



Amateur Spotlight

Editor's note: Lee Cone is a member and former president of the Special Friends of the Aurora Fossil Museum. During his time with the FOSSIL Project, Lee was instrumental in coordinating the Belgrade Community Science project. FOSSIL team members interviewed him about his experiences with paleontology.

How and when did you first get interested in collecting fossils? How long have you been involved in paleontological research?

That is an interesting question, but I believe that certain people have a natural interest in things relating to the past, and that quality comes out at an early age. I grew up in Augusta, Georgia and was fascinated by Native American artifacts from the local area. In the early 1960s I collected with my parents, walked the shoreline of Clarks Hill Reservoir, looked in newly plowed fields, and collected the banks of Brier Creek at a Boy Scout campsite near Waynesboro, GA. I spent one summer in high school volunteering for the Augusta Museum on a professional archeological Native American mound site on the Savannah River, and experienced collecting at a completely different level. That experience showed me that there is so much more to research than the collected item itself.



Lee Cone at the Belgrade Mine

Fossils came later, after college, graduate school, and marriage, on a chance visit to Edisto State Park near Charleston in the late 70s. An exhibit, showing fantastic Pleistocene and Pliocene fossils collected off Edisto Beach, hooked me like nothing else. Forty years later I still have a kid's fascination about fossils. There is a natural by-product of collecting that passively morphs the mind of all collectors, professional or amateur. It is knowledge. One can not collect without gaining knowledge along the way. Professionals actively seek out that knowledge and look for answers to unasked questions, while amateurs ask questions relating to their finds seeking answers from known questions. There are some amateurs, though, that go beyond the obvious, and wonder why or how, and seek a greater connection to education, learning, and research. I don't really consider myself a researcher, but intellectual questions related to observations that I see from specimens that I collect invite further study of the literature. Through my collecting experiences of Miocene shark teeth from the west coast, there have been observable differences between the east and west coast faunas. Numerous questions have invited some rudimentary research to try to answer some of those questions. I have been very fortunate to have

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www.myfossil.org

had support for my comparative study from one of the UF graduate students, Victor Perez, who continues to encourage me to pursue answers to my questions.

Do you have a favorite collecting location?

Now, you know that you're not supposed to ask an amateur THAT question, but seriously, I have really gotten hooked on the Cooper River and the massive amount of material that is continually being uncovered as the huge river meanders across the flood plain near Charleston, SC. Diving is a sport that I love and to combine black water diving with my passion for collecting is the best of both worlds. Of course, everything on the river bottom is a mixture of formations ranging from present to Oligocene, but probably the greatest contributory layers are the marine based fauna from the Miocene-Pliocene period. Six inch megs are fairly common, but can lie next to a mammoth tooth from the Pleistocene. Every dive is an adrenaline rush, and the excitement of the possibilities never ends.

Do you have a favorite group of animals or do you have a favorite fossil?

I do love the marine mammals, and the Pliocene whale that I donated to the Mace Brown Museum is easily my favorite. The baleen whale, consisting of 25 associated vertebrae (lumbar, thoracic, and cervical), ribs, cranium and maybe 30% of the entire skull, consumed 8 years of my life piecing the thousands of fragments back together. We knew the specimen came out of the Yorktown Formation, and that knowledge gave Dr. Robert Boessenecker, paleontologist at the Mace Brown Museum, the opportunity to engage in research on the specimen, as well as the assemblage of material that was associated with the site. The whale is currently on display at the museum, and is viewed by so many more people than when it rested on my wife's dining room table. I have to thank her for her patience with my OCD side.



Pliocene whale on display at the Mace Brown Museum of Natural History

Can you tell us a little about your experience working with professional scientists?

Searching for fossils in the Nebraska Badlands. I was fortunate to have had a wonderful Major Professor at the University of Rhode Island Graduate School of Oceanography in the early 1970s, who served as a supporter and mentor. A comment he made, "Never stop asking questions about the established," is one of those things I never forgot. After a 35 year career as an educator, I once again found myself working with professionals at the University of Florida, this time in paleontology. Opportunities afforded to me by myFOSSIL have opened my eyes once again to the excitement of knowledge-based research. My experience in the Nebraska Badlands with Bruce MacFadden was one of the most life-changing eye-openers for me. Bruce's bold challenge with the FOSSIL Project, I believe, has been one of the most important projects in reformatting the value of amateurs in paleontology. We live in a terribly divisive time, both around the world and politically at home, and there has been divisiveness within the world of paleontology between some amateurs and professionals. Bridging that gap, demonstrating collaboration, and educating the

amateur collector was one of the challenges that Dr. MacFadden bravely took on. We speak of the need to change the culture of the amateur collector through education of that collector. Nebraska was that point for me. It revealed cooperation. It revealed amateur value to research. It revealed the importance of site data. It is up to all amateurs that have been touched by myFOSSIL to continue to educate other amateurs now and in the future. You will face defiance and objections from some, but the legacy that myFOSSIL has initiated can only be sustained through education by those who know about fossil ethics sharing with those individuals who do not know. Lack of knowledge regarding fossil ethics comes from ignorance more than greed.



Searching for fossils in the Nebraska Badlands

Can you describe the relationship among participants in the Belgrade events and how this partnership has developed?

It is fitting that the Belgrade Project occurred toward the end of the NSF Grant of the FOSSIL Project, because it clearly demonstrated that “If you build it.....They will come” (Field of Dreams). Bruce and I collaborated on an idea that was designed to add data to a larger research project which studied mid-Miocene terrestrial mammal fauna. Sites in Panama, Nebraska, Florida, and eastern North Carolina are included. We offered an educational collecting opportunity to amateurs for two consecutive years (2018, 2019). To date a total of 54 amateurs from the Special Friends of the Aurora Fossil Museum and the North Carolina Fossil Club have joined with 10-12 participating professionals from University of Florida and the Smithsonian Institution to collect the Belgrade Formation from the Belgrade Mine. All specimens were donated either to UF for processing or the Smithsonian, depending on the research at each repository. All I can say is that model worked to perfection, with each participant (professional or amateur) gaining equally from the experience. Camaraderie between everyone was one of equal respect, friendship, and enjoyment in the shared experience.



Collaborating at Belgrade

Featured Professional: Gabriel-Philip Santos

Editor's note: This issue, Jennifer Bauer interviews Gabriel-Philip Santos, Collections Manager and Outreach Coordinator at The Raymond M. Alf Museum of Paleontology.

Can you describe your journey through paleontology? Were you always interested in caring for specimens as a collections manager?

So my journey through paleontology, my path of the paleontologist if you will, did not actually start out with the same destination in mind. Sure, when I was a kid, I loved science and dinosaurs was definitely up there in my list of interests. And being in Los Angeles, I had two amazing museums just up the freeway that I could force my family to take me to all the time. But really, that was more of a phase in my life. As I got older and responsibilities started to become a thing, I started to go down the path of a doctor. While that path choice was more influenced by my background and family (lots of Filipino nurses and health care professionals in my family), I didn't really complain too much because I got to take lots of science classes, which I absolutely loved. It wasn't until after I graduated from UC Irvine with a B.S. in biological sciences that I realized I didn't want to be a doctor. Wish I had realized that before I took the MCATs.

Throughout most of the undergrad studies, I was actually very unhappy with my career path and also I was undiagnosed with major depressive disorder. I didn't feel like the medicine was what was going to be fulfilling in my life. See, deep down, my passion that connects most things in my life is my love of storytelling. So while I could have told and learned some stories as a doctor, they just weren't the kind of story I wanted to tell. It was a couple of years later after kind of wandering around a bit that I found myself at the American Museum of Natural History in New York for my birthday. Walking through the beautiful paleontology halls of that museum, I found myself walking through the pages of the most amazing tale, the story of life itself. Ending up at the giant *Paraceratherium*, I must have stared at that fossil for at least 15 minutes just in awe of its grandeur and thinking about how someone had to find it, had to put it together, had to study it, and had to tell its story. Right then and there I decided to work in a museum which eventually led me to volunteer at another collection in Orange County (previously the Cooper Center) a few weeks later.



Eventually, I got hired and began working as a collections assistant learning about museum science and collections management. I also got to dabble in science communication and outreach, which really appealed to my love of storytelling. From there, I eventually started my masters at Cal State Fullerton in geology with my amazing advisor, Dr. James Parham, who taught me what it meant to be a scientist and the responsibilities that come with being one. Then by chance, a collections manager position opened up at the Raymond M. Alf Museum of Paleontology about a year and a half into my

graduate program. The museum is the only accredited museum on a high school campus and does a lot for science education, so this was basically my dream job! Never thinking I would actually get the job, I applied and the rest is history.

So to answer your question, no I was not always interested in working with fossil collections. That sort of just developed over time. I think what really attracted me to paleontology, and I guess science in general, was that there are literally billions of years worth of stories to learn about and tell. As a storyteller, what more could I want?

Your research interests include understanding Southern California Eocene vertebrate fauna, specifically marine mammals. Can you explain your projects and interests in studying these animals?

So those are actually two different, but super fun projects I did while I was a graduate student with Dr. Parham. My first real research project that was studying the ontogeny of *Desmostylus*. There was a really big and weird looking mandible in the Orange County collection. It was a desmostylian, but it was huge and didn't have any teeth, super weird for mammals known for their unique teeth. So I started to look at other desmostylians from other collections and compared them to the Orange County specimen. From there, my co-authors and I were able to develop a life stage series for *Desmostylus* based on their tooth eruption and wear! It turns out the Orange County specimen was an elderly specimen that had worn down its teeth to the point of its teeth sockets had closed up!

The Eocene project was actually my masters' thesis describing specimens and stratigraphy of a 45 million-year-old bonebed that was found in Southern California during the construction of a housing development! That one was fun because I got to learn a lot about many different taxa and really got to learn about deposition and stratigraphy. Something I had never learned about as a biology undergrad.

You are also heavily involved in innovative education and outreach, can you share with our readers about your efforts with Cosplay for Science?

I would love to! So Cosplay for Science is a science education initiative that looks to use cosplay and pop culture narratives to make science more relatable and scientists more approachable! What we mainly do is try to bring science education to places not traditionally known for science education like comic-cons. By developing pop-up museums inspired by things like Pokemon, Star Wars, or Harry Potter, and dressing up as characters from those franchises, we hope to make it easier for audiences to engage with us scientists and get them to learn about the science in a fun way. We started as four paleontologists, but have since grown to include scientists from all over the US and from so many different fields. We also have started a research and education team! In the end, Cosplay for Science is about getting people to see the science in their everyday lives and hopefully inspire them to ask the right kind of questions when it comes to science in other aspects.



Your students have used myFOSSIL to upload around 350 specimens to our database. Can you explain your reasoning for having them upload and a little bit about what they gained from the experience?



So when I started helping out with the afternoon museum science program at The Webb Schools (the high school the Alf Museum is part of), I wanted to figure out a way for our students to learn about cataloging and even have them help us add uncatalogued specimens to the database. My problem was that cataloging can be quite difficult for some people because it is so detailed oriented and also mistakes are not good to have in our database. I needed a way to teach the students the basics of cataloging without having them play around in our database. So after learning about the FOSSIL project at a GSA workshop, I was inspired to have them learn how to catalog museum specimens by having them practice on my FOSSIL with real museum specimens. By having students upload already cataloged specimens, they could learn best practices for data entry and the internet could have access to some cool specimens from the Alf Museum collection! Win-win! I think, in the end, our students realized the importance of collecting good data for specimens and also a little bit about a different side of paleontology outside of research.

Do you have advice for people interested in getting into the field of paleontology, museums, and/or outreach adventures?

First off, my advice is to make sure you are doing what you love. Be sure you are following your passion. Second, don't think that there is a single path to finding your dream career. Sometimes its gonna curve off, sometimes it will merge with someone else's path, and sometimes, you're gonna have to make your own path! It's gonna take time and a lot of hard work to get into a career in museums or paleontology, but it's totally worth it if this is what you love. And I guess last for people, especially when it comes to outreach, is to have fun with it! Find a way to make sure your personality shines through and you will find an audience that connects with it and want to learn from you. It's not about how many followers you have or how many views your videos have (I mean those do mean something, but they aren't the only metrics to gauge your success as an educator or science communicator). If you are actually engaging with your audience, even a small one, then you are doing something right. And often those smaller audiences are the ones that need it the most.



Club Corner: Kentucky Paleontological Society

By Dan Phelps, President

The Kentucky Paleontological Society (KPS) <http://www.uky.edu/OtherOrgs/KPS/> (<http://www.uky.edu/OtherOrgs/KPS/>) was founded in 1993 for the purpose of promoting interest in and knowledge of the science of paleontology. It is intended that the Society be a network for the exchange of data between professionals and serious amateurs in Kentucky and surrounding states.



Fayette County Science Fair

Meetings of the Society are held once a month and usually feature a speaker on some aspect of paleontology and geology. December's meeting is usually a party and auction. Visitors are always welcome.



National Fossil Day celebration at the Cincinnati Zoo



National Fossil Day celebration at the Cincinnati Zoo

A newsletter is published monthly, and 10 field trips are arranged annually. There are no field trips in January and February's trip is usually a behind the scenes tour of the Cincinnati Museum Center's Geir Research Center.

The KPS also participates in the Kentucky Geological Survey's annual open house held during Earth Science week in October. Additionally, the KPS has displays during various county and regional science fairs. Several KPS members participate in local public school science nights. The KPS has a fossil display that is shown in several regional public libraries.



Displays at the annual open house.



Aerial view of open house attendance and tabling.

In 1998, the KPS revived the annual February Darwin Lecture at the University of Kentucky. In recent years, the Kentucky Section of the American Institute of Professional Geologists have taken over the lead in these lectures, but the KPS is still a major participant. Past Darwin Lecture speakers have included Bruce MacFadden, Jack Horner, Philip Currie, and Eugenie Scott.

The KPS and its members have worked with world-class paleontologists on exciting research projects ranging from the discovery of new genera of extinct echinoderms, and the excavation of a rare early land vertebrate in Kentucky to helping excavate dinosaurs and other vertebrate fossils in New Mexico and Montana. Our mission is to advance science by bringing untapped talent into the field, and to help create a more scientifically literate public through our educational efforts.

The KPS has also taken a role in the advocacy of good science education in Kentucky. KPS members testified in favor of the Next Generation Science Standards in public hearings in Frankfort. Additionally, the KPS was a major sponsor of the 2017 March for Science in Lexington. The KPS's President, Dan Phelps, is well known for his public opposition to creationism. In 2017 he was awarded the National Center for Science Education's "Friend of Darwin Award" for his activism against Kentucky's Creation Museum and Ark Park. His struggle to stop Kentucky's government from giving the Ark Park an \$18.5 million dollar tax rebate incentive is featured in the new documentary film "We Believe in Dinosaurs." <https://www.webelieveindinosaurs.net/> (<https://www.webelieveindinosaurs.net/>)



A portion of a display in the library curated and showcased by KPS members



Another display in the library curated and showcased by KPS members

Featured Fossil: New Heron described from the Montbrook Fossil Site in Levy County, Florida

By Rachel E. Narducci

Around 5 million years ago, Williston, Florida was a very different place. The gulf coast was much further inland than it is today, i.e. most of the land around State Road 24 out to Cedar Key would've been underwater. There was also at least one river that no longer flows through and tons of creatures roaming around, many now extinct. So far, through extensive digging efforts beginning in November of 2015, over 100 different fossil taxa have been discovered from this ancient river system. One of these taxa is a new genus and species of large heron described by David Steadman and Oona Takano and published in the Florida Museum Bulletin, Volume 55 ([click here to read \(https://www.floridamuseum.ufl.edu/wp-content/uploads/sites/35/2019/05/vol55no9archival.pdf\)](https://www.floridamuseum.ufl.edu/wp-content/uploads/sites/35/2019/05/vol55no9archival.pdf)).



Hodge displays the fossil coracoid, the largest and strongest of three bones that make up a bird's shoulder, from his namesake heron. Credit: Kristen Grace/Florida Museum

The new heron was given the scientific name *Taphophoyx hodgei*, pronounced taf-o-fi-ox hodge-i, which equates to a common name of Hodge's Tiger-Heron. The authors chose the genus name because, "*Taphophoyx* is derived from the Greek words *taphos*, meaning grave or tomb, and *phoyx*, meaning heron (Brown, 1956:381, 408). Both words are masculine. The first half of the name *Taphophoyx* refers to the large concentration of fossils of gomphotheriid proboscideans at Montbrook, rendering the site the paleo-equivalent of an 'elephant graveyard'." The species name, *hodgei*, was chosen to "honor Mr. Eddie Hodge, who has been most generous to the Florida Museum of Natural History in providing logistical help and in granting permission to excavate and study the fossils discovered on his land."



Coracoid

Scapula

*Recovered fossil specimens of the coracoid (UF 425443) and scapula (UF 431654) of *T. hodgei* in different views.
Scale bars represent 10 mm*

The holotype fossil specimen is a complete left coracoid and was discovered on November 9th, 2017 by a University of Florida student volunteer, Toni-Ann Benjamin. The paratype is a nearly complete left scapula discovered a few days later on November 16th, 2017 by volunteer Sharon Shears. The excavation area at Montbrook is gridded out in 1-meter by 1-meter squares and the two type specimens of our new heron were discovered in adjacent squares. They are also both left-sided and similar in size, allowing a reasonable assumption that these elements are from a single individual. The coracoid and scapula in birds makeup part of the shoulder region and play a major role in flight.

Toni-Ann Benjamin said, "I loved going to Montbrook every Saturday during the Fall semester because of the people I got to meet and the atmosphere was relaxing. I could just sit down and get lost in my thoughts digging for fossils." Both specimens used to describe the new taxon were discovered in the field, but later deemed significant during the screenwashing and curation process back at the lab.



Eddie Hodge, center, holds a signed copy of the study naming a new species of extinct heron discovered on his property in his honor. Vertebrate paleontologist Jonathan Bloch, left, and ornithologist David Steadman visited the fossil site with Hodge to share the news. Credit: Kristen Grace/Florida Museum

In their publication, David Steadman and Oona Takano indicate that the two skeletal elements are the only ones yet discovered from Montbrook that belong to a heron. To better understand how the Montbrook heron compares to others, they looked at boney features on the coracoid and scapula across the entire family of modern and fossil heron. The features indicate a new taxon, possibly more closely related to the modern-day boat-billed and tiger herons than to other herons. Today, the boat-billed and tiger herons live throughout South America and north into Mexico, so inhabit a neotropical environment.

Size-wise, measurements of the new Montbrook heron are closest to those of *Ardea cinerea* (grey heron – Eurasian and African distribution) and *Ardea cocoi* (cocoi heron – South American distribution). Both of these herons are large, long-winged and long-legged waders, with body masses of about 1443 grams (~3 lbs).

Without the help of dedicated individuals volunteering their time to dig in the field and process fossils back at the lab, a majority of the most important discoveries from this 5-million-year-old river setting would be unknown to science. Since the excavation began in November of 2015, about 1,550 individuals have spent 479 days digging for over 25,700 hours. The next digging season will likely begin in November of 2019 and if you are interested in getting involved visit the Montbrook website by [clicking here](https://www.floridamuseum.ufl.edu/montbrook/get-involved/) (<https://www.floridamuseum.ufl.edu/montbrook/get-involved/>).

The Arlington Archosaur Site: A Model of Citizen-Science in Paleontology

By Chris Noto



Art Sahlstein digging: AAS discoverer and volunteer Art Sahlstein excavating around a fossil bone at the Arlington Archosaur Site in 2016. Photo by Chris Noto.

In the heart of the Dallas–Fort Worth metroplex, paleontologists have partnered with a dedicated team of local volunteers and fossil enthusiasts to excavate a treasure trove of fossils dating from 96 million years ago, during the last period of the Age of Dinosaurs. This prolific fossil area named the Arlington Archosaur Site (AAS) is playing a critical role in expanding our knowledge of a rare, ancient ecosystem largely unknown from North America. Amateur fossil hunters and citizen scientists have played an integral role in the AAS since the beginning. Credit for the discovery of the AAS belongs to local fossil collector Art Sahlstein and University of Texas–Arlington students Phil Kirchoff and Bill Walker, who independently found fossils there in 2003. Organized excavation though was stymied until 2007, when new landowners granted access to the area. This fieldwork was organized and initiated by UTA graduate student Derek Main, who worked with students and amateur groups such as the Dallas Paleontological Society, to methodically excavate what appeared only to be a drab, run-of-the-mill hillside.

As it turns out, that hillside contains one of the most diverse, well-preserved, and numerous fossil accumulations yet discovered in the entire Dallas–Ft. Worth metroplex. The AAS contains the remains of theropod dinosaurs, duck-billed dinosaurs, croc-relatives, turtles, amphibians, snakes, mammals, bony fish, sharks, rays, invertebrates, and plants. The AAS belongs to a body of rock called the Woodbine, which is formed from a series of deltas deposited on a peninsula that jutted out into a shallow seaway during the Cretaceous. Even before discovering the AAS, the Woodbine was considered important because it is one of the few groups of terrestrial rocks known from this place and time, giving us a rare window into what life was like on land in eastern North America, which generally has a poor fossil record. What fossils were previously known from the Woodbine were scattered and incomplete, offering only tantalizing clues as to what organisms existed here. The discovery of the AAS changed all that, acting as a Rosetta Stone paleontologists can use to better interpret and understand the Woodbine.



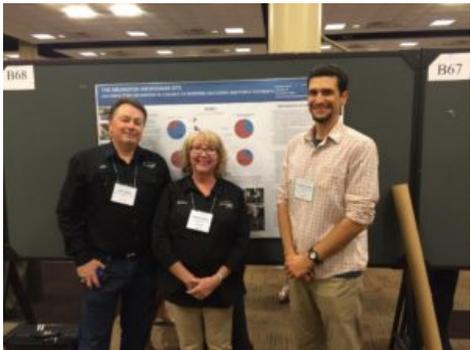
A large group of volunteers at a typical dig in 2011. Photo by Derek Main.

The AAS wouldn't be the success that it is if it weren't for the small army of dedicated volunteers donating their time, energy, expertise, and resources. Hundreds of people from the community have participated in digs over the years; people from all walks of life and many diverse backgrounds. Many who otherwise may not have come together were it not for their shared interest and passion for fossils. This unique combination of location and interest allowed us to dig nearly year-round, accomplishing much more in this time than many other projects. Conditions aren't easy, either. During the summers we have to contend with temperatures that top 100 °F and terrible humidity when even the shade tents provide little comfort. In the spring and fall, rains can transform the site into a sticky mud pit teeming



Volunteers excavating a large, intact turtle shell that may represent a new species. Photo by Derek Main.

But volunteer involvement doesn't stop there. Many volunteers have spent their free time cleaning and repairing the same fossils they discovered—a skill that takes a great deal of time and patience—but is necessary so our scientists can study them properly. More importantly, our volunteers have taken what they learned from working at the site and share it with the wider community. Many of our volunteers are teachers in local schools and have integrated Texas fossils and geologic history into their curricula. A few have even completed research projects related to the AAS, presenting their results at professional scientific conferences. Some take part in educational outreach, traveling to gem & mineral shows, schools, community groups, etc. to educate people about the lost world beneath their feet and communicate the value of these fossil resources to the wider public. Experiences at the AAS have transformed people's lives, giving them new and unique perspectives, inspiring many to do and learn more. There is no greater outcome that I can think of.



Volunteers Ronnie Colvin and John Beeck with Dr. Chris Noto at the 2015 Society of Vertebrate Paleontology annual meeting in Dallas. Photo by Chris Noto.

The AAS exists because of the hard work of amateurs and fossil enthusiasts who recognize the value of our shared fossil heritage. Every dig they worked hard to get us there with every shovel full of dirt, every trowel-turn of sediment, every single day spent uncovering an ancient Cretaceous coast. The true legacy of the site will be the people: the great numbers of volunteers, scientists, educators, and others who came together to preserve, study, and most importantly educate people about, this unique fossil locality.

with biting insects. There is all manner of wildlife, including spiders, scorpions, centipedes, mosquitos, ants, wasps, velvet ants, snakes, feral pigs, bobcats, and coyotes, to name a few.

To date, three new species discovered at the AAS have been named for the volunteers who found them: the lungfish *Ceratodus carteri* (Brad Carter), huge predatory crocodyliform *Deltasuchus motherali* (Austin Motheral), and small, enigmatic croc *Scolomastax sahlsteini* (Art Sahlstein). There are many more specimens left to describe, many of which will likely also be new species.



Volunteers Ronnie Colvin, Art Sahlstein, and Anissa Camp at an AAS educational outreach booth. Photo by Derek Main.

Currently, excavations at the AAS are on hiatus as the research team works on describing the thousands of specimens that have already been discovered, among other projects related to enhancing our understanding of the Woodbine. But public involvement doesn't end here. Some of our most dedicated and knowledgeable volunteers continue to search the Woodbine for new sites with more fossils that can help us further flesh out this ancient ecosystem. The next AAS could be right around the corner.

The AAS exists because of the hard work of amateurs and fossil enthusiasts who recognize the value of our shared fossil heritage. Every dig they worked hard to get us there with every shovel full of dirt, every trowel-turn of sediment, every single

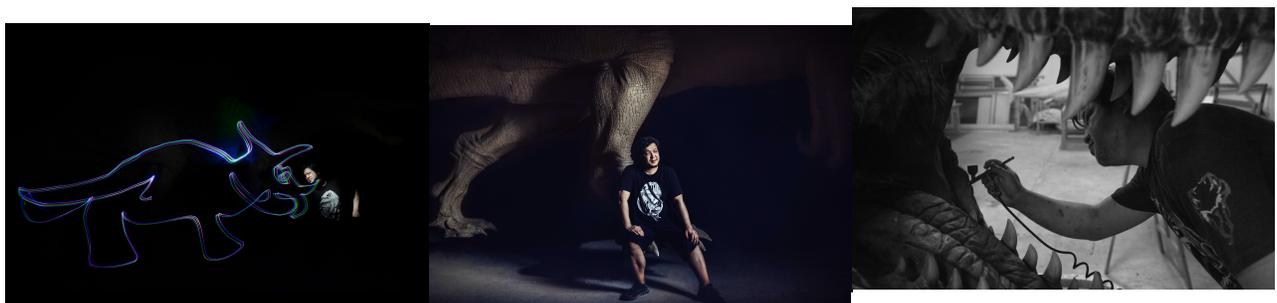
Paleoartist: ZHAO Chuang

Editor's note: This interview was facilitated by Mary Jane Hughes and Jennifer Bauer

Describe your path to paleoart. Have you always been interested in ancient life? Did you come upon it randomly? Do you have science and/or art training?

A trivial hobby has become my future career, and some would say that's like a "butterfly effect." Every child has wild dreams, and in my childhood, I always fancied huge animals. I heard about dinosaurs early, but I always thought people made those things up. That changed when I was seven, reading about *T. rex* in a book titled *100,000 Why (shi wan ge wei shen me)*, a popular Chinese encyclopedia for children in the 1970s and 80s. Reading about dinosaurs amazed me: what a wonderful world! The Tyrannosaurus rex was real! Since then, I have been infatuated about dinosaurs, trying to know more and more about them. At that time, I was learning how to paint in the local youth community center, and when I got distracted in class, I drew dinosaurs. The teacher saw the sketches, was happy about them, even encouraged me to draw more. This was my life-changer, because at that time, everyone, including myself, regarded the painting of dinosaurs as an irrelevant digression, a pastime not worth mentioning. It is great having someone acknowledged the things you have been doing was worthwhile; the encouragement is powerful regardless of whether the encouraged is young or old. Subtly, my teacher's kind words worked for a long time, sustaining me in painting dinosaurs. Then, my confidence got another boost from the recognition by professional paleontologists.

In 2006, when I was in my sophomore year, Dr. Wang Xiaolin, a paleontologist at the Institute of Vertebrate Paleontology and Paleoanthropology of the Chinese Academy of Sciences, somehow got in touch with me. He asked me to paint a picture of a Jurassic mammal, *Volaticotherium antiquum*, a small animal that could glide. In an email attachment, Wang sent me the photo of its fossils and micrographs. Wang stated his requirements: the picture should show how the animal extends and contracts its wing membrane, set in a background of pines or ginkgoes, at dusk or at night.

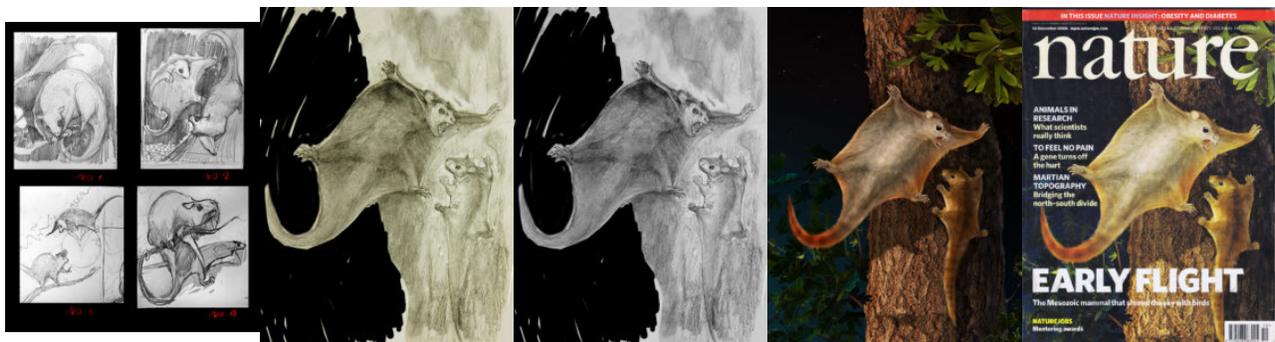


The assignment filled me with excitement and joy. The difficulty of the job, however, soon became apparent. My first sketch contained fundamental errors: the animal's limbs were too advanced for its evolution, and its membrane was of the wrong size. Fortunately, Professor Wang answered all my queries with patience and helped me get an ideal composition. In getting this job done, I started to

understand the specific issues that I never thought about. For example, paleontologists are greatly concerned about the shape of an animal's teeth. Hence the paleoartist must ponder about how to show this in the painting.

When I considered the job well done, the ginkgo trees in the background turned out to be problematic. Experts on that tree sent in their opinions telling me that the Jurassic ginkgoes have leaves which were palm-shaped instead of today's fan-shaped. I corrected that. A month later, I got the news that the painting would appear on the cover page of *Nature*. This was a glory that I have never thought possible, the most significant encouragement I ever got, and it has been inspiring me to this day. When I reflect upon the job, I realize this: while it is important to see an opportunity as it comes, it is more important to make full use of it, to deliver the results perfectly.

Before my painting landed on the cover of *Nature*, I worked for some popular science periodicals and other media for some time, providing them with scientific dinosaur paintings. Technically, at the time, I had some vague thoughts about developing my career based on these jobs and put in some effort towards that. But, compared to the depth of the work I did for the *Nature* job, all previous efforts paled. From that point on, I realized that restoration in paleontology means something and bears responsibilities. Any art, as a form of expression, carries information. Restoration in paleontology is special because it is responsible for visualizing the learnings and achievements made by paleontologists. Artists who do this must work as hard as scientists, improving their work continually by trying to add more accurate information. So, strictly speaking, this job was the starting point of my career in paleontological restoration.



I took graphic design as my undergraduate major. Regrettably, my academic training in fine art was limited to the college's few basic compulsory art courses, and I had no formal training in paleontology or zoology either. I learned techniques in oil, watercolor, sculptures, and digital painting, as well as animal anatomy and evolution by auditing classes from other departments or colleges, often informally. Whatever information I couldn't get from these classes, I would try to find in libraries. Honing my painting skills took a lot of practice in my spare time.

After graduation, I spent many years working with scholars. During this period, I trained myself in science and art by doing projects, including observing fossils, asking scholars questions, and doing fieldwork.

Where do you come from most of your artistic inspiration?

Most of my inspiration comes directly from nature. The world's best artworks appear crude and clumsy compared to nature's creations. Hence, nature provides the best mentorship. For example, my work often deals with the texture of dinosaurs' soft skin around their eyes and at their joints. If

the dinosaur in question had scales, the best way to get reference will be to look at reptiles with fine scales to see how their scales arrange; if the dinosaur was closely related to birds, I could get information from birds with exposed and bare skin. Some dinosaurs have keratinous beaks and large plates; these can be compared to the structure of wild cloven-hooves' horns, or large *Geochelone*'s mouth and back. I often look at how these tissues and parts get stained or wear out in the wild, because learning from these details then helps me depict how nature leaves its traces on animals.

I have seen extraordinary things like African buffalos got close to one another to warm themselves on a chilly night. Also, predators were not always hunting and killing herbivores, somewhat surprisingly, even if chances permit them to do so. I saw antelopes sometimes staying one or two meters from a group of hyenas, and neither group had any interest or concern towards the other.

Sometimes, I got inspirations for composition from my dreams. Many years ago, I painted a group of *Shastasaurus*, and I had a dream before the job. In my dream, the golden sunbeams were trying to break through purple clouds. Under the clouds were buildings that looked like bamboo shoots, with rough walls, while a group of gigantic airships flew slowly through them. This scene lingered on after I woke up, so I used the ideas and colors in painting that picture.

What form of media do you use, most frequently, to create your art? Was this the same as when you first started as an artist? Do you have a favorite media?

If I have the energy, I use all form of art that I can lay my hands on watercolor, acrylic, oil, ink or other composite materials; sculptures, digital painting, 3-D sculptures, or short videos.

My most commonly used form remains digital painting, a method that I had adopted since when I was a student taking part-time paleoart jobs. Hence, my work style is different from a traditional artist who preferred oil or sculptures. Digital painting differs significantly from paintings by hand; the former allows considerable freedom in choosing the size of canvass, picking a color from the RGB model, and adding layers; therefore, a digital artist works with a distinctively different set of logic. One can ignore the properties of the paints; one can forget about choosing tools, setting up the studio, or other steps in traditional painting that often drain the artist's energy; by going digital, one can instead go straight into the subject. Digital painting can easily shape precise structures and provide more details. At the same time, this technique works efficiently and allows easy modification, suitable for my subjects.



Xinghaiornis: acrylic painting by ZHAO Chuang



Shastasaurus: digital painting by ZHAO Chuang



Yutyranus chases Microraptor: oil painting by ZHAO Chuang

What is my favorite media? A hard question, since different projects require different specifics. To answer, I take three perspectives: In painting, I prefer acrylic and watercolor. Acrylic provides more vibrant colors, some of which are highly bright or fluorescent, properties that most other materials can't match. Also, acrylic dries fast to become irreversibly insoluble, making it ideal for creating rich details and random effects. It also allows me to work on a variety of surfaces. In sculptures, I like doing real-sized animal sculptures. Many ancient creatures are impressive because they are huge. They used to be living beings, and if we could look at them, we would be awed by their huge size as well as the rich, fine details. I can think of no better way to present them than full-size sculptures. If I have the liberty to choose the technique I like, my favorite will be oil. The complex and slow creative process of oil painting is relaxing, gets me into the best mental state, and gives me more time to brood.

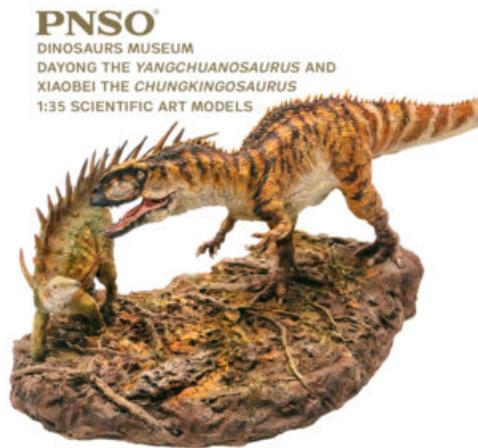
On the other hand, I always hope to use some techniques of Chinese ink and brush painting in my work, but I never have the time, with all I have done being some sketches. Still, I'm confident that this traditional approach can work wonders with paleontology, yielding incredible visual effects.

I found your project descriptions online, and much of it surrounds natural sciences: ancient life, exceptionally preserved fossils from China, constellations, humans and their relatives, and a lot of animals. Can you explain your decisions about themes for large projects like these?

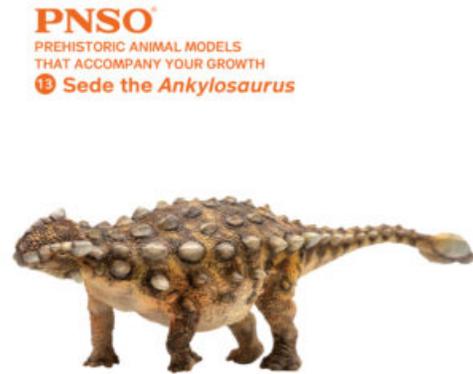
Our project is called "PNSO's Scientific Art Projects Plan: Stories on Earth (2010—2070)," created by me and my partner, Ms. YANG Yang, in 2010. YANG, a writer, happened to work for my publishing house in 2009 as a text editor. I was an art editor, so we got to know each other. Both of us were fresh graduates then, and we would talk about our hobbies, career plans, and aspirations. YANG is a small girl with great inner strength, is persistent, and works very hard. I can feel that she has a deep love for writing and a rare obsession in perfecting her pieces. Our editing work was somewhat related to what our real interests were, but I felt that she wanted much more, something bigger. I was good at painting ancient creatures, but not so good at writing well about the prehistoric world to let potential readers know about them. Then I developed an idea: I could work with YANG; I would paint, she would write, and together we could do something great. When I talked to her about it, she caught on and said she had that in mind, too. So, we both resigned and officially started PNSO, and that was the beginning of our 10-year cooperation.

Our first creative project is *Darwin: An Art Project of Life Sciences*. It traces the evolution of life on Earth, starting from the Cambrian explosion to the present day. We restored ancient organisms and paleoenvironment of various periods, aiming to restore all known extinct organisms. In this project, we recreated stories about Earth's past.

The second is *Galileo: An Art Project of Constellations*, one that we work on astronomy and the universe. This project includes a wide range of topics, from celestial bodies to microscopic particles. For example, it has description or speculation about existing or emergent aerospace technology that has emerged or is likely to occur, and how stars and planets affected Earth's ecology or human civilization (which includes the extinction events and the origins of mythology). Some of the more interesting things we have done were based on the constellations defined by modern astronomy, which had origins from Greek mythology or the era of great navigation.



Yangchuanosaurus vs Chungkingosaurus by ZHAO Chuang



Sede the Ankylosaurus by ZHAO Chuang

The third is *Starland Paradise: A Project Creating A Wonderful Science Literature World for Children*. The books for children in this series have a "soft" sci-fi nature, with the central theme being courage, dreams, and love. For example, we have produced a series called *I Have a T-rex*, telling how a little girl keeping a *Tyrannosaurus rex* as her pet. In this series, we tried to describe the finer points of our world.

The works in these projects are available to the public in the form of books, model toys, and exhibitions. These three projects by YANG and I represent Earth's past, present, and future. We want to retell a new version of Earth's story, both scientifically and using the language of art. Naturally, the work cannot be finished; it is impossible to restore all extinct creatures in our lifetime. We will, however, continue to do it, until we can no longer write and paint.

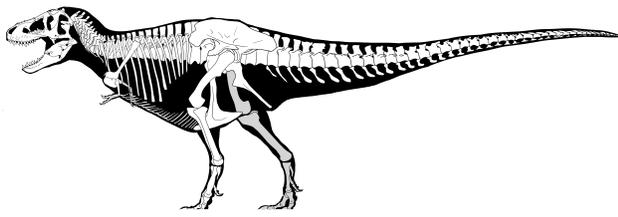
What are the most rewarding and challenging aspects of being a paleoartist?

Restoration in paleontology serves an important function: a paleoartist, like a good translator, should accurately translate cutting-edge research to the general public. Therefore, a paleoartist's work is important and difficult: apart from creating impressive visual effects, it must be as accurate as possible.

Like industrial or architectural designs, restoration is about applying our imaginations and fantasies in the real world. The difference is that the designers try to depict things which are about to appear, while restoration artists work about things which are no longer with us.

One may say that, technically, the highest goal of paleoartists is to create a time machine that brings people back to that era to see every detail themselves. This is nearly always impossible since the perfect specimen we own still have missing details. Paleontologists must present hypotheses and arguments very objectively, refrain from being assertive or arbitrary about the parts that went missing. The scientific discourse on those parts then necessarily becomes laden with words like “may” or “probably,” but a piece of paleoart cannot leave the corresponding details blank. The greatest challenge for paleoartists, therefore, is to fill in those blanks with visual details. In addition to be thoroughly familiar with paleontology, one must acquire knowledge in other areas. For example, I often have to present the shape of an animal’s pupil, the colors of its skin, the posture as it moves, or other creatures and the environment at a particular prehistoric moment. I have to learn these things by studying other disciplines.

In addition to these technical details, to make an animal look “real” and “alive” requires skills that are not quantifiable or easily described. For example, I often think about an animal’s temper. Each animal has its own temper; some are aggressive, while others tend to mind their own business. How to make the animals in a painting “alive” is challenging.



Restored skeleton of the T.rex



Restored muscle of the T.rex



T.rex digital painting by ZHAO Chuang



Life-sized sculptures by ZHAO Chuang in the exhibition

Another contribution of restoration is to faithfully record the extent of progress, in paleontology and in other related sciences, from many perspectives. For example, the Iguanodon and Megalosaurus sculptures that remain standing in Crystal Palace, the United Kingdom, were the works of Benjamin Waterhouse Hawkins. Today’s paleontologists may think of them as inaccurate, impossible monsters; nevertheless, they represented the pinnacle of paleontology in the era when they were

built. No doubt, what we created today will be overturned many years later, but they will serve as stepping stones for future scholars and artists to aim higher. Eventually, they will become part of the efforts to recover our planet's history.

Education: myFOSSIL in Undergraduate Education

Editor's Note: Kyle W. Bostick is a Ph.D. candidate at the University of Florida's Department of Geological Sciences studying the biogeochemistry of fire-derived organic matter. His interests in paleontology stem from his early years collecting invertebrate fossils in Southwest Florida. In addition to his doctoral research, K.W. Bostick has taught "GLY1150L: Florida Geology" at the University of Florida.



An example GLY 1150L class experiencing the geology of "Real Floridaism" on a field trip. Photo by Kyle Bostick

Over the last three years, I have taught "Florida Geology (GLY 1150L)", a single-credit geology course in the Department of Geological Sciences at the University of Florida (UF). One of the best parts of this course is it gives students a completely new geological perspective on the Sunshine State. The course takes a hands-on approach, relying heavily on 1) field trips to local geologic features, and 2) laboratory exercises using field-collected samples from these trips. While this course has existed for more than 18 years, we are actively improving its curriculum and relevancy by using modern teaching tools such as myFOSSIL.org.

After learning the basics of stratigraphy and Florida's geologic history (in the first 4 weeks of class), the students arrive at what is usually their favorite part of the curriculum, paleontology. Equipped with plastic bags and pasta strainers, we trekked to Hogtown Creek and Three Lakes Creek in Gainesville, FL with the mission of collecting a wide variety of Miocene (5.3–23 million years ago) shark and ray teeth.



GLY1150L students in Hogtown Creek sieving for fossils, photo by Joshua Dawson

The fossils found in the Gainesville creeks perfectly illustrate the low energy coastal depositional environment of Florida during the Miocene. At this point in the curriculum, the students have learned about coastal depositional environments of the Hawthorn Group and Florida's geologic history, but nothing drives home the message like seeing marine fossils more than 50 miles inland (e.g., shark/ray teeth, whale vertebrae, corals, foraminifera, etc.).

After the collection trip, students are responsible for identifying, characterizing, and preparing a report of their shark teeth. Students are taught to use myFOSSIL and the Florida Museum of Natural History Paleontology Databases as quick fossil identification tools. This lab exercise involves measuring the vertical tooth height of shark teeth, ranking preservation, pooling class findings (to increase sample size), and characterizing the class fossil set using basic statistics. Students are also prompted to sign up for myFOSSIL to post two fossils they found on the trip. From here, we compare our findings to those found in our area by other amateur paleontologists.

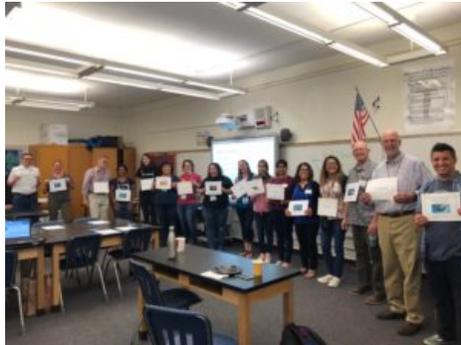
Several other GLY1150L instructors have adapted this lab exercise for their classroom. Over the last three years, the lab exercise has been responsible for approximately 500 Gainesville fossils in myFOSSIL's eMuseum. In addition, many of these students are actively engaged with myFOSSIL after the end of the curriculum. Not only do students get to use myFOSSIL as a great resource, but they also enjoyed being able to contribute to our ever-growing eMuseum.



Example of two common shark teeth found by a student. Lower left is an upper tooth of Hemipristis serra (snaggletooth shark). Upper right is Negaprion sp. (lemon shark). Photo by Megha Mahapatra (modified by K. Bostick).

Digital Resources in Paleontology Professional Development Workshop at NAPC 2019

By Jen Bauer and Molly Phillips



Teachers and facilitators having just completed the ice breaker. Each person was a time period or an event and they had to find their pair and line up chronologically!

The National Science Foundation's Advancing Digitization of Biodiversity Collections program along with many other associated projects have been hard at work developing high-quality educational materials associated with paleontology for K-12 audiences. The iDigBio team collaborated with the FOSSIL Project to bring all of these wonderful materials together as part of a paleo-themed professional development opportunity for local teachers in association with the 2019 North American Paleontological Convention (NAPC) in Riverside, California. The one-day workshop on June 25, 2019, introduced teachers to a variety of project-based resources from ADBC and beyond including: EPICC Virtual Field Experiences, Digital Atlas and Encyclopedia of Ancient Life, myFOSSIL, iDigFossils, iDigPaleo and HHMI Global Change. You can see the full agenda by clicking

here.

Teachers were provided multiple ways to access all of the resources presented including a website, a Google Drive folder, and their own USB drives. Participants brought laptops so they could walk through each resource and test out materials through hands-on activities. Because of the variety of materials, there was something for every situation and learning style – from 3D printed specimens, to virtual field experiences, and educational data portals.



Jon Hendricks exploring the Digital Atlas of Ancient Life and all the resources stored there!



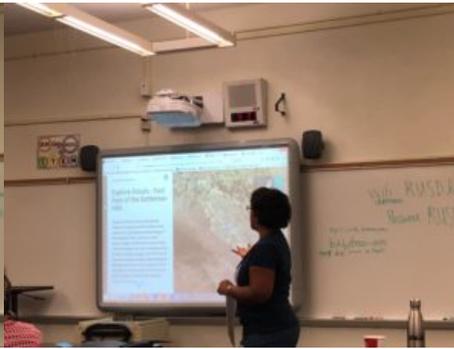
Alycia Stigall giving an introduction to an activity using the virtual teaching collection on the Digital Atlases of Ancient Life.



Michael Zeigler walking through a lesson plan he developed with Liz Lewis on bite marks in the fossil record. Available on iDigFossils.



Jeanette Pirlo walking through navigating the iDigBioLisa White gave not one but two presentations. One website so teachers can find all the valuable resources on EPICC's virtual field trips and another on HHMI's stored there. *Understanding Global Change.*

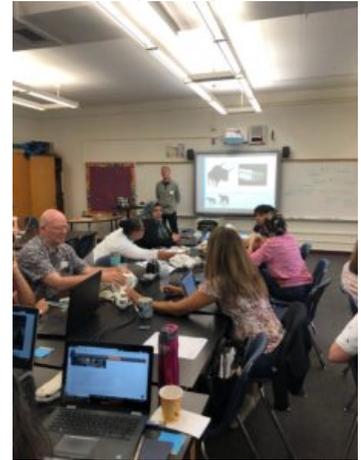


Molly Phillips walked through how to effectively use the iDigPaleo portal, which is a way to annotate, measure, and explore iDigBio data.

During NAPC and the workshop, teachers and other participants were invited to contribute to the myFOSSIL group "NAPC" where pictures could be shared and discussion could take place surrounding the events. If you are interested in seeing what the teachers were up to or what other NAPC attendees shared please click here. As this convention is recurring, we hope that the chatter in the group continues into the coming years.

The workshop agenda was created to have "free time" so teachers and resource developers could talk and exchange ideas for how to use each project in various classroom settings as well as what was missing and/or needed to support teachers and students during implementation.

Thank you to the presenters and facilitators for creating and sharing so many quality resources, and to the teachers that joined us for a jam-packed schedule on one of their summer days. Also a huge thank you to Riverside STEM Academy for hosting the workshop and to the NAPC organizing committee for allowing us to be part of their programming. Last but not least, thank you to our funders: iDigBio, the FOSSIL project, and the Paleontological Society.



Participants exploring 3D fossils and trying to figure out who dun it – the mystery of the bite marks on different bones!

11TH NORTH AMERICAN PALEONTOLOGICAL CONVENTION



JUNE 23 - 27, 2019 RIVERSIDE, CALIFORNIA

UC RIVERSIDE UNIVERSITY OF CALIFORNIA



myFOSSIL



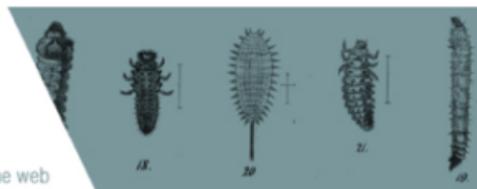
iDigFossils



Digital Atlas of Ancient Life

iDigPaleo

Making data and images of millions of insect specimens available on the web



All of the workshop's partners.

2019 Southeastern Geological Society of America Overview

By Mary Jane Hughes

SE GSA 2019:

The 68th annual meeting of the Southeastern Section of the Geological Society of America (SE GSA) was held in Charleston, SC, on March 28–29. Members of the myFOSSIL team were in attendance, including Jen Bauer, MacKenzie Smith, Fauve Wilson, and Victor Perez, as well as the two social media interns, Sam Ocon, and Mary Jane Hughes.

Two of our team members completed oral presentations during the meeting on the second day of the conference. MacKenzie Smith presented on Thursday, March 28, 2019, from 3:40 – 4:00 p.m. and Fauve Wilson presented on Friday, March 29, 2019, from 11:15 – 11:35 a.m.

The social media interns presented posters of their research on Instagram posts and stories from the FOSSIL Project account (@thefossilproject (<https://www.instagram.com/thefossilproject/?hl=en>)). The poster session lasted from 9:00 – 11:00 a.m. on Friday, March 29, 2019.

ORAL SESSIONS:

MacKenzie Smith is a paleobotany Ph.D. student with the FOSSIL Project at the Florida Museum of Natural History. He presented on Thursday, March 28, 2019, on how to generate engagement with the paleontology community on YouTube. Using this social media platform for a different form of digital science communication, Smith gathered data to see if video format (genre) or topic has an effect on user/viewer engagement.

SCIENCE COMMUNICATION THROUGH ENGAGING AND EDUCATIONAL YOUTUBE CONTENT ABSTRACT. (<https://gsa.confex.com/gsa/2019SE/meetingapp.cgi/Paper/327357>).

Fauve Wilson is a volunteer researcher in the vertebrate paleontology department at the Florida Museum working with paleontology graduate student Victor Perez to work through the fossils gathered at the Belgrade Quarry and determine the various ancient shark species found in Maysville, North Carolina. Wilson presented on the fossils discovered from the early Miocene Belgrade Formation sediment that was collected during the 2018 Belgrade Community Science (<https://www.myfossil.org/belgrade-community-science-2018/>) event.

DIVERSITY AND PALEOECOLOGY OF EARLY MIOCENE CHONDRICHTHYANS FROM THE BELGRADE QUARRY (MAYSVILLE, NORTH CAROLINA) ABSTRACT (<https://gsa.confex.com/gsa/2019SE/meetingapp.cgi/Paper/327185>).

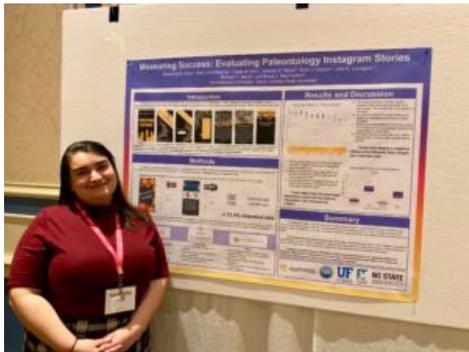


MacKenzie Smith presenting his work on considering what type of videos performs better on YouTube.



Fauve Wilson presenting on the shark and ray fauna found during the FOSSIL Belgrade 2018 trip.

POSTER SESSIONS:



Samantha Ocon at her poster examining the utility of Instagram stories.

such as the poll sticker, provide insight into how engaged our users were with our content. [Read the entire abstract by clicking here \(https://gsa.confex.com/gsa/2019SE/webprogram/Paper327109.html\)](https://gsa.confex.com/gsa/2019SE/webprogram/Paper327109.html).

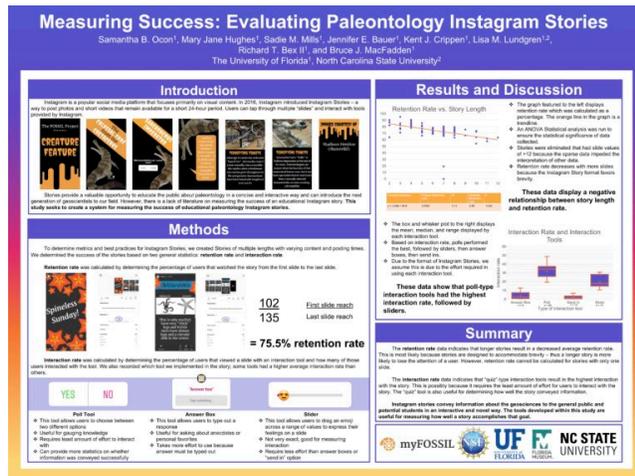
Samantha Ocon is a rising senior in geology specializing in invertebrate paleontology and science communication. She presented on Instagram stories as an understudied facet of Instagram that can be implemented to share and discuss information in an interactive and novel way. Ocon's study defines metrics for educational Instagram stories while exploring methods we found to be successful at conveying paleontological knowledge. We developed a retention rate metric that measures viewership retention throughout a story. This is calculated by taking the number of viewers from the last slide, dividing it by the number of viewers on the first slide, and multiplying by 100. We also found that using interactive tools



Mary Jane Hughes with the conference proceedings!

engagement rates when compared to other types and have the potential to reach broad, diverse audiences. [Read the entire abstract by clicking here \(https://gsa.confex.com/gsa/2019SE/webprogram/Paper327118.html\)](https://gsa.confex.com/gsa/2019SE/webprogram/Paper327118.html).

Mary Jane Hughes is a recent UF graduate who majored in Public Relations with a concentration in business and a passion for science communication. Her poster served as a visual representation to help answer the question: "What post types are most effective for generating followers and engagement with social paleontology in this social niche?" The social media team has collected data since the start of the account in an effort to better understand how this unique platform can be used to further engage with a diverse community, increasing participation and contribution to the science of paleontology. From these data, Hughes focused on creating a method of classifying the FOSSIL Project's posts into six different types. These post types include Opportunity, News, Information, Promotion, Activity Updates, and Other. The results indicate that opportunity and informational posts garner higher



REFLECTION FROM A NON-SCIENTIST:

Coming from a communications background, visiting conferences is the hallmark for networking or finding your future co-workers and SE GSA did not disappoint. There was a variety of opportunities to meet others both within your field and in multiple areas of geology. One aspect that I did not expect were the vendors that sold a variety of gems and jewelry during the first night of the conference. I think this was a positive addition with the other activities and I could not pass up the opportunity to buy the FOSSIL Project's logo, the ammonite. The poster sessions were well organized and very efficient to walk through when visiting each booth. The subjects ranged from three-dimensional geometric modeling to advances in geoscience education.

During the poster session Friday morning of the conference, there was excitement in the air and a strong aroma of freshly brewed coffee. Standing in one spot for two hours seemed to fly by once people started to approach the poster and ask questions such as "How do you find other paleontologists on Instagram?" and "Do you think this makes a valuable impact on the community?" Most of the conference-goers interested in the poster were also educators looking to utilize social media in their classrooms and develop a repertoire with the online paleontological community. Overall, I believe this was an enjoyable learning experience and even a non-scientist can have a great time!



Sam and Fauve enjoying Charleston SC!

Field Camp: Reflections of a Geology Student

By Samantha Ocon



Climbing up Orphan Mesa at Ghost Ranch (<https://www.ghost ranch.org/>), near Abiquiu, NM

SO... WHAT IS FIELD CAMP?

This summer, I went to field camp. Field camp is often considered a tradition, or rite of passage, by the many geologists and paleontologists that were fortunate enough to have the opportunity. The phrase itself often conjures up both sweet and unsavory memories from many in our fields. So what is Field Camp? Field camp is an academically and physically strenuous capstone course required by many universities for geology and paleontology students. It often entails a month or more of fieldwork far away from campus. It is meant to teach students field skills that can't necessarily be practiced in a classroom setting, like geological mapping or stratigraphic unit measurements. My field camp, with the University of Florida, took place around Taos, New Mexico over the course of 6 weeks.

CAUGHT BETWEEN A ROCK AND A FINAL EXAM.

Field camp is challenging both physically and mentally. The turn around rate for projects was typically 24-48 hours after returning from the field. Professors are expecting professional-quality maps and stratigraphic columns, so sleep was often sacrificed for double- and triple-checking our work. There were quizzes and tests, sometimes given in unconventional settings, like a bar on Route 66. Accompanying academic stress is mental stress.



Posing at Great Sand Dunes National Park



Quick nap at Colorado National Monument



Plant fossil found in the late Cretaceous Mesa Verde formation

You are sticking 20 college students together in a stressful environment with very little privacy. Although I was lucky to have a very good group of classmates, there was inevitably a little tension at times, especially near project deadlines. There were definitely moments where we were exhausted and sore, yet pushing on to finish our maps in time. Some of the field areas were daunting, involving long hikes with steep drop-offs on either side of the trail.

Field camp is physically the equivalent of a six-week-long marathon. We were hiking at least 4 miles a day (although, 6 is more accurate) through mountainous terrain with little time to rest. I have a long-term knee injury, so this was perhaps a little harder for me than someone with properly functioning knees. Many of the places we were working at were far from civilization and consequently, very far from medical assistance. Luckily, there were no life-threatening injuries during my field camp; however, we did thrive on pain medication to get through some of the harder days.



St. George Dinosaur Discovery Site at Johnson Farm (<https://utahdinosaurs.com/>)



Students of UF Field Camp 2019



Goblin Valley State Park (<https://stateparks.utah.gov/parks/goblin-valley/>) in Utah.

AN ADVENTURE SIX WEEKS IN THE MAKING...

Ultimately, field camp pushed me to break past my limits. It was one of the hardest things I've ever done, but also one of the most rewarding things I've ever done. I was able to see parts of the country I had never seen before and understand the geological processes that shaped them. I became closer to some of the most amazing people. I became a better geologist.

My Time as a Paleontologist: A Science Communicator

by Mary Jane Hughes

Well hello there!



Enjoying some time in the teaching collection from the Florida Museum of Natural History.

If you are reading this, then that means I am no longer a team member on the FOSSIL Project.

Instead, I have moved from my comfy home in Gainesville, Florida and started my life as an educator in South Korea. My time at the FOSSIL Project has been a memorable one filled with long trips to conferences, exciting outreach events, meetings with the always hilarious social media team, and a renewed passion for graphic design. I accomplished more than I could have expected when I was hired as the social media intern back in 2018.

Originally, my job description included making a post on all three of our platforms, making a few designs a month for the myFOSSIL website. By the end of my time with the project, I had taken over posting for the Instagram account, conducted

research and presented on these data, made interactive videos for various parts of our project, and was given a voice on various items that the project developed. Now that you know a little more about what I did on the day-to-day, here is a rundown on the tasks I accomplished while becoming a paleontologist.

LET'S START FROM THE BEGINNING

In May of 2018, I was hired as a FOSSIL Project intern and tasked with aiding in creating content for social media and bringing a perspective outside of the paleontology community. My background is in Public Relations and I worked for the Harn Museum of Art at the University of Florida as their social media intern before taking on this project.

At first, I was making a few posts a week for Facebook, Twitter, and Instagram while recording the insights Instagram allows us to see about our audience. Drafting posts was not foreign to me but the topics were. I remember creating my first post about mammals found at Belgrade, North Carolina. The project was partnering with the Special Friends of the Aurora Fossil Museum at the Belgrade Mine in North Carolina to research rare extinct land mammals and I quickly realized that I had no idea about the niche community that is very passionate about paleontology.

During that same week, the team was hosting a webinar on the same topic and I was asked to live-tweet the event with my freshly hired co-intern, Sam Ocon. Sam is a geology student that cannot get enough of invertebrates and has all of the paleontological knowledge I do not possess. This task soon

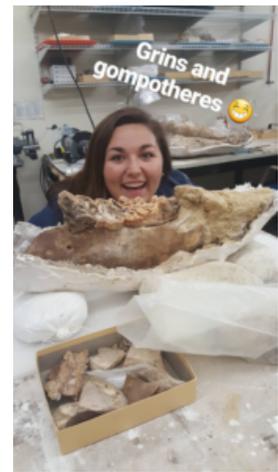
became very daunting to me because the online scientific community is not very forgiving when a mistake is made so writing about a certain 'hell pig' was a nerve-racking, knowledgeable learning experience.

Moving forward, I became confident in my ability to gather the necessary research for a range of topics dedicated to not only paleontology but geology, paleobotany, stratigraphy, and many more!

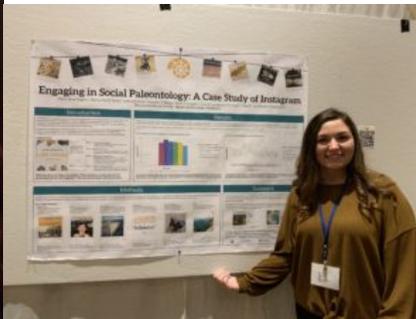
HOW INFORMATIONAL POSTS GREW OUR PLATFORM

From there, my tasks grew to make two posts a week, then taking over the Instagram account, while also completing any assignments our calm and collected project manager asked us to complete while in the office. One of the first big projects I was asked to take on was to gather and analyze the data collected from Instagram. The research began with the intern prior to my start date, who also created the account on the platform, and was being collected every Wednesday to see how our page grew from the previous week.

This project became my main focus as we discovered the significance of post types and how our paleo community is involved with our content. This subject came to mind as our follower count started increasing exponentially in July of 2018. Since June 18, 2018, we have grown from 500 followers to 5,500 followers. This leap within one year caused my team and me to search for answers so we can replicate this success on our other platforms. After taking notes from another team member's Ph.D. dissertation on the taxonomy of post types that engages individuals on social media, we determined that our page has six different types of posts. These types include Opportunity, News, Information, Promotion, Activity Updates, and Other. Further analysis allowed us to come to the conclusion that informational posts perform better than any other post type, reaching 15 percent engagement rate. The average engagement for Instagram as a whole is only 3 percent proving that the paleontology community is very interested in content pertaining to their field.



Grinning through the gomphotheres fossils found in the Florida Museum of Natural History vertebrate collections.



Once the data was reviewed and verified by my social media team, I presented my poster the information at the Southeastern GSA conference in March of 2019. This was an eye-opening experience for networking and gaining knowledge on a range of subjects pertaining to geology. You can read more here about my experience and the other team members involvement during the conference.

MYFOSSIL MOBILE APP AND OTHER PROJECTS

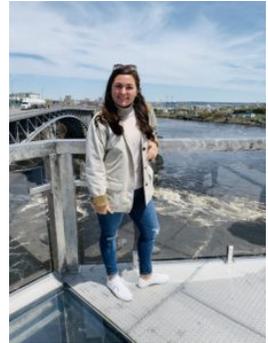
During my time with the FOSSIL Project, the myFOSSIL mobile app was launched and I began using one of my favorite skills, creating promotional videos. After some research on different platforms that produce software for video making, we decided to work on the website powtoons to create all of the informational videos on our YouTube account. I am especially proud of the myFOSSIL eMuseum video series that we created this summer to help spread knowledge of paleontological terms and teach users how to properly upload their specimens to possibly be used for research.



A NEW CHAPTER

Overall, I wouldn't change my experience for anything. Without my incredible social media team guiding and supporting me in whatever direction my creative drive lead me, I would not be the science communicator I am today. Other than the skills I acquired working on my various objectives, I also began my journey of becoming a paleontologist in my own right. Even though I do not have a direct background in science, I can now easily describe to my family members why birds can be considered dinosaurs because they are also theropods and who Mary Anning was along with her discovery of the plesiosaur.

I have even made my family take special trips to see geological masterpieces like the Bay of Fundy that lies between Canada's Nova Scotia and New Brunswick provinces! In the end, I hope to continue learning about paleontology and share my knowledge with my students in South Korea.



Thank you, everyone, for your hard work and amazing personalities. I am going to miss you all!

안녕 ♡ MJ

FOSSIL Project Updates Summer 2019

FOSSIL EDUCATION TEAM CONFERENCE RECAP *BY RICH BEX*

This past Spring, I had the opportunity to attend three conferences to present on research related to myFOSSIL and gain feedback on the myFOSSIL App. During March 13th-March 15th, I spent time at the Citizen Science Conference (CitSci (<https://www.citizenscience.org/association/conferences/citsci2019/>)) in Raleigh, NC. The CitSci 2019 national conference brought together researchers, practitioners, and participants with an interest in citizen science to share their ideas and practices. While at the conference, I was able to meet with experts involved in a variety of mobile citizen science projects with the goal of using their feedback and guide future updates to the myFOSSIL app.

Shortly after the CitSci Conference, I attended the Society for Information Technology and Teacher Education (SITE (<http://site.aaace.org/>)) 2019 Conference in Las Vegas, NV. This conference took place March 18th-22nd. I presented a paper on the use and usability of the myFOSSIL App. The study involved testing the app with high school students and a group of K-12 teachers. Findings from the study revealed that the App was perceived to be usable and users showed high satisfaction. The paper can be found in the proceedings for the Society for Information Technology & Teacher Education International Conference (<https://www.learntechlib.org/primary/p/207762/>) (<https://www.learntechlib.org/primary/p/207762/>)).

Finally, from March 31st-April 3rd, I attended the National Association for Research in Science Teaching (NARST (<https://www.narst.org/>)) 2019 Conference in Baltimore, MD. The NARST Conference focuses on the improvement of science teaching and learning through research. At the conference, I was joined by former FOSSIL Team member, Dr. Lisa Lundgren. Our presentation focused on the forms of social paleontological practices within the myFOSSIL website.



Rich at SITE this year!

SOCIETY FOR THE PRESERVATION OF NATURAL HISTORY COLLECTIONS *BY JEN BAUER*

I attended SPNHC as representative of the FOSSIL Project team to share our recent advancements in the myFOSSIL eMuseum. In a session dedicated to small museum collections, I shared information about the eMuseum upload process, curation team, and underlying WordPress plugins. The talk was only 15 minutes but I encouraged the audience members to check out the mobile app and come talk to me about the plugins and their utility for small natural history collections. The following day, I participated in an Education Share Fair hosted by iDigBio's education and outreach coordinator, Molly Phillips. I led a round table discussion with about 10 museum professionals about how myFOSSIL could benefit them and how we could form partnerships into the future. Most valuable from this discussion was the idea that people could have a badge or marker indicating they were



interested in donating their specimens to a physical museum collection when they are no longer able to care for them so that these valuable scientific items can be safely stored for others to access in decades to come.

NORTH AMERICAN PALEONTOLOGICAL CONVENTION

BY JEN BAUER

Life size pterosaur at the Field Museum!

Many members of the FOSSIL Project team traveled to Riverside, California to participate in NAPC. FOSSIL also sponsored the travel for a number of myFOSSIL community members. In total, our group submitted over 29 abstracts! The FOSSIL Symposium was a great success and had a non-traditional set up with four themes. Each theme had a spark that was meant to start the conversation, a panel discussion, followed by a total audience discussion. Each 45-minute block had a different theme where we could discuss different aspects of the project. Tune in to the final FOSSIL newsletter this fall to get all of the NAPC details!

BELGRADE 2019 *BY VICTOR PEREZ & FAUVE WILSON*

We had another successful trip to the Belgrade Quarry, with more than 40 participants from the Special Friends of the Aurora Museum, North Carolina Fossil Club, Smithsonian, and Florida Museum of Natural History. The spoil piles set aside by the mine operators survived the heavy rains over the last year and accumulated some of the coarser material at the surface. This allowed for very successful surface collecting, followed by some dry screening. There were two notable finds this year: a protoceratid tooth (extinct deer-like herbivore) and a *Notorynchus* tooth (cow shark). Neither of these taxa were found during last year's trip, so it was exciting to add them to our taxonomic list. We also received a few interesting donations. Eric Sadorf sieved matrix from last year's trip and found a *Mustelus* tooth (smooth-hound shark) and a *Gymnura* tooth (butterfly ray), which we had not yet found at Belgrade. Progress continues back in the lab as we continue to process matrix and sort through all the new material collected this year!



Dave Bohaska, vertebrate paleontology collections manager at the Smithsonian, provides a site overview.



Participants spread out and scour the mounds for new fossil discoveries.



Sean Moran, PhD student from the Florida Museum of Natural History, dry sifting.

SOUTHWEST FLORIDA FOSSIL SOCIETY BY MICHAEL ZIEGLER



Jim Davis (Vice President of SFFS, left) and Michael Ziegler (right)

On June 8th I had the pleasure of visiting the Southwest Florida Fossil Society (SFFS) in Punta Gorda, Florida. As the 2019 Mitchell Hope Scholarship Award recipient, the SFFS invited me to be a guest speaker during their monthly meeting. After being introduced to the society members, I presented on some aspects of my thesis research which aims to produce a paleoenvironmental site formation analysis of the local Montbrook Fossil Site. During the talk, SFFS members had numerous productive and thought-provoking questions that led me to view my analysis from a different perspective. Moreover, presenting to an audience of fossil enthusiasts helped me further refine the quality of my science communications skills when delivering research. After the meeting, one of the youngest SFFS members disclosed to me that she was interested in pursuing an education in natural sciences when she goes to college. Her interest initiated a

discussion on career paths facilitated by the various experiences of her fellow SFFS members and myself. All in all, I am now honored to be part of the SFFS community and excited to see many of the members at Montbrook this upcoming field season!

EMUSEUM UPDATES BY JEN BAUER

(<https://www.myfossil.org/emuseum/>) At NAPC, I met with a team of volunteer assistant curators who will assist with curating the specimens that are uploaded to the eMuseum. Every time someone uploads a specimen through the app or website it heads to a queue where the curators can access it. Each curator has site privileges that allow them to correct any taxonomic or time period typos they find in the specimen data. The curators will use their expert knowledge to help improve the quality of data uploaded to the museum. All specimens uploaded to the website will be examined by the curation team and subsequently curated. If the data are of a high caliber the specimen will be marked as 'Research Grade' and will be sent to iDigBio to be accessible to other researchers and the public. The team has started curating and we are working to get through the backlog of specimens on the website. So expect comments from the team working through all of the specimens on the website!



Other minor updates such as a global search bar, currently only on the home page but will soon be accessible from anywhere on the site. Soon you will be able to export a CSV file with your entire specimen collection from the website and create specimen labels to print out.

APP UPDATES BY JEN BAUER & RICH BEX

(<https://www.myfossil.org/resources/mobile-app/>) The Education and Outreach group (<https://www.myfossil.org/groups/education-and-outreach/>) has been very active in the myFOSSIL mobile app these past few months. Check it out on the app or on the web-based platform to see what members of the community are involved in! There is a new group in the app dedicated to fossils of Coastal N.C. (<https://www.myfossil.org/groups/coastal-n-c/>). This group was created a few months ago and has 21 members! Join in the discussion in the app or on the myFOSSIL website!



The myFOSSIL mobile app now has 359 total active users with about 31 active users per day over the past month. Users are spending about 5 minutes on the app, which is greater than many comparable social media platforms.

Updates are coming to the mobile app! This includes features such as moving the crop as you upload a photo and pinch and zoom to examine photos in greater detail.

TEAM UPDATES *BY JEN BAUER*

(<https://www.myfossil.org/newsletters/>)The FOSSIL Project NSF funding will conclude at the end of September 2019. This will be our last regular newsletter issue as our last issue will be sourced from our community members that participated in the NAPC FOSSIL events this past June. If you are interested in contributing an article for the last issue please reach out to us!



Mary Jane Hughes has graduated with a Bachelor of Science in Public Relations from the College of Journalism and Communication here at the University of Florida and is moving on from the FOSSIL Project team. Mary Jane has grown our Instagram community and helped the FOSSIL team cater their language, graphics, and content to a broad audience. She will be moving to Daegu, South Korea by the beginning of September to begin her new journey as an educator teaching English.



Graduation conformation with speaker James Patterson on May 3, 2019.



Mary Jane attending the SE GSA conference in March of 2019 to present on her research.

Upcoming Events

August 7

[Lottery Deadline for Edelman Fossil Park's Dig Day](#) (online)

August 10

[NARG Northwest Fossil Fest](#) (Hillsboro, OR)

August 14

[Poetry Pop-Up - Wonderful Life: Poems of the Cambrian](#) (Chicago, IL)

September 6 - September 14

[Colorado Mineral and Fossil Show](#) (Denver, CO)

September 22 - September 25

[Geological Society of America Annual Meeting](#) (Phoenix, AZ)

October 4 - October 6

[Rock, Mineral, Gem, Jewelry, and Fossil Show](#) (Orlando, FL)

October 9 - October 12

[Society of Vertebrate Paleontology Annual Meeting](#) (South Brisbane, Australia)

October 16

[National Fossil Day](#)

Click [here](#) for more information and events.



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