



# T Tracks



Sam Noble Museum

Summer 2016 Newsletter Vol. 28, No. 2

## IN THIS ISSUE

Volunteer of the Year

“Titanoboa”

Science Means the  
World to Us

The Poetry of a  
New Species

Citizen Science





## TRACKS, SUMMER 2016: VOLUME 28, NO. 2

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### OUR MISSION

The Sam Noble Museum at the University of Oklahoma inspires minds to understand the world through collection-based research, interpretation and education.

### OUR VISION

As one of the finest museums, we are at the heart of our community, collectively working to inspire understanding, appreciation and stewardship of the earth and its peoples.

### TRACKS

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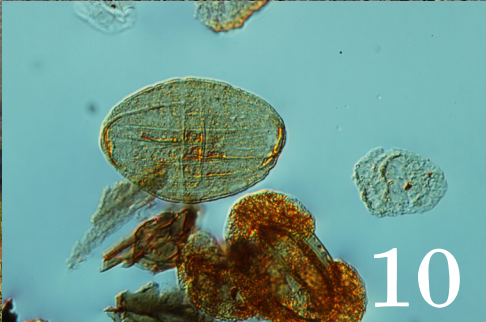


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courtesy of the Arkansas Discovery Network.

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# From the Director



Dear members and friends,

Since Jan. 1, almost 70,000 visitors have come to the Sam Noble Museum. Spring saw “First Folio!” Family Day and a member reception, Spring Break Escape, Breakfast with Dinosaurs member event, Eggstravaganza, Volunteer Appreciation Week, the 14th annual Oklahoma Native American Youth Language Fair and the annual Board of Visitors meeting. Whew!

As of press time, 452 new memberships have been purchased in 2016 and now total more than 1,500 members of Oklahoma’s official natural history museum. As the only natural history museum in the state, we see support from across Oklahoma, from Norman to Ponca City to Claremore to Duncan, as well as from folks in Texas, Kansas and Colorado.

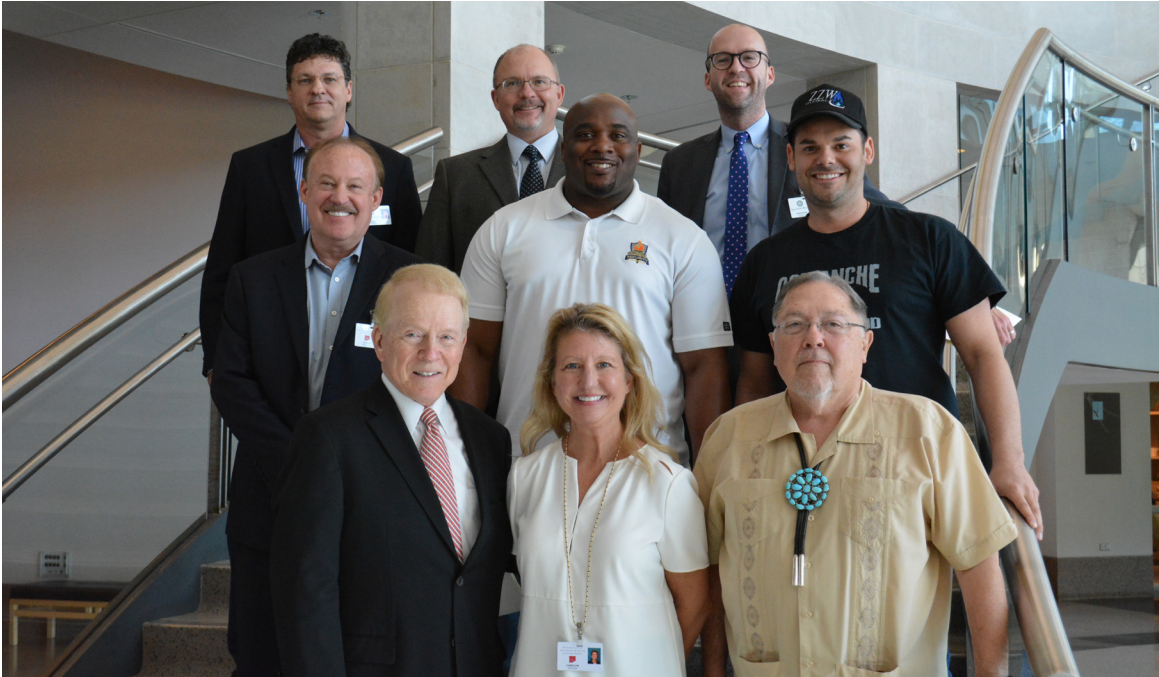
We have welcomed over 10,000 Oklahoma students and educators to the museum on field trips. Thanks to the Fossil Fuel Fund, some schools were able to afford the trip through financial assistance from the Board of Visitors, museum members and other donors. Travel costs for fuel and a bus driver can be reimbursed to the school by the fund. We continue to have scheduled groups, children from summer camps and adult tour buses visiting throughout the summer.

We have some staff changes to report. On June 1, we welcomed Matt Miller, Ph.D., curator of our ornithology department. You will read more about Matt and his research in the fall issue. We will begin the search for a curator of Native American Languages this fall. The position will be a joint appointment between the OU Department of Native American Studies and the museum.

Summer brings a change in our activities. Curators shift their teaching activities to research in the field to discover new facts about life on Earth. Students ages 4 through 14 enrolled in Summer Explorers classes experience the excitement of learning about life around them in classes that often take them outside on field trips. Museum attendance is high with vacationing families and out-of-state visitors. We are participating again in the National Endowment for the Arts’ Blue Star Museums Program, which offers complimentary admission to the museum for all active duty military personnel and their immediate families from Memorial Day through Labor Day. We took the program one step further to include retired military and their families.

ExplorOlogy’s Paleo Expedition and Oklahoma Science Adventure have taken place again this summer. Twelve lucky high school students from across the state were selected for Paleo Expedition. They spent their first week being introduced to paleontology and field science. They also traveled to geological and paleontological sites across the state and visited the Oklahoma City Zoo as well as worked in museum collections and labs. Through the Whitten-Newman Foundation, they were able to spend their second week at an active





*(Pictured from left) Front row: Gary England, Carolyn Taylor, Ph.D., Director Michael Mares, Ph.D.  
Center row: Reggie Whitten, Roy Williams, Zane Woods. Top Row: Kevin Easley, Tim Munson, Jonathan Fowler.*

paleontological dig site in Black Mesa again this summer. Oklahoma Science Adventure allowed 14 middle school students to work with staff and scientists, with whom they spent two days at the Rogers County Conservation District in Claremore and a day canoeing the Illinois River. They also visited a paleontology site in Sulphur. Both groups toured collections in the museum and gave presentations about their experiences to friends and family in the auditorium. For all of these participants, they said it was the experience of a lifetime!

We are fortunate to be able to provide our visitors with different exhibits several times a year. “Be the Dinosaur: Life in the Cretaceous” went on display at the beginning of March. We learned in June that we could keep this fun family exhibit through the summer until Labor Day. July 2 was the opening of “Titanoboa: Monster Snake,” a collaboration between the Florida Museum of Natural History, the University of Nebraska and the Smithsonian Tropical Research Institute. Both of these interactive exhibits have been popular. We are looking at another family-oriented exhibit for next summer – “Comets, Asteroids and Meteors: Great Balls of Fire.”

This spring, we said goodbye to two Board of Visitors members – Mary Beth Babcock and Bill Cameron. I appreciate their time on the board to move the museum forward. Our 15-member board will again be chaired by Jonathan Fowler for the coming year. We have three lifetime board members – Reggie Whitten, Carolyn Taylor and Lars Noble. Other board members are Kevin Easley, Gary England, Becky Franklin, Taylor Hanson, Elaine Hobson, Ross Kirtley, Tim Munson, Xavier Neira, David Nimmo, Roy Williams and Zane Woods. This impressive group of Oklahomans are from diverse backgrounds and careers, but all are wonderful ambassadors to the museum.

Come visit your museum. It’s the coolest building in the state!

*M. Mares*

Michael A. Mares, Ph.D.  
Director



# Volunteer of the Year

BY ELYSSA MANN

John Stonecipher has a life-long love of science. That passion brought him to the Sam Noble Museum in October of 2007, and has kept him in the vertebrate paleontology collection ever since. Thanks to his hard work and dedication to his craft, he recently was named the 2016 Tom Siegenthaler Volunteer of the Year.

Stonecipher began volunteering with the vertebrate paleontology collection after being approached by other museum volunteers during a member event. Since then, he has logged 2,006 hours with the museum.

"They made me realize that I was going to be able to learn about something that fascinated me and that I loved, while also treating the specimens with the respect they deserved," Stonecipher said.

Stonecipher helps open fossil jackets, prepares bones for storage in the collection or display and creates casts and conducts mold-making. One of the largest projects he has worked on was aiding in the creation of casts and pouring the plaster for the baby *Apatosaurus* skeleton now on display in the Clash of the Titans exhibit in the Hall of Ancient Life. He was also part of the team that removed a set of a *Sauroposeidon*'s ribs from their fossil cast, which were over 7 feet long.

"I love getting to see things that haven't been seen before by humans," Stonecipher said. "I love working on them until they're presentation-quality specimens."

He also has spent his time trying to improve the way he and his fellow volunteers pour plaster into molds.



*Above: John Stonecipher, 2016 Tom Siegenthaler Volunteer of the Year and long-time museum volunteer.*

"I modified a pressure tool used for painting," Stonecipher said. "I modified the tank with plumbing, and we're able to pour the plaster in without any air bubbles now."

Stonecipher is currently retired, but previously worked for three government agencies, two branches of the military and several savings and loan companies. In his spare time, he likes to go trout fishing at Montauk State Park in Missouri and is an avid reader of non-fiction. He says that while he never pursued a career in it, his avocation has always been science.



# *Titanoboa: Monster Snake*

BY ELYSSA MANN

**T***itanoboa*, the world's undisputed largest snake, recently slithered into the Sam Noble Museum. A full-size realistic replica of the snake, which thrived in a hot tropical climate over 60 million years ago and is related to the modern boa constrictor, is on display as an awe-inducing exhibit.

The startling discovery of snake vertebrae fossils was made in 2009 by a team of scientists working in one of the world's largest open-pit coal mines at Cerrejón in La Guajira, Colombia. These collecting expeditions began in 2002, when a Colombian student visiting the coal mine made an intriguing discovery: a fossilized leaf that hinted at an ancient rainforest from the Paleocene epoch.

Over the following decade, collecting expeditions led by the Smithsonian Tropical Research Institute in Panama and the Florida Museum of Natural History at the University of Florida opened a unique window into what some scientists believe to be Earth's first rainforest, in which huge creatures fought to become the Earth's top predators.

"Having *Titanoboa* come to the Sam Noble Museum is exciting for us to share current scientific knowledge of snake ancestry with museum goers," said herpetology collection manager Jessa Watters. "Herpetology curator Cameron Siler also looks forward to the opportunity to share his ongoing research on the evolution of limb-loss in modern reptiles as it compares to ancient snakes in the family workshop 'Scale Tales' this August."

The exhibition is a collaboration between the Florida Museum of Natural History, the University of Nebraska and the Smithsonian Tropical Research Institute. "*Titanoboa: Monster Snake*" will travel to 15 cities on a national tour organized by the Smithsonian Institution Traveling Exhibition Service.

"*Titanoboa: Monster Snake*" is on display through Sept. 25 and is sponsored by Love's Travel Stops and Country Stores.

*Lower left: Measuring 48 feet long, the massive predator "Titanoboa cerrejonensis" could crush and devour a crocodile.*

*©2012 SNI/SI Network, LLC. All rights reserved.*

*Lower right: Fossil plants and animals found at the site reveal the earliest known rainforest, teeming with life and dating to the Paleocene, 60 million years ago. Illustration by Jason Bourque, Florida Museum of Natural History.*





# Science Means the World to Us: What Does It Mean to You?

BY JES COLE, HEAD OF EDUCATION

“Fun!” said one museum visitor. “Problem solving for the betterment of mankind,” said another. Yet another said, “Learning new things.” Someone else commented, “Something that helps us understand stuff.” And finally: “Mud in your shoes!”

Every visitor who comes through the museum’s front door has a different idea of what “science” means to them. Serving the museum through the education department for the past nine years has given me the tremendous opportunity to meet and learn with a diverse group of youths and adults from across the state.

I often hear how much visitors appreciate the ability to explore science through seeing fossils, specimens and artifacts up-close. Just as often, I hear the wish that everyone in Oklahoma would be able to access places like the museum and the worry that many will never get the chance. Many concerns come from teachers who look to the museum and other science centers to supplement their classroom requirements. They’ve told me that they consider their students lucky to have the opportunity to visit at least once, knowing they might never have the means to visit the museum again.

As an outreach educator, I have traveled to schools in all areas of the state. From the Oklahoma panhandle to the Arkansas border, I’ve visited schools urban and rural, large and small. Teachers are proud of their students and passionate about their profession. But they are under increasing strain. Oklahoma has consistently

ranked below the national average in student achievement, including science achievement. Many fault the educational reforms that necessitated high-stakes testing, which reduced the amount of instruction time for non-tested subjects. Others cite the lack of resources (whether lab equipment or trained staff), cuts in funding and state legislative support.

Indeed, 2016 has been a difficult year for Oklahoma economically. With mid-year budget cuts and an additional significant cut expected to public schools and higher education, many schools have been forced to cut staff, instruction time and field trips. Essentially, schools are being asked to do more with much less.

It is likely that funding will not immediately rebound for Oklahoma education, which means a prolonged reduction in the amount of science opportunities available to students in schools. With fewer staff and resources, there are fewer afterschool programs and clubs, less opportunity for varied curriculum and fewer supplies. However, just because the ability of schools to offer quality science education has been undercut does not mean the interest in or value of science has diminished for Oklahomans. Teachers, students and their families have increasingly sought ways to boost the quality and amount of science learning available to them.

Now, more than ever, the roles of museums are of critical importance to education. Museums are uniquely situated to be able to provide high-quality science content to all learners, regardless of age, ability or





*Above: Students take part in Pond Explorers, one of the museum's most popular Summer Explorers programs.*

previous experience. As free-choice learning spaces, they encourage exploration, critical thinking and communication. As community spaces, they give us a place to interact and to share with others what is valued. Above all, they can provide a meaningful, fun experience with science that many students would never have experienced otherwise — one that could inspire a lifetime interest.

Where else could someone touch an actual fossil thigh bone from the giant *Apatosaurus*, crawl through a limestone cave in search of bats, or see the oldest painted object in North America? For decades, the Sam Noble Museum has strived to be a valuable community resource for science learning and exploration. By designing a variety of educational programs and resources that seek to immerse students and teachers in the process of science, the museum is responding to the overwhelming need for more science content.

Whether through professional development training that pairs teachers with working scientists or delivering actual museum specimens to classrooms with an accompanying curriculum, the museum takes an active

role in creating opportunities for schools and students throughout the state. Through summer camps, special events and other programs, the museum also works to provide a variety of programs for youths, families and adults year-round so that Oklahomans of all ages can supplement their personal learning and enjoyment of science.

What does “science” mean to you? It is critical, now, more than ever, to sustain our community’s best resources for science education outside of the classroom. One meaningful experience with science can inspire a lifetime of discovery.

Unfortunately, students across the state are currently in the position of losing rather than gaining this access, whether at school or on field trips. Increasing opportunities for science education for all students will lead to increased understanding and awareness about our natural world. Supporting science education in Oklahoma is a big step we as a community must take together, but it can start with something as small as encouraging a visit to the museum.



# The Poetry of a New Species

BY MICHAEL MARES, MUSEUM DIRECTOR

As the 20th century came to a close, my research team was surveying the mammals of northwest Argentina, in the many isolated desert valleys and extraordinary mountain ranges of the region. It is an area where little mammalian research had ever been done. The Andes mountain range includes peaks that exceed 20,000 feet in elevation.

Our collecting sites in the desert ranged from about 3,000 to 16,000 feet above sea level (the headache zone). Our research showed that these isolated valleys permitted the evolution of species that were often restricted to a particular valley, or that originated there before moving to other areas in the complex deserts and scrublands of the northwest. This helped explain

the high biodiversity we were discovering and would assist provincial and national wildlife authorities in developing conservation plans to protect the newly discovered mammals.

We made a special effort to enter the heart of the Bolsón de Pipanaco, an enclosed valley that includes a significant salt flat that could be an ideal place for a specialized mammal to develop over the millions of years of time that the valley had been isolated since the mountains arose.

Our research was showing how one group of rodents managed to evolve species that were specialized to survive in an extreme region where other mammals could not succeed. These woodrat-sized animals were able to live on salt-adapted plants that concentrated salts in their tissues to four times that of seawater. Our work was clarifying

*Far right: Salt flat in the eastern portion of Bolsón de Pipanaco.*

*Near right: View of the salt flat.*

*Below: The golden vizcacha rat, "Pipanaoctomys aureus."*





how these remarkable rodents managed to do this.

The animal we discovered in the Pipanaco Salt Flat was so unique that we named a new genus and species for it, *Pipanacoctomys aureus* — the golden vizcacha rat of the Pipanaco valley. It is a beautiful and extraordinary animal that lives in one of the harshest habitats in the world for a mammal — a salt flat that supports few plants, has no fresh water and experiences extraordinarily high temperatures in the long desert summer.

Once the animal had been discovered, it could be studied, and today other researchers have examined its behavior, genetics, physiology, ecology and conservation. It is now listed by the International Union for the Conservation of Nature as critically endangered and efforts are underway to protect the species. Had we not discovered and described it, none of this would have taken place. The species might have disappeared before anyone knew it existed.

Museum specimens and artifacts have frequently stimulated poets to creativity. For example, the Greek Elgin Marbles, also known as the Parthenon Marbles, in the British Museum caused the great poet, John Keats, to write a line that is famous to this day, “A thing of beauty is a joy for ever:/ Its loveliness increases; it will never/ Pass into nothingness.”

My brother, the late E.A. “Tony” Mares, was a noted historian and poet in New Mexico. He was always fascinated by nature and science, so when I told him about our discovery, he wanted to know all about it.

He examined the specimens and photographs and read my account of the discovery of this amazing mammal. He was moved to write a poem about the remarkable rat, and I think this melding of science and poetry shows how the hard work of discovery can influence people in ways that are surprising to those who do science. I do not think he ever published the poem, but here it is for your enjoyment.

## “Golden Viscacha Rat”

by E.A. Mares

I miss the salt plains.  
The streets of the city are harsh,  
here where I escaped the trap.  
Near the trash bin

I find spilled popcorn,

eat it. For the salt.

There’s water in the gutter.

I have no need for it.

I need only succulent plants,  
shade where I can sleep.

Did these two-legged giants  
trap me for my gold hair?

They fill the streets,  
buildings, cars.

They kill everywhere,  
every plant, every animal,  
including themselves,  
but they love blondes.

I miss the salt plains,  
the cool nights and fiery days,  
my peaceful life as a golden rat.

# Seeking Permian Pollen

BY ELYSSA MANN

In science, holotypes are extraordinarily important. A holotype is the premier specimen for a new species — most of the time, it's the first discovered specimen of its kind. When future researchers believe they've found evidence of the same species elsewhere, their specimen is always compared to the holotype to determine if both are the same species.

When a holotype goes missing, it's a devastating blow to the science community because there's no original specimen to compare with newly discovered ones. That's why Richard Lupia, Ph.D., curator of the micropaleontology, paleobotany and mineralogy collection undertook the task of replacing the holotypes collected by his predecessor, Leonard Wilson, Ph.D. Lupia believes the holotypes — which were, at the time, newly discovered taxa of Permian pollen (a level of classification higher than species in ecological classification) — went missing some time in the 1960s. The pollen, which originally existed between 252 and 290 million years ago, was collected by Wilson in Greer County, Okla., and was described heavily in Wilson's published papers on each new taxa. His papers are some of the most heavily referenced in the world when it comes to the study of Permian pollen.

"They're very important for telling time in the rock record," Lupia said. "They help to date other pollen



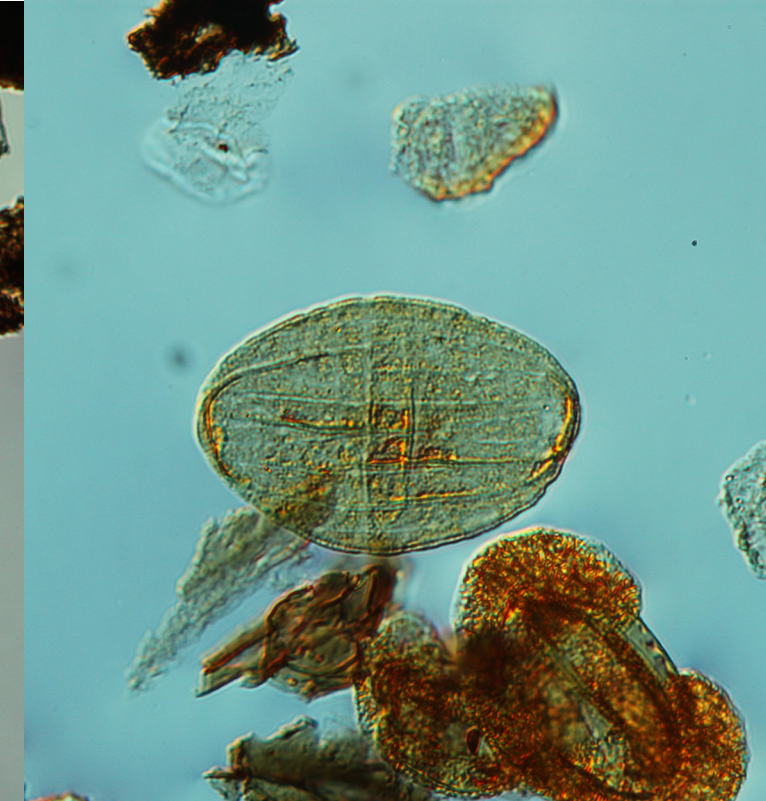
*Above: A possible "Hamiapollenites saccatus" specimen, though based on this view, it does not match all of Wilson's state characteristics.*

specimens that are now being discovered."

Recollecting the same pollen specimens as Wilson wasn't going to be an easy task for Lupia. He had to dig through Wilson's papers for evidence as to where specifically in Greer County the specimens were collected. They knew approximately where the specimens were from (about a .25-mile radius), had to search through public records to discover who now owns the land and ask the landowner's permission to survey the site. Once the landowner gave his consent, Lupia then, again using clues from Wilson's papers and a picture that had been taken of the original site, determined from where exactly the pollen had been excavated. After months of work, Lupia hit gold. Or, rather, pollen.

He and Roger Burkhalter, collection manager for the museum's invertebrate paleontology collection and one of Wilson's former students, excavated about one kilogram of sediment from the site and returned to the museum to sift through their findings. When selecting sediment to take home, Lupia and Burkhalter focused on collecting dark rocks rather than red or beige. "Then you have to process them and dissolve away all the rock in a series of different acids," Lupia said. "You concentrate anything that survives the acid treatment





Above: A possible specimen of "*Vittatina costabilis*," though the specimen is not well enough preserved to be entirely sure.

— that will include pollen, pieces of wood and other pieces of plant leaves — basically, the organics. Then you have to drop them on a glass slide and look at them through a microscope to determine what's pollen and what isn't."

To a layman, it doesn't seem as though one kilogram of dirt and rock is much to sift through. But when the specimens a scientist is searching for is only a 20th or even a 100th of a millimeter in diameter, the task is daunting. In reality, Lupia said he usually only processes three or four grams of the sample he's taken from a given site. He also has no way of knowing if a sample is going to contain the prehistoric pollen. In the past, Lupia has collected samples from six different sites, dissolved all of the rock, and discovered that there was no pollen in the sample.

When transferring specimens to an electron microscope to examine, specimens are so tiny an eyelash must be used to make the transfer.

"It takes a long time and it takes patience," Lupia said. "Much of the time you're moving the samples of pollen from slide to slide on an eyelash. Then we mount each specimen on a stick slightly smaller than a toothpick. It's extremely detailed work."

This time, however, Lupia found exactly what he was looking for.

"At the site we were targeting this time, we got great pollen," he said. "But we expected that, since we excavated in the same place Wilson did."

Lupia said after processing the samples he collected, he found all of the specimens he was looking for to replace Wilson's lost slides, except for one.

"I think we found almost all of the others. This one, *Hamiapollenites saccatus*, does not match all of the characteristics Wilson claimed for the species," Lupia said. "We started looking at them under light microscopy and scanning electron microscopes, and we're hoping to find it."

Another species, *Vittatina costabilis*, may be a confirmed match. According to Lupia, the specimen is not well enough preserved to say so with 100 percent certainty.

Now that the collection and processing work is complete, Lupia intends to write several papers re-describing the pollen samples found that replace Wilson's lost material.

"I want to describe the flora — all of the species represented in the pollen — and to utilize the information from the scanning electron microscope. Wilson only used a light microscope, and there's a lot more to be learned with our advances in technology since the 1960s," Lupia said.

Lupia also plans to discuss the structure of each species of pollen, such as the walls, to see if they're built the same. Some of the species Wilson described appear to be the same as others found in South America and Europe, but that was only using evidence gleaned from a light microscope. With the advent of the scanning electron microscope, he said the higher magnification and higher resolution will help determine whether they're all truly the same species. This will help solidify or correct the rock record Wilson's work originally helped to establish.



Above: A student holds a green tree frog (*Hyla cinerea*).

# Swabbing Turns Students Into Citizen Scientists

BY MORGAN DAY

**A**mphibians across Oklahoma are coming down with an infectious — and often fatal — disease that impairs eating and sustaining respiration through their skin.

The disease (chytridiomycosis, or chytrid for short) is caused by the pathogen *Batrachochytrium dendrobatidis* (Bd), which creeps into ponds, lakes and streams and is passed from animal to animal. It's even spread from one body of water to the next by humans on their untreated fishing and boating equipment.

For now, scientists are unsure just how widespread the fungal disease is throughout Oklahoma.

All that might sound pretty bleak, but the Sam Noble Museum's herpetology staff has dozens of allies throughout the state who are eager to help them get a more accurate understanding of the problem. Tasked with testing amphibians from all of Oklahoma's

77 counties, the museum enlisted citizen scientists, or students in elementary through high school, to find, catch and swab amphibians for their cause.

"We couldn't get to every county ourselves — it's just impossible," said Jessa Watters, collection manager for the herpetology collection. "The Amphibian Infectious Disease Citizen Science Project gives us a lot more data, and it provides classrooms around the state a really great outdoor education activity that maybe they would never get to do."

The herpetology collection has recently been awarded a three-year grant from the Oklahoma Department of Wildlife Conservation and a one-year grant from Oklahoma City Zoo's Conservation Action Now program to test amphibians in 23 counties around the state. What they have found so far surprised them. "What we had discovered after one year of testing on our own is that the chytrid fungus is much more



widespread in Oklahoma than we would have guessed,” Watters said. “Almost no one had been checking this before. We’ve seen counties with 30 to 100 percent infection rates.”

When teacher Diana Cook heard about the Amphibian Infectious Disease Citizen Science Project, she knew it was a perfect fit for her seventh-grade class at Collinsville Middle School. It wasn’t difficult to get her whole class on board, and soon enough, they were catching and swabbing frogs at a creek close to their school.

“The students were very interested in the fact that what we were doing wasn’t just a class project; it was actually going to be put into a database, and the samples we took and sent back to the museum would be researched with other samples in Oklahoma,” Cook said.

“They were definitely very curious about the disease, why we were worried about it and what we could do. And the project fit into our lesson while we were studying ecology. We talked about what would happen if frogs disappeared and the fact every single thing is dependent upon everything.”

Cook’s class and others participating around the state received museum-prepared kits containing 10 pre-sterile, individually packaged cotton swabs; 10 pre-sterile, 1.5 mL screw-top vials; instructions; datasheets; a permanent marker; and an Oklahoma frog identification guide.

In addition to requesting the kits, teachers downloaded the complete Citizen Science teacher packet that contained a lesson plan, sampling instructions, datasheets, student worksheets and background information.

Citizen scientists needed to follow several steps to accurately identify the frogs and the frogs’ location. Once they caught a frog, they swabbed it and placed the swabs in the provided vials to send back to the museum. The museum then extracts DNA from the swabs before sending them to a third party to test for the disease. The herpetology staff currently awaits results for this year’s project.

So, what can Average Joes do now that they know about the chytrid disease? It’s simple, Watters said. Eliminate your chances of spreading the disease by cleaning gear taken from one body of water to another, especially felt-bottom waders that can house living organisms for weeks.

“Clean everything between trips with bleach or serious amounts of sunshine and drying,” Watters said. “And it’s not just these frog diseases that we should worry about. There’s a lot of aquatic invasive species that are spreading throughout the U.S. — like zebra mussels in the Northeast — and anytime you’re bleaching your gear, it will stop that kind of spread.”

Watters hopes the pilot project can continue with new classes each year and transform more students into citizen scientists. Cook is one teacher who hopes to incorporate the project into her upcoming classes.

“I wanted my students to get excited about science,” she said. “They got excited about some of the little projects we did, but nothing really major. And this was big for them. They felt like they were part of something, even at their age. They felt like scientists.”

Find more information about the project and up-to-date results at [cameronsiler.com/citizen-science](http://cameronsiler.com/citizen-science).

*Below: Jessa Watters, collection manager for the herpetology collection, at the Red Slough WMA in McCurtain County searching for specimens.*





## Sam Noble Museum

The University of Oklahoma  
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# ARCHAEOLOGY FIELD STATION

## Coming Soon!

*Mystery of the Mayan Medallion*  
Saturday, Oct. 15, through Sunday, Jan. 8, 2017