

2014

BOARD OF TRUSTEES

Mr. Scott F. Wendorf
Chairman of the Board

Dr. Louis L. Jacobs
President

Dr. James E. Brooks
President emeritus and Vice Chair

Mr. Michael C. Forrest

Mr. Peter D. Gaffney

Mr. James A. Gibbs

Mr. W. Herbert Hunt

Dr. Bobby B. Lyle

Dr. Ray H. Marr

Mr. Thomas E. Meurer

Mr. Carter R. Montgomery

*Benefiting the community by
promoting and supporting
interdisciplinary research at
the interface of people, Earth,
and the environment.*



The generous support of our donors allows us to fulfill our mission. Please send your fully tax-deductible contribution to:

ISEM at SMU
P.O. Box 750274
Dallas, TX 75275-0274

*Please make checks payable
to ISEM. Thank you!*

CONTACT US:

(214) 768-2425
email: isem@smu.edu

smu.edu/isem

SMU Studies North Texas Earthquakes

SMU geophysicists have launched an investigation of recent earthquakes in North Texas. These earthquakes in the Reno, Azle, and Mineral Wells areas, began in late 2013 and heightened local and national concerns about the impact of shale gas production. Recognizing an immediate need to understand these events fully, a team from the Huffington Department of Earth Sciences headed by **Heather DeShon** installed a seismic network to pinpoint earthquake locations, characterize their sizes, and identify the mechanisms and causes associated with these events. The team of professors, graduate students, undergraduates, and a high school intern has recorded over 300 earthquakes since their first station was deployed in December 2013. A few periods of swarm activity with over 1000 micro-earthquakes per day have been recorded; however, most of the events were below magnitude 2 and hence not felt. The last widely felt earthquake in the Reno-Azle area reported by the National Earthquake Information Center was on January 28, 2014. A recent series of earthquakes has been recorded in the Irving area. The largest of them (M3.3) was felt in Dallas.

For more on this team and their study visit:

<http://www.smu.edu/News/NewsIssues/EarthquakeStudy>



SMU's network group deploying seismic array at Eagle Mountain Lake.

Left to right: Yanjun Hao, Remi Oldham, Heather DeShon, Beatrice Magnani, Austen Klauser, Chris Hayward

SMU's Seismic Team Members

Heather DeShon, Associate Professor of Geophysics
Brian Stump, Claude C. Albritton Chair in Geological Sciences
Chris Hayward, Senior Scientist
Matt Hornbach, Associate Professor of Geophysics
Beatrice Magnani, Associate Professor of Geophysics
Remi Oldham, Geophysics Graduate Student
Mason MacPhail, Geophysics Graduate Student
Chris Cain, Seismo-acoustic Technician
Zhong Lu, Shuler Foscue Professor of Geophysics
Ray Kubacki, Geophysics Lab Engineer
Austen Klauser, **Jim and Judy Gibbs Undergraduate Research Assistant**

Casey Brokaw, Geophysics Graduate Student
Kaylee Kaigler, Lake Highlands High School

Heather DeShon and Beatrice Magnani are recipients of ISEM's Downey Family Award for Faculty Excellence. ISEM supported Matt Hornbach's acclaimed marine seismic hazards course held on ship and in Jamaica.

ISEM Funding Supports Education Outreach at Azle Memorial Library

SMU's seismology team is working to educate the community about earthquakes in their area by installing and operating an Active Earth Display, funded by ISEM, which will host interactive educational content on earthquakes, including views of real-time global seismicity.

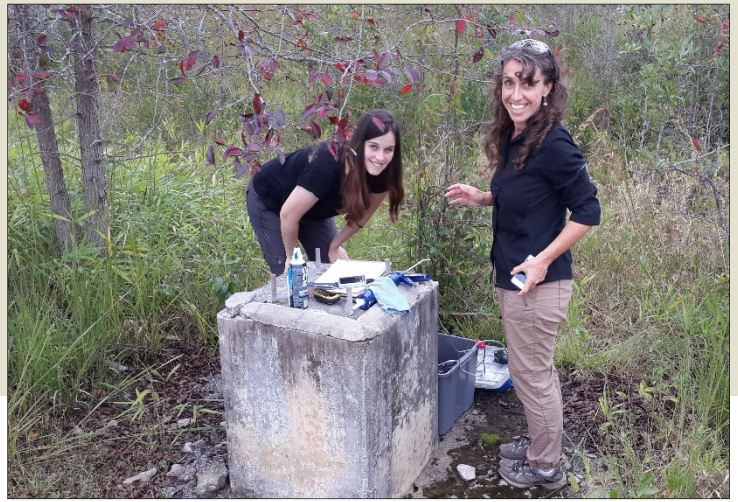


Active Earth Display located in the lobby of the Azle Memorial Library.

DOWNEY

Family Award for Faculty Excellence

Downey Family Award for Faculty Excellence was established by **Marea** and former ISEM Trustee **Marlan Downey** to facilitate faculty advancement in Earth Sciences and Archaeology. This year's \$5000 award recipient is **Dr. Maria Beatrice Magnani**, Associate Professor in the Roy M. Huffington Department of Earth Sciences. Beatrice (right) is shown with a student deploying a seismometer for the Eastern North American Margin Community Seismic Experiment (ENAM-CSE). The goal of ENAM-CSE is to understand the processes that led to the breakup of Pangea and the opening of the Atlantic Ocean, to study the development of the passive margin with particular emphasis on the role of pre-existing lithospheric grain on the geometry of continental rupture, on the distribution and volume of magmatism, and on the along-strike segmentation of the margin. The study addresses research questions regarding the later evolution of the margin by landslides and other active processes. The project, funded by the NSF-GeoPRISMS program, has been collecting active and passive, onshore and offshore seismic data to image geological structures at a range of scales across the North Carolina and Virginia margin. For more information about the project and the ongoing field efforts go to <http://www.ig.utexas.edu/enam>



CAST 2014

On November 20-22 the Conference for the Advancement of Science Teaching was held in Dallas. At the Conference, **Louis Jacobs** led the *Ocean Dallas* field trip for 35 educators from around the State. He was assisted by ISEM education specialist **Diana Vineyard**, and ISEM **Hamilton Undergraduate Research Assistant, Myria Perez**. The field trip concluded at the Perot Museum of Nature and Science where the teachers toured the **T. Boone Pickens Life Then and Now Hall**. For the *Ocean Dallas* field guide visit <http://www.smu.edu/Dedman/academics/InstitutesCenters/ISEM/OceanDallas>



Teachers examine crab burrows and other sedimentary structures in the Woodbine Formation at Lake Grapevine.



GAFFNEY FAMILY Interdisciplinary Initiative at ISEM

The Gaffney Family Interdisciplinary Initiative at ISEM provides undergraduate students with research experience focused on the Great Smoky Mountains National Park. Students work with SMU faculty and community organizations to study the state of the forest, past, present, and future, testing water quality, analyzing tree-ring data, and studying Ice Age records, performing geochemical analyses for climate studies, measuring diversity through plant transects and camera traps, and more. **Hadley McPherson**, a **Gaffney Family Research Assistant**, has been working two semesters. Hadley also received SMU Entrepreneurship recognition through which she presented a poster of her initial results titled, *Baseline Photographic Mammal Census in a Major Urban Forest*. Hadley is a member of the Association for the Advancement of Sustainability in Higher Education in Portland, Oregon. Hadley continues her work with motion-activated cameras to provide a photographic census of the mammals inhabiting the Trinity River Audubon Center. Former **ISEM Hamilton Research Assistant**, Hadley has been surveying the plants of TRAC and participated in devising a water filter system that won the award for Innovation Gym Showcase in the Improv Competition in the Lyle School of Engineering.

BIG BONE LICK, KENTUCKY

ISEM Excursion

ISEM excursions have journeyed to Iceland, Yellowstone, the Aleutian Islands, the North Slope, the Galapagos Islands, and the Channeled Scablands among other places, to examine the relationship between Earth's resources and the future of humankind. This year the excursion was to Big Bone Lick, Kentucky, the Cradle of North American Vertebrate Paleontology, known to George Washington and Benjamin Franklin, who developed ideas of climate change from the mammoths and mastodons entombed in the salt. It quickly drew the attention of Thomas Jefferson who kept a mastodon tooth from there at Monticello and sent Lewis and Clark to find them alive in the American West, thus ushering in the concept of extinction. Glenn Storrs, Assistant Vice President for Collections at the Cincinnati Museum Center, and Kenneth Tankersley, Associate Professor of Anthropology and Geology at the University of Cincinnati, hosted the group at Big Bone Lick and a behind the scenes tour of the Cincinnati Museum, including a look at an original letter from William Clark. Stanley Hedeem, author of *Big Bone Lick: The Cradle of American Paleontology*, provided a special book signing for the participants. Thanks to **ISEM Trustee Ray Marr** and Shade Tree Studios for documentaries of ISEM excursions (view at smu.edu/isem/excursions).



ISEM trustee Ray Marr (right) and group views William Clark letter in the Cincinnati Museum and gathered at Big Bone Lick. Louis Jacobs serves on the Science Advisory Committee that recommends National Natural Landmarks.



"In my opinion, the most creative research at a university is done by the most energetic investigators, by which I mean students. Those are who we can support best."

Louis L. Jacobs, President

ISEM SUPPORTS GRADUATE STUDENT RESEARCH

An ISEM Research Grant awarded to archaeology student **Michael Aiuvalasit** helped fund his dissertation fieldwork in the Jemez Mountains of New Mexico. Michael is investigating the relationship between "mega-droughts" in the 15th and 16th Centuries and the long-term sustainability of prehistoric Ancestral Puebloan communities. By directly testing prehistoric water management features to determine how prehistoric communities managed water through droughts, he seeks to identify the degree to which the resilience (or vulnerability) of communities was impacted by the type of "mega-droughts" the American Southwest is experiencing today. Since receiving the ISEM grant Michael was awarded a Doctoral Dissertation Improvement Grant from the **National Science Foundation** for the analytical phase of his research, as well as grants and awards from the **Geological Society of America** and the **Society for American Archaeology**.



at Trinity Forest. quality, coring for and mentoring at Engaged Learning in Setting at the at Jewel Lipps is 2013 Research

Huffington Visualization Lab Acquires 3D Printer

Thanks to **Mike Polcyn**, the Visualization Lab in the Huffington Department of Earth Sciences has added a 3D printer, expanding its resources for training of graduate and undergraduate students in 3D capture, analysis, visualization, and digital archive technologies. These technologies have broad application in research and industry. They have been applied here to a range of graduate student projects from anatomical reconstructions to biomechanical studies using Finite Element Analysis. Many important fossil and archeological specimens have already been digitized in the Lab using structured light or CT scanning, and 3D models have been produced for analysis and archival purposes. These objects are as varied as pottery from the Hummingbird Archeological Site in New Mexico, a modern whale skull in the Smithsonian Institution, and fossil vertebrates from the work of Projecto PaleoAngola in Africa. By applying advanced digitization and visualization technologies, virtual facsimiles of these objects can be widely distributed. **Omar Roa**, a computer science major and ISEM's first **Jim and Ellie Brooks Research Assistant**, is rendering 3D reconstructions on Amira software. 3D printing is a viable tool for producing physical models from digital data and the Lab has been at the forefront of application of these technologies, having produced a skull of a dinosaur now on display at the Perot Museum of Nature and Science. Mike Polcyn established this lab and has provided the scanning and 3D printing equipment. It is supported by the Huffington Department of Earth Sciences and ISEM. Visit <http://paleolabs.org/Vislab>



118 million year old footprints in African Diamond mine

The Catoca Mine, Angola, is the fourth largest diamond mine in the world, but the only one to have fossil footprints of dinosaurs, crocodiles, and even a very large mammal (for its time). The tracks were reported by Projecto PaleoAngola, an international project headquartered at ISEM. The tracks were found in sediments filling the crater of a kimberlite pipe emplaced on the Lucapa Fault zone, which controls the shape of the continental margin where alum **Chris Strganac** did his dissertation work, and then can be traced to the Mid-Atlantic Ridge. For more on the Catoca tracks visit <http://blog.smu.edu/research/2014/11/05/international-business-times-angola-ancient-mystery-mammal-tracks-found-in-angolan-diamond-mine/>



MAJOR DONORS

James E. Brooks

Marlan and Marea Downey

Karen Carr Studio, Inc.

ESSO Angola

Game Creek Ranch Roundtable

James and Judy Gibbs

Hamilton Family Fund

Herbert and Nancy Hunt

Peter and Tessa Gaffney

Louis L. Jacobs

Bobby B. Lyle

La Vida Foundation

LS Filmes

Maersk Supply Service

Ray H. Marr

Tom and Sharon Meurer

Michael J. Polcyn

Suzy Ruff

The Saurus Institute

Sonangol EP

Leighton and Lynda Steward

Scott and Andrea Wendorf

Bill and Patsy Zimmerman

Korea Delegation Visits Perot Museum

Hwaseong City is building a museum to house fossils from their country and from the Gobi Desert. Five field seasons of the Korea-Mongolia International Dinosaur Project were organized by SMU alum **Yuong-Nam Lee** and included SMU participants every year. Ph.D. student John Graff is currently studying diagenesis of dinosaur eggs collected by KID. The delegation visited the Perot to learn from a successful example of a modern museum. The photo shows the participants from Korea, Perot Museum, SMU, and ISEM Trustee who hosted a lunch for the group.



To read Yuong-Nam Lee's latest paper on Mongolian dinosaurs, visit: <http://www.nature.com/nature/journal/v515/n7526/full/nature13874.html>

In Appreciation of Stephen N. Inbusch



It is with deep regret and sadness that the Trustees of the Institute for the Study of Earth and Man note the untimely death of Stephen Inbusch. Steve was a very active and regular participant in ISEM's Energy Roundtable held at the Game Creek Ranch. His wide experience in the energy industry, both domestic and international, made his contributions both helpful and illuminating. They guaranteed that Steve was well liked and respected.

More recently Steve was elected to the Institute's Board of Trustees. As with the Roundtable, Steve's contributions to the Board were genial, informed and insightful. He will be missed by all with whom he had contact.