

Sam Noble Museum

Fall 2011 Newsletter Volume 23, No. 3

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Native Explorers Program Partnership launches program

Behind the Scenes The making of an Apatosaurus

Research Assistantship Assistantship recipients announced



TRACKS, FALL 2011: VOLUME 23 NO. 3

MUSEUM INFORMATION

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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

Editor-in-Chief: Michael A. Mares *Managing Editor:* Jen Tregarthen *Design:* Hadley Jerman *Layout:* Jen Tregarthen



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ON THE COVER The juvenile Apatosaurus on display in "The Clash of the Titans"

PHOTO Hadley Jerman

Thanks to our Corporate Benefactors:



Dear Friends,



As 2011 nears an end, it seems like a repeat of 2008 in many ways. Our Fall Newsletter in 2008 began, "Whew!" What a year of change at all levels, from global to local. How will Oklahoma fare during the undeniably tough times that are coming?" This year there have been crises in the national and global economies, a high unemployment rate, and the hottest and driest summer on record for Oklahoma, not to mention tornado swarms, microbursts, and ice storms. Oklahomans have a special understanding of recessions and depressions – and extreme weather, too. Yet, we persevere, prosper, and, in many instances, accomplish great things in tough times. The museum continues to prosper and serve the people of Oklahoma even during this challenging period.

This year, the Sam Noble Museum opened a magnificent new permanent exhibit, Black Mesa, in the Hall of Natural Wonders. The exhibit was funded by the Whitten-Newman Foundation and has been enormously popular with visitors. We recently unveiled one of only two baby Apatosaurus dinosaurs in the world and we are grateful, again, to the Whitten-Newman Foundation for supporting the work to put the little dino back together again. The Sam Noble now hosts the world's smallest and largest apatosaurs and both are on display in the "Clash of the Titans". You can only see these unique dinosaurs here in Oklahoma, which was, after all, their home more than 150 million years ago. Our collections now stand at 10 million objects and specimens and we continue to grow across many areas. For example, we recently acquired a large mammal collection from Memphis University, making the Sam Noble mammal collection one of

the top 10 among university museums in the Western Hemisphere.

Visitors continue to flock to the museum to see the ever-changing exhibits, to revisit the remarkable objects on display, and to enjoy the vast array of public programs that are presented each week. To date, we have had more than 130,000 visitors with almost three months remaining in 2011. The Fossil Fuel Fund helped to bring thousands of school children to the museum on field trips and the Whitten-Newman ExplorOlogy program continues to grow, adding Native Explorers to its umbrella of outreach educational programs. Our Native American Youth Language Fair continues to attract thousands each spring. Museum curators continue to write and receive grants, give lectures, teach classes in departments across OU's campus, and travel the globe for their research. This museum is clearly a world class facility and a leader among the university museums of the world.

The Sam Noble Museum strives each day to provide new knowledge to people of all ages so they better understand how our world developed, how it functions, and where the planet may be headed. We are grateful to you, our members, our Board of Visitors, and our donors and sponsors for making it possible for us to serve the people of Oklahoma and to inform visitors from throughout the world who marvel at the Oklahoma story told in the museum's exhibits. This truly is an exceptional place.

We wish you and your family a happy holiday period and a peaceful New Year.

M. Mars

Michael A. Mares, Ph.D. Director

Thank You!

 ${f E}$ ach year the museum is grateful for the generous support for the numerous programs, exhibits and events held here. Thank you to donors, members and sponsors for an outstanding commitment to the museum.

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Native Explorers

BY JES COLE, EXPLOROLOGY

I n an effort to increase the number of opportunities for Native American students in science, the Chickasaw Nation partnered with the Sam Noble Museum and the Whitten-Newman Foundation to launch the Chickasaw Nation Native Explorers Program this fall.

Chickasaw students ages 6 to 18 will work with professional mentors from the Sam Noble Museum and engage in activities from diverse areas of study, including earth science, natural science and biomedical science.

"The Chickasaw Nation Division of Education



Kent Smith and participants Hope and Faith grab a quick bite.

continually looks for ways to enhance educational programs for Chickasaw and Native American youth," says Lisa John, administrator of the Division of Education, Chickasaw Nation. "Native Explorers is an awesome program that introduces science in innovative, exciting and creative formats that challenge the creative thinking of youth. It seemed only natural to team with the Sam Noble Museum and Whitten-Newman ExplorOlogy® Program to begin this wonderful partnership."

The Chickasaw Nation Native Explorers Program is designed to recruit, train and educate Chickasaw Nation students in the science field. The goal of the program is to increase the number of students that pursue degrees in the areas of science and medicine.

The idea came from the Native Explorers Foundation, created by Dr. Kent Smith and the Whitten-Newman Foundation in 2010. Smith, a research associate of the Vertebrate Paleontology Department at the Museum, developed a summer field-study experience for Native American college students. Working with scientists from the Sam Noble Museum and Oklahoma State University Center for Health Sciences, participants explored medicine, paleontology and native tradition and culture. The Chickasaw Nation decided to adapt the program for school age students with quarterly meetings and additional science events throughout the year.



"Providing programs that are creative, hands-on and educational is how we attract our Chickasaw students to think outside of the box."

Explorers sift through the Oklahoma waters. "Providing programs that are creative, hands-on and educational is how we attract our Chickasaw students to learn and think outside of the box," says Lori Hamilton, director of Education Services Department, Chickasaw Nation. "Both the Native Explorers and ExplorOlogy® programs funded by the Whitten-Newman Foundation teach the world of science and medicine in unique ways that educate students in "real world" environments. Experts in these fields of study share their knowledge through instruction and activities conducive to their professions."

Through partnerships with Native Explorers and the Whitten-Newman ExplorOlogy® Programs, Hamilton feels the Chickasaw youth will be given academic readiness and career awareness that will help prepare them for their future careers.

Going forward, the Sam Noble Museum will assist in making available educational resources to the Chickasaw Nation, including outreach and field-based experience for students through the Whitten-Newman ExplorOlogy® Program. For more information, visit www.nativeexplorers.org or http://www.chickasaweducationservices.com

(To the left and right) students in the program explore Oklahoma wonders.



COLLECTION

Behind the Scenes: The Making of an *Apatosaurus*

BY JEN TREGARTHEN

The Sam Noble Museum waited decades for a technology advanced enough to shed light on fossils packed in drawers at the museum since the 1930s and whose significance was discovered by curator, Richard Cefilli in the 1980s.

The next time you visit the museum, it will have a tender new addition to the "Clash of the Titans" exhibit, thanks to a generous donation from the Whitten-Newman Foundation and SEAM (The Center for Shape Engineering and Advanced Manufacturing), the technology provided by the University of Oklahoma School of Industrial Engineering.



Apatosaurus on display in the "Clash of the Titans" exhibit

SEAM was founded in 2009 by two OU College of Engineering faculty, Shivakumar Raman and Binil Starly, from the School of Industrial Engineering. State-of-theart laser-scanning equipment and rapid prototyping technology were set up to provide a much-needed service to the local and regional industry. Laser-scanning equipment allows virtual point cloud capture of physical objects and rapid prototyping technology that prints 3D objects from virtual 3D models.

Starly was invited to give a brief preview to the museum curators and staff of the scanning and prototyping technology. Coincidentally, it was during the same time the museum staff was looking to adopt new techniques to reconstruct an *Apatosaurus* skeleton. Traditional techniques would simply have been too time consuming, laborious and error prone.



Kyle Davies displays a portion of the Apatosaurus skull.

SEAM provided an opportunity for the museum staff to utilize digitally enabled reconstruction technology to make the whole process easier while meeting time constraints. Putting together an entire *Apatosaurus* skeleton in the manner performed here has never been attempted before.

Several advanced 3D digitization technologies, including cutting-edge hardware and software techniques, were used in the virtual reconstruction process. A large-object 3D scanner was employed to scan the large adult Apatosaurus, currently on display at the museum, and the scan was used as a template for the baby skeleton. Actual bone specimens and reconstructed clay models were scanned using small-object scanners while forcefeedback devices were used to manipulate virtual models on the computer to create freeform shapes of bones. Finally, computer-aided design and reverse engineering software performed the bulk of the reconstruction process. The 3D printing technology was used to print the master patterns for each of the bones on the skeletal structure.



scanning of the adult

Apatosaurus.

564 2 2



(Bottom image) Freeform modeling.

(Top image) Scaled production of complete Apatosaurus.



Rapid prototyping of the head of Apatosaurus.

Many challenges faced the team as they attempted a first-ever digital reconstruction of the *Apatosaurus*. Because of the varied disciplinary knowledge of the technical glossary used by paleontologists, engineering students first had to ensure they completely understood the requirements defined by Davies and his staff. Methods of communication were established to ensure limited chances of error.

The very essence of SEAM-based technology is the ability to manipulate virtual objects of data obtained from physical objects. The technology has broad implications for the museum, especially in the making of 3D models of biological specimens. These models can then be manipulated by the user in ways impossible with real specimens. This technique may lead to avenues of research previously not studied. In addition, the technology allows complex specimens to be printed on a 3D printing machine, scaled up to a much larger size and then used as educational kits for students to handle and study.

One of the museum's major missions is to perform biological specimen collection-based research, curation and management. With the advent of the Internet and the World Wide Web, the museum's scientific collections can be digitized and shared online benefitting the scientific community and the general public in many ways.

However, digitization of scientific collections is no easy task. Both Raman and Starly believe significant engineering and computing challenges must be overcome to achieve the goal of digitization of BioCollections. Through the collaborative efforts of the faculty and staff at SEAM and the Sam Noble Museum, Raman and Starly believe these goals are achievable.

A Desert Calling: Life in a Forbidding Landscape

A re species disappearing due to human activities? Are geographic ranges changing as a result of deforestation or global climate change? Are habitat destruction, pollution and agricultural development causing species to disappear? How do we know the answers to these questions? How can we tell that species "A" was once common in the northern parts of the United States but is no longer found there?

The way we know these things is because the museum specimens in collections tell us that the animals were once there. Biologists have no other way to arrive at answers to these important questions.

Collections are dynamic entities, not static ones. When scientists were hypothesizing that DDT was causing birds to die at enormous rates (a fact that was eloquently noted by Rachel Carson in her book, *Silent Spring*), they needed to find a way to test whether or not the pesticide was responsible for the disappearing birds. How did they do this? First, they hypothesized that DDT influenced calcium deposition, thus causing eggs to become thinner. Were eggshells becoming thinner? How could this be shown? It was proved by comparing the thickness of shells in egg collections preserved in museums that were made before and after DDT entered the environment.

A similar use was made of mammal study skins in collections when questions were asked about the possible age of viruses that were related to HIV. Suggestions were made that the viruses were something new in nature, perhaps developed in the last decade or so, but by testing monkey skins collected over a century, it was found that the viruses were present in nature long ago. Collections are fundamental databases of nature. They are snapshots in time of the status of the world's biological diversity.

Exactly where did South American chinchillas occur before they were hunted almost to extinction? How do we know the answer to this question? The chinchillas are gone from most of their original range. We know where they occurred, when they reproduced, when they molted, how they grew, and many other parameters of their lives because there are specimens of chinchillas in the British Museum, the national museums of France, Argentina, Chile, and Peru, and many other museums. Taken together, the specimens in these collections tell us where the species was found, when it stopped being collected (showing that it was on the road to extinction), and where it exists today. They also tell us where we can hope to reintroduce endangered species so that they might have a chance of surviving in the wild, thus avoiding the ultimate loss-extinction.

As new techniques are developed, collections only become more valuable. A hundred years ago, the specimens still had great value, but their utility was more limited than it is now. Today it is possible to take DNA from dried museum skins for molecular, viral and other analyses. Museum collections have become living repositories of life, past and present. A good example of this is recent research on moas: extinct birds that once lived in New Zealand. They were large, flightless birds (at more than 12 feet tall, much bigger than an ostrich) that were killed by habitat destruction and uncontrolled hunting, disappearing forever in the late 1600's.

Fortunately, a very few were preserved as museum specimens and are still available today. In 2001, DNA was isolated from the bones and the relationships of the extinct birds with living ratites (ostriches, rheas, cassowaries, emus and other species) were clarified. The specimens that were fortuitously collected and preserved centuries ago permitted the use of the latest genetic technology to study the history of these extinct birds.

Biology is the science of life, but in order to study animals, field biologists often have to collect them as voucher specimens—specimens that are permanently preserved in a museum as benchmark specimens for species determination. Most people are unaware of either the diversity of mammals or the abundance of individuals within species. Most people do not know that it is almost impossible to identify many mammals without first preparing them as a study skin, cleaning their skull so that the bones and teeth can be examined in detail, and collecting tissue samples and chromosomes for analysis. Finally, most are not aware of the enormous numbers of animals that die each year in nature. Museum scientists only take an infinitesimal sample from this huge number of doomed animals.

The scientific specimens that are placed in museums will continue to be studied for centuries. I have worked with specimens that Darwin collected in the early 1800's and have studied specimens even older than that. Museums are designed to preserve specimens forever. To understand why it is important to collect and preserve specimens, we must come to grips with the magnitude of both life and death in nature. Museum scientists only collect an infinitley tiny sample of populations that are then studied

> A Desert Calling: Life in a Forbidding Landscape, is available in the museum store, Excavations.

"The animals we study often are extremely rare. Sometimes the only specimens that have ever existed in a museum for a particular species are the ones we collect."

Michael A. Mares

A Desert Calling



Research Assistantship

BY JEN TREGARTHEN

The Sam Noble Museum welcomes two new recipients of the Nathan L. Peck Memorial Undergraduate Research Assistantship Fund. James Grant Mouser of Norman, Okla. and Emily Munding of Moore, Okla. will work with the museum's paleontological department until summer 2012.

Established in May 2007 to honor Nathan L. Peck (1995 - 2006), the fund provides research assistantships to students selected by a committee of museum curators. Members of the Peck family including Nathan's father and stepmother, John and Angie Peck of Oklahoma City, Okla. and his uncle, Steve Peck of Atlanta, Ga. established the fund to honor Nathan and his dream of becoming a paleontologist. Nathan slipped and fell from a cliff in the Adirondacks while on a family hike in July 2006.

At a very early age, when other children would say they wanted to grow up to be a fireman or astronaut, Nathan Peck would say he wanted to be a paleontologist.

He loved dinosaurs, Star Wars, soccer, church camp, drawing and playing with his army men. Nathan could

identify dinosaurs from pictures. He could tell you all about them and share his theory on their extinction.

"We established this fund to honor Nathan's interests and dreams in hopes they would live on through others," said John Peck, Nathan's father.

Students selected to receive the research assistantship have demonstrated a passion and interest in paleontology. Museum staff conduct research in all areas of paleontology, and student applicants may have an interest in any sub discipline such as Invertebrate Paleontology, Paleobotany or Vertebrate Paleontology.

"For such students, the hands-on experience provided by this assistantship is a dream come true," says museum curator, Rich Cifelli.

Grant Mouser grew up visiting the Stovall Museum and attending the youth summer programs. His interest in the sciences led him to pursue an undergraduate degree in zoology. He plans to use his assistantship to study vertebrate and invertebrate paleontology. Emily Munding is a senior completing a degree in biochemistry with a minor in zoology. She is currently working with Rich Cifelli on her honors thesis and plans to attend graduate school.

To date, the fund has assisted ten undergraduates at the University of Oklahoma. Other recipients of the Nathan L. Peck Undergraduate Research Assistantship have been Jennifer Wells, Geoffrey Lau, Katharine Giffhorn, Cole Cisternino, Lyndsey Jones, Andrew Somers, Alison Morgan and Katie Thompson.

Holiday Hopping Can you see a mammoth in a Santa hat along with Santa or photos with dinosaurs? The Sam Noble Museum is

Where can you see a mammoth in a Santa hat along with Santa posing for photos with dinosaurs? The Sam Noble Museum is the place where the holidays take on Jurassic proportions. The museum's annual Holiday Happening event is scheduled from 6 to 9 p.m. on Thursday, Dec. I. Admission is free, and visitors will enjoy live holiday music, crafts, storytelling and shopping throughout the evening.

Wolf to Woof: The Story of Dogs

The crates are in and the boxes unloaded! Wolf to Woof: The Story of Dogs opened to the public Oct. I and will stay on exhibit through Jan. 8, 2012. Visit and learn how dogs evolved from wolves and how humans helped to create the hundreds of different dog breeds we have today. Discover ways in which dogs help people and how we can help our furry friends, as well.

(Below) Roxie Hites examining the crates for Wolf to Woof.





6 6 6 UNITED STATES OSTAL SERVICE

Services for Jim Mustoe

BY MICHAEL MARES, DIRECTOR

7 e mourn the loss of a dear friend to the museum, Jim Mustoe, who passed away Aug. 30, 2011, in Norman. Services will be held at 3 p.m. on Tuesday, Oct. 25, in the Museum Auditorium, with a reception following at 4 p.m. in the RedBud Cafe.

As the Sam Noble prepared to move into the new building, it became clear that we would need a security staff. Jim was a captain in the OU Police Department with 27 years of police experience. Moreover, he held a doctorate in botany from OU (having worked his way through graduate school as a police officer). He also held master's and bachelor's degrees in botany from the University of Georgia.With this diverse background, he seemed the ideal person to develop our security operation. I was able to convince Jim to leave OUPD in 1998 and join the museum.

Jim helped us develop a first-rate security force and all security and safety systems in the new building. It was a big undertaking, but his efforts resulted in the Sam Noble Museum having one of the finest security staffs among university museums.

While head of Security, Jim published various articles on museum security operations and even organized a statewide museum security association. Jim was active in his community, having given 50 years of service to the Boy Scouts. Additionally, Jim's

Jim Mustoe. memberships included the Oklahoma Campus Law Enforcement Association, the Oklahoma Museums Association and the Cleveland County Genealogical Society. As a genealogist, Jim traveled over the country to document hundreds of descendents of his immigrant ancestor, Anthony Mustoe.

He retired from OU in 2007 due to declining health. His service to the university and to the museum was long and exemplary and he will be missed by his many friends.

The family requests that donations be made in his honor to the Eller Wood Badge Fund at the Last Frontier Council, Boy Scouts of America, 3031 NW 64th, Oklahoma City, OK, 73116.



Museum Welcomes New Staff

OMA Award



Jen Tregarthen joined the Sam Noble Museum Sept. I as the marketing and public relations officer. She is a member of the Public Relations Society of America, Norman Next, and Sooner Rotary as well as a board member, and is a graduate of Leadership Norman.

She has been promoting tourism in Norman for two years. She is heavily involved in community activities, including festivals, events and other community-wide functions.

Jen received her bachelors of journalism degree in public relations at OU. Recreationally, she plays kickball and volleyball and enjoys mountain biking and hiking. She is a Tulsa native, served in the U.S.Army and currently resides in Norman with her husband, Mark, and daughter, Terra. The Oklahoma Museums Association in August announced the winners of its 2011 Annual Awards Program, honoring excellence and recognizing groups and individuals whose contributions have impacted Oklahoma museums and the museum profession.

It is with great pride that we announce winning the Best Promotional Piece for the new museum logo design. Congratulations to Hadley Jerman and all who assisted with the research, creation and promotion of our new logo.

Award recipients were honored at a luncheon Sept. 30 at the Rogers State University Centennial Center in Claremore. The luncheon was part of the Oklahoma Museums Association's annual statewide conference.

Welcome Board Members

The museum is proud to welcome Roy Williams, a former NFL safety, and Noah Roberts, CEO of Docvia, to the Board of Visitors.

Williams played football at OU before being drafted by the Dallas Cowboys eighth overall in the 2002 NFL draft. He spent seven seasons with the Cowboys, earned five straight Pro Bowl selections from 2003 to 2007 and played for the Cincinnati Bengals from 2009 to 2010.

In July 2004, Williams started the Roy Williams' Safety Net Foundation, which was inspired by his sister Alecia, a single mother raising a young son. The Foundation's purpose is to help ensure that low-income single mothers receive support, guidance, and assistance to enhance their quality of life. Williams currently is a sideline reporter for OU football games. After graduating from Oklahoma Christian University, Roberts, who lives in Tulsa, worked for Apple before launching his own startup. Roberts also previously served as chief creative officer for the design firm New Medio.

Since 2005, he has been involved in expanding health access around the world. He is a co-inventor of the invisibleBracelet. org (iB) Emergency Health Registry, adopted by the American Ambulance Association in 2009.

The board meets three times a year to assist in fundraising and promotional efforts, and they serve as ambassadors to the museum in their communities. The museum is grateful to our Board of Visitors for their time and expertise.



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Coming soon!

Warrior Spirits: Oceanic Arts, on exhibit at the Sam Noble Museum Feb. 4, 2012 through May 13, 2012.