicate the lead-up. “In Long Beach (2012) we spent the Saturday visiting the La Brea tar pits and museum, so this Saturday of the competition we went to the Houston Museum – what a fine museum! – and at the awards ceremony we again sat in the front row as a statement that we expected to win, just as we did in Long Beach.”

Practical Petroleum Geology
For UL Lafayette, like all the schools in the competition, participation in the IBA competition is not just about the contest or the $20,000 first prize – which will be used to upgrade facilities and programs, provide scholarships, buy computers and software (“We are not well funded compared with many other programs, and the award money definitely helps," Lock said) – but about its overall program, its day-to-day operations, its students preparedness.
“Our reputation has grown. Recruiters have become aware that we have a program strongly oriented toward practical, petroleum industry geology.”
But he wants to underscore that none of it happens without a team of students, administrators and others.
“I cannot leave out a comment about the industry mentors for IBA,” he said. “Without the time and trouble that these men and women provide, for little recognition, the IBA program would not be the success it is.”
And here he mentions, specifically, the great work and passion of AAPG members Mary Broussard and Mike Quinn of Freeport-McMoRan Oil and Gas in Lafayette, who also are adjunct faculty members at the school.
Ultimately, Lock says the IBA winners, which, along with Helm and Babineaux, consisted of Sam Ely, Nicholas Geyer and Daniel Sutton, are now ready for the next contest: careers.
“The IBA competition is a fantastic opportunity for a lot of students to gain incredible experience,” he said, “and I know that anyone who has ‘IBA team’ on his or her résumé is sending a strong message – here is a bright, hard-working team player who is ready to take a place in our industry.”
The team will you tell you it's more than that.
"I have a great sense of pride," Helm said, "in this school and the geology program."
A thought echoed by Babineaux.
“As geology students at the University of Louisiana at Lafayette, we are all well aware of how strong the geology program is here,” he said, “but it is still not as well-known as some of the geology programs at the larger universities.”
It’s known now.

James E. Martin
University of Louisiana Geology Museum

The year 2014 was a banner year for the Geology Museum at UL. After partnering with the Lafayette Science Museum in downtown Lafayette, we began a three-year cyclic paleontology display known a Fossil Giants. The first year (2014) concerned Jurassic Dinosaurs, including 11 large skeletons and numerous skulls. This display allowed the Museums to double their attendance compared to 2013, indicating the overall favorable reception of paleontology displays. We recently opened the second year of displays, Cretaceous Dinosaurs, including carnivores (a skull even larger than Tyrannosaurus rex), a large sauropod skeleton (Moabosaurus), duck-billed dinosaurs (Prosaurolophus), armored dinosaurs, and horned dinosaurs, including a fine skeleton of Chasmosaurus. This exhibition will be on display until March, 2016, when Giant Mammals will be featured.

President Savoie cutting ribbon at opening ceremonies for Fossil Giant Exhibition at UL Geology Museum.

Viewing window in Geology Museum, Preparation Lab

In addition to displays, the Paleontology Preparation Laboratory was completed, including a large window that allows the public the opportunity to observe students and staff preparing fossils. From grants and contracts, Dr. Martin was able to hire 12 UL Geology majors (undergraduate and graduate students) to work in the laboratory, and two volunteers regularly prepare vertebrate fossils from surrounding rock.

The collections storage area was completed and houses principally federally owned vertebrate and invertebrate fossils. These fossils form the basis for paleontological research and education. Thousands of fossils were collected last year, principally from Ice Age deposits in Oregon. UL students found some fantastic specimens, including a mammoth tooth, partial pelican skeleton, and bones of a giant flesh-eating bird, a teratorn. Dr. Martin also published two papers concerning the fossils from the area, one on a bighorn sheep and another concerning the gopher species of the area.

Paleontological repository, the library of fossils.

2014 Field Camp Photo Gallery

Gifts to the School

We would like to thank all those who donated to Geology in 2014

Donations up to $1000

Acosta, Nathan
Americ Student Chapter
Badger Oil/ David Etienne
Ball, Richard
Barbay, Anna
Battle, Julia
Bergeron, Dalton
Borrok, Peggy
Broussard, Mary
Brown, Scott & Krista
Burch, Donald
Caffery, Stephen
Campo, Donna
Comeaux, David
Crowell & Moring
Curley-Lee, Catherine
Dodson, Richard
Dudley, Dane
Dungan, James
Estes-Jackson, Jane
Etienne, David
ExxonMobil Found.
Gottardi, Raphael
Grubb, William
Guidry, William
Hebbard, Matt
Huffman, Gary
Jordan, Kevin
Judice, Keri
Labat, Brenton
Lanier, Vance
Ledy, Lawrence
Leone, Samantha
Lillie, Bob
Louisiana Onshore Exploration, LLC
Guilbeaux, David, Bieber & Ellis
Madere, Carolyn
Mathy, Mike
McBride, Laura
Melancon, John
Mendelson, Douglas
Murley, Christopher
Neese, Johnny
Neese, Bob
Nelson, Greg
Petrolog, Int. Inc.
Poret, Kelly
Quinn, Michael
Rafferty, Elizabeth
Reif, Linda
Salathe, Lauren
Seicshnaydre, Rosalind
Strickland, Matt
Sturlese, David
Trauth, Marie Jean
Watkins, Jin

Donations $1000 to $5000

Bourgeois, Channon
Broussard, Mary
Bureau of Land Management
Donlon, Lewis
Dore, Timothy
F W Harrison Consulting Geologist
Fugro Geoservice
Goodrich Operating Company, Inc.
Hydro-Environmental Technology, Inc.
Island Energy LLC
Martin, James E.
Schlumberger
Sobba, Donald
Sullivan, Dennis

Donations $5000 to $10,000

AAPG Foundation
Bradley, Christopher
Freeport-McMoRan, Inc.
Stone Energy Corporation

Donations > $10,000

AAPG Foundation
Freeport-McMoRan, Inc.
Halliburton Foundation
QEP Resources Education Foundation

Honors and Awards to Faculty and Students

Faculty

Carl Richter was awarded the Outstanding Professor Award in the College of Science, which honors his outstanding research and teaching.

Geology Students

Bill Paine/LGS Endowment Scholarship
(†) *Jolie Helm,* (†) *Jordy Babineaux,* (†) *Sam Ely*

Eberhart E. Leschin Scholarship
(†) *Ayokomi Lasisi*

Imperial Barrel Scholarship Fund
(†) *Jordy Babineaux,* (†) *Sam Ely,* (†) *Nicholas Geyer,* (†) *Daniel Sutton,* (†) *Jolie Helm*

Joe Battle/LGS memorial geology scholarship
(†) *Daniel Sutton*

Marathon Oil Scholarship
(†) *William S. White,* (†) *Duncan McIntosh*

Nolan Badeaux Endowed Scholarship
(†) *Jade Bujard,* (‡) *Brittany Fuller,* (‡) *Rose Tellus,*

Paul Toce Endowed Geology Scholarship
(‡) *Gage Seaux,* (‡) *Taylor Perrin,* (‡) *Kin Tchen,* (‡) *Sakrin Dahal*

Pogo Producing C. Scholarship
(†) *Ayokomi Lasisi*

School of Geosciences Scholarship
(†) *Kristen Speice*

Tim Dore Geology Scholarship
(‡) *Spencer Stelly*

Wilkinson Family Foundation Scholarship in Geology
(†) *Nicholas Geyer*

(†) Graduate Students, (‡) Undergraduate Students

A trip down memory lane…

USL Geology fieldcamp circa 1979 – Miles Pierce's sheep ranch between Alpine and Marathon, Texas. From left to right: (?), Edith Gomez, (?), Dr. Gary Kinsland, David Mamer, (?), Miles Pierce's girlfriend, Dr. Brian Lock.

Picture taken outside Madison Hall, late 90s. Do you recognize anybody?

Degrees Granted - 2014

Spring 2014

Bachelor of Science in Geology

Rene F. Broussard, Ayrton Costa, Ryan C. Davis, Anthony E. Day,
Victor Giraldo, Conley R. Pomerenke, Tyler Pullig, Samuel J. Stutes

Bachelor of Science in Environmental Sciences

Gavin Faulk, Zachary Gravette, Delaina McGee, Dale Stephen Nevitt
John Peno, Erin Rusca, Fabiane Santos Neto, Karl Simon

Master of Science in Geology

Olamide Dada, Brennan T. Higginbotham,
Timothy K. Mcvey, Alan F. Simonis, Lauren Stiles

****

Fall 2014

Bachelor of Science in Geology

Jade Bujard, Elizabeth Cunningham, Greg Lewis Jr.,
Geoffrey Miller, Robert Russo, Chance Skinner, Hunter Stover

Bachelor of Science in Environmental Sciences

Jennifer Lallande-Uzcategui, Dylan Lormand, Alexandrea Pasch
Bobby Soukanh, Andrew Spinosa, Jacob Thompson

Master of Science in Geology

Christopher Murley

In Memoriam

Eldred Griffin "Griff" Blakewood, IV

Born on the Greenest Day of the year, St. Patrick's Day, March 17, 1960 - Died on Memorial Day, May 26, 2014

Griff Blakewood was a trained Animal Reproductive Physiologist who was hired by the University to help build an environmental studies program in the early 90's. He quickly settled into his new job "teaching reality", as he liked to put it. He was considered a visionary by his students and encouraged them to reconnect with nature and each other for a more beautiful and sustainable future.

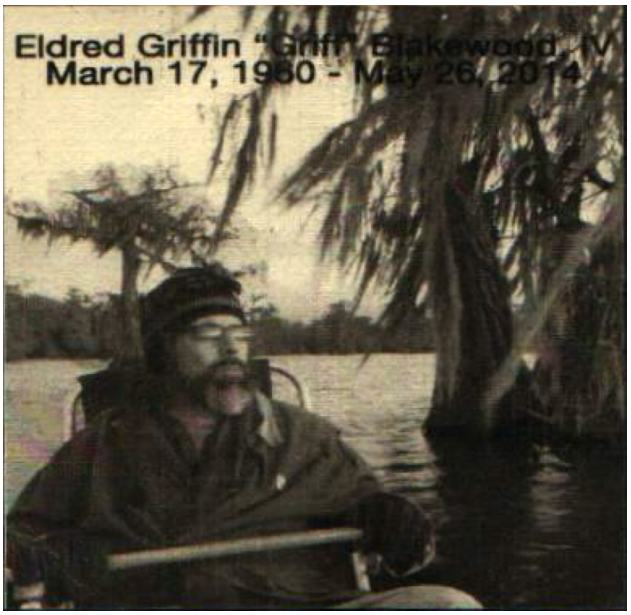
He prepared and taught classes like Biosphere Systems, Environment and the Spirit, Human Macro-Ecology and The Meaning of Life. In these classes and in conversation, he reminded his students that we depend on the air we breathe, the water we drink, and the earth we stand on for the basic needs of life itself. It is our moral imperative, he taught, to actively engage with the daily practice of making this world a better place. This ethic inspired his signature line, "Keep up the Good World!"

Through his life, Griff engaged in the practice of cultivation and creation. This creation took the form of peace and non-violence in his daily practice. Griff could be seen riding his bike all over town, cultivating community, reducing his carbon footprint, and having fun, all in one action.

Griff taught that each one of us has the ability to cultivate a generosity of spirit and that we can create a better world with love and the practice of non-judgement. We must allow new information in, he would say, and allow our worldview to be shaped by these new ideas, if the new information is indeed accurate. We must be open to the challenge and to recognize valid arguments against our own beliefs. He was a scientific purist in this regard, ready to answer life's curiosities with poignant questions, and ready to accept the difficult answers. He constantly pushed his students to explore the edges of scientific understanding, to question the 'inevitability' of the status quo, and to creatively envision an alternative worldview.

Griff was a man who knew no boundaries, only possibilities. He was an inspiration for the possible, and an example for how to get there.

He leaves in the wake of his canoe his wife Alice, his two sons Blake and Harrison, his mom, three siblings, and an unknowable number of students and friends who have been touched by his spirit and inspired to create a better world.



Upcoming Events

Gulf Coast Association of Geological Societies

Meet us at the 65th Annual Convention of the Gulf Coast Association of Geological Societies hosted from September 20-22, 2015 by the Houston 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.

FOSSIL GIANTS: Dinosaurs and Mammals opened to the public Saturday, April 4th, 2015. The Lafayette Science Museum is located at 433 Jefferson Street, Lafayette, Louisiana in the heart of Downtown. Call 337-291-5544 for more information.

Fossil Giants: Dinosaurs & Mammals. This exhibit is the result of an ongoing partnership between the Lafayette Science Museum and the University of Louisiana at Lafayette School of Geosciences.

How to support Geology or Environmental Science

Donations can be made by using the foundation website, http://www.ullafayettefoundation.org/giving, (the foundation phone number is 337-482-0700). When donating via the website, you will need to first choose the "College of Science". After completing the form, you can use the "notes" section at the bottom to direct your gift to where you would like it to go. Alternately, checks can be made out to the UL foundation with instructions for directing the money in the notes section of the check. In these cases it is most effective to 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.

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.

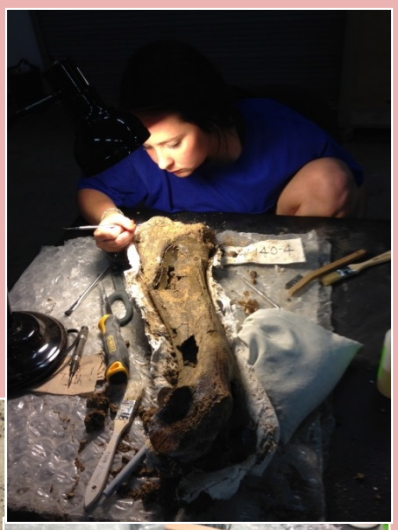
① **The UL Lafayette Geology Faculty & Student Development Fund (#21654).** This is a non-endowed fund that is designed to support the immediate financial needs of the Geology program. We suggest that donations under $1000 be directed here.

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 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.

In addition to our general funds, we are currently in the middle of a special fundraising effort to support an expedition to unearth the fossil skeleton of *Megatylopus*!

Seven million years ago, a giant relative of the camel roamed North America. These creatures, of the genus Megatylopus, were 12 to 14 feet tall and resembled modern-day giraffes. Their fossils are rare. No complete skeletons are known to exist. Last summer, a team from the University of Louisiana at Lafayette's School of Geosciences discovered a fossilized specimen at a dig site in central Oregon. They collected several bones believed to be the front leg of this ancient camel. Because of time constraints, a huge abundance of additional fossil bones from Megatylopus (and other large mammals) were left in the ground.



Right now we are asking for donations to help fund the expedition in 2015 to return to the site in central Oregon's high desert to unearth the remaining skeletons. The expedition team will include up to 5 UL Lafayette students who will engage in real-life research: collecting fossils in the field, and preparing them in the lab. These ancient bones will expand scientific knowledge and help establish a place for the UL Lafayette Geology Museum and Lafayette Science Museum among many similar museums worldwide.

Donations for this project can be directed to our Geology Museum account #21683.