

# Museum Quarterly

LSU Museum of Natural Science

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Vertebrate  
Paleontology

**Sophie Warny**  
AASP Assistant Professor of  
Palynology and Curator of  
Education

## Letter from the Director...



## CELEBRATING MIKE

He was a dog guy. He always told great dog stories, and he always used dogs to illustrate his points. He said dogs circle as they prepare to lie down because their ancestors did this to flatten grass into a nice bed (presumably on the Serengeti Plain, or some such place). He said he couldn't do exercises on the floor in his house because his dog would investigate and breathe in his face. He also loved Hawaii and Asia, and he used to tell stories about them all the time. Sometimes, he'd put dog stories and Asia stories together. For instance, he liked to practice Japanese phrases

on grad student **Kazuya Naoki**, and then describe Naoki's reaction—the poor kid would cock his head to the side in puzzlement, just the same way a dog does when you say something incomprehensible to it. Of course fishing was also a big issue; we heard lots of fishing stories. He told us that every fishing culture in the world describes a bad throw of a cast net as a “banana.” I was skeptical until I heard a Malaysian guy muttering about a “pisang besar” (big banana) when he missed a nice school of minnows. Silly stories woven with deep insights were some of his many gifts to us.

Of course I am talking about **Mike Fitzsimons**, our beloved former curator of fishes. Mike died last spring and, even though he was retired, his loss has put a big hole in our Museum family. We are a small group of faculty, staff, and students and when something happens to one of us, we all feel it. We love it when our students get married to each other and make babies, and we follow their careers and the careers of their kids with a great satisfaction, like surrogate parents. Mike's former students **Lori and Mark McRae**, now professors at the University of Tampa and parents of two little girls, are a perfect example. On the other hand, we hate it when things go wrong for our family, and Mike's death was by far the worst thing to happen to us in a long, long time.

Here are a couple of photos of Mike showing what he did best.

**Fred Sheldon**



*Top: Mike and Moke  
Bottom: Mike and Lori McRae at  
Kahana Beach*



## Students participate in a field school held at the Harrison Homestead site

By Rebecca Saunders

Under the direction of **Dr. Rebecca Saunders**, nine students from LSU's Department of Geography and Anthropology participated in a field school held at the Harrison Homestead site (8BY1359), on Tyndall Air Force Base (near Panama City, Florida). Excavations took place between May 14 and June 9; the students then spent two weeks in the Laboratory of Anthropology at the Museum of Natural Science learning about artifact processing, conservation, and curation.

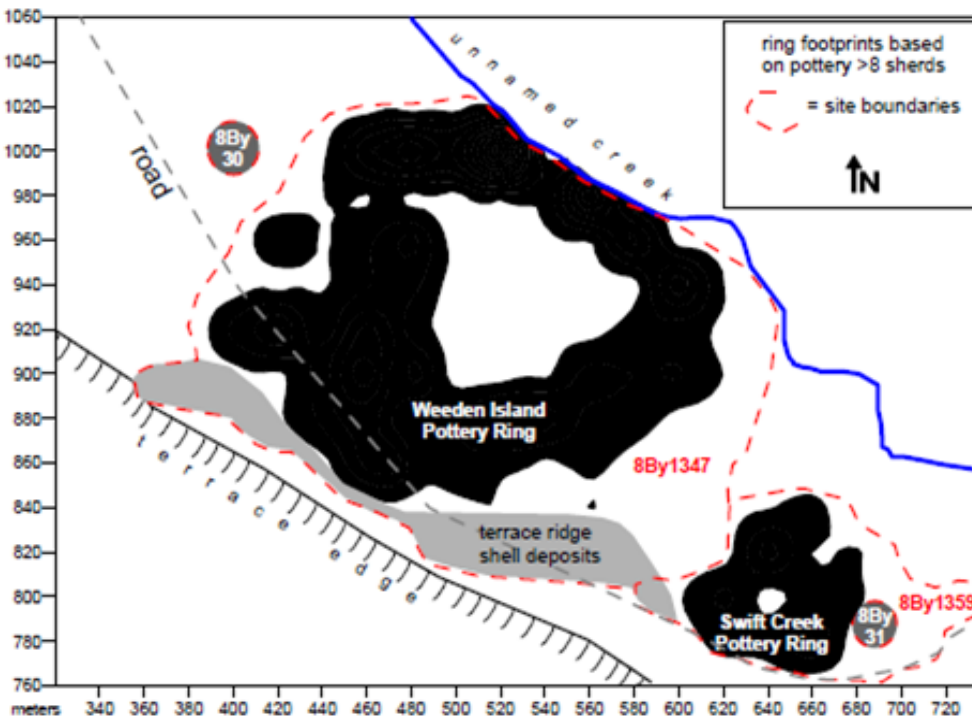
The Harrison Homestead site consists of a circular earth and shell midden—the “midden” is the debris field that accrued around a circular arrangement of houses--around a central plaza. A small ceremonial mound, now almost completely destroyed, was present on the eastern edge of what is interpreted as a village of fisher-hunter-gatherers. Pottery from the site is principally a type called Swift Creek, a type of pottery

(mostly bowl and jar forms) that was impressed with a carved wooden paddle bearing fanciful and fantastic designs. The pottery generally dates to between A.D. 100-800; however, the Swift Creek culture is poorly dated on the Florida panhandle. Curiously, while the paddle stamped designs are quite elaborate, some motifs have the same elements and structure as were incised on Marksville pottery found in Louisiana. This could not occur by chance, and indicates some rather intense communication along the northern Gulf coast at this time.

One of the main foci of the project is to anchor the Harrison Homestead site in time and then compare its dates and lifeways with an adjacent ring site that is larger and contains a larger mound. That site, the Hare Hammock site, has mostly Weeden Island pottery; Weeden Island pottery types have analogues in the Louisiana types French Fork Incised and Pontchartrain

Above:

Crew (LSU Undergraduate unless otherwise specified): Front row, L-R: Matt Lunn, Ashley Dawsey, Carla Hadden (University of Georgia, Graduate Student); Back row, L-R: Mike Russo (NPS); Jeffrey Shanks (NPS); Brian M. Thibodeaux; Rebecca Saunders (LSU Prof), Christopher Triche, Jules Haigler, Kelly Nodurft, Matthew Chouest, Tajji Abney, Nicholas A. Turner, Craig Dengel (Tyndall AFB Cultural Resources).



Left: Map showing the smaller Harrison Homestead village site and mound (gray circle) and the adjacent larger Hare Hammock Ring and mound.

Bottom Left: Harrison Homestead siltstone gorget fragment; Bottom: gorget from the Susquehanna River Valley illustrated in Moorehead (1917) Stone Ornaments used by Indians in the United States and Canada.


Bottom Right: Reconstruction of Swift Creek paddles with typical designs.

Check Stamp. This field school project is part of a long-term research endeavor by Saunders to understand how and when pottery styles moved along the northern Gulf coast.

Students worked in large block excavations in the plaza as well as smaller excavation units in the ring midden. While we are literally just out of the field and have much analysis ahead, one thing is for sure. Our Swift Creek folks had an amazing amount of stone for coastal folks. Much of this stone was associated with deep (up to 120 cm below present ground surface)

features the village inhabitants dug in the plaza—features that we still don't understand. Stone includes small bits of sheet mica, quartzite axes, a quartzite metate, and the siltstone gorget shown below. Mike Russo of the National Park Service found a gorget nearly identical to the Harrison Homestead gorget on the web (pictured below). That gorget was recovered from the Susquehanna River Valley. We have done a portable xrf (x-ray florescence) analysis of the Florida gorget and are hoping to be able to compare it with its northern cousin soon!





# The Death Goby and Her Kin

By Prosanta Chakrabarty

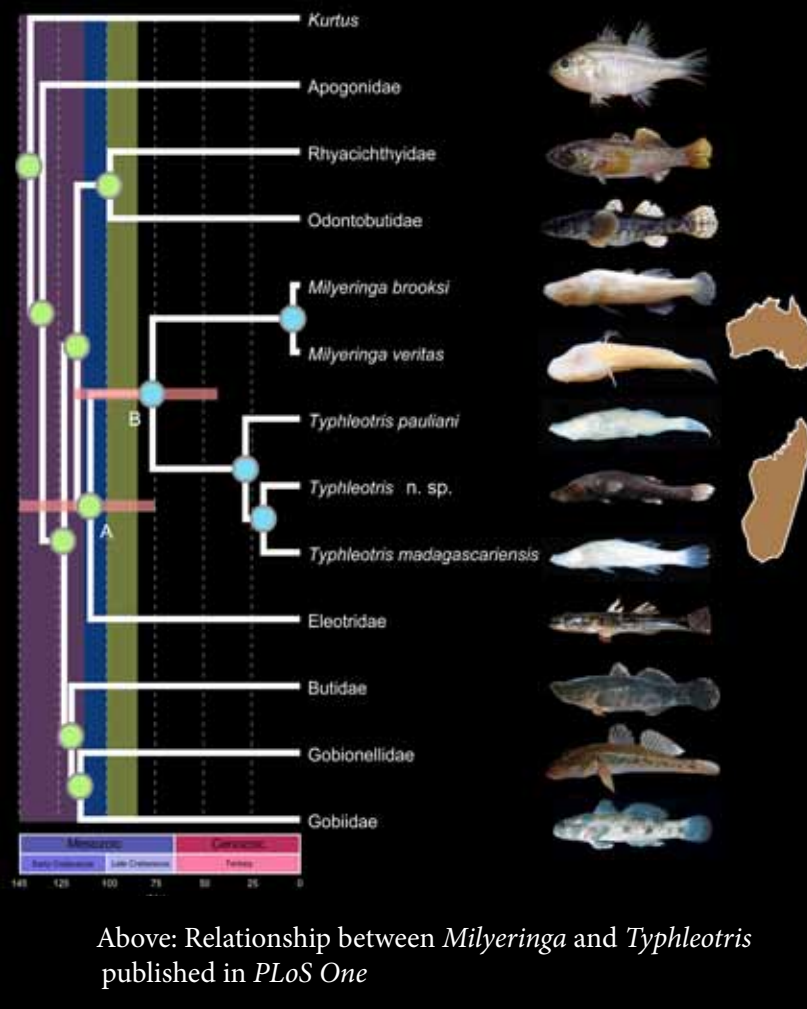
The day Hurricane Isaac rolled through Baton Rouge (Aug 28th) saw the publication of what I consider the best project that I've ever been a part of: a paper showing the sister relationship between *Milyeringa*, a genus of cavefishes from Australia and *Typhleotris*, a genus of cavefishes from Madagascar (Chakrabarty et al., 2012). I'd like to tell the tale of the Malagasy trip that was the inception of the project and to tell a bit about the story behind the paper before diving into the science.

When I was a young boy dreaming of being a zoologist, I dreamt of going to far off countries and discovering wildly amazing new creatures in places no one has ever been. In my childhood nightmares I feared the dark and being trapped in small spaces. My trips to Madagascar and Australia fulfilled both the dreams and nightmares of my youth.

Sinkhole fever and the Death Goby.

I went to Madagascar shortly before my postdoc ended at the AMNH (American Museum of Natural History) and after I had been hired at LSU in the summer of 2008. It was a weird period in my career when I was probably focusing more on the future than the present. My wife and I were in the process of buying our first house; in fact I was signing documents (including my LSU contract) up to the moment I was getting into the cab headed to the airport. The trip to Madagascar came at the perfect time for me; I was done with the stresses of having to find a job, and was ready for something to highlight the end of my old position. As luck would have it the Constantine

S. Niarchos Expedition Fund provided my postdoctoral mentor, John Sparks (Curator, AMNH), with a grant to travel to Madagascar and collect blind gobies. I actually didn't pay much attention to why we were going to Madagascar, I just knew I wanted to go: I've always wanted to go. My first work in science, as an undergrad with Melanie Stiassny, was on Malagasy cichlids (Stiassny et al. 2001) and I always saw Madagascar as one of the last remaining wild places on Earth. I was so busy buying a house in Baton Rouge, negotiating my start-up, and packing for the trip that I really didn't know much about the actual taxa we were after in Madagascar. I had been working on bioluminescent fishes my entire postdoc and never worked with gobies or caves before. I figured I would catch-up on these subjects during the plane ride over to Antananarivo (Tana). As it happened I did more catching up with Scott "Scuppy" Holtz (now a grad student at Cal State Fullerton) and Phil Willink (then at the Field Museum) who were joining John and I in the field. By the time we got around to our first field site (after much stamping of documents, preparation of materials, shaking of hands, and days of impossibly slow and shaky driving across terrible Malagasy "roads") I sort of had an idea that we would be collecting some rarely seen and poorly understood freshwater cavefishes, namely two species of *Typhleotris*. Most of what we knew about these species was from their original descriptions (in the 1930s and 50s) and that others had noted that they share a striking resemblance to the cavefishes of Western Australia. John had done a ton of research on the caves of the region, and



Above: Relationship between *Milyeringa* and *Typhleotris* published in *PLoS One*

with the help of the wonderful Steve Goodman (Field Museum, MacArthur Fellow), discovered a large sinkhole that was mentioned in a French geologist's dissertation that possibly contained blind cavefishes. Sinkholes are not caves, they are exposed to the open air and sunlight; what is visible is just part of a larger subterranean habitat (i.e., a karst window). I was horrified and impressed when I was first confronted by this football-field sized sunken lake (Fig 1). The vintany, as the locals called it, made my heart sink into my stomach. 'What could possibly live down there?,' I thought to myself. I was trying not to let my nervousness show when Scuppy secured a flimsy chain ladder to a dangling tree at the edge of the sinkhole. As luck would have it I went into the water first while the others secured more equipment. The first part of the climb down over the lip of the sinkhole was particularly nerve-racking because you couldn't see over the edge to your next foothold. The local guides sat a safe distance away with no interest in getting closer to the insides of this strange pit.

As I snorkeled I started thinking of what I would do if I encountered one of the huge Nile crocodiles this region is famous for. I felt a bit like a miner's canary, but I didn't see anything: no fish, no crocs, no beluga whales. All I encountered were some spiders and insects and a beautiful view of the deep dark waters below. As I climbed

back up the ladder I saw John and Phil were getting ready to head down. They swam for a long while and after some 25 minutes John yelled out, "I got one."

'Got one, what?' I thought.

He passed the specimen to Scup who climbed up the chain ladder with an ease I wish I possessed. I looked at this little beast, no longer than my pinky, and as dark as a Hershey's chocolate. How strange this creature was: it lacked eyes and had a smooth bony head (Fig 2). Why would there be an eyeless fish here? Why is it so darkly colored? The water is clear and sunlight penetrates as far as you can see; the sinkhole appeared more than 50 meters deep, perhaps more. What lies beneath, the French geologist's dissertation told us, was a subterranean groundwater connection to caves several kilometers away. After some time John yelled out again: he had gotten another one. Around this time I started to get nauseous, I had ingested some of the water while snorkeling and it wasn't sitting well. I tried not to think about it while I dutifully took photos, GPS coordinates, and tissue samples. The locals had warned me that this was a revered site and that I should not urinate near the mouth of the sinkhole. I didn't need to pee but I did need to vomit, although the water was clear it was full of loose vegetation and was effectively a pit trap for anything unlucky enough to fall in.

I walked out of sight of everyone and vomited the sinkhole water I had accidentally ingested. I came back to my notebook, camera and specimen just in time for the second specimen to be brought up to me. John and Phil who had been swimming for more than an hour finally came up. This second specimen was dark and eyeless like the first one, and a similar size. John and Phil told me they had seen others but those individuals slowly sank away into the deep just out of reach. The dark coloration is a great camouflage and the fish are certainly aware of their surroundings, enough so to move away from larger moving objects splashing around. Were this species white, as most subterranean species are, it would have been easy pickings for birds that could strike from above and perhaps even to swimming snakes or other creatures that could handle the initial 30ft descent.

We were feeling pretty good about ourselves having collected something amazing from the very first site. We were in good spirits when we retreated back to our camp. A couple days later when we started collecting at a new location a little further north it became clear that all was not well. In deference to my colleagues I won't replay how sick the team got, but it was pretty scary stuff - especially given how far we were from civilization. I think I was spared major illness because I expelled most of the water I had ingested while snorkeling. We jokingly named the mysterious illness "sinkhole fever," but seeing your mentor

and friend so ill that you consider using the satellite phone to call in a helicopter is no joke. The next day we sent Scuppy and John back to Tana. Scuppy went to a hotel to rest up while John flew back to New York.

We did quite a bit more collection after that. Phil and I went to a dozen or so more caves over the next week and had quite the amazing experience in the southeastern part of Madagascar. Scuppy, who had recovered well in Tana, was well enough to join me for a trip to the northern tip of Madagascar (Ankarana) after Phil departed. In the north, Scuppy and I collected both blind and sighted members of *Glossogobius*, sometimes right next to each other. Those caves in the north remain the most spectacular places I've ever been, but it will always be the vintany, home of the darkly pigmented "Death Goby," that will be the defining site of the trip. [The description of this darkly pigmented form is in press and should come out later this year.]



#### Back Home, My New Home.

On returning from Madagascar I effectively was done at AMNH and was now a new faculty member at LSU. All the sequencing and analysis was done at LSU for the project that would eventually become our PLoS One paper. The addition of Matt Davis as my postdoc, the first person to join my lab in 2010, really transformed how we viewed our data.

Before Matt joined the lab I took a trip to Australia to complete the sampling for the other piece of the taxonomic puzzle. That trip was part fieldwork (in the caves in Exmouth), part conference (the 8th Indo Pacific Fish Conference) and part museum work (at the Western Australia Museum). Read my article "Going Down Under: Caving for Fish in Australia" in the November 2009 Museum Newsletter (Vol 27:3) for more about that trip. In that 2009 trip to Australia I collected what turned out to be a new species of *Milyeringa* (described

in Chakrabarty, 2010). With both pieces of the puzzle sequenced we discovered what we and others had suspected, these two cave lineages, now separated by more than 6,000km of Indian Ocean, are sister taxa.

#### The Paper.

The cavefish paper describing the relationship between *Milyeringa* and *Typhleotris* published in PLoS One includes John Sparks and **Matt Davis** (now at the Field Museum in Chicago) as co-authors (Chakrabarty et al. 2012); everyone contributed equally. The dated phylogeny we present for Gobiiformes is the only time-calibrated phylogeny of this extremely diverse group and uses mostly taxa that had been sampled by others for molecular data (mostly from Thacker, 2009). Our main concern for this paper was the relationships among blind and cave dwelling forms. Besides the five species of *Milyeringa* and *Typhleotris* we also included blind members of *Glossogobius* (also collected in the 2008

trip) and *Typhlogobius* in our phylogeny. Less than 1% of described fish species are blind, and a stygobitic (aquatic cave dwelling) lifestyle has only evolved in 20 families of the 500 or so families of bony fishes. Stygobitic forms are especially poorly known among gobies. Besides those mentioned above there is *Caecogobius* (from Philippine caves), *Oxyeleotris* (from Papua, and the only blind eleotrid we don't have samples for) and a few species of *Luciogobius* and *Typhlogobius*, found in seaside caves in marine or brackish water). Given the limited number of blind gobies species known it probably isn't a surprise that our optimization recovered the common ancestor of *Milyeringa* and *Typhleotris* also as a blind taxon, with independent origins of blindness recovered for both *Glossogobius* and *Typhlogobius* (Fig 3). When collecting *Glossogobius* in Madagascar, I couldn't help but notice how different they were from the *Typhleotris* we collected in the first part of the trip. We could easily scoop up

Above: A newly discovered darkly pigmented member of *Typhleotris*  
Page 7: Home of the Death Goby. Enter at your own risk.



most individuals of *Typhleotris* with a simple swipe of a dipnet (or even our hands) while individuals of *Glossogobius ankaranensis* were much more skittish and swam away at almost the same speed as the sighted *G. callidus* that we collected in the same caves. Individuals of *G. ankaranensis* that we collected were depigmented and blind but you could still see the remnants of a dark bead-sized lens right where the full eyes would be, implying a more recent loss of sight. The *Typhleotris* species had bone covering the region of the orbit and no eye to speak of. The specimens of *Milyeringa* I sampled in Australia look very much like their cousins in Madagascar. I couldn't help but note the red dirt and baobab trees that are also common to both the regions where these fishes are found; I like to imagine that this must have been what parts of Gondwana looked like.

Using what limited data there is on goby fossils, and using a number of outgroups that did have a good fossil record, we were able to date the divergences across the tree and as it is related to our node of interest. Incorporating the error bars around the divergence estimates, we recovered ages that were congruent with the break up of eastern Gondwana. Eastern Gondwana included India, Madagascar, Antarctica and Australia as part of a larger super continent that included South America and Africa in the Cretaceous. In no current geological reconstruction do India and Madagascar directly abut each other. Are we suggesting that there are likely cavefishes in India that may be related to *Milyeringa* and *Typhleotris*? Or that they were once on Antarctica? Possibly: one can only speculate about "missing" lineages. We continue to discover that our knowledge of major geological events are not quite as stable as we once thought. (Remember when the Closure of the Isthmus of Panama was

only 3.5mya?) I think assuming that the current timing and scenario of the break-up of Gondwana is the last word on the subject would be a mistake. One intriguing possibility is of a possible direct connection between Madagascar and Australia in a land connection called Pandora (Parenti and Ebach, 2010). The cavefishes in their current incarnation as *Milyeringa* and *Typhleotris* are probably not capable of dispersing much beyond their isolated aquatic cave systems but that doesn't mean that the cave systems themselves haven't moved around and evolved. More than likely they did, just look at the karst window that gave rise to the Death Goby. The scenario I picture in my head is of a widespread lineage probably composed of both cave dwelling and non-subterranean species on eastern Gondwana; the drifting continents then separated this lineage. Most of the members of this lineage slowly went extinct with time (while adding a few new ones now and again) and all that remains today are a handful of species in isolated caves in Madagascar and Australia. What better way to escape extinction than to hide out in a cave? (Just ask Al Qaeda.) Of course there are other potential scenarios, as we discuss in our paper, this one is just the most palatable for me. However, without evidence of sighted members of the *Milyeringa* + *Typhleotris* clade, the simplest conclusion is that the ancestor was a blind cavefish too (as we report in the paper).

Any way you slice it, the best explanation we currently have for this lineage of cave dwellers remains that they are a Gondwanan relict. Given their very limited dispersal ability (blind, restricted to their cave habitats) and the ancient age we recover for them, it would seem that this group might be one of the best cases for a group that shows a vicariant Gondwanan pattern.

# News from the palynology group

By Sophie Warny



Searching for 15 Ma old forests in Antarctica (Photo by P. Bart)

**T**his is my fifth year as an assistant professor of palynology in the department of Geology and Geophysics and as Education curator at the LSU's Museum of Natural Science (MNS). My research group keeps growing and is now composed of four fantastic PhD students: **Kate Griener, Marie Thomas, Shannon Ferguson, and Jill Bambricks**. Shannon and Jill will both begin their palynological doctoral research this Fall. They are planning to present their proposals at various meetings such as the Microfossils III meeting that will be held in Houston in Spring 2013. This meeting is a good first venue as it welcomes palynology specialists from both academia and the industry. Shannon is supported by a LSU MNS curatorial assistantship (CA). We are grateful for this CA position as it will provide the start up funds to finally proceed with the digitization of the pollen collection donated to CENEX by the industry in 1995. The digital curation will be done using SPECIFY software. Drs. Warny and Kluse (from the LSU Herbarium) hosted a SPECIFY workshop at LSU in September to get the project

started. We are actively looking for two additional years of funding for this digitization project.

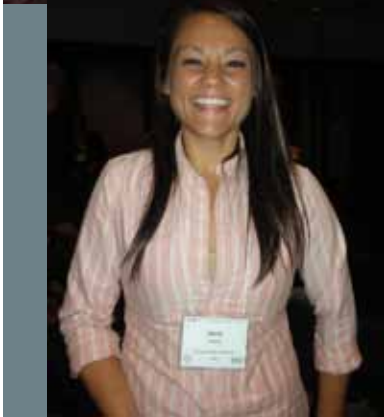


Kate and Marie's are supported by the Marathon GeoDE program. Marathon's very generous gift allowed LSU to recruit these students, and in Marie's case, beat other top universities in attracting her! This is a great example of how industry support really impacts the quality of a research program. Marie studies sedimentary systems offshore Papua New Guinea, a project in collaboration with Dr. Sam Bentley at LSU and Dr. Andre Droxler at Rice University.



Kate's research focus is ground-breaking. She couples isotopic and palynological analysis to better quantify past hydrological and climate changes. Her first results have been submitted for publication to the journal *EPSL*.

Kate and Marie both won two of the five awards given by the American Association of Stratigraphic Palynologists in 2012. We are very proud of their accomplishments. Another accomplishment was that one of the palynomorph SEM photographs Kate and I took last year was selected as the cover of the PNAS (Proceedings of the National Academy of Science) magazine last academic year, and another SEM picture was selected this summer to be part of a new permanent exhibit at the California Academy of Science in San Francisco.



Kate Griener (above) and Marie Thomas (left) at the American Association of Stratigraphic Palynologists meeting in Lexington, Kentucky. Both students won AASP awards.

In addition to the doctoral students, our research group is composed of three master's students: **Breigh Rainey Rhodes, Steve Babcock, and Isil Yildiz**. Breigh and Steve are teachers at the LSU University Laboratory School. Their goal in pursuing a Master's in Natural Science is to improve their ability to teach K-12 science content. They are truly outstanding teachers and leaders in their field. Isil is our newest student, she comes from Turkey thanks to a fellowship from the Turkish petroleum industry.

Last year was a great year for my graduating students as well. **Kevin Jensen**, who conducted a biostratigraphic study of the Eocene/Oligocene boundary at St. Stephen Quarry in Alabama, was hired by Chevron and moved to Pittsburgh. **Carlos Santos** and **Sandra Garzon**, who conducted palynostratigraphic analyses of upper Cretaceous formations in the Middle Magdalena Valley Basin, in Colombia, were both hired by BP. Sandra is now at the Houston office. Before graduating, Sandra and her committee members submitted a research paper that was published this summer in the journal *Palynology*. Carlos was hired after competing with a pool of international students as a biostratigrapher at the BP office in London, U.K. We are very proud of them.

As a new venture, I co-hosted **Laura Coquereau**, a French intern last year. Laura worked tirelessly on some Antarctic sediments and was able to produce a work that was accepted as a "honor" thesis at the famed Sorbonne's Pierre and Marie Curie University in Paris. Dr. Phil Bart and myself were invited as jury members to her defense. A new LSU-Sorbonne collaboration flourished from this endeavor and a research paper was submitted this summer.

The 2012-2013 academic year has also started on a high note as my own research has just been published in the August 2012 issue of *Nature Geoscience*. The paper is by Dr. Sarah Feakins (USC in Los Angeles), Dr. Warny and Dr. J.E. Lee (NASA), and is titled "Hydrologic cycling over Antarctica during the middle Miocene warming." It combined the strengths of the three co-authors; organic geochemistry, palynology, and modeling. A summary of the findings can be found on pages 10 and 11.

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LETTERS

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## Hydrologic cycling over Antarctica during the middle Miocene warming

Sarah J. Feakins<sup>1\*</sup>, Sophie Warny<sup>2</sup> and Jung-Eun Lee<sup>3</sup>

Antarctica developed its ice sheets about 34 million years ago. But during a more recent warm period, the interior landscape would've resembled tundra found in parts of modern-day Chile and New Zealand, and the coasts would've been lined with beeches and a type of conifer. The surprising evidence comes from “abundant” remains of pollen, spores, and leaf waxes in sediment cores taken from deep beneath Antarctica’s Ross Ice Shelf, said study leader Sarah Feakins, a biogeochemist at the University of Southern California, **Sophie Warny**, a palynologist at Louisiana State University, and Jung-Eun Lee, a modeler at NASA.

The sediments had blown off Antarctic soils into the ocean during the Miocene, a mild period in Earth’s history between about

15 and 20 million years ago.

Not only were the leaf wax remnants numerous—suggesting many plants were growing on Antarctic coasts—but an analysis of their chemistry revealed the continent was warmer than thought.

Previous research from sediment cores hinted that Antarctica was about five degrees Fahrenheit (three degrees Celsius) warmer on average during the Miocene than it is today (Warny et al., 2009). But the new geochemical signal revealed that Antarctic temperatures were 20 degrees Fahrenheit (11 degrees Celsius) warmer—which means the Antarctic coast would have

Above: Artist rendering (NASA JPL based on photograph by P. Bart) depicting a greener Antarctic in the Miocene.

been about 45 degrees Fahrenheit (7 degrees Celsius) on a summer day.

“We knew the Miocene was a warm period, but it was a surprise to see how warm it got,” Feakins said.

#### Leaf Waxes Reveal Ancient Climate

When a plant dies, most of it decomposes, except for pollen grains and the waxes on its leaves. The leaf wax can then get trapped and preserved in sediment as a kind of “molecular fossil,” Feakins said.

For the new study, Feakins and Warny extracted plant waxes and pollen or spores from the Miocene sediment cores. The plant waxes were placed in a mass spectrometer, which separates out isotopes—variations of chemicals that have different masses.

Leaf waxes keep climate records by capturing the ratios of water isotopes that a plant “drank” while it was alive, said Feakins. Normally the lightest element on the periodic table, hydrogen has a stable isotope called deuterium that’s twice as heavy as regular hydrogen.

When it rains, water made from deuterium falls out first, leaving the lighter isotope in the cloud.

“Today the precipitation that falls over Antarctica is some of the lightest, isotopically speaking, because evaporation happens in the subtropics, and the cloud is almost all rained out by the time it gets to Antarctica,” Feakins explained.

But the team found more deuterium preserved in the ancient plant waxes. Combining those data with atmospheric models, the team concludes that the Miocene’s warmer oceans led to increased evaporation, so that clouds were more water-laden, and thus produced more rainfall, by the time they traveled to the Antarctic coast.

Pollen grains also found in the sediments revealed two tree species: the beech *Nothofagus fusca* and a shrubby conifer in the genus *Podocarpidites*.

Tree species vary in how far their pollen grains can

be transported from the plant. Neither *N. fusca* nor *Podocarpidites* grains can travel far, which shows that the trees must have grown on Antarctica and not, say, on the more distant coasts of New Zealand.

And if the trees had grown far inland on Antarctica, the pollen would not have been found in coastal sediments in such quantities.

#### Modern Warming Insights

Although the Miocene was generally warmer than it is today, the new research may have some relevance to the current trend of global warming, Feakins noted.

Earth’s average global temperature has increased by about 1.4 degrees Fahrenheit (0.8 degree Celsius)

since 1880, according to NASA’s Goddard Institute for Space Studies. Two-thirds of that warming has happened since 1975.

Understanding Miocene rainfall patterns may help scientists figure out how much wetter it will get as the world gets hotter, the study

authors say.

Overall, warming-related changes to the global water cycle are “really troubling [because] it’s just not easy or inexpensive for societies to adjust to big changes in water supply,” Mark Pagani, a biogeochemist at Yale University who wasn’t on the study team, said via email.

And the new research suggests there will be “substantial” shifts in the water cycle—making areas either rainier or drier—due to current temperature changes, he said.

“I realize that for most folks, stories about the Earth 20 million years ago sound very abstract,” he added. “But in terms of the Earth and climate, this [Antarctic warming] was not very long ago, and the distribution of the continents and chemistry of the atmosphere was actually not very different than today.”

**An unexpectedly warm period about 15 million years ago temporarily thawed Antarctica, turning the continent green around its edges.**

*This article is a modified version of a paper written by National Geographic Daily News writers. It is based on a joint press release article provided by the PR offices of USC, LSU, and NASA.*

# New species of rat described by MNS new mammalogy curator redefines rodents

Press release from McMaster University



Scientists have discovered an extreme species of rodent in Indonesia unlike any other on Earth; an almost toothless, worm-eating rat unable to gnaw or chew.

The research paper “Evolutionary novelty in a rat with no molars” is written by **Jacob Esselstyn**, currently with McMaster University, Canada, but will soon be joining our Museum as the Curator of Mammalogy. The co-author of the study are Anang Achmadi of Museum Zoologicum Bogoriense, Indonesia and Kevin Rowe of Museum Victoria, Australia.

Announced in ‘Biology Letters’ this month, the discovery of *Paucidentomys vermidax* illustrates how the process of evolution can lead to the loss of previously successful traits in species faced with new opportunities.

“There are more than 2,200 rodent species in the world and until this discovery all had molars in the back of their mouth and incisors at the front,” said Dr. Kevin Rowe, Senior Curator of Mammals, Museum Victoria, and member of the team of scientists who discovered the new species.

The scientific name for the new species *Paucidentomys vermidax* reflects its dental and dietary adaptations, *Paucidentomys* meaning “few-toothed mouse” and *vermidax* meaning “devourer of worms”.

“The specialised incisors of rodents give them the distinct ability to gnaw - a defining characteristic of rodents worldwide. In having lost all teeth except a pair of unusually shaped incisors that are incapable of gnawing, this new rat is unique among rodents,” explained Mr Anang Achmadi, Curator of Mammals at Museum Zoologicum Bogoriense, and research colleague of Dr Rowe.

“This is an example of how species, when faced with a new ecological opportunity, in this case an abundance of earthworms, can evolve the loss of traits that were wildly successful in previous circumstances,” said Dr. Rowe.

The species was discovered in the rainforests of Sulawesi by a team consisting of researchers from Canada, Indonesia and Australia, including Dr Rowe.

“While we face a global crisis of biodiversity loss, this new species reminds us that we are still in an age of biodiversity discovery. Wild habitats where new species wait to be discovered are still out there,” said Dr Rowe.

“In the mountains of Sulawesi, where we discovered *Paucidentomys*, healthy forests still nurture rare and remarkable species, however, they are isolated patches imperilled by expanding logging, mining, plantations and other human activities.”

Bottom Left: *Paucidentomys vermidax* specimen known only from montane forest, probably occurring more broadly in mid-to high elevation areas. Credit: © Kevin Rowe

Top Left: *Paucidentomys vermidax* skull: The highly-elongated jaw gives some impression as to how the mouth is used to feed on earthworms, with only incisor teeth to bite off the pieces as they enter; Credit: © David Paul

Right: *Paucidentomys vermidax*; Credit: © Kevin Rowe

## The Long Nose Batfish

By William Ludt



August 13th 2012 marked the date that I left my hot and dry hometown of Tucson, Arizona, and began my drive to hot and humid Louisiana. The journey took me through desolate areas in the Southwest, as well as cities such as Santa Cruz, El Paso, San Antonio, and Houston. Most of the drive I was accustomed to, as I am from Arizona, and also lived in Texas during a two and half year stint at the University of Texas at Austin getting my Master's Degree. However, nothing prepared me for the roughly 20 mile long Atchafalaya Basin Bridge. I had never been in an area with so much water before. My road trip concluded with no major events, and I settled into my new house and began work at the

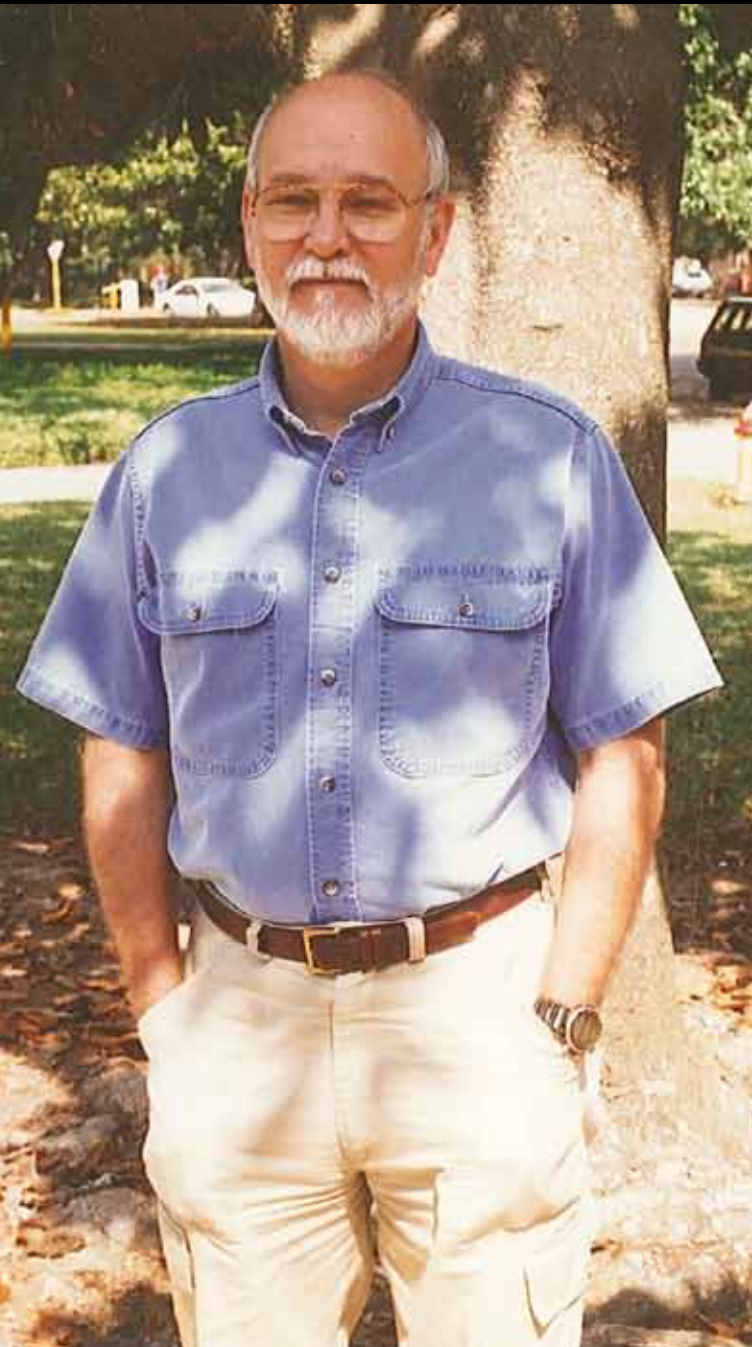
LSU Museum of Natural Science.

After I have been working only for a week at the Museum, Dr. **Prosanta Chakrabarty**, my new advisor, came to me with an offer to go on a five day research cruise in the Gulf of Mexico to collect specimens for the museum. Being part of an actively growing museum collection was one of the many reasons why I chose to come study at LSU, and I eagerly jumped at the chance.

The night we left port I met with Dr. Darryl Felder from the University of Louisiana Lafayette, who was the lead scientist on the trip. We left port during the night, and started sampling early in the morning. Every time a new haul came up I would be busy collecting all the fish, while Darryl's lab would be busy searching for crustaceans. Little did we know that the smooth sailing of the first day would not last: early the next morning our deep-water sampling gear got snagged on something and was lost. On the 3rd day Hurricane Isaac decided to switch paths from hitting Florida to heading towards Louisiana, while we stood in its path. With warnings of 20-25 foot swells we decided to end the trip early and head back to port before the ensuing storm. Despite these rough turns I still managed to get some great specimens for the museum, and I am currently determining and cataloging the species now. I already know that even though I sampled right off the coast of Louisiana that I am already adding new species to our collections. I look forward to upcoming field excursions (including going to Singapore with Prosanta in a few weeks) and could not have come up with a better way to start my time at LSU.

Top: "On the cruise we collected many unique species. Some of which are new to our collection, including the longnose batfish, *Ogcocephalus corniger*, shown above."

# *In Loving Memory of Dr. Mike Fitzsimons*



**D**r. John Michael (Mike) Fitzsimons died at home Sunday, May 20, 2012. Mike was a resident of Baton Rouge, La. and a native of Oklahoma City, Ok. He was Professor Emeritus in the Department of Biology at Louisiana State University, Curator Emeritus in the LSU Museum of Natural Science, Pereboom Alumni Professor in Ethology & Animal Behavior and a Fellow of the Bishop Museum of Honolulu and the United States Antarctic Research Program. He is survived by his wife, Charlotte Fitzsimons; daughters, Karen Pino of Prairieville, La. and Laura Harvey of Dallas, Tx.; sons-in-law, Lannie Pino of Prairieville and Arthur Harvey of Dallas; grandchildren, Maxwell Harvey and Mika Harvey of Dallas; stepgrandchildren, Nicole Pino and Trevor Stubbs; brother, Robert Fitzsimons of Houston, Tx; and best buddy, Moke, his Labrador retriever. After earning his B.S. at Louisiana Tech University, Mike received his M.S. at the University of Hawaii and his Ph.D. at the University of Michigan. His lifetime research included the systematics of subtropical and tropical marine and freshwater fishes. Mike's expertise in stream ecology, stream restoration, systematic ichthyology and behavioral ecology of aquatic animals influenced the application of conservation recommendations, stream restoration and stream-use decisions in Hawai'i. He was a devoted mentor and advisor to graduate students. The family thanks special friend and caregiver Rebecca Williams, Dr. Michael Castine and staff of the Hematology-Oncology Division at the Baton Rouge Clinic and St. Joseph Hospice.

*The Museum of Natural Science continues to send its prayers and condolences to the Fitzsimons family. We are truly grateful for the many contributions of Mike. He is certainly missed.*

# A Roaring History: Mike the Tiger Exhibit now at Alex Box Stadium

thanks to a collaboration between the LSU School of Veterinary Medicine and the LSU Museum of Natural Science



Visit the latest Mike the Tiger Exhibit at the Alex Box Stadium!

# MNS NEWS ITEMS



Congratulations to Robb Brumfield, who is now the Roy Paul Daniels Professor in the College of Science.



## ESPN-U visited the LSU Museum of Natural Science



ESPN-U has featured the LSU Museum of Natural Science in its series, "SEC: Stories of Success." Check out the video on YouTube at:

<http://www.youtube.com/watch?v=2wV9IM6WD8g>





# LSUMNS Welcomes James R. Stewart to the LSU Foundations 1860 Society!



The longtime friend and benefactor of MNS, has recently joined the LSU Foundations' 1860 Society. Through his estate, Mr. Stewart will leave a donation in support of tropical bird study and conservation to the Museum.

*"I am grateful for the value I have received from the Museum over the years. My relationship with George Lowery in particular got me access to American Museum tray rooms and introduced me to many bird watchers across the country. Bird watching has been a life-long passion of mine."*

Members of the 1860 Society enjoy the satisfaction of shaping the future of LSU programs by leaving legacy bequests. We are deeply grateful for Mr. Stewart's commitment to the Museum.

Ann Marie Marmande, CFRE, Senior Director of Development, LSU College of Science



## Check out the new 2012 LSUMNS T-Shirts!

*"The boys are loving their shirts; they've only had them for a week, and already wore them twice!"*

-Jessica Eberhard  
Assistant Professor, Research  
Biological Sciences & Museum of Natural Science

L to R: Beckett, Jessica E., Dylan, Kyle Harms  
photo credit: Jonathan Myers (Kyle's former grad student)



# Making a Big Splash... ...with Louisiana Fishes

**New exhibit NOW OPEN!**  
**Thank you to the LA BoR and for your support!**

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If you would like to include items in the next issue of *Museum Quarterly* please send information, articles and photographs to the Museum Education Office. Articles about research, study or any other items of interest are encouraged. Information may be submitted as completed articles with jpeg pictures in attachments, or in list form to be put into article.

Email your material to [swarny@lsu.edu](mailto:swarny@lsu.edu) or mail to:

The LSU Museum of Natural Science  
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