ISEM AT SMU INSTITUTE FOR THE STUDY OF EARTH AND MAN
AT SOUTHERN METHODIST UNIVERSITY

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ISEM facilitates research initiatives and attracts resources that otherwise may not come to SMU. A prime example is Projecto PaleoAngola, a multidisciplinary, multinational investigation of geology, ancient life, and environments that accompanied the disassembly of Gondwana into Africa and South America. The puzzle-like fit of those two continents across the South Atlantic Ocean is an icon of modern geology, graphically illustrating the power of our dynamic Earth to move continents and open oceans. Because it is so easily recognized, it is the premier example of continental drift and plate tectonics widely used in geology classes, my first year oceanography and paleobiology courses included. But because of decades of civil strife and war, the environmental effects on Africa of the opening of the South Atlantic has not been investigated – until now.


Angolasaurus bocagei

Projecto PaleoAngola is the first extensive boots-on-the-ground expedition to Angola since the acceptance of plate tectonics. Even before this project, SMU Earth scientists had a long history of research in Africa, including fieldwork in nine countries along the Great Rift Valley, where modern day East Africa is being pulled apart by geological forces, eventually to open a future ocean. In Angola, on the west side of the continent, where rifting has already led to the formation of the South Atlantic, Projecto PaleoAngola began fieldwork in 2005, two years after the signing of a peace treaty ending forty years of war. Projecto PaleoAngola was seeded through ISEM and then funded through two grants from the National Geographic Society and one through the Petroleum Research Fund of the American Chemical Society. Most recently – and most generously – Projecto PaleoAngola is funded by the Fundaçao Vida of Angola, because the fossils and the knowledge obtained through Projecto PaleoAngola are seen as an educational tool, as a cultural resource, and as a source of pride for that country.

The main results of Projecto PaleoAngola have come through research conducted in SMU laboratories by SMU faculty and students. Results have been published in peer-reviewed journals and presented at international meetings, including those of the Geological Society of America, the American Geophysical Union, and my favorite, the Society of Vertebrate Paleontology.

Six students from three countries have participated in the fieldwork. Eight graduate and three undergraduate students at SMU have focused their studies through Projecto PaleoAngola. The research in which SMU students are involved is transferred into classrooms down the hall from the laboratory where the knowledge was created. That is what universities are about. But that is not all. Learning about Earth will always have many

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Fossil bones in Angola

returns. The Petroleum Research Fund of the American Chemical Society confirmed the relevance of Projecto PaleoAngola when it provided two year's funding for field and laboratory studies. Beyond the primary funding, PRF also added a supplemental grant to fund undergraduate research by Karen Gutierrez, an Earth Sciences major (now alumna) and Presidential Scholar.

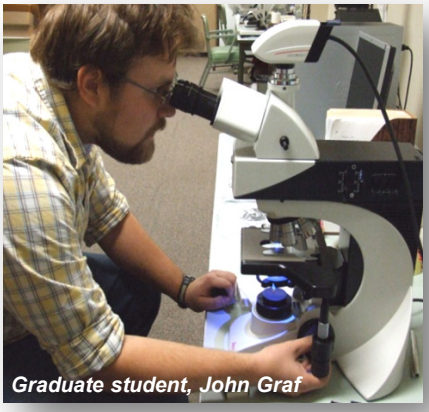
Angola produces 1.9 million barrels of oil per day, the second highest production in Africa after Nigeria. Geophysical models derived from offshore seismic data have uncertainty with respect to timing and formation of petroleum resources as related to crustal thickness, salt basins, and emplacement of oceanic crust. Projecto PaleoAngola sees in outcrops on land the rock units that are inferred from seismic studies of the subsurface and thus provides "ground truth" for geophysical models. For that reason I was invited to be the keynote speaker at ExxonMobil on November 11, when some one hundred geologists and geophysicists from Angola and the US gathered in Houston to discuss petroleum exploration and production in Angola.

Research on Projecto PaleoAngola continues. Thanks to Maersk Shipping, three tons of fossils in their protective plaster casts are now aboard ship, plying their way to the fossil preparation laboratories in the basement of Heroy Hall, where they will be met by nine ISEM Hamilton Student Research Assistants.

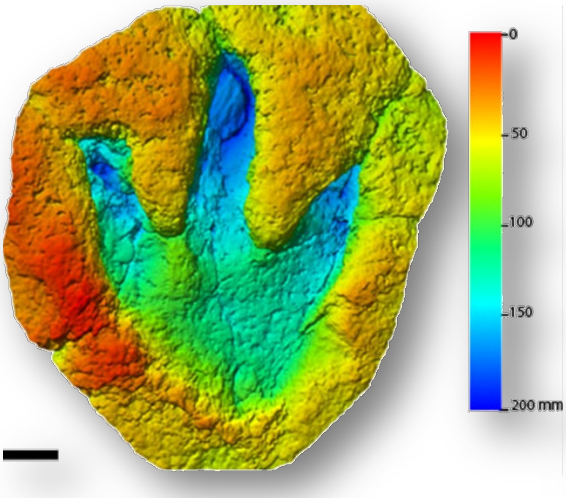
Entrepreneurial spirit is a big part of SMU and ISEM. As for Projecto PaleoAngola, ISEM was essential in fostering this work at SMU, and that has had important benefits to the students and to the University.

Louis L. Jacobs, President

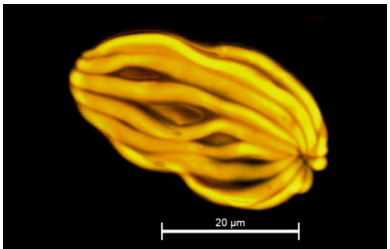
Instrumentation


Graduate student, John Graf

Student training and research is a major focus of SMU. In today's world students need familiarity and expertise with the latest technology and scientific instrumentation. ISEM has had a record of establishing and equipping laboratories at SMU since it built Heroy Hall in 1969. Most recently, ISEM has, through the generosity of trustee Ray Marr, helped the Department of Earth Sciences to obtain two state of the art microscopes, a Leica epifluorescence scope and a Keyence digital scope. Both are already making a positive impact on student and faculty research. Their addition complements the visualization laboratory in Earth Sciences at SMU. The visualization lab was established by Michael J. Polcyn, a co-leader of Projecto PaleoAngola, through ISEM. Mike came to SMU from the telecommunications industry. He is a world's authority on both marine reptiles and on digital imaging. He now teaches courses in the Department of Earth Sciences and he has recently returned from a two-week consultancy at Yale where he lectured about Projecto PaleoAngola, conferred with colleagues, evaluated collections of the Peabody Museum, and mentored students.



***Left top**. Graduate student, John Graf working with epifluorescence scope. **Left bottom**. In 1933, the citizens of Glen Rose, Texas, placed a dinosaur track in the bandstand of the Somervell County Courthouse. It was studied by Ellis Shuler, the founder of the geology department at SMU. Since that time it has been subjected to the erosive effects of weather. Recently graduate students Thomas Adams and Chris Strganac, working through the Digital Visualization Lab, laser-scanned the track in order to help preserve this valuable piece of Texas history. (from Adams, T.L, C. Strganac, M.J. Polcyn, and L.L. Jacobs. 2010. palaeo-electronica.org)*



This photo, taken with the new Leica epifluorescense microscope that ISEM helped to purchase for the Department of Earth Sciences, is of a 130 million-year-old pollen grain extracted from a drill core taken in the Congo Basin, Africa. Three graduate students and an undergraduate Presidential Scholar have studied clay minerals and stable isotopes from this core, giving a window into Gondwana that has never been opened before. This pollen grain places ancient relatives of the enigmatic and endemic Namibian desert plant* Welwitschia *in the arid heart of African Gondwana at a time when its closest known relatives were found in adjacent Brazil. The current very limited distribution of* Welwitschia *in southwest Africa is a result of environmental change caused by the opening of the South Atlantic.

(Photo by B. Jacobs)

Hamilton Support for Student Research Assistants

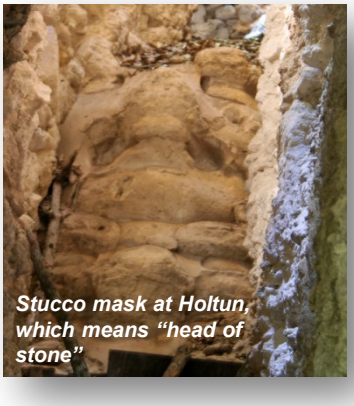
Through the generosity of Jack and Jane Hamilton nine undergraduate students (first-year to seniors) have joined the team in the Shuler Museum fossil preparation laboratories in Heroy Hall as Hamilton Student Research Assistants. This program attracts students to science who would not otherwise be exposed to hands-on investigation of the natural world. Hamilton Research Assistants are introduced to the Earth Sciences by allowing them to take part in meaningful and serious research activities alongside graduate students, staff, and faculty, in a welcoming home in an active department, adding depth to their undergraduate experiences. They earn as they learn and their experience as a Hamilton Student Research Assistant can be a significant addition to their *curriculum vitae*. None of these students were declared Earth Sciences majors or minors when they began, but some have since found this path. That is an important measure of the success of the program.

Some of ISEM's Hamilton Student Research Assistants (from left to right): Erin France, Marissa Lev, Kyle Paterson, Alex Williamson, Katharina Marino, Claire Jones, Louis Holbrook.

Downey Family Award for Faculty Excellence

The Downey Family Award for Faculty Excellence was established by Marea and Marlan Downey to encourage and facilitate faculty advancement in Earth Sciences and Anthropology at SMU, consistent with the mission of ISEM. The award, in the amount of $5000, has no restrictions on its use. Marlan Downey is a former ISEM trustee.

This year the recipient of the Downey Family Award for Faculty Excellence is Dr. Brigitte Kovacevich, an archaeologist in the Department of Anthropology at SMU. Although there are no restrictions on how the award is used, Brigitte applied her funds to the Holtun Archaeological Project, which she initiated in the central lakes region of Petén, Guatemala. This site is the focus of a five-year investigation of the rise of social inequality in the Maya lowlands, including its underlying causes and the demographic and political collapse of this society in AD 150-250.



Stucco mask at Holtun, which means "head of stone"

Dr. Brigitte Kovacevich

ISEM
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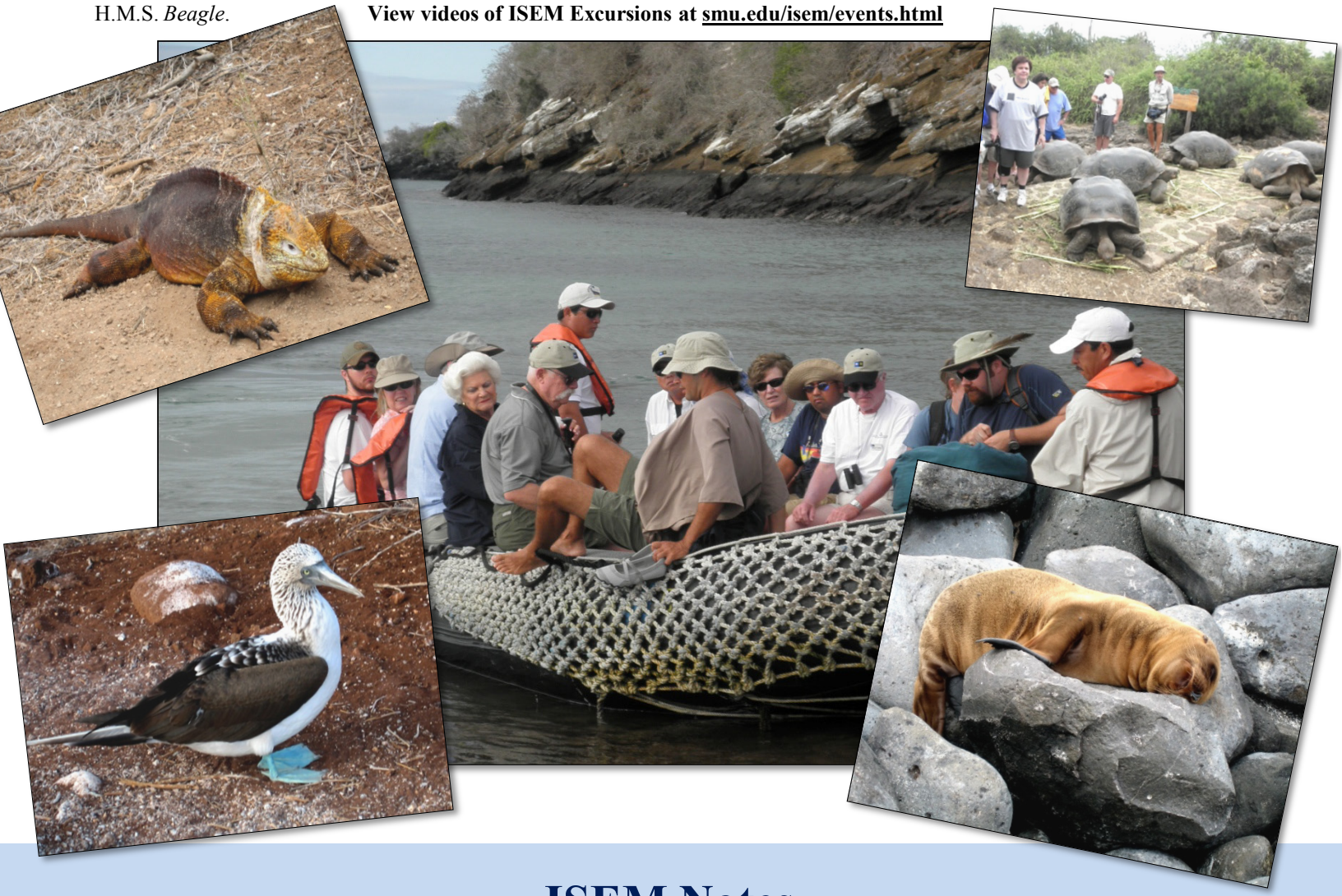
ISEM Excursions

GALAPAGOS: Close Encounters of the Wild Kind. ISEM has a tradition of organizing informative, high-level travel excursions for trustees and friends, including trips to Iceland, Yellowstone, the Aleutian Islands, and the North Slope of Alaska, among other places. Last year on the occasion of the 200th anniversary of the birth of Charles Darwin and the 150th anniversary of the publication of *On the Origin of Species*, ISEM teamed up with SMU's Godbey Lecture Series for a trip to the Galapagos Islands aboard the Lindblad-National Geographic *Explorer* to visit evolution's workshop, sailing from island to island as Darwin did on the H.M.S. *Beagle*.

View videos of ISEM Excursions at smu.edu/isem/events.html



ISEM Notes

- The ISEM energy programs began in 1969 with the Unconventional Methods in Exploration Symposium series, which morphed into the annual Taos Energy Roundtable in the 1980's. Energy programs continue today as the high level, by invitation only, Energy Roundtable held each spring at Herbert Hunt's Game Creek Ranch.
- The Texas Energy Council has held its annual Energy Symposium, sponsored by the ISEM, in the Hughes – Trigg Center on the SMU campus since 2005. Next year's symposium is scheduled to be held on Tuesday, 1 March. The program, cutting edge as usual, will address new exploration and production techniques, methods and results.
- Dr. James A. Martin, host and guide in the Big Badlands for the ISEM BIG SKY AND BADLANDS excursion to Montana, Wyoming, and the Dakotas, has had a building named in his honor at South Dakota School of Mines and Technology.
- Did you know three books by SMU Professors *emeritus* have acknowledged support from the ISEM?

  Bhat, U. Narayan. *An Introduction to Queueing Theory: Modeling and Analysis in Applications*. Birkhauser, Boston, 2008.

  Binford, Lewis R. *Construction Frames of Reference*. California Press, California, 2001.

  Read, Campbell B. (Editor-in-Chief). *Encyclopedia of Statistical Sciences*. Wiley, New York, 2010.