ISEM AT SMU 2020 INSTITUTE NEWS

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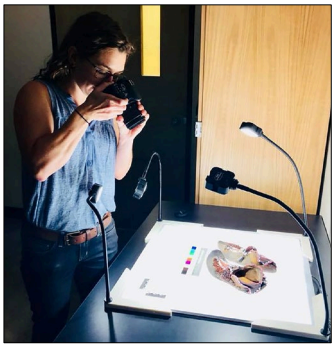
Benefiting the community by promoting and supporting interdisciplinary research at the interface of people, Earth, and the environment.

UNBRIDLED STUDENT RESEARCH IN CHALLENGING TIMES

ISEM student research support in 2020 began at the beginning of the Spring semester as usual, with students working closely with professors and mentors on various projects in labs spread throughout Heroy Hall and in the field. Those graduating were supported through the semester and were able to conclude their projects. **Parker Torres**, for instance, worked with **Dr. Bonnie Jacobs** (Earth Sciences) and the SMU Digital Collections Library to establish protocols for hosting hundreds of paleobotanical images accumulated as part of her National Science Foundation funded research. **John Berry** worked with **Dr. Chris Roos** (Anthropology) on his ancient fire in the southwest project, helping him to determine the timing of environmental change and establishment of persistent oak shrub fields in New Mexico. Both completed their studies and graduated.

In March, as appropriate measures were put in place to combat COVID-19, emphasis pivoted to research and creative activities that were suited to remote and distance venues. As stated by **Dr. Sunday Eiselt**, "Student support in the age of a pandemic not only facilitates education, it unlocks ingenuity and creative potential." Dr. Eiselt directs **ARC@SMU**, which is the Archaeology Research Collections. Through zoom meetings and virtual training, her students created professional on-line exhibits for the collections (**https://arcsmu.omeka.net**), processed digital scans of artifacts from home, and analyzed geochemical data on obsidian tools using a portable X-ray fluorescence devise (pXRF), which was purchased in part through ISEM funds.



Graduate Student and ARC@SMU Curator Rachel Burger

Dr. Maryann Cairns (Environmental Anthropology) decided to develop the concepts of connective technologies in her class, leading to the submission of a manuscript that will be published in December in *Human Organization*, titled "Covid-19 a Human Connection: Collaborative Research on Loneliness and Online Worlds from a Socially Distanced Academy." Her coauthors, **Margaret Ebinger**, **Chanel Stinson**, and **Jason Jordan** are her undergraduate students and members of her Environmental Anthropology lab, The Cairns Lab **(https://people.smu.edu/mcairns).** All three have ISEM support. Margaret Ebinger is a double major in Public Policy and the interdisciplinary Health and Society program, where she is the student liaison for **Dr. Nia Parson**, developing and maintaining communications with majors, alumnae, faculty and others interested in the major. Margaret also assists Dr. Cairns in the MERA Project, a National Science Foundation investigation of beach water quality and human health in tropical regions. Chanel Stinson is an Environmental Studies and Anthropology major. Her focus is fashion sustainability, waste, and pollution.

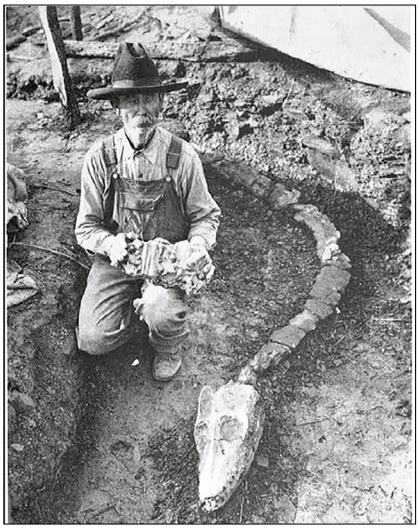
Margaret Ebinger

Chanel Stinson

Jason Jordon worked last Spring in the lab of **Dr. Rita Economos** (Earth Sciences) where he helped develop a new method for mixing epoxy for mounting micro-crystals, no greater than the width of a human hair! Not a run-of-the-mill garage epoxy, Jason experimented with viscosity and hardness by varying ratios, temperatures during mixing, and curing temperatures to develop bubble-free mounts that will be used for high-precision analysis. As a double major in Geology and Anthropology, in the Cairns lab, his passion is the development and implementation of sustainable solutions to combat global environmental change.

Jason Jordon

SEA MONSTERS UNEARTHED - *IN DALLAS*

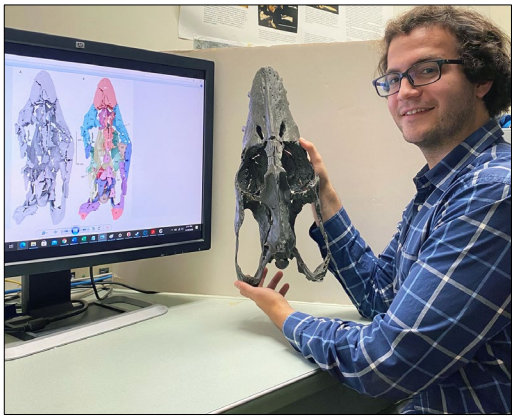


In 1931, Thomas Jefferson Tidwell (*right*) unearthed a gigantic, 93 million-year-old sea monster near Cedar Hill. The fossil is not a dinosaur but an ocean-going plesiosaur that looks like a model for the Loch Ness monster, and this was an exceptional specimen. Its name is *Libonectes morgani*, named in honor of Charles Gill Morgan, a 1928 alumnus of the SMU Geology Department. Morgan was an instructor in the department when the fossil was discovered. He received the eponymic honor because he went to visit Mr. Tidwell and the landowner Mr. Anderson "with a truck and a villainous tobacco pipe," as Ellis Shuler, founder of SMU Geology and namesake of SMU's Shuler Museum of Paleontology, described the event in 1950. After an all-day session Morgan came back to Hyer Hall with the skeleton. He is credited with "much patience and diligence" in obtaining the bones and preparing them for SMU.

Charles Gill Morgan

Morgan taught summer school in 1933, but later that year he was the geophysicist on Admiral Richard E. Byrd's 1933-1935 Antarctic expedition. He carried with him an SMU pennant and he sent a radiogram to be read at Dr. Shuler's Christmas Open House in 1934. In 1937 he was awarded the Congressional Medal of Honor for scientific service rendered the United States Government in the Byrd Expedition.

Ever since its publication, *Libonectes* has been scientifically popular and regularly revisited by researchers. Its head has been CT-scanned. A 3-D model printed from the scans will be placed in a new exhibit about the Cretaceous Western Interior Seaway being produced at the Carnegie Museum in Pittsburgh. *Libonectes morgani* has been instrumental in understanding the marine reptiles of Angola, which are the focus of ISEM's Smithsonian exhibit, as well as those of Texas, providing a higher level of understanding of Earth and life history.



***Miguel Marx** with* Libonectes *cast for Carnegie Museum and digital model of Angolan skull on screen.*

As the world turns, not long ago, Tim Morris walked into Heroy Hall to see the gigantic ancient sea monster housed in the Shuler Museum that his great-great-great grandfather Thomas Jefferson Tidwell unearthed 89 years ago, his proud, and well protected, family legacy.

JAMES E. BROOKS AWARD FOR FACULTY EXCELLENCE

The recipient of ISEM's **James E. Brooks Award for Faculty Excellence** for 2020 is **Dr. Rita Economos**, whose research in Earth Sciences has been focused on volcanism, the interaction of tectonism and magmatism, and isotope geochemistry. Her field work has taken her from the United States to Italy and Mongolia. The funds from this award will support a new Field Emission Scanning Electron Microscope laboratory, installed last summer in Heroy Hall, the result of a joint National Science Foundation-SMU effort, headed by Rita. This instrument can image at the nanometer scale and can conduct chemical analyses at microscopic scales. The laboratory will support student and faculty research across the Earth Sciences (micro- crystals and micro-fossils), Environmental Engineering (contamination remediation) and Anthropology (artifact fragments and fuel sources). One of Rita's new exciting projects is the study of Apollo lunar soils and lunar meteorites that have been brought to SMU because of the new facility's analytical capabilities. These soils are mostly crystals and rock fragments that are less than 4x the width of a human hair, yet they contain critical information about the history of volcanism and impacts on the moon, which will be studied by Rita and her students.

***Rita Economos** and graduate student **Katelyn Lehman-Franco** making discoveries about Apollo lunar samples in the new FE-SEM laboratory*

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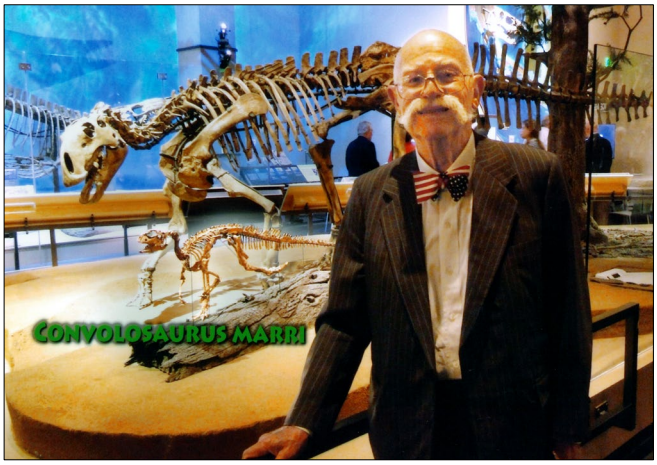
TEXAS DINOSAUR NAMED IN HONOR OF DR. RAY H. MARR



Ray H. Marr, ISEM Trustee, has had a dinosaur named in his honor. The dinosaur – or rather 29 of them – discovered in Comanche County, was named last year by recent SMU Ph.D**. Kate Andrzejewski**, **Dale Winkler**, and **Louis Jacobs**. *Convolosaurus marri* translates to "Marr's flocking lizard." The name describes the occurrence of numerous young individuals of the species found clumped together with only a few adults, as if they were in life like ostriches on the Serengeti. Ray Marr was specifically honored because he is a strong proponent and friend of students in Earth Sciences at SMU. More broadly, he has aided the profession of vertebrate paleontology by producing through his Shade Tree Studios the production of *"We are SVP"* and *"About the SVP Logo,"* posted on the Society of Vertebrate Paleontology website (vertpaleo.org). They are well worth watching.

32st ANNUAL TEXAS ENERGY COUNCIL SYMPOSIUM

Dynamics of Change was held as a virtual event on September 10, 2020. The symposium was co-sponsored by ISEM, which provided for two students, **Gage Baumli** and **Zak Napper**, to attend.

DR. ANTHONY R. FIORILLO BRINGS HIS ARCTIC RESEARCH PROGRAM TO SMU

Welcome to long-time ISEM Senior Fellow and SMU Earth Sciences Adjunct Research Professor **Anthony R. Fiorillo** (*left*) to campus. For more than two decades Tony's research has focused on the dinosaurs of Alaska and how they lived in high latitudes, a significant question with respect to Earth's past climates as a way of under-standing future climates. Tony received the 2019 international George Wright Society's Natural Resources Achievement Award for his research in Alaska's National Parks. He has continuing research projects in Asia with SMU alumni Professor **Yoshitsugu Kobayashi** of Hokkaido University, Japan, and Professor **Yuong-Nam Lee** of Seoul National University, Korea. He included SMU graduate students **Thomas Adams** (now Curator of Paleontology and Geology at the Witte Museum, San Antonio), **Peter Rose** (now with the Michigan Deptartment of Natural Resources) and **Chris Strganac** (formerly of the Perot Museum) in his previous Alaska expeditions. He and **Neil Tabor,** SMU Geochemistry Professor, are currently exploring new directions in Arctic research.

Tony Fiorillo *(center) with* ***Yoshi Kobayashi*** *(left) and* ***Thomas Adams*** *(right) at Beaver Lake, Wrangell-St. Elias National Park, Alaska. At six times the size of Yellowstone, Wrangell-St. Elias is the largest national park in the United States. Photograph courtesy of Thomas L. Adams.*

SEA MONSTERS UNEARTHED FEATURED ON ANGOLAN EMBASSY WEBSITE

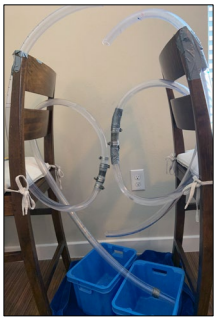
The Embassy of Angola in the United States specifically requested a video for their web site to keep the exhibit, ***Sea Monsters Unearthed: Life in Angola's Ancient Seas***, in the minds of their visitors and to highlight this example of Angolan geoheritage. The exhibit opened at the Smithsonian's National Museum of Natural History in November 2018, where it was viewed by 4.8 million visitors until its March 2020 closing due to coronavirus. In addition, the Smithsonian's *Sea Monsters* web page has had 40,165 views in that time. The exhibit is based on field work and research carried out by an international team called *Projecto PaleoAngola*, led by ISEM's **Louis Jacobs** and **Mike Polcyn**. It displays fossils removed from rock in SMU laboratories by over one hundred students and volunteers who skillfully helped construct the exhibit. The video was completed thanks to **Ray Marr's Shade Tree Studios** and **Edd Chappell Productions**. Written by **Diana Vineyard** and **Louis Jacobs**, the video can be viewed at **angola.org.**

Screen shots from the Embassy of Angola Sea Monsters video. Upper left, ***Sant Director Kirk Johnson*** *of the Smithsonian's US National Museum of Natural history. To view the video on the Embassy website, go to angola.org and click on the image of* Angolasaurus*, a 71.5 million year-old fossil in the exhibit. (Photograph by Hillsman Jackson.)*

UNBRIDLED STUDENT RESEARCH *continued*

Dr. Matt Hornbach's students, **Lars Koehn** and **Tom Kyritz** (Geophysics), were able to take their experiments home. Their research focuses on a significant geologic hazard, submarine slope stability in slide and tsunami prone areas of the Caribbean. Their approach was to build permeameters, each his own, so that the permeability of well cores could be measured at home. Lars and Tom are now lead authors on a manuscript assessing permeability in some of the largest known submarine slope failures in the Caribbean. Their work will be valuable to other researchers assessing subsurface pore pressure evolution leading to a better understanding of these hazards.

Tom Kyritz with permeameter set-up.



Lars Koehn with mini lab setup in his apartment.

Geophysics undergraduate **Tanyon Hejny**, a remote-only student working with **Dr. Heather DeShon**, plays a key role in analyzing the North Texas continuous seismic data streams, which is both time sensitive and meticulous work. He also helps maintain the database of injection volume and rate data and has prepared figures for pending papers using ArcGIS.

Congratulations to all these SMU students and many more like them who perform so well under difficult conditions.