

Museum Quarterly

LSU Museum of Natural Science

October 2015

Volume 33, Issue 3

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Letter from the Director...



Taking advantage of the technological revolution that brought us the World Wide Web and iPhones, this issue marks a new electronic format for the Museum newsletter. You will receive an email with a list of articles and all you have to do is click on an individual article to read the full story. A link to download the entire pdf is also available if you prefer that format.

Here at the Museum the technological revolution has also empowered us with a revolutionary new molecular method that allows us to collect vast amounts of DNA data quickly. For example, it would now take me about five minutes to collect all of the DNA sequence data from my PhD back in the 1990s. What is even more remarkable is that this same technology, known as next-generation sequencing, allows us to collect millions of base pairs of DNA sequence data from legacy museum specimens. George Lowery, Charles Darwin, John Audubon and other legendary collectors could have never imagined that specimens they collected would one day have their entire genomes sequenced.

The common thread in research and science outreach conducted at the Museum is that it is collections-focused. It is a field in which we quite literally stand on the shoulders of those who came before us. As you'll read about in the Newsletter, we are actively growing the collections so that future scientists here and around the world will have the same opportunity. You'll also read that we are using the collections in ways that the original specimen collector could have never anticipated. It is impossible to predict how the Museum's collections will be used even 50 years from now, but we are dedicated to preserving them so that they will be available for research and science education 1000 years from now.

Finally, it is with sadness that I report the passing of former Curator of Herpetology Dr. Douglas A. Rossman. Doug was a great scientist, mentor, and educator, and the Herpetology Collection saw tremendous growth during his tenure. Doug continued to be a great supporter of the Museum after his retirement, and we all looked forward to his annual visits from Iowa. He will be missed.

Robb

LSU Mammal Curator Discovers New Species

By Alison Satake



BATON ROUGE – LSU Museum of Natural Science Curator of Mammals **Jake Esselstyn** and his international collaborators have discovered a new genus and species on a remote, mountainous island in Indonesia. This new discovery is the third new genus described by this group of scientists since 2012, and identifies a rodent with features never seen by the scientific community before.

On the second morning of their field season in 2013, Esselstyn and Museum Victoria Senior Curator of Mammals Kevin Rowe set out in opposite directions from their field camp to check their traps. Unbeknownst to each other, they both caught the same type of animal in their respective traps and immediately knew they were looking at a new species.

“We had never seen anything like this. It was obviously a new species. We came back to camp and were both surprised that the other one had it as well,” Esselstyn said.

The animal is a shrew rat with a large, flat, pink nose and forward-facing nostrils for which they named the Hog-nosed rat, or *Hyorhinomys stuempkei*.

With extremely large ears, long hind legs that may be used for hopping, long white incisors and very long urogenital hairs, the Hog-nosed rat is so genetically different from any other species that the scientists described it as a new genus. This discovery is the cover story of the *Journal of Mammalogy* this month.

Long incisors are a trait of shrew rats. But the Hog-nosed rat has especially long incisors. Another distinct characteristic of the Hog-nosed rat is that it lacks a jaw muscle attachment point found in most mammals called the coronoid process on the dentary bone.

“I don’t know of any other rodents that have lost the coronoid process completely,” Esselstyn said.

The loss of the coronoid process indicates a weak jaw musculature and a diet that does not require vigorous chewing. The scientists found that the new species eats earthworms and beetle larvae.



Above: The Hog-nosed Shrew Rat (*Hyorhinomys stuempkei*). Photo Kevin C. Rowe.



not just subtly different organisms, but really charismatically different,” Rowe said.

The scientists described the Few-toothed shrew rat, or *Paucidentomys vermidax*, in 2012. One of the reasons why scientists have thought that rodents have been evolutionarily successful is they have incisors for gnawing and molars for grinding.

“However, this rat we described in 2012, doesn’t have molars and they really can’t gnaw because of the shape of their incisors. Interestingly, this species has lost the two things that we think made rodents successful,” Esselstyn said.

In 2014, the scientists described the Sulawesi water rat, or *Waiomys masae*, which was known to villagers and their guides but not to the scientific community. Villagers use this animal as a talisman to protect their homes against fire.

“Our guides didn’t tell us right away that they had caught it. We were asleep and they were up late at night discussing whether they should give it to us or keep it for themselves. We were very glad that they eventually decided to give it to us, because otherwise we would have left and never had known about this animal,” he said.

These animals Esselstyn and his colleagues have described are new species within new genera, because the animals could not be placed within any existing group. After sequencing the DNA from the specimens, the scientists had the molecular evidence to confirm the species’ unique distinctions.

Challenging Study Site

The island of Sulawesi in Indonesia is geographically complex, mountainous and challenging to scientifically sample. Little research has been conducted on the island since the early 20th century.

“On Sulawesi, there is a lot of ground to cover and most of it hasn’t been surveyed before, especially at high elevation,” Esselstyn said.

He and his collaborators from Australia and Indonesia have been studying the region since 2010. Inundated by constant rain, the study site for this discovery was a moss-covered habitat on Mt. Dako at about 1,600 meters elevation and a two-day trek from the nearest village.

“There’s a lot of biogeographic complexity at Sulawesi. So we’re not too surprised that we’re finding new things. But our team has been a bit surprised by the degree to which these animals are really novel. They are

Above: View of the hog-nosed rat’s nose and insisors. Photo by Kevin C. Rowe.

Title Photo: Dr. Jake Esselstyn in Sulawesi, Indonesia. Photo by Kevin C. Rowe.

Mammal Expeditions to Ouachita National Forest

By Mark Swanson

Considering all of the exotic locations **LSUMNS** curators and students travel to, it can be easy to forget that there is still a lot of natural history to study right here in the American South! Distributions of many small mammal taxa are currently shifting in response to climate change and alterations in human land use patterns. Consequently, museum work is never done, and we need to conduct new surveys and collect voucher specimens in order to document where species are currently found. Additionally, surprisingly few high quality tissue specimens of common southern species are curated in museum collections for researchers to conduct studies of molecular systematics, phylogeography, and population genetics.

The Ouachita Mountains are located at the intersection of the ranges of five species of mice which do not co-occur in other places. We are inter-

ested in knowing how these species are able to divide food and other resources while sharing the same space, since it could help us understand how animals adapt to their environments and what determines where they are found. One possibility is that each species of mouse is specializing on a particular suite of seeds and insects, and that they have unique communities of microbial gut symbionts to help them digest their food. These microbial communities might shift over the range of the host mouse depending on environmental conditions and the other species of mice present.



Above: A Texas mouse (*Peromyscus attwateri*) from Arkansas.

In order to gain a clearer picture of these phenomena, I organized a pair of 5 day collecting trips to Ouachita National Forest this past summer. Former **Esselstyn** lab post-doc **Thomas Giarla** joined me in June to collect around Fourche Mountain



people what we were doing. We used snap traps, Sherman live traps, and pitfall lines in order to catch rodents and shrews. From each of these animals we prepared a study skin, skeletal, tissue, stomach, and intestinal specimen. These data rich specimens will allow us to answer the questions we are interested in, as well as assist future researchers in their efforts.

While we are still preparing our microbial community data, we already have some interesting finds to share. Tom and I collected the first woodland vole (*Microtus pinetorum*) tissue specimen for LSUMNS collection and the first record for Yell County along an old logging road on Fourche Mountain in June. Additionally Jon and I collected the museum's first Texas Mouse (*Peromyscus attwateri*) specimen in some boulders between a cliff face and Jack Creek in August. Other species we found included the Eastern Woodrat (*Neotoma floridana*), the White-footed Mouse (*Peromyscus leucopus*), the Cotton Mouse (*Peromyscus gossypinus*), the Golden Mouse (*Ochrotomys nuttali*), and the Southeastern Shrew (*Blarina carolinensis*). We are looking forward to conducting more extensive fieldwork in Ouachita National Forest and surrounding areas in the coming months.

Above: Thomas Giarla digging a pitfall line.

Title Photo: Jack Creek in Logan County, Arkansas. It was exquisite doing fieldwork in such a gorgeous setting.

while new student **Jonathon Nations** traveled farther west with me in August to explore Jack Creek. The majority of National Forest lands are logged at regular intervals and we chose these sites because they were close to recreational areas, and therefore more likely to have mature, late succession forests.

After setting up our first trapline, Tom and I were welcomed to Arkansas by an obnoxious Eastern Whip-poor-will (*Antrostomus vociferous*). This bird's lullaby sounded like a particularly shrill car alarm all night long. While I was initially woken up every hour and a half to the whip-poor-will's screaming, I was eventually able to adjust and now long for its call on a cool Arkansas summer night.

Our workflow on both trips consisted of checking traps early in the morning, prepping specimens, and setting out more traps. This cycle was only interrupted by briefly eating and explaining to the charismatic local



Above: Jonathan Nations setting a Museum Special trap.

Collecting Birds near Santa Cruz and in the Beni, Bolivia

By Jessica Oswald & Ryan Terrill

I jumped at the chance to be part of the Bolivia trip that **Ryan Terrill** was organizing to join forces with **Greg and Donna Schmitt**, and Miguel Angel Aponte Justiniano and Miguel Angel Montenegro based out of Museo de Historia Natural Noel Kempff Mercado. We left sleepy eyed in the middle of the night on July 10th from Baton Rouge to undergo our long voyage to Santa Cruz, Bolivia, only to arrive in the middle of the night there too. Because Ryan has been working in Bolivia for six years with Miguel Angel Aponte Justiniano, we were able to start fieldwork right away. We arrived in Santa Cruz and stayed with Sebastian Herzog. The day after arriving in Santa Cruz, Miguel had everything ready to go, so we started with some collecting in the rice fields north of the city. The aim of our ex-

pedition was to collect birds from often overlooked sites near Santa Cruz and also to visit the flooded savannas in the Beni near Trinidad. We were there from July 20-August 16, which is the austral winter, so we were excited to see so many species on their wintering grounds at our collecting sites. Ryan was especially excited to see what molt condition these birds were in considering so little is known about molt in Neotropical birds.

Greg and Donna are master taxidermists who have been working in the field with **LSUMNS** since the late 70's, when they met **Curator Van Rensen** and the late **Ted Parker** through mutual friends Tom and Jo Heindel in La Paz, Bolivia. Those collections form the core of the **LSUMNS** collections of Bolivian birds, which



Above: Jabiru (*Jabiru mycteria*), one of the many charismatic species in Bolivia.

Right side photos from top to Bottom: (1) Bolivian three-toed sloth (*Bradypus variegatus*). (2) Chaco Chachalaca (*Ortalis canicollis*). (3) Greater Rhea (*Rhea americana*). (4) White-wedged Piculet (*Picumnus albosquamatus*). (5) Great Black Hawk (*Buteogallus urubitinga*). (6) Bolivian red howler (*Alouatta sara*). (7) Bare-faced Ibis (*Phimosus infuscatus*) in a flooded rice field outside of Santa Cruz, Bolivia.

is the largest in the world. Donna is among the best in the world at prepping small birds, while Greg Schmitt is a master of preparing large birds, which are scarce in collections, and we were able to collect some larger species for the LSUMNS.

We started just NE of Santa Cruz collecting in rice fields around the town of Warnes. These fields host a spectacular diversity, with a mix of high densities of wintering austral migrants, and birds of the intertwinning semihumid Amazon-type forest and arid Chaco-type forest of the area. The diversity was spectacular and we often had 100 bird species on our lists often within two and a half hours of sunrise. The heavily flooded fields were packed with stilts and Bare-faced, Plumbeous, and Black-faced ibis, Brazilian and Ringed teal and White-faced, Black-bellied, and Fulvous whistling-ducks, Yellowish Pipits, as well as large numbers of Snail Kites and Limpkins that were eating the abundant snails. The small stretches of dry woodland dividing

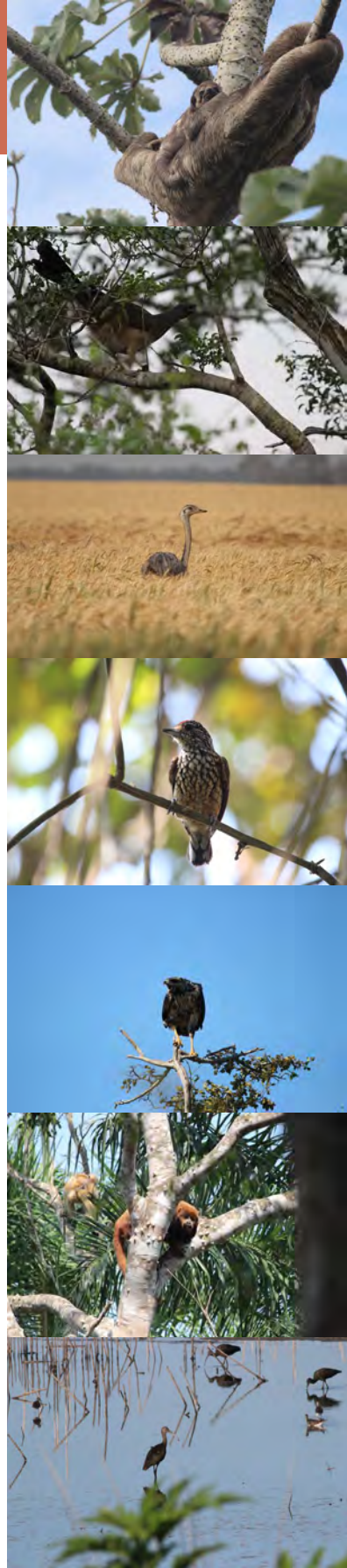
fields were packed with birds including Great Antshrike, Banded Antshrike, Straight-billed woodcreepers, Chotoy and Pale-breasted spinetails, and the recently-described Straneck's Tyrannulet. The reed beds had Spotted Rails, Rufous-sided Crakes, Spectacled Tyrants, Black-backed Water-Tyrants, Bicolored Seedeaters with large roving flocks of Chestnut-capped Blackbirds and Blue-crowned Parakeets overhead. Another surprise was a flock of 110 day-roosting Nacunda Night-hawks, a locally uncommon breeder whose numbers are supplemented by migrants from the south.

Next we visited an agricultural complex east of Santa Cruz, across the Rio Grande in the extreme Northeast corner of the Chaco, which is a vast dry forest habitat that spans from central Argentina through western Paraguay to Southeastern Bolivia. The fields were in various stages of growth and planting and dry forest and woodlands separated many fields from each other. This complex has a strictly-enforced no hunting policy, and the numbers of tinamous, ducks, ibis, chachalacas, and mammals were impressive, as well as large numbers of 11 species of raptors. One set of fields was overgrown and packed with chaco type dry vegetation, and contained Black-Legged Seriema, Many-colored Chaco-finch, and Stripe-backed Antbird. The complex was completely



Above: Ryan in a stand of palms adjacent to flooded savanna.

Title Photo: A flock of Blue-and-yellow Macaw (*Ara ararauna*) flying at sunrise in the Beni.





Above: A Plumbeous Ibis (*Theristicus caerulescens*) flying at sunrise outside of Santa Cruz.

fenced in so few non-native animals were in the fields and the native mammals at the site were abundant. We spotted two species of armadillo, a presumed ocelot kitten, monkeys, peccaries, and camera traps Miguel had placed snapped photos of giant anteaters and a puma. Jessica got her lifer Great Rhea, as one regularly called and displayed a couple hundred meters away from where we were doing a majority of our collecting.

Our most spectacular field site and where we spent most of our time was in the Beni about two hours southeast of Trinidad. The most common habitat type in this region is flooded savanna. This area has been the focus of few collecting trips. We camped on a local

ranch and the parrot diversity was outstanding. Flocks of Blue-and-yellow Macaw were common along with Blue-crowned and Peach-fronted parakeets. The ranch was situated near a mosaic of habitats including palm stands, marsh, flooded grassland, and varzea rainforest. An adult capybara was our neighbor and was a happy sight every afternoon from the prep tent. A large troop of Bolivian red howler monkeys lived near the ranch and it was great to get to see them close up. Miguel raised his binoculars one day to investigate some movement in the grasses only to look into the eyes of a puma. On our way back to Santa Cruz we saw an impressively sized anaconda crossing the road and numerous sloths. Needless to say Bolivia is still a very diverse place and it is refreshing to be able to see so many species in apparent high abundance.



Above: White-eyed Attila (*Attila bolivianus*) spotted in varzea forest in outside of Trinidad



Above: The crew from left to right - Miguel Angel Montenegro, Ryan Terrill, Jessica Oswald, Greg Schmitt, Donna Schmitt, Miguel Angel Aponte Justiniano.

Despite a lot of travel and moving camp three times we were incredibly successful. We collected 343 specimens in just three and a half weeks. This was largely because of Greg and Donna's efficiency and the great working relationship (and friendship) between Ryan and Miguel Aponte and Museo de Historia Natural Noel Kempff Mercado. By the end of our trip, we were all exhausted, happy, and Jessica now has a new favorite place to work.



Last Pleistocene songbird fossils from Peru

By Jessica Oswald

As an evolutionary biologist, ornithologist, and paleontologist I am keen to understand what has shaped modern high bird species diversity in the Neotropics. Fossils give tangible evidence of historical diversity and distributions, but bird fossils, especially of passerines (songbirds), are rare. This is especially the case in the Neotropics where bird species diversity is higher than any other biogeographic region on Earth. Despite their rarity, there are a few very bird fossil rich localities in the Neotropics. For a chapter of my dissertation my PhD advisor, David Steadman (UF, FLMNH), and I identified 625 songbird late Pleistocene fossils from one of these fossil rich localities, a tar seep near the city of Talara in northwestern Peru. The fossils are late Pleistocene in age (~ 15,000 years old), which was during the last glacial period when spectacular “mega” mammals, e.g. giant sloths, saber-toothed cats, dire wolves, could be found across the Americas. These same mammals have been found from the site near Talara in addition to numerous ducks, shorebirds, and extinct species of vultures among many other species (see Campbell 1979). These animals have vanished and today the site is a depauperate and windy, hot desert, home to few species of birds and widely spaced scrubby vegetation. We identified at least 21 songbird species, only two species identified are likely to be found at the site today and three of which are extinct. The majority of the extant species identified from the fossils are now primarily found in grasslands, savanna, dry forest, and semi-deciduous forest. The presence of these species at the site suggests these habitats were present at the now barren site at the end of the Pleistocene. The extinct species were all members of the blackbird family (Icteridae), which based on our findings and previous studies suffered high extinction at the end of the Pleistocene. What led to the higher diversity of plants and animals and wetter climatic conditions at the site 15,000 years ago? That is still a mystery but it could be the result of more reg-

ular El Niño events that result in higher precipitation along the Peruvian coast today. The major findings of this study are that the distributions of songbird species can change over relatively short time periods and bird species diversity was much higher in the recent past in the Neotropics relative to today.

This research was published in *The Auk Ornithological Advances* Volume 132, 2015, pp. 836–862 DOI: 10.1642/AUK-15-74.1 and featured on LiveScience, IFLScience!, *The Auk: Ornithological Advances* / *The Condor: Ornithological Applications* blog, and NBC News.



Above: View of three pools of petroleum (tar/asphalt) and the arid landscape at the Talara Tar Seeps fossil site. The pool in the foreground on the left is covered in dirt and debris making it the perfect trap since it blends into the solid ground nearby. Through time the pools dry up, which preserves all of the animals and plants that fell into them.

Top: Jessica Oswald standing near a spot at the site where you could watch oil and water bubbling out of the ground.

WADERS IN WORKING WETLANDS

SHOREBIRD EXTRAVAGANZA



Above: Burt Tietje explains how you identify male and female crawfish during the tour of Tallgrass Farm.

By Donna Dittmann & Steve Cardiff

LSU Museum of Natural Science's **Donna Dittmann** and **Steve Cardiff** launched the first **Waders in Working Wetlands: Shorebird Extravaganza** on 29 April 2015 to promote Louisiana's spectacular shorebird densities and diversity during spring migration. The concept of this event has been in the works for many years as a way to expand the annual spring "Shorebird Blitz," coordinated by Steve Cardiff, into an agri-ecotourism event. The "Blitz" is a one-day volunteer all-out census of shorebirds and other bird species in the rice-growing areas of SW Louisiana and has tallied impressive numbers of shorebirds, including as many as 47,000 individual shorebirds tallied in a single party survey area. Held during the peak of shorebird migration in late April-early May when overall species diversity is greatest, during the Blitz relatively early transient species (e.g., American Golden-Plover, Buff-breasted and Pectoral sandpipers) overlap with relatively late ones (e.g., Hudsonian Godwit, White-rumped Sandpiper) so that at least 30 species of shorebirds can be found at inland sites (and an additional five species can be found on the coast during that period).

The Shorebird Extravaganza, like the Yellow Rails and Rice Festival (YRARF), focuses

on the importance of SW Louisiana's working wetlands as critical habitat to birds – rice and crawfish cultivation. Whereas YRARF is held in late fall during the second rice harvest, the new event emphasizes shorebirds (many species of which are in decline), northbound bird migration through the southern Central Flyway, and the peak of Louisiana's crawfish harvest, thus providing a Spring compliment to YRARF.



Above: Lesser Yellowlegs (left) and White-rumped Sandpiper (right) provide a nice size and structural comparison during the identification workshop.

The event opened with registration on Wednesday evening at Jennings, LA. Thursday morning there were local field trips to look for shorebirds plus a trip for pineywoods specialties at Kisatchie National Forest. Leaders included Dittmann and Cardiff. Afternoon presentations put the Extravaganza into perspective highlighting the importance of working wetlands - thanks to Ducks Unlimited's Alicia Wiseman, Manomet Bird Observatory's Monica Iglecia, and Louisiana Ecrevisse's Jay Huner. Following the talks, a field trip visited Tallgrass Farm (Roanoke, LA), where the group was informed about crawfish production by Burt Tietje during a very entertaining guided tour at his farm, followed by a visit to the local crawfish wholesale processing and distri-



Left: Another ‘wader,’ although not a shorebird is this Green Heron, which showed off to participants during a trip to Lacassine NWR.

Right: Upland Sandpiper – one of the more sought-after shorebird species.

bution center. The day concluded with a social at Mike’s Seafood in Jennings, hosted by the Jefferson Davis Parish Economic Development and Tourism Commission and Mike’s Seafood Restaurant; it was a delicious near-finale to Day One. Those still with some remaining energy headed out for a night bird trip. Friday’s trips included shorebird trips in the morning and afternoon, or a trip to Cameron Parish. A Friday evening social involved live entertainment by R. Bruce Richardson (birder-entertainer) at the quaint Strand Theatre. Saturday’s trips included morning and afternoon local shorebird trips, or an all-day trip that began in the Atchafalaya Basin and then headed west into rice-field shorebird country. Saturday trip leaders included LSUMNS graduate students **Ryan Terrill**, **Matt Brady**, and **Oscar Johnson**. Saturday concluded with a crawfish boil at Tallgrass Farm – and an impromptu night bird trip as we marched across a field to see a calling Chuck-will’s Widow in a nearby hedgerow! On Sunday there was a short morning field trip for shorebirds, and an all-day Shorebird identification workshop by Dittmann and Cardiff.

Of course, the ultimate focus of the event was shorebirds, and they did not disappoint. De-

spite considerable rain across the area just prior to the festival resulting in shorebirds being relatively dispersed over vast areas of suitable habitat, a respectable 30 species were tallied. Trips farther afield to the Atchafalaya Basin, Kisatchie National Forest pineywoods, and the Cameron Parish coast provided participants with a nice cross-section of Louisiana’s other breeding and migrant species, including various sought-after southeastern U.S. breeding and migratory specialties.

This first Shorebird Extravaganza had a relatively small turnout, but participants did indicate that they had a great time and enjoyed the event, and many promised to return next year. However, unlike the Yellow Rail at the Yellow Rails and Rice Festival, there is no single unique species to draw visitors to the Shorebird Extravaganza. Therefore, in the future we need to better advertise the event to make visitors aware of Louisiana’s spring bounty of birds, scenery, and good times. *Laissez les bons temps rouler!*



Above: Hudsonian Godwit is a late spring migrant that moves north through the central US but migrates south off the coast of the Atlantic; here during the Extravaganza in a rice field.

Avian Events Support Team coordinated the festival. The festival is very thankful to its great sponsors and

supporters who helped in various capacities including providing excellent field trip leaders: Audubon Louisiana, Barataria-Terrebonne National Estuary Program, Cameron Parish, Crescent Bird Club, Greg Lavaty Photography, Jefferson Davis Parish Economic Development and Tourism Commission, Jimmy Hoppe Farms, Kevin M. Berken Farms, Louisiana Bird Observatory, Louisiana Department of Wildlife and Fisheries, Louisiana Ornithological Society, Louisiana Rice Promotion Board, LSU Museum of Natural Science, Mike's Seafood Restaurant, Orleans Audubon, Thornwell Warehouse Association, U.S. Fish & Wildlife Service, U.S. Geological Survey, USA Rice Federation, Wader Quest, and Wild Birds Unlimited.



Above: Participants were able to hold a baby alligator (from Gator Chateau) including event co-coordinator Steve Cardiff supervised by Dione Sablehouse of JD Parish Economic Development & Tourist Commission.



Above: A group of field trip participants searching a field near Thornwell.



Back to the Middle East for More Fishes

By Prosanta Chakrabarty

Bill Ludt and I returned to the Middle East this April going back to Kuwait and adding Abu Dhabi to make our regional collections. Again, we had the wonderful LSU alum **Dr. Jim Bishop** host us. Jim organized and had specimens waiting for us collected by Kuwaiti research vessels in advance of our arrival. We also were asked to present a five-day short course at the Kuwait Institute of Scientific Research (KISR) titled “Taxonomy and Identification of Fishes from the Arabian Gulf” – teaching this course allowed us to pay for this trip and make our collections which otherwise would have been impossible. Each morning we lectured from 9 to 11:30, and each afternoon we held two-hour labs. It was exhausting but ful-

filling work, for both the instructors and students. In the lectures we covered topics ranging from taxonomy, systematics, and museum studies of fishes, to early explorers of the region (Jim’s section) and the geology of the Arabian Gulf (Bill’s section). In the lab we sorted the collections made in the previous weeks by a KISR research vessel, and the students learned to use keys and

identification guides to put scientific names on each specimen. They also created their own characters to help with identification. There were 19 students in all, many of them from KISR but some coming from as far away as Oman and the United Arab Emirates. The first language of all the students was Arabic, and although they all spoke English, the language used in field guides can be quite ob-



Above: The High Line at NYU Abu Dhabi.



Left: Jim showing some beautiful fish plates from a historical regional book.

Right: Dissection of a butterfly ray.

scure even to a native English speaker. My job was to help them understand the regional guides and to help them personalize their own guide to fishes from the region. I pointed out to them the oddity that an American was teaching them about their fishes, but LSU has one of the best recent collections of Persian Gulf fishes in the world (thanks to our past efforts). I also pressed upon them the need to create a reference collection of vouchered fishes somewhere in Kuwait. No natural history collection exists anywhere in the Arabian Peninsula (the nearest one is in Iran). I pointed out to them that if there is loss of species from an oil spill or climate

change, that there is only institutional memory to make note of the shifting or declining diversity. A reference collection could help keep better track of the changing diversity.

We went through nearly 100 species from the Gulf during the class. Bill and I brought back hundreds of specimens and tissue samples to LSU, many of which are new to collections (we sampled 100 different species last year). With Kuwait having only about 350 species, we now have many of those at LSU.



Left: Early Morning Fish Market

Right: Some fish identified and labeled in English and Arabic by students.

Title Photo: Students seining in Kuwait Bay.

A photograph of two divers on a boat. The diver on the left is wearing a black wetsuit, a yellow buoyancy compensator, and has his right arm raised. The diver on the right is wearing a black wetsuit with a 'SCUBA PRO' logo and orange gloves. They are on a boat with a red and white flag. The background shows a body of water and a forested shoreline under a cloudy sky.

Pursuing Pacific Fishes in Panama

By Bill Ludt

The month of May saw the LSU ichthyology lab collecting in very different places on the globe. **Prosan-ta** and I finished up our Middle East collecting trip at the beginning of May, and a short ten days after I found myself traveling to Panama for yet another collecting trip. The hot and dry conditions we experienced in the Middle East had no resonance in the wet, humid, tropics of Central America. The trip was funded by a Lerner Grey grant that I received from the American Museum of Natural History as well as funding from the **LSU Museum of Natural Science**, and was intended to be a brief ten day long collecting trip on the Pacific side of Panama. Luckily, I had help collecting on this trip from Moisés Bernal, who is a graduate student at the University of Texas at Austin, and a Panamanian local.

The goal of the trip was to collect a variety of marine reef fishes that have different life history traits for a comparative population genetic study along the eastern Pacific. We were after fish that were small or large, nocturnal or diurnal, as well as solitary or schooling. One species we were after, the yellow tailed saw-tail surgeonfish, is particularly important for one of my dissertation chapters. To collect these fishes without

damaging any reefs we decided to scuba dive with pole spears, and we got help with renting boats and getting all of the necessary scuba tanks through the Smithsonian Tropical Research Institute (STRI). STRI assists a vast network of scientists with logistical support, permits, and laboratory space, and is a great help when working in Panama. However, rough sea conditions arrived with us, resulting in STRI halting all marine operations for several days due to safety concerns. Moisés and I wasted no time with the bad weather, and decided to spend those days rummaging through some local fish markets to look for good specimens. Luckily the weather didn't stay too long, and with the hard work of STRI boat organizer Reinaldo Tapia and STRI dive safety officer Raul De Leon we got several days of diving through STRI at Isla Taboga, near the STRI Naos lab, and in Las Perlas Archipelago a little ways off the coast of Panama.

The time that we lost due to inclement weather had a big impact on such a short trip though, so to get back some of the days we lost Moisés and I decided to dive throughout the weekend to get the necessary number of fishes that we needed. Luckily we were able to get in touch with Guillermo Schuttke at Coral Dreams



Above: One of the outdoor fishing markets we visited in Panama City during the bad weather.

dive shop on Contadora Island in Las Perlas who graciously agreed to help us. Las Perlas is an archipelago of about 200 islands and islets about 30 miles off the western coast of Panama. The islands are surrounded by a mix of rocky coral reefs and are the ideal location to collect most of the fishes we were after. Guillermo was a tremendous help, and used his decades of experience in Las Perlas to help us find the fish we were looking for very quickly. In just two days of diving with Guillermo and his company we had made up all of the time we lost due to the bad weather and got the fishes that we needed. Overall it was a great trip, and I hope to return to Panama in the near future for more collections.



Above: Fish collected from one of our dives in Las Perlas. The fish include Tinsel squirrelfish (*Sargocentron suborbitalis*), a Spot-tail grunt (*Haemulon maculicauda*), a Barred serrano (*Serranus psittacinus*), a Pacific Night Sergeant (*Abudefduf concolor*), and two Yellow-tail sawtail surgeonfish (*Priopurus laticlavus*)

Title Photo: Moisés Bernal and I preparing for our last dive in Las Perlas Archipelago.

On the Amazon and Tapajo Rivers

By Prosanta Chakrabarty

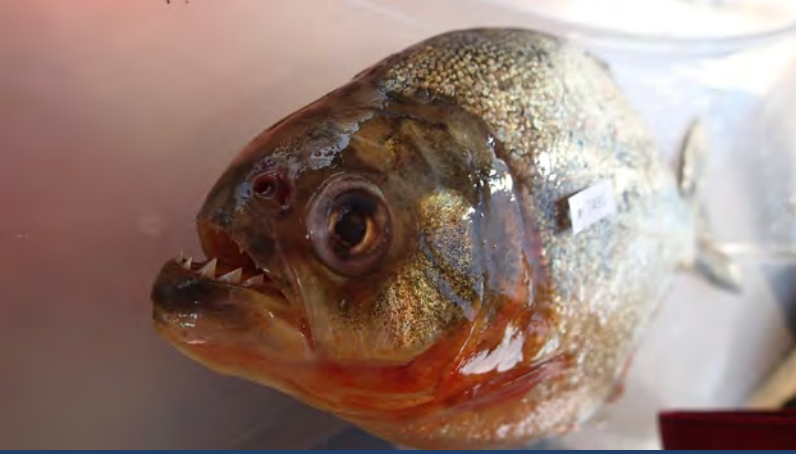
In June of this year graduate student **Bill Ludt** and I went down to Brazil to attend the Evolution meetings and to do a little fieldwork. The Evolution meetings were in Guarajá but we decided to fly up to Santarém (about 6 hours north of Guarajá) to join the lab of Dr. James Albert from the University of Louisiana Lafayette. James and I both were PhD students in the lab of noted ichthyologist Dr. Bill Fink at the University of Michigan Museum of Zoology (UMMZ) but we didn't overlap as students (he was there a little over 10 years before me). We actually met for the first time in Brazil in 2004 when I was a graduate student attending the Joint Meeting of Ichthyologists and Herpetologists in Manaus. He was one of the first people I contacted when I found out I would be coming down to work at LSU. We are good friends and he is one of my favorite colleagues. We recently obtained a grant of nearly \$800,000 from the National Science Foundation to work on the systematics of fishes from the Neotropics. We were in Santarém to collect fishes from two beautiful rivers that come

together there: the clear waters of the Tapajós, and the brown silt and nutrient filled waters of the Amazon. This is a strange mixing of rivers and the fauna is odd here too, you can find sponges, sea gulls, terns, shrimp, and other organisms you would normally associate with being marine. However, the fish fauna is pure Amazonian and completely dominated by a group called the Ostariophysans. These are your catfishes, characins (things like tetras and piranhas) and electric knifefishes (Gymnotiformes), the latter being the group in which Dr. Albert is the world's foremost expert; he recently had a paper in Science about the genome of the electric eel (which is not an eel at all, but a gymnotiform). There are also many cichlids down here – together there are more

than 5000 species of freshwater fishes in the Amazon – about 1/3 of the world's total! The catfishes alone are quite amazing – the old saying goes “any old fool knows a catfish” but you've never seen them like this before. There are nearly 1000 species down here and they include things like the



Above: Prosanta Chakrabarty and graduate student Bill Ludt: proud LSU MNS Tigers on the Amazon.



Above: Up close and personal with a recently collected Amazonian piranha specimen.

Title Photo: Doing some nighttime netting out in the Amazon.

candirú – the notorious parasite of other catfishes that on occasion has been known to swim up the urethra (yep) or anus of unsuspecting bathers. (We have some on display in the LSU MNS Fish exhibit.) There are actually many species of candirú including some freelifing forms and others that are scavengers. One of the species we collected is best known for being discovered inside human cadavers from some unfortunate souls who lost their lives in the Amazon River.

When Bill and I arrived in Santarém, Dr. Albert's lab was just getting into the hotel from a three-day long boat trip. They looked disgusting and I was really jealous: they were muddy, smelly, and all had big smiles on their faces. The Albert lab had struck out the first two days but hit the jackpot on the last day (the day I saw them). They cleaned up and we headed out to get some caipirinhas to celebrate. Santarém is a sleepy river city that besides being the meeting point of the Tapajós and Amazon rivers is also notable for being next to Henry Ford's abandoned utopian suburbia, Fordlandia. He created an American style village there for rubber plantation fieldworkers under his imagined idyllic conditions – good English schooling, no drinking, and no women – obviously it didn't last.

The next morning we first headed out to the local fish market. This was a rather large market with four rows of stalls with fish ranging from small anchovies to giant pirarucu (the bonytongue, arapaima). This was in a large outdoor stall and one of the vendors was even able to call in the famous pink river dolphins with a few fish treats. (There is an old Brazilian myth about how these dolphins don hats at night and hit on the wom-

en.) We purchased some of the more notable species and headed out to the water. We walked on to a little chartered boat, "The Calypso," so named because the captain of the boat was obsessed with this kind of music and about a tenth of the boat was filled by a giant set of speakers and a strobe-light disco ball. James got a great deal on the boat and it fit their trawling net they brought from Lafayette. The captain was also quite knowledgeable about fishing in the area. Besides Bill and I, there was James and four of his students, plus the captain and two helpful staff. It may sound like a lot for a 30ft boat but it was rather comfy. We set up a large trawl net at the back end of the boat and sometimes we would take a smaller boat to set out a long (almost 100ft gill net). The captain always picked me to go out and pull in these gill nets. I felt like the kid in the classroom that the teacher always pushed to test their limits. But I soon realized he picked me because I was the only one who could cast net so he wanted me to cast while we waited for the fish to hit the gillnet. We had a successful first day and Bill and I had a fun time interacting with the Albert lab and the staff on the boat. We headed back to the hotel that night and James and one of his students left the next day for some pre-meeting organizing in São Paulo. (James ran a Parametric Biogeography session for the Evolution Meetings.) It was just me and the students on the boat for the next few days and it was a great time. We teased each other giving each other nicknames – Jack from Los Angeles who showered twice a day was "Hollywood," Max was YCE because he was a "young Clint Eastwood" – and the rest of the pseudonyms I'll keep a secret between the fishing crew of the Calypso. Besides the teasing we had a lot of amazing samples come in: piranhas, arowanas, cichlids and of course lots of catfish,



Above: The prominent snout of an electric knife fish.

knifefish, and tetras.

The first night we strung up our hammocks and were rudely awakened to a violent storm surge. The winds knocked our hammocks together and the Captain and crew were calm but clearly concerned, they had to “batten down the hatches” on our little 30ft'er and sailed us into safer waters. Around 5am he started getting phone calls on a regular basis as we learned a larger boat owned by the captain's friend had sank. A similar swell happened the next day, with lightening and thunder forcing us to take cover again. It was a bit disconcerting knowing that you are a bit of a sitting duck in the middle of the remote Amazon far from any other people. We were surprised by the strength of the storms, luckily neither lasted long and we were able to get along with our business.

I loved fishing for little small things on our little side boat we were pulling along the Calypso. We collected many of the cichlids and bony tongues this way and some other rare things. One of my favorites times was going out at night with just a dinky flashlight to small patches of reeds, we were often remarkable successful with just a dipnet and a castnet. Often while I was out

on the little boat the rest of the group used hook-and-line to pull in a catch. The crew of the boat, particularly “Donnie” our cook, was quite adept at catching large piranha. One of these, the black piranha (*Serrasalmus rhombeus*) was such a nice specimen with beautiful interlocking teeth that without thinking I tagged it and sank it into formalin; I realized later that Donnie had intended to cook that fish that night. I felt awful but hopefully made up for it by bringing in other fishes for dinner.

On our last night out we were pleasantly surprised by the captain finally putting on his speakers and setting the volume to 11. Luckily we were in such a remote place that there was no one that could complain about the noise. He even put on his strobe-light disco ball. We went up to the roof of the boat and watched the stars and the dense forest around us.

After a few days of not showering and getting muddy and smelly we were glad to be brought back on shore in Santarém. I was ecstatic for our adventures and still feel so lucky to get to do this for a living as part of my job at the LSU MNS.



Above: Prosanta Chakrabarty and James Albert holding a tray of piranhas, our Michigan Ph.D. advisor's favorite fish.

Pollen Analysis Helps Identify Victim in Baby Doe Case

LSU Palynology Student Contributes to Discovery

By Michelle Watson



LSU doctoral student **Shannon Ferguson** contributed to the investigation that led to the identification of the body of Bella Bond, the two-year old toddler discovered on the shores of Deer Island in Boston on June 25. This past summer, Ferguson interned with the Department of Homeland Security, or DHS, in Houston where she worked with head palynologist, Dr. Andrew Laurence, in Customs and Border Protection, to track the origin of confiscated drug paraphernalia and other items. However, it was her work on the Baby Doe murder case that had the greatest impact on her summer internship experience.

As part of her internship, Ferguson assisted Dr. Laurence, her DHS supervisor, in the analysis of the pollen found in Bella's hair and clothing. It was the results of this analysis that gave investigators their first break in the case. Based on the pollen found on Bella's clothes and blanket, it was determined that she was from the local area prompting police to focus their search in Boston.

Bella's body was found June 25. After weeks of news coverage and virtually no leads in the child's identity, she was referred to as Baby Doe. Earlier this month, the little girl was identified as Bella Bowman. Bella's mother and her mother's boyfriend have been charged in her killing.

To help investigators identify Bella, DHS palynologists combed through her hair and clothes for remnants of pollen and other forensic evidence that could be used to geolocate where she came from. The scientists used tiny vacuum cleaners to suck up the pollen grains through a filter. After that, the samples underwent chemical processing to isolate pollen grains, and this is what Ferguson, Laurence and a team of scientists examined.

"Pollen has a wide utility, because it's everywhere," said Ferguson, "What ever question you're trying to answer, it can help. It's not going to be perfect, but it's going to get you close and definitely in the right direction."

Used most often to date and track climate change, palynology is becoming a key factor in forensic

studies. Palynology is the study of organic-walled microfossils like pollen, spores and dinoflagellate cysts (a type of plankton) that can be used to locate the origin of objects, to date sequences or reconstruct past environmental conditions. The study of palynology falls under the bigger umbrella of paleontology and geology.

“Narrowing pollen to a certain region can be a tricky process. For example, oak and pine trees are two of the most common plants found in the Southeast region of the United States. Studying any object that’s found in the Southeast region will most likely have both oak and pine pollen grains on it,” said Ferguson. “It all comes down to the trace elements of rare pollen types that help determine the location of the object. Usually there are only one to three pollen grains that will help pinpoint the location even better.”

Ferguson, now in her final year of her PhD studies in LSU’s Department of Geology & Geophysics, is funded by a Curatorial Assistantship from the **LSU Museum of Natural Science** Palynology Collection. At LSU, Ferguson is learning to identify pollen, build the pollen online database, and use the pollen to reconstruct environmental changes in the Gulf of Mexico.

“I always knew I wanted to do geology since third grade,” said Ferguson, “We went to Desoto Caverns in Alabama for a field trip, and I told my dad, ‘It’d be cool if I could play with rocks all day.’” Ferguson’s dad assured her there was a career path for people interested in rocks.

Ferguson became interested in palynology while studying under Fred Rich, her advisor at Georgia Southern University. When she enrolled in the PhD program at LSU, she began working with **Sophie Warny**, associate professor of palynology in the Department of Geology & Geophysics and curator of palynology in LSU’s Museum of Natural Science. In 2013, Professor of Palynology Vaughn Bryant, who is also considered the father of forensic palynology in the U.S., invited Warny to a DHS/FBI meeting in D.C. to discuss the use of pollen in forensic cases. This meeting led to a forensic project funded by the National Center for Biomedical Research and Training at LSU under the governance of Jim Fernandez. The forensic training Ferguson acquired while working with this project and the connections she made are what landed her the internship.

Currently, Ferguson is working on a project with Warny using software called Specify that helps digitize pollen grains. There are presently about 12,000 pollen species in the LSU CENEX collection. Because there’s so much unknown pollen in the world, Ferguson said it could take decades to sort through. The collection had not been digitized before because most laboratories don’t have the time or the funding to sort through pollen, measure it, take pictures, and upload it to a computer with a name and description. But digitizing the pollen grains is essential to build the type of database needed to identify the different types of pollen in forensic and other cases.

When not knee-deep in pollen research, Ferguson is a runner participating in marathons like the Louisiana Marathon and the Atlanta, Georgia Peachtree Road Race. For the future, however, Ferguson is happy as long as she gets to examine pollen.

“Solving any question with pollen is interesting to me. No matter if its dating oil-bearing sequences, or forensics, I want to learn everything, there’s always more to know.”

Photo on previous page: Shannon Ferguson, LSU PhD student in palynology, photographed in front of a scanning electron microscope at the Department of Homeland Security in Houston. Ferguson was trained to use the microscope during her DHS internship.



The experience of a lifetime

LSU students spent five weeks in Paris and Southern France taking two geology classes

By Sophie Warny, Ph.D., Associate Professor and Curator, Louisiana State University

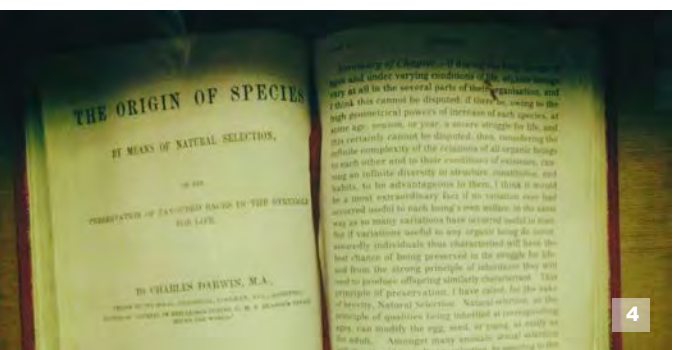
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Last August, I was contacted by Dr. Harald Leder, Director of the LSU Academic Programs Abroad (APA) and Dr. Kevin Bongiorno, a faculty in the Department of French Studies at LSU. They were organizing the Summer 2015 edition of “LSU in Paris” and were looking for one more faculty member to join the experience. They already had two French instructors (Dr. Bongiorno and John Patin), and two English instructors (Dr. Jerry Kennedy, who hold the prestigious title of Boyd Professor; and Dr. Sarah Liggett, the Donald & Norma Nash McClure Alumni Professor in the Department of English, and the director of the Communication across the Curriculum program). Having the chance to teach in the country where I spend much of my childhood was a great opportunity, and I gladly accepted the offer.

With LSU APA, each faculty member is responsible for teaching two classes, so I was left with the challenge of creating two classes that would take advantage of all that France has to offer. The new syllabi had to be submitted and approved early in the fall 2014 semester. Having done my doctoral research on the Messinian Salinity Crisis under the direction of Dr. Jean-Pierre Suc in Montpellier, I knew I had to incorporate the many fantastic outcrops that can be found in the French Riviera and in Provence. So, very naturally, two classes came to mind; a version of Historical Geology that would use the countless buildings (such as the *Musée d’Orsay*¹), monuments and science museums of Paris as lecture support, and a field geology class in Southern France. The syllabi were approved, and the “LSU in Paris” program had 45 students registered by the spring. We were at full capacity, with 16 of these students taking one or two of the geology classes offered, four of these students coming from the LSU Honors College, and most studying either geology or petroleum engineering.

We arrived at our dorm, the FIAP Jean Monnet (located in the very safe and pleasant 14th *arrondissement*) at the end of May. This dorm/hostel has a full service cafeteria, a café, some conference rooms, many classrooms perfect for our teaching needs, and it was conveniently located a five-minute walk from the *Glacière métro* station. As part of the package, all students received a subway card for the duration of their time in Paris to give them some flexibility.



Historical Geology was taught for the first three weeks of the program. In addition to daily morning lectures, we took some afternoon field trips. The first week, we went to the *Galerie d'Anatomie Comparée*^{2,3} in the magnificent *Jardin des Plantes*. This garden hosts many science museums and laboratories, and it was very humbling to see items such as one of the first edition of Darwin's book⁴ on *The Origin of Species* or walk in a building once occupied by Cuvier⁵ (also, see inset below the title). It was truly inspiring to be in the very location where this French naturalist, one of the fathers of paleontology, worked on modern and fossil comparative anatomy, the *Basin de Paris* sediments, and discovered so many extinct species.



Cuvier is not the only historically famous scientist who worked in the *Jardin des Plantes*, this garden also hosted some physicists in their Museum of Applied Physics. One of the most notable physicists was Henri Becquerel, and it is in this location, on March 1, 1896, that he discovered radioactivity⁶. You can't help, when visiting these laboratories, but to be inspired and to want to give the best of yourself, in your research and teaching endeavors.



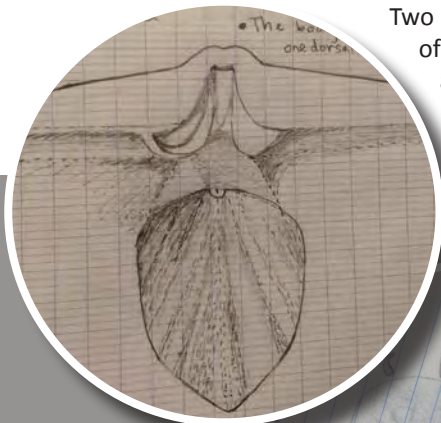
On another afternoon, our Historical Geology class was joined by Dr. Kennedy's English class and this gave us the chance to exchange our different knowledge. Dr. Kennedy took us to the house⁷ that was once inhabited by American writer Ernest Hemingway, where we learned that it was in this apartment, under the mentorship of Gertrude Stein, that Hemingway wrote *The Sun also Rises*. From there, our group walked by the *Arènes de Lutèce*, built in the year 200 with Eocene Beauchamp sandstone. The geology students shared with the English students a few of the concepts they had just learned in Historical Geology by showing some of the features seen in the sandstone, such as cross-bedded facies. We ended the day at the *Musée de la Minéralogie*^{8,9}, where the students were able to test the knowledge they had just gained that morning in the introductory chapter on mineralogy.



The second and third weeks, we spent each morning studying one of the geological time periods, starting with the Precambrian and ending with the Holocene. When I taught that class at LSU, it was generally in an auditorium with about 150 students. In Paris, this class was qualified as an Honors class, and the advantage was that I had, at most, 16 students in the class, and we had the luxury of having fabulous museums just a short subway ride from our classroom. We took advantage of this by visiting, twice, the *Musée de la Paleontologie*. Tucked in a corner of the *Jardin des Plantes*, by the Seine River, this building is less imposing than the prestigious and fabulously remodeled *Grande Galerie de l'Evolution*, but the collection on display in this museum are priceless and by far better than those visitors can see in the *Grande Galerie de l'Evolution*. This museum had on display most of the key fossils that are discussed in the textbook we were using as support for the Historical Geology class. What a treat to see these as opposed to just abstractly read about them in a book!

To help the students pay attention to details and take the time to reflect on these priceless specimens, they were all tasked to sit in this museum and draw 10 fossils of their choice (see inserts for examples of students' work), while discussing the paleo-environments that existed at the time these fossils lived. One of the LSU students' favorite was of course a fossil of a Cenomanian crawfish¹⁰. After all, we are from Louisiana and crawfish season is always on our mind. One of the impressive larger-scale fossils was the full skeleton of a specimen of *Cynhiacetes peruvianus*¹¹. It was interesting to us because one of my fellow curators at LSU, Dr. Judith Schiebout, has a *Basilosaurus* in her collection. The *Basilosaurus* whale, found in North Louisiana, is a reminder that our coastline used to be around Shreveport in the Eocene. Both genera are part of the basilosaurid Upper Eocene early whales. It was a chance to see this different genus and analyze some of their differences. A favorite of mine were the Ediacaran fossils¹². For those of you not familiar with these fossils, they were named after the Ediacara Hills of Australia where they were first discovered. Although seemingly uninteresting if you simply look at their morphology, they are truly unique because of their age. They are from the Proterozoic Eon and are found at the end of the Precambrian time, they are thus the first fossils of multicellular animals known and possibly the ancestors of anemone, annelid, and creatures such as jellyfish. The museum also had a variety of marine fossils such as sea urchins¹³ and a great section on the evolution of fishes, amphibians and reptiles.

Two other specimens I enjoyed were the replica of a *Dutuitosaurus ouazzoui*¹⁴, an extinct amphibian; and the fossil of an Eurypterid¹⁵, an extinct arthropod from the Paleozoic.



Sketches by petroleum engineering students Beth Broussard and Nick Mouille



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While living in Paris, the students had two meals a day at the FIAP, but the program also proposed weekly pizza night. Every Tuesday, the students from English, French and geology programs would gather together along the Seine River¹⁶ and enjoyed the pizza purchased by Dr. Bongiorno. The weather was fantastic (we were lucky) and musicians and tango dancers gave the riverside a touch of extra magic. Most of all, it gave us all a chance to interact between our different specialties. For instance, I learned that the beach near my grandparents' home in Antibes (at the *Plage de la Garoupe*) is where F. Scott Fitzgerald wrote his famous novel *Tender is the Night*. The French and English students learned to look at the stone on which they were sitting and realized that they were full of fossils. One of the Honors students, Joe St Cyr, an English major, wrote:

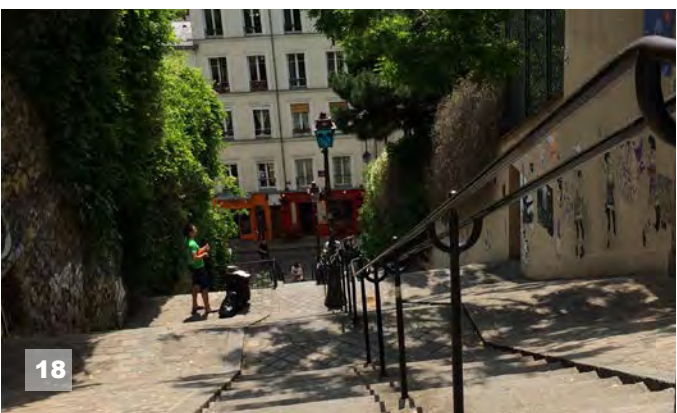
"Paris is a great place for the historical geology class because of the insane variety of rocks easily found here. We were not even on the walking tour, we had accompanied a group of girls to go shopping, and Ross [Ross Teichman, an Honors student from petroleum engineering] made the entire group stop to look at the stones on a bridge that exhibited a lot of cross-bedding structure similar to the ones we saw in the Roman arena."

When I read his comments, it really made my day because I love the fact that these students have learned some skills that they will keep well beyond the classroom setting.



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In addition of taking full advantage of the museums, we took some walks in the street of Paris, mostly in the 5^{ème} and 11^{ème} *arrondissements*, to look at the rocks that were used in the construction of the French monuments, buildings, churches and castles. The students learned that many of the buildings in Paris are made out of rocks that came from the *Basin de Paris*, a geological sedimentary basin where successive marine layers were deposited during the Triassic to the Pliocene. For instance, the *Grande Galerie de l'Evolution*¹⁷ is made of Eocene limestone called "*Calcaire Lutetien*" and "*Calcaire de Château-Landon*." The students also learned that cobblestone streets¹⁸ can tell you a lot about the periods in which the streets were built (many of the pavements are made of sandstone named "*Gres de Fontainebleau*"). They also learned that most of the sidewalks¹⁹ in Paris are made of granite. One of these granites, the *Granite de Vire*, is Precambrian in age. Dominic Mouille, a petroleum engineer student, wrote in his essay that one of the things that amazed him about Paris is not so much the age of the buildings, but that it took *millions* of years for nature to form the rocks used in some of the construction.



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The fourth week in France, the 12 students enrolled in the advance field class (Geol 4002) left Paris Saturday morning onboard the high-speed train (TGV) for the six-hour ride to Nice. Upon our arrival in Nice, a small bus (courtesy of Dr. Wicks) was waiting to drive us to the Oceanological Observatory of Villefranche-sur-Mer²⁰ (OOV), where we had an agreement allowing our students to use their dormitory, and to share the space with French graduate students conducting marine research. This historic building is located less than 10 km (4.2 miles) from Nice on the French Mediterranean coast. It is the most exhaustive marine science campus in France, and it is attached to the *Université Pierre et Marie Curie*, one of the top scientific research universities in France, and is also part of *La Sorbonne* system in Paris. The UPMC is ranked 6th in Europe in the Shanghai academic ranking and 39th worldwide.

Because the OOV is located in the beautiful small maritime town of Villefranche-sur-Mer²⁰, the students had the opportunity to walk to the beach and outdoor coffee shops and restaurants after class. It is also located just a few minutes from major cities such as Menton and Monte Carlo, so the students decided to dress up and spend their free Saturday evening at the famous Monte Carlo casino. The next day, the group took the coastal train and met in a small restaurant in Cannes to sample the Mediterranean cuisine²¹ and enjoy one day at the beach.

After this short break, the field class started with a day spent looking at the Nice inland area, focusing on Neogene and Quaternary sedimentary outcrops and discussing tectonic concepts. This was the first contact with the Southern Alps and topics such as overthrusting and uplift. We also discussed several concepts relating to Miocene and Pliocene sedimentary basins deposited in the region (datations, continental to marine sedimentation, Gilbert-type fan delta). We ended the day discussing the impact of the Messinian Salinity Crisis, i.e., the brief desiccation phase of the Mediterranean Sea and visited sites where fluvial erosion, relationships with offshore evaporite deposition, and marine reflooding were observed and discussed. For instance, the village of Carros²² provided some excellent outcrops where a Messinian erosional surface separates Burdigalian clays from what is called the Carros breccia. The fieldwork also allowed us to enjoy the beautiful scenery that surrounds you in the French Riviera as the group shared a picnic lunch in the charming mountain-top Carros village²³.





On the second fieldwork day, we travelled to the foreland basin of external Alps and spent the day looking at Mesozoic and Cenozoic sections. More precisely, we travelled to the absolutely breath-taking region of the *Gorges du Verdon* where the students enjoyed a picnic and, for the boys, a swim in the chilly turquoise-colored water²⁴ of the Verdon river. One of the concepts discussed is the difference between valley, canyon and gorges²⁵. We also analyzed the landscape and discussed the Paleogene marine to continental evolution of this basin and of the impressive Verdon Gorges in relation with the Alps tectonics, stopping just long enough to represent LSU at the *Point Sublime*²⁶. The complicated landscape tested the observation skills of the students!

While in the *Gorges du Verdon*, we also travelled to a fantastic Mesozoic section that includes the proposed Barremian Stage Global Stratotype Section and Point (GSSP) in Angles. This thick Cretaceous sequence gave us the opportunity to discuss ways various geological fields provide different types of datation (absolute or relative), and the ammonites the students observed helped them grasp the concept of biostratigraphy first hand. The cyclic deposition and alternating layers of carbonates and marls also provided a perfect setting to discuss Milankovitch cycles²⁷. In the inset below is a picture of the proposed "golden spike" at "*banc 72*," i.e., layer 72. The Aptian, also visible at that site, is mostly composed of clays.



On the third fieldwork day, we travelled to the Var region, around the towns of Saint Maxime and Saint Tropez to study the Maures and Estérel massifs and focus on crystalline rocks. These provided a unique chance to look at magmatism, metamorphism, volcanism, and even sedimentary deposits made of volcanic clasts. This introduction to magmatic, metamorphic and volcanic rocks allowed the students to not only improve their geological knowledge of non-sedimentary rocks, but also to visit some of the most wonderful coastal landscapes on Earth.

In the Var, we started the day by visiting five sections, each displaying various levels of metamorphic grades. We discussed the origin of these deposits within the frame of the geological evolution of the region. The first deformation of the Maures Massif corresponds to thrusting by nappes involving an obducted oceanic crust sequence around 350 Ma. Fold amplification was due to magmatic intrusions dated at 303 Ma (Rolland et al., 2009, discussed in the next page). The students visited various outcrops made of crystalline rocks such as micaschists, orthogneisses, amphibolites, phyllades²⁸, and after a quick picnic^{29,30} with some Louisiana flair²⁹ in the midst of a rosé vineyard, we visited a quarry that gave us the opportunity to observe several additional types of rocks. The students saw the complicated relationships between intrusions of granite, dolerite, or basalt, and a basement made of migmatitic gneiss³¹. The session in the quarry ended after the students found a layer of pumice stones that they sampled to bring home as a present for their moms or sisters for a “spa” day.



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It was hard to leave the beautiful scenery of countless grapevines growing on fields made of siliceous-rich soils, a composition that is not surprising as these fields are next to miles of micaschist outcrops, thus providing the right substratum for these vines to produce the fabulous *Rosé de Provence* wine³².

But, the day was not over; after the morning spent in the *Massif des Maures*, we drove to the coast to see additional outcrops of volcanic rocks and clasts. We observed red conglomerates and sandstone^{33,34} made of debris of volcanic clasts such as rhyolites. I noticed later that day that most of the landscaping in the French Riviera uses these rhyolite clasts around the flowerbeds. We then travelled to the section where these clasts originated from, to view the gorgeous red Permian rhyolitic³⁵ deposits that make the *Massif de l'Esterel* so famous with its vivid red and orange colors against the turquoise Mediterranean waters. We ended the day in Saint Tropez^{36,37}, a mythical town, rich in history, and made famous by various movies. The students enjoyed a much-deserved break at the beach after a long day in the blazing sun.

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The last field day was spent a couple of hours away, west of Nice, and took us from the perialpine sea to the Rhône Delta. The purpose of the day was to visit a modern delta and discuss Early to Middle Miocene global versus Mediterranean Sea sea-level changes (sedimentology, fossil records, transgressions, regressions, onset of the Rhône River). We reviewed the impact of fluvial erosion, relationships with offshore evaporite deposition, marine reflooding, and we analyzed the outline of the Holocene Rhône Delta.

The first stop was in the village of Carry le Rouet where Dr. Philip Bart discussed the outcrop within a sequence stratigraphic context. Dr. Bart was also extremely helpful in Paris where he gave some of the lectures while I was fighting a walking pneumonia. This outcrop at Carry le Rouet beautifully displays the passage from brackish to marine conditions and provides the perfect settings to study regressive/transgressive concepts^{38,39}. The section is also very rich in various gastropods, bryozoans and coral colonies of Aquitanian ages. The inset shows some fossils of *Turitella* found by the students.

The next stop took us to an outcrop displaying a Burdigalian-age marine transgression. The erosional surface is marked by borrows made by saxicavous molluscs⁴⁰, on this wave-cut erosional surface⁴¹. This outcrop was remarkable.

One of the other outcrops visited was a Burdigalian sequence made of white calcarenite with a thick bed of abundant oyster fossils⁴² found in life position. According to my co-guide, Dr. Suc, this section marks the upper Burdigalian transgressive system track. The day ended with a couple more stops followed by the visit of the Arles Roman ruins and a visit to some of the sites (café, park, etc.) painted by van Gogh in his last days.

I am extremely grateful to my former Ph.D. advisor, Dr. Jean-Pierre Suc, who joined us and helped guide our group for these four days. Thanks to his knowledge of the region, we were able to put together a very full program and visit some of the best outcrops that the French Riviera and Provence have to offer. I couldn't have selected these spots without his guidance.



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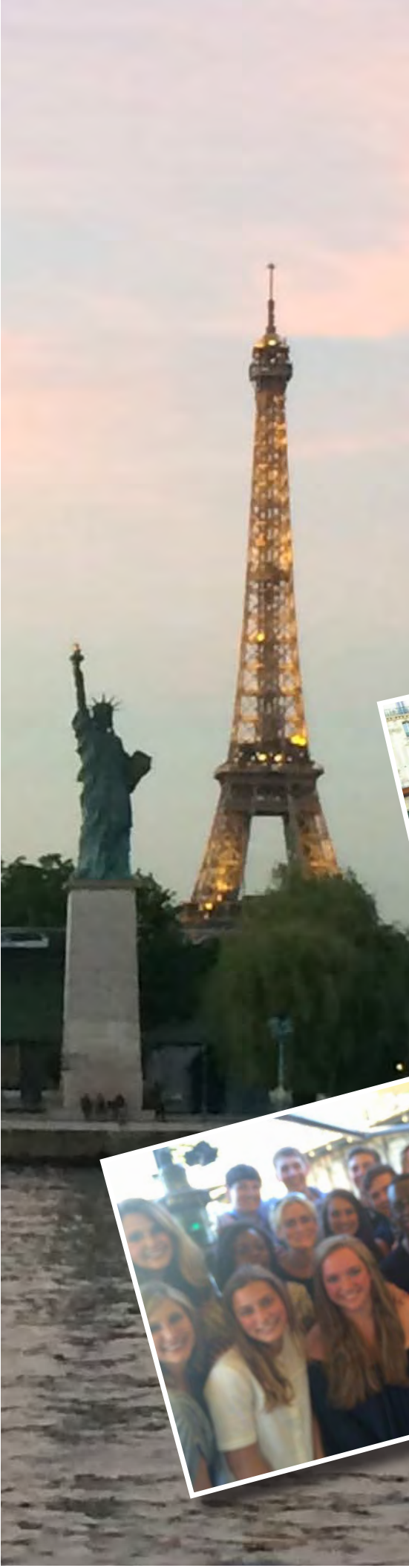
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We returned to Paris after this amazing experience in Southern France. The fifth and last week was mainly filled with exams, final presentations, and other homework. As we did not want the program to end with schoolwork only, Dr. Bongiorno organized a gourmet dinner cruise on the Seine River (see various inserts on this page). By then, all students had created bonds that will likely last a lifetime and all had a fabulous time during the dinner cruise. They had survived life with no cellular phone, very limited and slow wifi, crowded public transportation, two French strikes, and no AC... but I am fairly certain all of them had a blast. I certainly enjoyed the adventure and the chance to teach in these fantastic conditions and share some of my home country's geological sites with the students.

I want to thank Dr. Carol Wicks, Chair of the Department of Geology & Geophysics, for supporting this program and providing funding for the bus in Southern France, and Dr. Cynthia Peterson, the Dean of the College of Science, for allowing me to take on this adventure and trusting me with our students overseas. Thanks are extended to the Department of Petroleum Engineering and the Honors College for promoting this program among their students. Dr. Kevin Bongiorno (Director of *LSU in Paris*) and the APA staff members, especially Dr. Harald Leder and Jill Clemmons, are to be commended for running a very smooth operation, making life much easier on faculty and students. We are grateful to Dr. Rodolphe Lemée and the staff of the OOV in Villefranche-sur-Mer, especially, Mrs. Véronique Gourbaud-Stevens for their hospitality and efficiency! I also thank my fellow curators at the Museum of Natural Science at LSU for inspiring me to be a better naturalist every day. Lastly, thank you to Dr. Phil Bart and Dr. Jean-Pierre Suc for all their help during these five weeks. Their various input helped made this program a success, according to the students' feedback we received.



OUTREACH ROUNDUP

STEP OUTSIDE DAY



The LSUMNS took part in Step Outside Day in Krotz Springs, LA on May 9th. We brought specimens from our research collections and had a bird prepping demo. There were 549 registered guests this year! Thanks to **Cathy Newman, Zach Rodriguez, Donna Dittmann, and Steve Cardiff** for volunteering.

Cathy Newman, Zach Rodriguez, Donna Dittmann, and Steve Cardiff for volunteering.

USS KIDD FIRST FREE SUNDAY



On June 7th, we participated in the USS KIDD's First Free Sunday themed "Our Finned Friends." We brought specimens from our fish collection including anglerfish, an armored searobin, sharks, and a pufferfish. Thanks to

Zach Rodriguez, Dr. Prosanta Chakrabarty, and Bill Ludt for volunteering.

GEAUX SCIENCE WELCOME



This year the LSUMNS hosted the GEAUX Science Welcome event on August 23rd. About 150 new students in the College of Science stopped by to learn about all of the departments/organizations in the college.

There were demonstrations, a hotdog and snowball stand, and an opportunity to meet the Dean and faculty members. We had a table featuring specimens in addition to providing the venue. Thanks to **Cathy Newman, Glaucia Del-Rio, and Rafael Marcondes** for volunteering.

GSLE B.I.G. EVENT



On September 12th, the LSUMNS participated in the Girl Scouts of Louisiana East's (GSLE) Believe in Girls (B.I.G.) Event showing girl scouts how to look for fossils in Louisiana gravels. The most commonly found

fossils were crinoids, corals, and bivalves from the Paleozoic Era. We also found two birds claimed by window strikes to add to the bird collection. Over 1000 girl scouts attended the event! Thanks to **Dr. Jessica Oswald, Vivien Chua, and Ryan Terrill** for volunteering.

BEHIND THE SCENES



On July 25th, LSUMNS Curator of Birds, **Dr. Van Remsen** took eleven Northshore Bird Club members on a behind the scenes tour of the Museum of Natural Science's bird collection. They were able

to view hummingbirds, woodpeckers, tanagers, as well as many other species found in the LSUMNS collection.

Behind the scenes tours are a great way to showcase the amazing research we do at the museum. Several tours were given this summer to various school groups, camps, and clubs, and we hope to continue to provide this unique experience to those interested in learning a little bit more about natural history museums.

Photo by Bill Lang

LOS Spring Meeting

LSUMNS's **Donna L. Dittmann** (LOS Vice President) and **Steve Cardiff** led one of the three Louisiana Ornithological Society Spring Meeting Saturday field trips to birding spots in coastal Cameron Parish. The car caravan started out with about 15 people – and a few more joined our group in the afternoon. The weather started out blustery, but we were able to make it back to Cameron in the nick of time to wait out an impressive rain squall. When the storm passed, we resumed our trip birding westward to Johnsons Bayou. There were birds downed by the rain including great views offered by a flock of 17 gorgeous rosy-pink breeding plumaged Franklin's Gull at Holly Beach and a dozen Common Nighthawks resting on lawns nearby. The afternoon was gorgeous and was a fun outing tallying 147 species. The trip concluded in time to make it back to Cameron for the evening banquet followed by a talk by LSUMNS alum **Sidney A. Gauthreaux**.

For more information on outreach events and museum tours, contact Valerie Derouen vderou1@lsu.edu. More photos on our Facebook page.

MNS NEWS & UPDATES

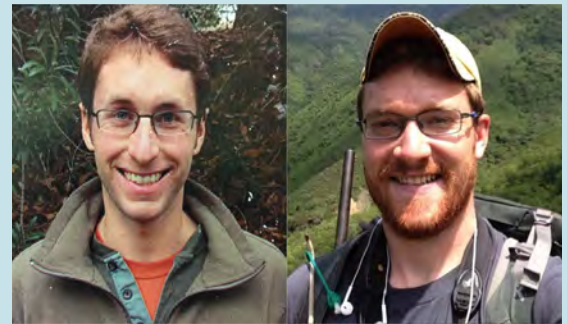
Virginia L. Mouw Award in Ornithology

Congratulations to ornithology Ph.D. student, Subir Shakya, who received the 2015 Mouw Award. This award is presented to an ornithology graduate student at the beginning of his or her second year and recognizes the enthusiasm, hard work, and promise of that student to be an outstanding scholar in avian biology. The award consists of \$200 that may be used toward research.



Travel Awards:

Congratulations to ornithology Ph.D. students, Glenn Seeholzer and Mike Harvey, who received travel awards to attend the NSFSSB Workshop in Model-based Molecular Systematics on June 26, 2015 at the Evolution meetings in Guaruja, Brazil. The award is valued at \$1750.



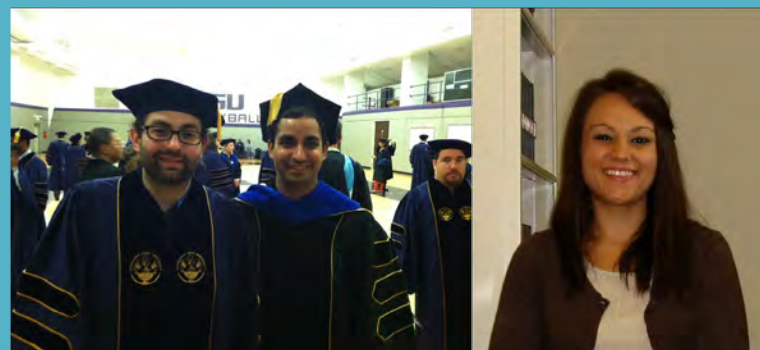
Mike Harvey accepts NSF Postdoctoral Fellowship

Congratulations to ornithology Ph.D. student, Mike Harvey, who accepted a postdoctoral fellowship from the National Science Foundation. He will work in Dan Rabosky's lab at the University of Michigan studying population divergence and diversification in birds.

Two LSUMNS students receives their Ph.D.

Dr. Caleb McMahan studied the diversification and biogeography of neotropical cichlids under LSUMNS Curator of Fishes, Dr. Prosanta Chakrabarty. He received his Ph.D. in August and now works as the Collections Manager in the Division of Fishes at the Field Museum in Chicago.

Dr. Marie Thomas studied the Holocene Palynology of the Gulf of Papua, Papua New Guinea, using modern palynomorph distribution to better constrain paleoenvironmental changes in that region. She graduated this summer with a perfect 4.0 GPA, both as an undergrad student and in grad school. She was hired as a specialist in biostratigraphy by HESS in Houston.



NEW STAFF/STUDENTS



Fernando Alda
Post-doctoral Fellow
Ichthyology (Chakrabarty)



Jonathan Nations
Ph.D. Candidate
Mammalogy (Esselstyn)



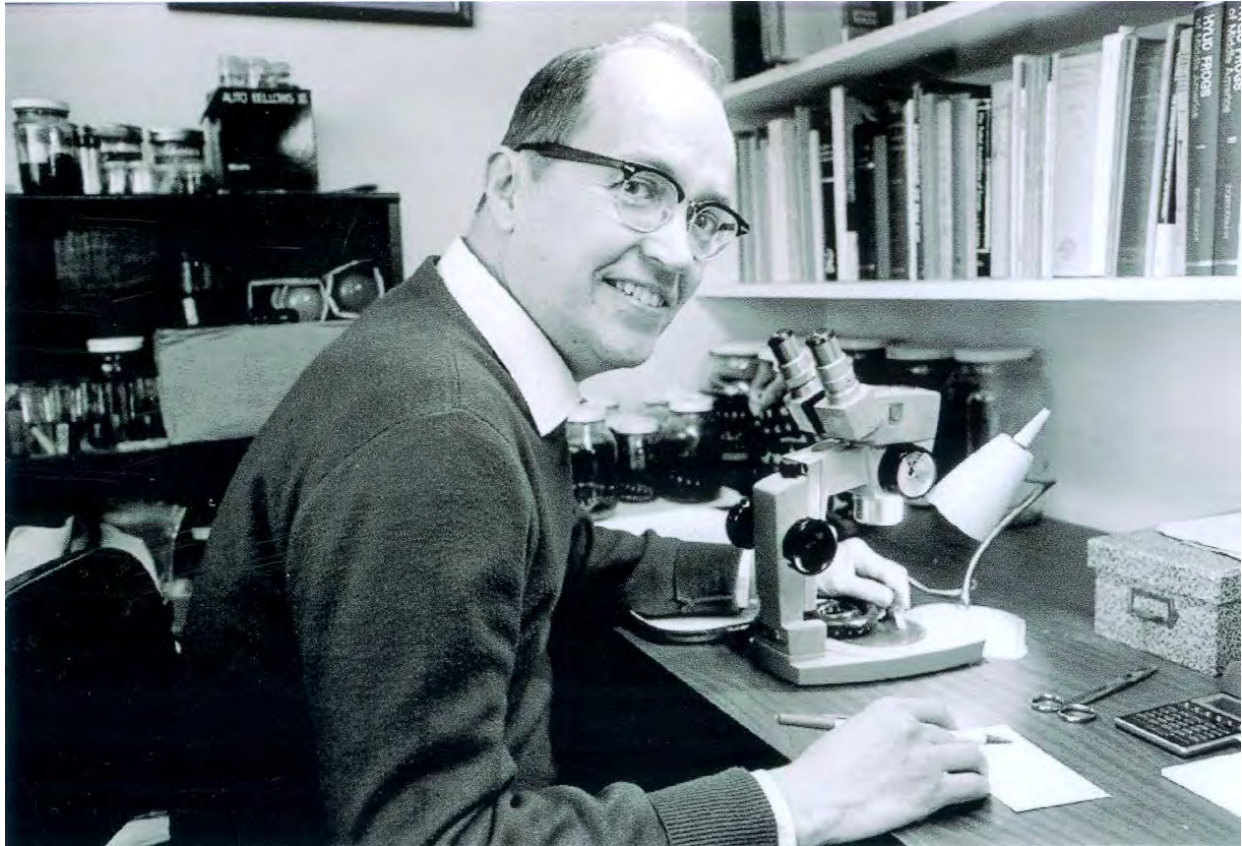
Jessie Salter
Ph.D. Candidate
Ornithology (Faircloth/Brumfield)



AJ Turner
Ph.D. Candidate
Ichthyology (Chakrabarty)

In Memoriam

Douglas A. Rossman



Douglas Athon Rossman was born 4 July 1936, and passed away on 23 July 2015 from the debilitating effects of muscular dystrophy that was diagnosed around 2001. He is survived by his brother William, first wife Nita, a son Charles and daughter Kathleen, nine grandchildren, his second wife Sharon, and her three sons and their children. He was born in Waukesha, Wisconsin, and lived in Illinois and New Jersey as a boy. In New Jersey he helped educate young people at camps run by the Young Men's Christian Association, where his father was an administrator. There, he developed an interest in educating and nature, and at the nearby Philadelphia Zoo he received scholastic guidance from its reptile keeper Roger Conant. Conant inspired in Doug an interest in natricine snakes, which became the core of his research throughout his career.

Doug received a B.A. degree in zoology in 1958

from Southern Illinois University, then went directly into a doctoral program at the University of Florida, graduating in just three years. For his dissertation he analyzed geographic variation in the ribbon snakes of the genus *Thamnophis*. Doug worked as an instructor at the University of North Carolina in Chapel Hill for two years before coming to LSU in 1963.

Doug's LSU career began as an assistant professor, becoming a full professor in 1976, which he remained until his retirement in 1998. He acted as curator of the herpetology collection, and during his curatorial tenure the herpetology collection increased from roughly 8,000 to a little over 80,000 specimens. Due to his interest in snake anatomy, he built into it the world's largest collection of snake skeletons.

Doug's 59-year publishing career started with a paper on feeding habits of the Black Swamp Snake, published when he was 20. At the time of his death he was collaborating on a paper describing a new species of South American water snake. In all, he produced 96 scientific publications and two books. His first book, *The Amphibians and Reptiles of Louisiana*, was coauthored with Harold Dundee, then of Tulane University. For that book they won the 1990 Louisiana Literary Award, a rare achievement for a scientific work. The other book, *The Garter Snakes: Evolution and Ecology*, coauthored with Neil Ford and Richard Seigel, compiled what was known about Doug's favorite taxonomic group, the garter snakes. Doug also worked and published on several groups of southeastern arachnids, and assisted other researchers by collecting invertebrates for them. A new species of crane fly that he collected on the screen door of his Baton Rouge home was named *Tipula rossmani* by a colleague.

Upon arrival at LSU, Doug began recruiting graduate students, and was advisor for 21 Masters students, and nine doctoral students (Edmund D. Keiser 1967, retired from Ole Miss) Larry David Wilson (1968, Miami-Dade Community College) Kenneth L. Williams (1970, retired from Northwestern State University), Richard M. Blaney (1971, retired from Titusville High School) Alexander Varkey (1973, deceased, Liberty College), J. P. Richard Thomas (1976, University of Puerto Rico), Donald W. Buden (1979, College of Micronesia), Robin Lawson (1985, deceased, California Academy of Science) and Jeff Boundy (1999, Louisiana Department of Wildlife & Fisheries).

Doug had an interest in anthropology and mythology, and as a spiritual individual he was particularly interested in the latter. In the early 1970s Doug began interacting with the Cherokee community in southern Appalachia, eventually publishing a book on Cherokee mythic places and their spiritual significance. In the 1980s he began a routine of spending summers in the upper Midwest, attending Nordic festivals, and story-telling and role-playing events. It was at one event that he met Sharon, and due to their shared interest, they moved to Decorah, Iowa, as soon as Doug retired. Nearly full-time involvement in Norse culture enabled Doug to release his creativity in writing, and in his later years he published four

books of his own mythic Norse tales and two others concerning Norse culture.

Doug's gentle demeanor and sober assessment of science made him an exceptional instructor, advisor and colleague. Whether at home or office, his door was always open, and he welcomed discussion of many topics, from fronto-nasal articulation of water snake skulls to the effects of animate spirits in the beliefs of early civilization. In his youth he learned to throw an atlatl, and in his last years learned to walk with two canes. Last year he and I took a last walk together along a road across which some of his beloved natricines were travelling to their summertime haunts. Doug managed over a mile on the rutted track, his two canes keeping him upright long enough to see three snakes.

Written by Jeff Boundy



2015 Fall Seminar Schedule

August 28 - Ryan Burner, Ryan Terrill, Dr. Jessica Oswald, & Bill Ludt

Dept. of Biological Science & Museum of Natural Science, Louisiana State University

Title: *"Expedition Travelogue Part I: Borneo, Bolivia, The Middle East, Panama, and Brazil"*

September 4 - Oscar Johnson, Mark Swanson, & Rafael Sobral Marcondes

Dept. of Biological Science & Museum of Natural Science, Louisiana State University

Title: *"Expedition Travelogue Part II: Peru, Southeast US, & Museu de Zoologia in Sao Paulo Brazil"*

September 11 - Dr. Greg Pauly

Section of Herpetology, Natural History Museum of Los Angeles County

Title: *"Mating Signal Evolution and Sexual Selection in the Western Toad Species Group"*

September 18 - Dr. Melissa DeBiasse

Dept. of Biological Science, Louisiana State University

Title: *"Genomic basis for salinity tolerance in Tigriopus copepods"*

September 25 - Dr. Cameron Thrash

Dept. of Biological Science, Louisiana State University

Title: *"Hunting microbes in the northern Gulf of Mexico"*

October 2 - Dr. A. Bradley McPherson

Alumnus, Museum of Natural Science, Louisiana State University

Title: *"LSUMNS Flashback Friday: Working with George H. Lowery, Jr."*

October 9 - Dr. Brice Noonan

Dept. of Biology, The University of Mississippi

Topic: *Biogeography of Malagasy biota. Title: TBA*

October 16 - Dr. Carl Oliveros

Dept. of Biological Sciences, Louisiana State University

Title: *"Phylogenomics of Rapid Avian Radiations"*

October 23 - Dr. Beth Stauffer

Dept. of Biology, University of Louisiana at Lafayette

Title: *"Phytoplankton blooms: thoughts on an evolving definition"*

October 30 - No Seminar: Fall Break

November 6 - Dr. Ray Danner

Dept. of Ecology and Evolutionary Biology, Tulane University

Title: *"Thermal ecology and adaptation of bird bills"*

November 13 - No Seminar: Museum Retreat

November 20 - Glaucia Del-Rio

Dept. of Biological Science & Museum of Natural Science, Louisiana State University

Title: *"A severe reduction in Atlantic Forest Wetlands and a bird on the brink of extinction"*

November 27 - No Seminar: Thanksgiving Break

December 4 - Chris Murray

Dept. of Biological Science, Auburn University

Topic: *Environmental androgens, sex-ratios, and temperature-dependent sex determination in the American crocodile. Title: TBA*

New Geology Exhibit now open in Howe Russell!



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Email your material to vderou1@lsu.edu or mail to:

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