



# The School of Geosciences Newsletter

## Greetings from the Director

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Welcome to the 2020 School of Geoscience Newsletter!

Diversification, diversity and forward with research: these are the three current axes of our action plan.

Our graduate programs in Environmental Science and Geology have been thriving and expanding in scope, thanks to the energy of our graduate students and faculty. With the launching of the new interdisciplinary PhD program in Earth and Energy Sciences (jointly with the Depts. of

Physics and Chemistry), the School of Geosciences is now ready to prepare the next generation of top notch geoscientists. Our Cajun geoscientists have also expanded their horizons up to the Kathmandu Valley of Nepal and the “wild west” of California, Utah and Montana. Our revamped field camp is now a solid

6-weeks field adventure taught mainly in the Rockies. At the local scale, we have successfully recruited two vibrant new talents, Dr. Anna Paltseva and Dr. Jorge Villa, in our Environmental Science program. Their expertise and research interest further broadens the scope of our scientific activities, as part of our diversification strategy. Our international exchanges with Chinese scientists has markedly increased while the School was hosting two visiting scientists (Dongliang Liu and Caicai Liu) and a doctoral student (Junbo Ren). The Geology Museum has welcomed a travelling, National Science Foundation-supported exhibition on ocean scientific drilling named in Search of Earth’s Secrets. Our successes in multiple areas should not obscure the two main challenges ahead of us: nationwide declining enrollments in geology, linked to low oil prices and, urgency to diversify our faculty. Our graduate student body demonstrates our strong commitment to increasing diversity but we have a long way ahead of us. We have recently engaged our partner Chevron to assist us in our mission to increase ethnic diversity in our graduate students. We also plan on increasing our collaboration with underrepresented students at regional high schools. Our instrumentation platform continues to grow with the acquisition of a new, cutting-edge, particle size analyzer for sedimentological and environmental research. Finally, the physical space in Hamilton has been substantially improved by the addition of two new research laboratories respectively in soil science and wetland ecosystem, as well as the dedication of our old library to a new conference room.

Sincerely,  
**Eric Ferré**

## Faculty and Instructor Updates

### Aubrey Hillman

This past year has been filled with lots of exciting new developments. Our project in China looking at metal pollution and how it is remobilized by lake level changes is wrapping up and as with any research project, the answers are generating yet more questions to look at in the future. With some anthropology colleagues at the University of Arkansas and University of Florida, we had a project in northern Peru funded to reconstruct precipitation over the last 4000 years and understand how this impacted settlement and subsistence strategies. While that fieldwork has been put on hold, we're hoping to get back there sometime next year. Last spring, Moira Lyons, Ryan O'Quinn, and Scott St. Romain completed their master's working on projects in China and Louisiana and this year John Goodin completed his master's project on metal pollution in South America. Closer to home in Lafayette, Scott and I were finally able to publish our study on the environmental history of Lake Martin in the *Journal of Paleolimnology*, so if you've ever wanted to know what Lake Martin tells us about the geomorphology and climate of the last 1000 years, check it out. Personally, my husband and I welcomed our first baby, Azaleigh Rose in November. We are thrilled to have her and she brings us such joy. She likes to be constantly busy (like her mama) and loves being outside (also like her mama).



### Tim Duex

For some strange reason people keep asking me about retirement and all I can say is that I'm still working right now. Maybe some think that I'm over the hill. All I can say is the classic response: over the hill? What hill? Where? When? I don't remember any hill... Am I retired? No, just plain tired. But it is time to bow out quietly and take a Du-exit, or maybe a Du-exodus? So I will retire at the end of this academic year, with many fond memories and gratitude for all who I have encountered. Thanks to everyone who helped and for all the friendships I developed along the way.

I am still teaching many of the same courses as before, but also a few new courses. A year ago this past summer, Dr. Durga Poudel and I conducted a field trip to Nepal with 16 students, in association with the Study Abroad Program at UL and help from Asta-Ja, the organization

that Durga founded in his native country. The main emphasis was to explore the Environmental and Geological aspects of that fascinating country, and I think all participants had a great experience. Unfortunately, because of the COVID-19 situation we could not do it last summer but maybe next year, as a swan song? I also taught a course in Coastal Science (!), with a lot of help from the real expert, now retired, Dr. Jenneke Visser. And lastly, I had two grad students in a "Petrogenesis" course, which is really a primary interest of mine, so I was gratified to re-explore many aspects of my Ph. D. research.

In these challenging times I hope everyone is surviving and prospering as much as possible. Stop by and say Hi before next August! Best wishes.



## Raphaël Gottardi

This year I was pleased to see the work of former MS student Matt O'Leary published in the [Journal of Coastal Research](#). Matt's work investigated the relationship between growth fault, subsidence and land loss in an area from Cameron Parish (SW Louisiana). His results highlight the importance of constraining the subsurface geology, especially growth fault and growth faulting processes, when considering subsidence and land loss issues.

Our work on the Tuscaloosa Marine Shale continues, thanks to the completed theses of Jack Simmons and Katie Fearn. These two MS students investigated the sedimentology, sequence stratigraphy, and geochemical record of the formation, and looked for evidence of the second ocean anoxic event in cores recovered from the TMS interval.

Conner and Christian Spano were able to leverage the large collection of cores from the Smackover Formation of Alabama for their thesis. Christian conducted a facies characterization of the microbiolite reef trend within the Conecuh Embayment, while Conner looked at the thrombolite facies diagenetic trend.

Ross Ledoux completed his investigation of the natural fracture system of the Buda Formation in a study area allocated near Del Rio (TX). His results show that fractures and stylolites in the Buda Formation follow regional structures formed by compressional stresses during the Laramide orogeny.

David Teter's completed a thesis on understanding potential controls on production of the Louisiana Austin Chalk. His tedious work, collecting hundreds of old log throughout the state, was able to highlight areas of significant thickness, high porosity, and low water saturation that have the lowest risk and the greatest production potential.

Victoria Chevrot finished her thesis on vertical and lateral trends in lithology, TOC, trace elements, porosity across an outcrop of the Eagle Ford Formation. Her work shows that large variations in some of these parameters exist on a small scale, which would not be detectable at the well scale. Victoria is now pursuing a PhD at the University of Alberta.

Finally, we are continuing our work on the effect of fluid flow on strain localization in mid-crustal shear zone. MS student Kristen Morris is yielding the first results on the role of phyllosilicate on strain softening and rheological weakening in quartzites. Brendan Hughes is looking at fluid inclusion distribution, orientation, and entrapment conditions in the same quartzites, to understand the physio-mechanical processes that allow fluid to permeate shear zones.



**Matt O'Leary familiarizing with the local fauna along Chenier Perdue**



**Victoria Chevrot at work on an outcrop of the Eagle Ford Formation in West Texas**



**Ross Ledoux investigating hybrid shear fractures in the Buda Limestone, West Texas.**

## Jennifer Hargrave

In some ways it feels like it was just yesterday that I was writing my last update, but in others it feels much longer. The past academic year has been an interesting one.

As usual, I taught numerous classes, reaching over 500 students. I now have two fully online general education classes. One of them was reviewed and certified through the University's Distance Learning Program. The next step is to have it nationally certified. I am applying to have the second course reviewed this Fall. Although I enjoy all the classes I teach, I think the Dinosaurs class is my favorite. It's offered every spring semester and is always at capacity. I have lots of hands-on and group activities for the topics covered that the students actively participate in and maybe even enjoy! The overall feel of the class is different – the students are more engaged with the material and often steer class discussions. That class is a teacher's dream.

I had two thesis students graduate this year, and one more is in the final stages of writing. All of these projects were from our Oregon field sites. I coauthored a paper on a new fish locality from Oregon and I am finishing up a paper on fossil birds from Fossil Lake. Our planned summer fieldwork was canceled due to travel restrictions. We are hoping to try again next summer.

The UL Geology Museum applied for and was selected to host a traveling exhibit from the IODP, called "In Search of Earth's Secrets". The exhibit is NSF-funded and meant to engage people in the excitement of exploration, the process of science, and the people and tools required to get there. We had many community outreach events planned in conjunction with the exhibit, but were unable to do so because of city closures. We are working to see if we can extend the exhibit's stay in Lafayette or reschedule it for another time.

Other highlights from the year include a few outreach opportunities in the fall, including a high-schooler job shadowing me for the day as we raced between teaching classes on campus and assembling a dinosaur cast at the UL Geology Museum. I attended an Earth's Educators meeting in Nashville last summer where I presented

"Teaching Evolution through the Scientific Method" and learned new strategies for active learning in large classes. All of this hard work paid off and I was promoted to Senior Instructor beginning this Fall.

I am definitely taking advantage of spending time with my family as we're all home together during this time of quarantine. I've learned quite a few things throughout this time; perhaps most importantly just to enjoy what you have, whether it's a hug from your 2-year-old in the middle of a Zoom meeting or the opportunity to teach and learn on a hike with your 8-year-old. Everything else seems to work itself out.



**The Hargrave kids on a hike in Kisatchie National Forest. This outing was part of the hastily put together curriculum of the "Hargrave Homeschool".**



# Gary Kinsland

## THE PERSONAL

I'm a year older but still happy being husband, father, hunter, member of the Geodogs (basketball team), teacher, thesis advisor, scientist... Kellie is in real estate now (shameless...call me), the girls are 19 and 21 (Victoria, rising junior in ChemE...planning to make money, and Mikaila, rising senior in Psyche...planning to study dolphins), down year hunting as I didn't get to hunt as I like because buddies were incapacitated...one with shoulder problems and the other surviving cancer treatments...missed one nice buck but got a hog, Geodogs won a game...even with me in the line-up, taught "normal" classes [some in abnormal way (COVID)].

## FOUR STUDENTS FINISHED IN THE FALL

- Forrest Frederick, X-ray Diffraction and X-ray Fluorescence Analysis of the Justiss LA Central IPNH No. 2 Well-Core from LaSalle Parish, Central Louisiana. This work is about the chemical/mineralogical evidence in the core of the Chicxulub Impact.
- Tyler Joseph Hebert, Uplift History of the Sabine Uplift in North Louisiana and Northeastern Texas
- Hunter Newman, Subsurface fault characterizations and structural investigations of the 3D Bonanza Seismic Survey, Saint Landry and Evangeline Parishes, Louisiana
- Spencer Stelly, Analysis of Small, Targeted, Surface-Sourced 3D Seismic Survey, Grant Parish, LA

## PUBLICATIONS:

Paper in J. of Hydrology with Xiuquan Wang (was faculty member here), Durga Poudel and Adam French about modeling urban flooding from heavy rains. My input was largely in calibration of model over Lafayette during 2016 flooding rains. My knowledge of Lafayette's response to

heavy rains also got me into several interviews in the local media.

Poster presentation at GCAGS (GeoGulf) Forrest Frederick was first author (his thesis). Mansour Rahmatian, whom many of you know, was also a co-author. Forrest won the student best poster award with the poster and his presentation. See the award given this fall at the meeting, in person or virtually.

Paper with co-authors Anne Brennan and Nathan Quick which combines their theses from 2019 into an exploration scheme to find shallow petroleum with detailed environmental/log facies mapping followed by verification/extrapolation with shallow, surface-sourced seismic data. I also presented this paper, adapted to southern Louisiana at the Feb. LGS meeting suggesting that Lafayette still has lots of shallow/left behind oil to find with this technique.

## PRESENTATIONS:

Invited paper for the Planetary Geology session at AAPG 2019. I presented our discoveries of the effects of the Chicxulub Impact in northern Louisiana and the influence on petroleum migration and trapping.

Regional GSA presentation on my ideas about the structural development of the GoM from Rodinia to the present.

Presentation about faulting for La Geol. Survey meeting about the Geohazards Atlas of Southern Louisiana which is being developed by researchers from the various universities.

If any of you should be interested in any of the topics covered in the theses and/papers/presentations, contact me at: [gkinsland@louisiana.edu](mailto:gkinsland@louisiana.edu).

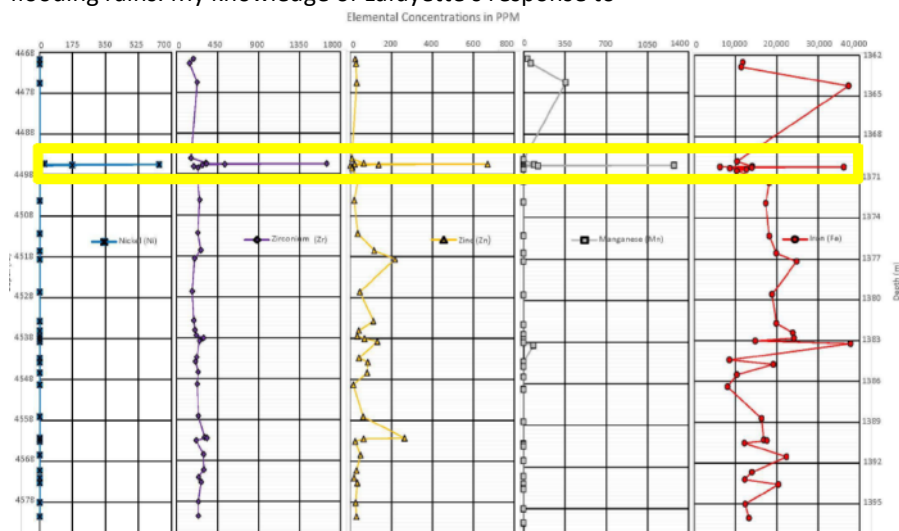


Image from Forrest Frederick's thesis - XRF elemental abundance graphs containing data for Ni, Zr, Zn, Mn, and Fe for all acidified samples collected throughout the Justiss LA Central IPNH No. 2 well-core. On all five elemental abundance charts samples 30 is encased in the yellow box, which shows the elemental spikes that are most likely evidence of air-fall ejecta.

## Gabriele Morra

In 2019, I focused mainly on two very long reviews on computational geodynamics (now in press for Elsevier, precisely on Encyclopedia of Geology), as well as on the Reference Modules on Earth and Planetary Sciences. Another direction in which I progressed was developing new implementations of the Lattice Boltzmann Method applied to a variety of geological problems, in particular on "mantle convection", for which LBM was never previously used, and for "porous media flow" for which instead LBM is extensively employed, but with many scientists are encountering difficulties modeling surface tension extreme viscosity variations such as water and oil. With my collaborators at Columbia University and at King Fahd University of Petroleum and Minerals, we have found a new formulation that allows unprecedentedly precise calculation of viscous and capillary fingering in oil and gas reservoirs. A third direction of research has been a new technique to use Machine Learning to detect eruptions during Strombolian activity, using Convolutional Neural Networks for which we published a

paper on Physics of the Earth and Planetary Interiors. Fourth, with my former student Saurav Gautam, we progressed our numerical models of non-thermal plasmas, which has applications in environmental sciences, and studied its role for creating new miniaturized antennas. Two publications have been submitted on our results. The fifth direction of research is "early Earth geodynamics", in collaboration with my former student Prasanna Gunawardana and other colleagues at Monash University, Australia. We have now a publication in review in which we constrain the yield stress of the Archean Lithosphere based on the volume of the cratonic crust in the first billions of years of our planet. The sixth direction of research is seismicity in Louisiana. Together with collaborators at LSU and Tulane, we have now established a long term network in Northern Louisiana and we plan to use these data on applications such as induced seismicity monitoring and quantifying mantle anisotropy in southwestern US.

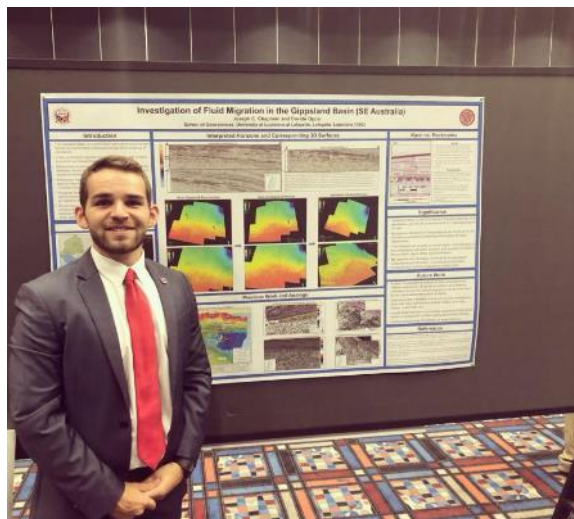
## Davide Oppo

The past year was a fascinating time that fully introduced me to the UL Lafayette School of Geosciences.

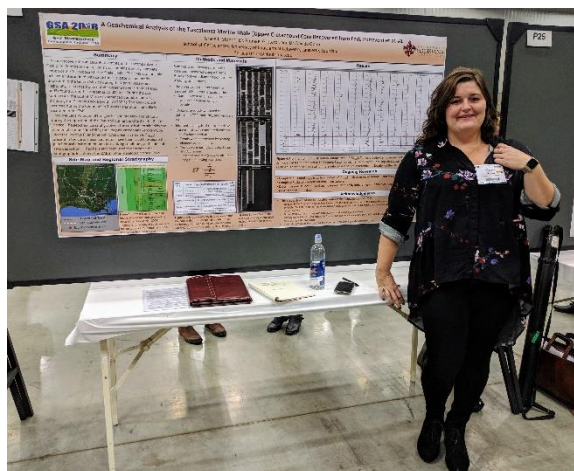
During the year, we completed the works to establish the [new sedimentology laboratory](#) in Hamilton Hall 109. This space is now the main laboratory of the Sedimentary Basins Research Group (SBRG) (<https://risingfluids.com/>). The lab is already operational and many students are using its facilities to describe and analyze cores from the School's collection. A new grant by the Louisiana Board of Regents allowed purchasing a Malvern Panlytical Mastersizer 3000 laser diffraction system completed of Hydro EV and Hydro Sight units. This new instrument, installed in HH109, is capable of grain size characterization over a large particle diameter range, from nm to mm. The new instrumentation for the SBRG saw also the acquisition of a Wink vibrocore (capable of reaching up to 50ft), a drone for photogrammetry, and an Emlid RTK-GPS. Four new high-performance workstations will be used for seismic data interpretation.

My [research](#) on fluid migration and seepage continued with the publication of a [new research paper](#) on the correlation of methane seepage and carbonate mounds formation in the NW Australia offshore. Fluid seepage was the theme of MSc student Joseph Chapman (now graduated and waiting to start working at the Bureau of Ocean and Energy Management) and the new Ph.D. student Bernardo Teixeira. Joseph worked on fluid expulsion linked to polygonal faults in the offshore of SE Australia (in partnership with the universities of Oxford and Cardiff, UK), while Bernardo on methane seepage in the offshore of the Gulf of Mexico (in partnership with TGS). The research on sedimentary dynamics along continental margins developed with new projects. MSc student Zachary Lukaszewski continued interpreting seismic data in the offshore of NW Australia and is finalizing his thesis defense. New Ph.D. student Grace Stone and MSc Mandi Lalonde and Kristen Holmes started their work on mass transport complexes offshore Gulf of Mexico (in partnership with BP). The collaboration with Dr. Gottardi on the study of the Oceanic Anoxic Event 2 in the Gulf of Mexico is continuing.

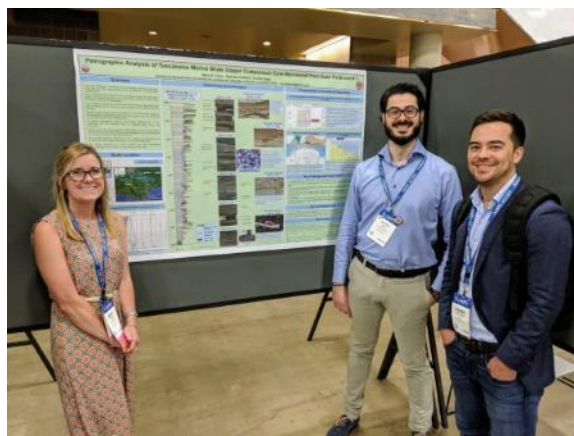
Students' work has been showcased at various conferences during 2019. In June, I had the pleasure to attend AAPG ACE in San Antonio, TX, where graduating student [Mary Fearn](#) (now at Shell) presented her research on the stratigraphy of the Tuscaloosa Marine Shale cored in Louisiana. MSc students Samseeden Ajala presented at the National Association of Black Geoscientist Convention (TMS stratigraphy), [Joseph Chapman](#) at the Annual AAPG Student Expo (SE Australia fluid expulsion), and then-MSc student Grace Stone at the GSA Annual Meeting in Phoenix (TMS geochemistry).



Cyle Chapman at the 2019 AAPG student expo



Grace Stone at the 2018 annual meeting of the Geological Society of America in Indianapolis



Katie Fearn at the 2019 AAPG Annual Convention and Exhibition



## Brian Schubert

We had three students successfully defend their theses and graduate in the last year, Nick Geyer, Robert Narmour, and Jamie Vornlocher, and welcomed two new students, Bárbara Almeida and Adrian Charles to the lab group. In addition, Junbo Ren has been training and studying in the lab as a visiting PhD student from China, and Dr. Yingfeng Xu continues to keep the lab and equipment running seamlessly, despite her ever increasing responsibilities across the School.

Lab progress has slowed while we work remotely, but we have been busy publishing a backlog of data, including Taylor Chapman's thesis work on reconstructing CO<sub>2</sub> during the Paleogene (published in the American Chemical Society's Earth and Space Chemistry), and Peace Eze's undergraduate work studying wood diagenesis (published open access in Geology), in collaboration with postdoc, now Assistant Professor, Dr. Bill Lukens.

Travel is obviously down right now, but I did have the opportunity last year to visit both China (1st time) and Norway (8th time) for field, lab, and museum research with my international collaborators studying past climate. This work has led to new funding from the National Science Foundation that supports undergraduate and graduate student research using our rich collection of fossil wood. Look for more results from our students in next year's newsletter.

This past year, I taught the graduate level stable isotope biogeochemistry class for just the second time, and first since 2016. We had a great group of students from across the College of Sciences (Geology, Environmental Science, Biology, and Chemistry), and all got the opportunity to develop and carry out their own research projects in small groups. I really enjoy teaching this course, and appreciate the interest and patience of the students who enrolled, in what can be a very challenging class. Most of all, they seem to at least bear with me when I get excited about the stable isotope composition of plants.

This fall I step down as co-Graduate Coordinator of the Geology MS Program, a position I shared with Dr. Gottardi since 2015, to begin a new role as Chair of the Graduate Advisory Committee for the Earth and Energy Sciences PhD Program. The EESC Program, which is beginning its second year, continues to set new benchmarks for growth, and has welcomed students from across the planet, including past graduates of the UL Lafayette Geoscience programs. If you are interested in returning to school for a PhD, please feel free to reach out to me for information.

Noah is starting second grade this Fall (online), and Alex has one more year before he starts kindergarten. The boys have really become best friends this summer. I hope all of you are staying safe!



GEOL 515 Stable Isotope Biogeochemistry students working on their class projects.



Left to right: Adrian Charles, Brian Schubert, Bill Lukens, Junbo Ren.



Left to right: Bernardo Teixeira (EESC), Grace Stone (EESC), Elham Hosseinzadehsabeti (EESC), Adrian Charles (GEOL MS), Brian Schubert (GEOS), Junbo Ren (visiting PhD student), and Shamsul Hoque (EESC).



# Rui Zhang



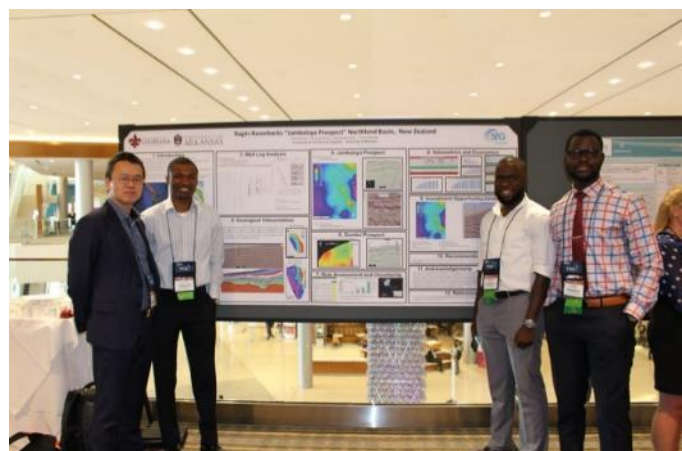
S M Shamsul Hoque started his PhD career in our new Energy and Earth Science program in 2019 working with Dr. Rui Zhang. He is working for the Tuscaloosa Marine Shale (TMS) Laboratory project funded by the Department of Energy. His current task is to develop a machine learning technique to estimate the Total Carbon Content of the TMS formations.

Allison Scates presented her master thesis in the “3-Minute Thesis” (3MT) competition across the university and won the first place. Her presentation’s title is “Geomorphic and Shallow Subsurface Expression of Growth Faults in Mississippi River Delta Quaternary Sediment; Golden Meadow, Louisiana.” Allison also presented her work in the [Conference of Southern Graduate Schools meeting](#) in Birmingham, Alabama

representing UL Lafayette in the regional 3MT competition. Allison was a Master student working with Dr. Rui Zhang funded by the Water Institute of the Gulf through a collaborative project with University of New Orleans and Tulane University. Allison also won the fourth place as the student poster during the GeoGulf 2019 in Houston.



Our SEG EVOLOVE TEAM 2019 won three awards during the SEG Annual meeting in San Antonio: Best investment opportunity in the Northland basin, Best basin model and Best use of powerpoint. The team includes Olawale E. Ariyibi, Samsideen Ajala, Mark Mlella led by Dr. Rui Zhang



## Carl Richter

Carl Richter continued his work on the marine geology and geophysics of deep-sea cores from the North Atlantic and the West Greenland Margin, in addition to projects in environmental magnetism and participating in a LADC-GEMM expedition near the Deepwater Horizon site in the Gulf of Mexico on the LUMCON ship R/V Pelican. He continued a research project with graduate student Olawale Ariyibi investigating the magnetic record of cores from International Ocean Discovery Program (IODP) Expedition 369 to the Mentelle Basin and Naturaliste Plateau in the Indian Ocean south of Australia, he was part of in October/November of 2017. Olawale successfully graduated in the Spring 2020 semester despite some delays imposed by the Coronavirus pandemic. The main goals of this investigation are to improve the age model of the sediments with magnetostratigraphy, to extract a record of the magnetic paleointensity going back into the Oligocene, and to use magnetic concentration parameters and granulometry to look into the environmental changes at the Australian margin throughout the Cenozoic. Preliminary results of this

study were presented at the Fall Meeting of the American Geophysical Union in San Francisco, the National Association of Black Geoscientists in Fayetteville, and the IODP Postcruise meeting in Kanazawa, Japan. Final data and analysis are currently being prepared for publication. Together with a team of researchers from physics, geosciences, and engineering lead by Gabriela Petculescu from the Department of Physics, Carl is part of an interdisciplinary group which obtained a major research instrumentation grant from the National Science Foundation for a physical properties measurement system (PPMS), which will significantly increase the research capabilities in the sciences and engineering. Carl is in his third year serving as Associate Dean of the College of Sciences in addition to his teaching and research duties in the School of Geosciences. Outside the university, Carl is now in his sixth year as president of the Southwest Louisiana Geophysical Society and in his fifth year as a speaker for the Louisiana Board of Regents Speaking of Science program, which brings cutting edge science talks to schools throughout the State of Louisiana.



Carl at the Fukui Dinosaur Museum during a field trip in Japan.



Instrument deployment on the RV Pelican in the Gulf of Mexico.



## New Faculty

### Jorge Villa



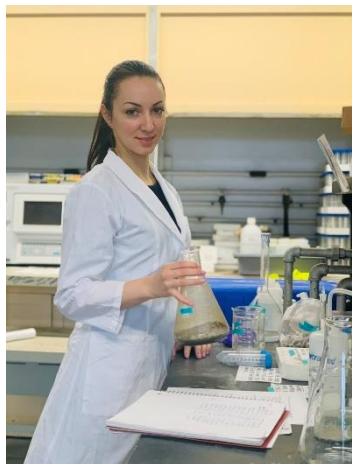
Dr. Villa joined the Environmental Sciences faculty team of the School of Geosciences this January. With a background in Environmental Engineering and an M.Sc. in Forests and Environmental Conservation, he completed his Ph.D. in 2014 in Environmental Sciences at Ohio State, studying carbon dynamics in Florida's subtropical wetlands.

After his Ph.D., he returned to Colombia, his home country, and conducted research in tropical mountain and lowland wetlands and taught environmental courses for four years at a private institution. He then moved back to the US in 2018 to work as a Visiting Research Assistant Professor at the Department of Civil, Environmental and Geodetic Engineering of The Ohio State University, before landing at Lafayette.

Dr. Villa describes himself as a wetland scientist with a keen interest in the study of wetland ecosystem functioning. His research focuses on understanding how the interplay between plants, soils, and water affects ecosystem functioning in wetlands and riparian zones. In particular, he is interested in functions determining carbon sources and stocks. His overall goal is to provide stakeholders with quantitative information useful in decision-making processes and modelers with data from field-driven experiments useful for parameterizing biochemical models.

Dr. Villa will be teaching Coastal Sciences (ENVS 445) and Coastal Restoration Methods (ENVS 545) in the fall and Wetland Soils (ENVS 357) and Fate of Pollutants in Soil and Natural Waters (ENVS 580) in the spring. "I invite all Geosciences undergraduate and graduate students to take any of my courses to learn about technical aspects involved in the building of socio-ecological resilience to land-use and climate change."

## Anna Paltseva



Anna Paltseva, a formerly New York-based urban soil scientist, has a doctorate in Earth & Environmental Sciences. Her mission is to educate communities about the critical importance of soil health for growing nutritious food and medicine, for supporting healthy ecosystems, and for

helping to sequester harmful greenhouse gases. Her expertise is urban soil contamination & remediation of urban gardens. She has presented her research at national and international soil conferences in Italy, Brazil, Mexico, China, and Russia; she has authored and co-authored twenty manuscripts and book chapters with a few more on the way. Her previous teaching appointments were at CUNY Brooklyn College, New York University, New York Botanical Garden, and Brooklyn Botanic Garden. Dr. Paltseva has developed educational materials, led soil workshops, and coordinated collaborations with international researchers for the NYC Urban Soils Institute.

Dr. Paltseva has a diverse academic background, with extensive experience in geology, soils, ecology and education, and she used this background to develop a series of novel and important research projects for her dissertation research. A major theme of this research was how metal contaminants interact with soil amendments containing phosphorus and organic matter to influence vegetable production and contaminant levels in urban and suburban soils in the New York City metropolitan area. She has also been adept at developing new methodologies (two new field and express methods to assess lead in soils). Currently, she leads a research group in Moscow at the Peoples' Friendship University of Russia, Agrarian-Technological Institute that develops new methods for express assessment of urban soils using X-ray fluorescence (XRF) technology. Dr. Paltseva also collaborates with Tulane University, Lead Lab evaluating the effects of soil contamination on elevated blood lead in children and University of Molise in Italy developing new ways to determine bioaccessible lead in soils using (Vis)-near-infrared (NIR) spectroscopy. Dr. Paltseva uses the 21st century channels to communicate her research findings and educate general public on soils science through her Instagram page [soil\\_expert](#), publications and interviews for Gotham Gazette, CBS News, NY Post, Civil Eats; Bloom & Grow Radio, the Intersect, and Alumni Aloud podcasts.



# Geology Museum

## Update on Exhibits and Collections

### Dr. Jim E. Martin – Dr. Jennifer E. Hargrave

If 2018 was the year of Eocene whales, 2019 was a return to the Mesozoic with the addition of three new meat-eating dinosaurs. The first new theropod skeleton was fabricated during the spring and is a large velociraptor from the Jurassic Period. *Utahraptor* was one of the largest of the sickle-toed velociraptors, agile carnivores that stalked their prey across western North America. The skeleton was the result of a cooperative project among the UL Geology Museum, Dinolab from Salt Lake

City, and the Lafayette Science Museum. Museum volunteers and students shouldered most of the work, producing a replica of this meat-eater with the guidance of Chris Madsen from Dinolab and with funding from the Lafayette Science Museum. Our *Utahraptor* took its place among the *Allosaurus* and *Stegosaurus* skeletons in the Museum's Dino-Lounge on the second floor, along with *Selfiesaurus*, where kids (both big and small) can take their picture with a fleshed out skull of *Tyrannosaurus*.



Chris Madsen directing UL Geology Museum volunteers in mounting the *Utahraptor*.



Completed *Utahraptor* skeleton prior to painting. Note the huge claw on the hind foot that was used as a weapon to disembowel prey and competitors.

In May, Jim Martin led a group of Museum volunteers and Geosciences students on an expedition to south-central Oregon to collect fossil specimens for paleontological research, student theses, display, and public outreach. Over 5,000 scientifically important specimens were collected, prepared, and catalogued into the systematic collections at the University of Louisiana Geology Museum. First, we returned to the famous Fossil Lake area, where thousands of Pleistocene vertebrate fossils have been collected in the last seven years for the Geology Museum. This year was no different with skeletons of suckers, minnows, gophers, and a rare prairie dog skeleton. This specimen is the most complete

prairie dog skeleton to come from Fossil Lake and represents the furthest west occurrence of prairie dogs in North America. Additional bird, rabbit, muskrat, dire wolf, lynx, mountain lion, horse, peccary, and camel remains were also collected.

We also made short excursions back in time to the Miocene where giant camel skeletons were collected in 2014-16. In the Fort Rock Formation, we found fragmentary but very important specimens of a small bovid, *Neotragocerus*. This rare bovid with straight horns represents the earliest occurrence of bovids in North America, arriving between 5-6 million years ago. While

bovids, such as the numerous types of antelopes, sheep, goats, and true buffalo, dominated the herbivore groups in the Old World during Neogene time, camels dominated and filled the various herbivore niches in North America. Not until *Neotragocerus* suddenly appears, do bovids gain a foothold in the New World, with later arrivals of bison, muskox, bighorn sheep, and Rocky Mountain goats. Jim Martin, in collaboration with Jim Mead at the Hot Springs Mammoth Site in South Dakota, are coauthoring papers based on *Neotragocerus* specimens collected during the last six years to finally unravel the affinities of this unique creature that crossed the first Bering Strait land bridge into North America. Finally while in Oregon, we made large collections of fish from the Pliocene Paisley Fish Locality near Summer Lake, Oregon. In conjunction with earlier collections from

the site, Andrew Whisnant, is completing his Master's degree on the paleontology of the salmonids, minnows, and suckers from this old lakebed. The project was started by Jim Martin in the 1990s, and with Andrew, Dr. Jennifer Hargrave, and the invaluable contributions of Dr. Gerald Smith, University of Michigan, a preliminary paper was published. A major contribution to paleontology is the confirmation of introgression among fish populations. Suckers had previously been thought to hybridize over generations, but we found both sucker and minnow species had done so at Summer Lake. Two lineages of fish prove the viability of different aquatic species laying eggs and being fertilized by a similar species, resulting in hybrid populations. For example, lake suckers in times of drought would be driven into the rivers where their eggs and sperm would mix with those of river suckers producing the hybrid populations.



Students and volunteers brave the cold to collect Pliocene fossil fish at the Paisley Fish Locality in southern Oregon.



Jim Martin conducted further paleontological field work at the Pliocene Richmond Hill site in the northern Black Hills of South Dakota. This locality is a fissure fill in the Mississippian Paha Sapa (Madison) Limestone. Thousands of creatures were trapped in the fissure ranging from bats to giant camels. The locality was discovered by Todd Duex, brother of our beloved Dr. Tim Duex, during gold mining operations in the 1990s. We have been bringing UL field geology students to the site to dig for many years when the UL field camp visited the Black Hills. This year, we collected additional rabbit, rodent, carnivore, and giant camel specimens for the UL Geology Museum. These collections too will provide the basis for future undergraduate and graduate theses, as well as research by Geosciences faculty. Our graduate research assistants, Ms. Abigail Breau and Mr. Josh Hardt, aided greatly in the smooth operations of our laboratory and in readying the fossils from Richmond Hill and elsewhere for the curational process. Our students and volunteers are exceptional! Thanks to you all!

In the fall, the other two theropod dinosaur skeletons were completed for display in the Geology Museum gallery. The display included a representative meat-eating dinosaur from each of the three Mesozoic periods: Triassic, Jurassic, and Cretaceous. We already had a Jurassic representative, so we built a Triassic theropod, *Herrerasaurus*, whose remains were originally found in Argentina, and a large Cretaceous *Albertosaurus* known from east of the Rocky Mountains in the northern United States and Canada. *Herrerasaurus* is one of the earliest known theropods and was a small, lightly built carnosaur, compared to the later occurring, huge theropods of the Jurassic and Cretaceous. The Triassic dinosaurs were mostly small compared to later representatives, so a diminutive meat-eater at this time is not surprising. However, it is surprising how patience and how many hours were involved to mount this delicate specimen. To make the skeleton appear similar to the original took the great artistic skill of our superb volunteers.

We then tackled the large *Albertosaurus* skeleton. *Albertosaurus* was a contemporary of *Tyrannosaurus* during the Late Cretaceous time. Whereas *Tyrannosaurus* was very heavily built with relatively short legs, *Albertosaurus* was slim with very long rear legs. Obviously, *Albertosaurus* was much faster than its cousin, and specimens from Canada suggest that *Albertosaurus* may have run in packs, similar to wolves, pursuing and capturing their prey. Meanwhile, *Tyrannosaurus* was more likely a scavenger, similar to a hyena. It could definitely capture prey, but stealing another's meal would have been likely. Its teeth are much more massive



Mr. Gage Seaux, Geoscience M.S. graduate, plastering an association of rodent bones at Richmond Hill.

than the slender knife-like teeth of *Albertosaurus*, again suggesting more of a scavenger habit of existence for *Tyrannosaurus* compared to the pursuit predator strategy of *Albertosaurus*. The sheer size of the *Albertosaurus* skeleton was a challenge to fabricate. Most of the fall and winter months were consumed in production of the beast; it was finally completed in December.

December was very busy. Not only did we complete the two dinosaurs, but we also prepared a new repository, essentially an area to systematically house the library of fossils at the Geology Museum. In seven years, we outgrew our space to house the UL fossil collections on the first floor of the Museum. In order for our program to expand, to institute a paleontology emphasis in the School of Geosciences, and to conserve specimens for posterity, we needed additional room. We approached Kevin Krantz, Director of the Lafayette Science Museum, who shared our visions. He dedicated space for a room built on the third floor that more than doubled our storage space for fossils and dedicated our former space to organize the mineralogy collections under the direction of curator, Tim Duex. We had painted the new area with help from students, staff, and volunteers and were negotiating for space compactors before the holiday break. Upon our return, Covid had made an appearance.

We also had planned a grand opening in March for the new dinosaurs and an exceptional display concerning deep sea drilling programs around the world and the important results of these undertakings over the last few decades. Dr. Eric Ferre, Director of Geosciences, and Dr.

Jennifer Hargrave spearheaded bringing this National Science Foundation supported display to us and for arranging its emplacement. We had the invitations completed when the virus struck Lafayette. Now, for the worst part, you may never see these displays other than in the photographs here. The pandemic resulted in reduced city revenues, and rather than make budget cuts

across the board, the new mayor selected closures of selected programs, including the Lafayette Science Museum where the UL Geology Museum is housed; thereby depriving the public, students, and researchers continued opportunities to preserve, study, and teach based upon our libraries of fossil and mineral specimens.



Completed skeleton of the small dinosaur, *Herrerasaurus*, one of the first theropods, surrounded by Museum volunteers, Mary Landry, Aleta McBane, and Susie Hughes, with *Albertosaurus* lurking in the background (note we wore masks long before Covid).



Philippe Gustin, Museum volunteer, spraying the base paint coat on *Albertosaurus*.



The new dinosaur display that the children and public may never see at the UL Geology Museum/Lafayette Science Museum.



The NSF educational deep sea drilling display that may be unseen by citizens of Acadiana.



# 2019 in Pictures



# Student Honors and Awards

## Geology Scholarship Recipients

**Bill Paine/LGS Endowment Scholarship**

*Hannah Hawkins, Gracie Babineaux  
Gabrielle Billeaud, Regan Lovett*

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

*Joshua Cecil*

**Eberhart E. Leschin Scholarship**

*Samsideen Ajala*

**Paul M. Toce Scholarship**

*Christian Gutierrez, Ryan Hood  
Grace Jones*

**Joe Battle/LGS Memorial Geology Scholarship**

*Chase Sylvester, Andrew Braun*

**Hugh Allen Bernard Memorial Geology  
Scholarship**

*Nick Holt*

**Chevron Gulf Oil Foundation Endowed Geology  
Scholarship**

*Niya Davis*

**Pogo Producing C. Scholarship**

*Gift Okunbor, Ricardo Penaloza*

**Nolan Badeaux Scholarship**

*Rachel Mouton, Abigail Watson*

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

*Ryan Hood*

**Tim Dore Geology Scholarship**

*Gabrielle Billeaud, Gracie Babineaux*

# Student Honors and Awards

## Environmental Sciences Scholarship Recipients

**Dr. Jorge Gonzales-Dean Joel Fletcher Memorial**

*Rhys Bellman*

**Tommy Sanders**

*Grace Rentrop, Ashton Roy*

**Charles Joseph Miller & Vivian Melancon Miller  
Scholarship**

*Gianna St. Julien, Elliot Boudreaux*

*William Faulk, George Bailey*

*Jacob Jarreau*

**South Louisiana Mid-Winter Fair Scholarship**

*Victor Bowler, Amber Reggiatore*

*Victoria Gomez*

**Mary Sandoz Brown Scholarship**

*Teri Lewis*

**Overton Cade Scholarship**

*Victoria Gomez, Amber Reggiatore*

**Louisiana Garden Club/The Kevin Russo  
Scholarship**

*Aubrey Mann*

**Dr. S.L. Solmosy & Mrs. G.A. Solymosy  
Scholarship**

*Brenae Bergeron, Tristen Ashworth*

*Zari Johnson, Kaitlin Freeman*

**Farmers Merchants Bank & Trust Co. Scholarship**

*Hunter Meche*

**Charles and Julia Walker Bourque Scholarship**

*Hali Corwin*

**J.C. Higginbotham Scholarship**

*Agueda Elena Bragg*

**Bob Lafleur / Luke Soileau Memorial Scholarship**

*Victor Bowler*

**ULL Collegiate FFA Chapter**

*Devin Durgin*

**Joel L. Fletcher Scholarship**

*Ashton Roy, Aubrey Mann*

*Jacob Jarreau*



# Degrees Granted in 2019

## Spring 2019

### Bachelor of Science in Geology

*Colby Boutte*

### Bachelor of Science in Environmental Sciences

*Jon Hebert, Stacey Newton*

### Master of Science in Geology

*Heather Brissey, Brennan Brunsvik, Mary Fearn, Daniel Gilder, Amanda Johnston  
Moirra Lyons, Natalie Merrell, Robert Narmour, David Teter, Jamie Vornlocher*

### Master of Science in Environmental Resource Science

*Ajay Bhandari, Taylor Girouard, Grant Kleiner, Coy LeBlanc  
Micah Muir, Courtney Poirier, Scott St. Romain*

\*\*\*\*\*

## Summer 2019

### Bachelor of Science in Geology

*Darian Bouvier, Stephanie Garcia, Kristen Holmes  
Daniel Richard, Alexandra Trahan, Dakota West*

### Bachelor of Science in Environmental Sciences

*Samantha Roberson*

### Master of Science in Geology

*Kristen Ball, Victoria Chevrot, Cynthia Cook, Nicholas Geyer, Garrett Goettel  
Tyler Hebert, Mark Mella, Ryan O'Quinn, Sarah Zdanowski*

\*\*\*\*\*

## Fall 2019

### Bachelor of Science in Geology

*Ryan Coreil, Ryan Hood, Mollie Pellegran*

### Bachelor of Science in Environmental Sciences

*Elena Bragg, William Faulk*

### Master of Science in Geology

*Charles Campise, Forrest Frederick, John Hardin, Ross Ledoux, Landon Newmann  
Allison Scates, Jack Simmons, Christian Spano, Conner Spano, Spencer Stelly, Sarah Zdanowski*

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