The Department of Earth and Environmental Sciences

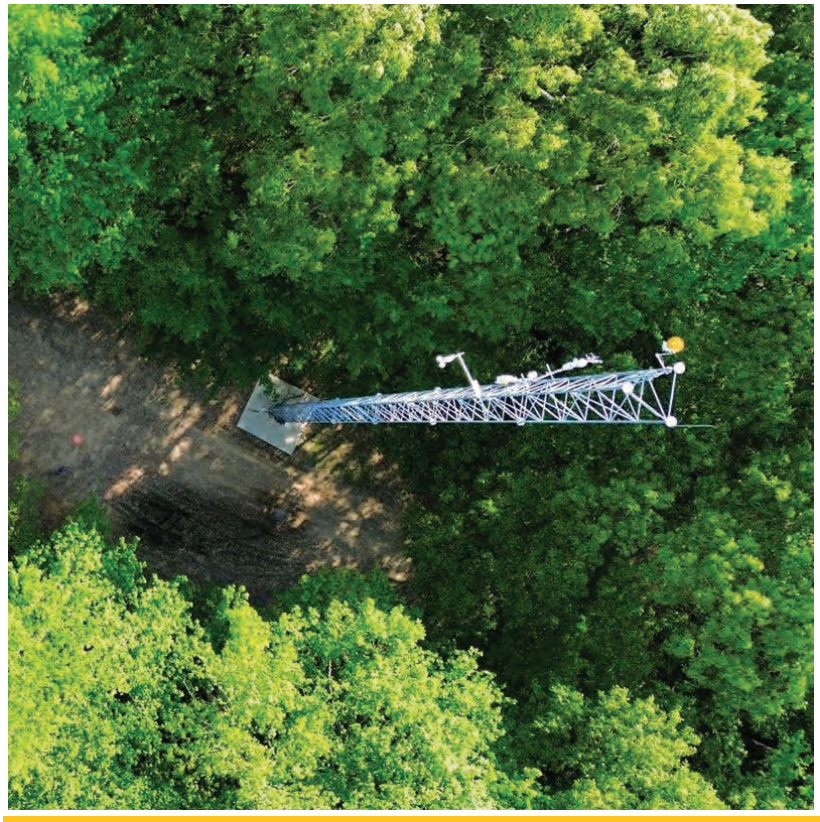
Greetings, EES faculty, staff, students, alumni, and friends!

Hello everyone,

I assumed my new role as the department chair in July 2025. It is an honor to have the opportunity to serve our faculty, staff, and students. Special thanks to Dr. Zhang for her leadership and dedication that helped grow our program significantly over the past nine years. We will continue to thrive on providing the best educational and research experience for our students. I look forward to meeting and engaging with all our students and alumni. Thank you for your continued support. We would love to hear and share your success stories! Please stay in touch!

--- Bassil El Masri

Our New Facility: Measuring Greenhouse Gas Exchange at Murphy's Pond



An eddy covariance flux tower measuring the greenhouse gas exchange between the terrestrial ecosystem and the atmosphere was installed at Murphy's Pond in December 2024. The tower will allow for continuous monitoring of methane, carbon dioxide, and water vapor, improving our understanding of the effects of climate change on the carbon cycle. Weather data (air temperature, precipitation, etc.), soil temperature, and moisture will also be measured at high frequency. To link changes in vegetation phenology to changes in the carbon cycle, a camera was installed, where the images will be processed to estimate phenological variables such as the start and the end of the growing season.

The site will be part of an eddy covariance flux tower network, Ameriflux, and the camera will be part of the Phenocam network. Daily images captured by the camera will be available via the Phenocam website. Funding for the instrumentation was made possible by the NSF MRI award to Drs. El Masri (Department of Earth and Environmental Sciences), Moon (Department of Biological Sciences), Flinn (Department of Biological Sciences), and Stinchcomb (University of Memphis). Additional funding was provided by LICOR LEEF and NASA EPSCoR awards to Dr. El Masri.

Faculty Spotlight: Dr. Bassil El Masri Travels to NASA Ames Research Center

Dr. El Masri and graduate student Zachary Brown visited NASA Ames Research Center in the summer of 2025 to work on methane modeling and the use of satellite data to estimate methane emissions from wetlands. The visit not only strengthened the current collaboration with NASA scientists but also helped initiate new research collaborations. The travel was supported by an NSF EPSCoR Fellowship to Dr. El Masri.

Dr. Cetin and Students at KY-NSF-EPSCoR Field Day at Horse Park, Georgetown, KY

Dr Cetin and two of his students, Amelia Slaton, Zane Yates, attended a field day event as a part of our KY-NSF-EPSCoR project at a groundwater monitoring station in Horse Park, Georgetown, KY, and at the KGS EARL Core Library on September 11, 2025.

Dr. Marcie Venter Presents Papers in Frankfort, KY and University of Veracruz, Xalapa, Mexico

EES students in Dr. Venter's "Pottery and People" class will be working with the Heritage Department at LBL on a variety of activities related to clay resource procurement, manufacture, kiln construction, firing, and historic kiln excavation throughout September and October this Fall. The class will be working under a newly executed "Special Use Permit" and as LBL volunteers at the Homeplace. Dr. Venter is collaborating with the Heritage Department at LBL to organize three activities at the Homeplace and other sites. A fourth activity has already been completed— clay collection. Specifically, these activities are within the context of the "Pottery and People" class. Students will be building kilns at the Homeplace, excavating a kiln site at LBL, and firing pottery at the Homeplace in the kilns that they construct using locally available natural and geological resources.

Dr. Venter represented institutions of higher learning at the bi-monthly meeting of the Kentucky Native American Heritage Commission, held in Frankfort, KY on November 1, 2025.

Dr. Marcie Venter and undergraduate student Alec Giron, co-author, presented research November 11-13 at the University of Veracruz, located in Xalapa, Mexico. The invited symposium examined the Mesoamerican ballgame, "pitz," from a variety of perspectives, including urbanism, ritual, authority, and more.

Dr. Katharine Loughney Joins Researchers in California, Nevada, and Wyoming

EES student Chaney Cox collecting field specimens at a research site in Nevada.

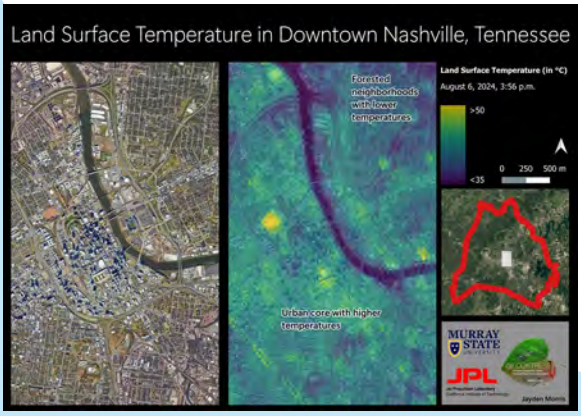
Summer is the geologist's time for field work, and this summer [2025] was packed. In May, I returned to southern California to help mappers from the California State Geological Survey investigate an area with high potential for lithium resources. Mapping is the first step in understanding where economically viable deposits occur, and in this case, the target area contains lake deposits that formed 18 million years ago during warmer and wetter climates. Ancient lake sediments are prime targets for lithium exploration, which is expected to be a growth area in economic geology as the demand for metals to power rechargeable batteries in electronics and electric vehicles increases.

In June, I traveled to UC Berkeley to look at fossils in their museum collections. The museum has fossil material that has been collected for over 100 years by many researchers working all over the world. I focused on the fossils of mammals that lived in Nevada approximately 16 million years ago, and I examined the fossils for surface features that may help indicate how the bones were deposited. From Berkeley, I drove to Nevada for field work in some of the same places where the fossil collections were made. EES major Chaney Cox joined me as my field assistant, and we spent two weeks collecting geological data at fossil localities to add to the biological information from the museum collections. Chaney documented our excursions in her role running the EES Instagram account.

Then in July, I joined colleagues from the University of Michigan working in Wyoming to help them characterize the sedimentology and stratigraphy of Cretaceous mammal localities in the Bighorn Basin. This region contains deposits from the late Cretaceous and early Paleocene, spanning the K–T boundary that marks the extinction of the dinosaurs 66 million years ago. Mammals lived alongside dinosaurs for most of the Mesozoic, and although they survived the end-Cretaceous extinction, few mammal fossils have been found in this region from the early Paleocene. It takes more effort to look for the fossils of tiny mammals than to look for large dinosaur bones—lots of sediment must be collected and washed using screens to sort out any small bones or teeth. My colleagues are working hard to find these tiny fossils in order to fill in some of the gaps in our understanding of mammal evolution before and after the K–T extinction.

Student Spotlight: Jayden Morris & Skylar Ross

Jayden Morris, an undergraduate student in the EES department, had his final class project map (EES 593: Using NASA satellite Data for Real-Time Environmental Monitoring) selected for publication on the NASA JPL ECOSTRESS website and Observing Earth from Above: *https://ecostress.jpl.nasa.gov/downloads/gallery/urban-heat/00135_Downtown_Nashville.png* *https://www.observingearthfromabove.com/blog/surface-temperatures-in-nashville*



Skylar Ross (MS 2025) published her thesis work in the Journal of Geophysical Research-Biogeosciences entitled "Bald cypress (Taxodium distichum) Knees are methane sources controlled by geomorphology, climate, and hydrologic extremes."

Ross, S. K., Klauss, N., Miles, M., Khatiwada, K. R., El Masri, B., Runkle, B.R. K., et al. (2025). Bald cypress (Taxodium distichum) Knees are methane sources controlled by geomorphology, climate, and hydrologic extremes. Journal of Geophysical Research: Biogeosciences, 130, e2025JG008996. https://doi.org/10.1029/2025JG008996

Congratulations to our Outstanding Students and Graduates of 2024-2025!

(From left: Sklyar Ross, Cameron Sullivan, Alyson Saul, Jenna Opp, and Avery Vogel)

Congratulations to Our Outstanding Students and Graduates of 2024-2025!

Outstanding Senior in Environmental Science: Cameron Sullivan
Outstanding Senior in Geology: Jenna Opp, Avery Vogel
Outstanding Senior in GIS and Geography: Alyson Saul
Outstanding Graduate Student in Research: Skylar Ross

BS Degree Recipients

Majora Hanson, Jenna Opp, Kaylee McCollum, Daniel Parker, Leana Rogers, Cameron Sullivan, Cainan Grove, Alyson Saul, Tegan Daw, Trinity Dunbar, Anniston Gafford, Philicady Garland, Garret Hudson, Avery Vogel.

Certificate in GIS Recipients

Jenna Opp, Cameron Sullivan, Alyson Saul, Tegan Daw, Trinity Dunbar, Anniston Gafford, Philicady Garland, Garret Hudson, Avery Vogel, Summer Wall

Geospatial Data Science Graduate Certificate

David Sye, Pinho Joaquim Munhequeira, Joyceline Adom Frimpong, Shaik Dawood Hussain Lnu

2024-2025 Departmental Scholarship Recipients

Alice and George Kipphut Sr. Scholarship: Jayden Morris, Olivia Sykes

A B Waters Scholarship: Anna Compton

Jesse D. and Deborah C. Jones Scholarship: Siddalee Roche, Lucas Cooley, Canyon Bourque

Jones Endowment Scholarship: Anna Compton

Clyde Reed-Jim Smith Scholarship: Jamie Gard, Lauren Tackett

James Allan Roberts STEM Internship Scholarship: Emilie Weiss

Matthai-Panzera Scholarship: Corree Yates, Lynlee Smith

Neil and Joan Weber Endowed Scholarship: Ronan Roberts

Fall Scholar's Week Earth and Environmental Sciences Poster Session

Students present their work at the Earth & Environmental Sciences Poster Session during the MSU Fall 2025 Scholars Week in the Waterfield Library Gallery, continuing a new tradition since 2019. (From Left: Zachary Brown, Chaney Cox, Lucas Cooley, Nathan Watson, Emily Haner, Joyceline Adom Frimpong, Rokeya Akter Liza, Avery Vogel, Megan Zerger)

Earth Day 2025 Celebration

We hosted hundreds of students, faculty, and staff, and worked with several organizations across campus and the greater Murray Community. Students were educated on sustainable practices and given products to live in a more eco-friendly way. We provided fun giveaways, games about energy efficiency, and even some animal therapy! The students were very receptive to the event and left with a greater understanding of the importance of Earth Day. We hope to make this event even bigger and better for 2026!" Special thanks to Professor Emily Johnson for planning and organizing this event, and to the ESS Club for their community outreach. "We are a department that studies Earth Science, so Earth Day is incredibly special to us," Professor Emily Johnson.

Alumni Update: Lacy Risner, MS '22, Archaeology, Archaeologist, U.S. Forest Service, LBL

When I returned to Murray state University in 2018, I wasn't sure how to turn my ffl finished bachelor's degree into a career I would love. Thanks to the guidance and support I received from the Earth and Environmental Sciences department I now have a dream career I never even knew existed. Dr. Zhang helped me reimagine my educational path and Dr. Venter helped me network and gain the credentials I needed. Today as a Forest Service Archaeologist, I get to do a little bit of everything: record historic sites, conduct shovel tests and excavations, and I get to share all that I learn with the public through a variety of educational outreach programs. What I never expected was that I would get to become a Fire Archaeologist! Now I am certified as a fire fighter type 2! This summer I got to go out on an Engine assignment in Oregon where I got to fight wildland fire with fire through controlled burns!! Eventually I hope to merge my growing experiences with wildland fire management and my archaeology experience to become a wildland fire resource advisor, where I will help protect our past from the damage that is caused by wildfires! None of this would have been possible without the care, concern, and encouragement I received while pursuing my degree with the EES department!

Lacy Risner (seated)

Alumni Update: Lance G. Morris, MS '94, GIS Analyst / Programmer, City of Owensboro, KY

I grew up in the Oil Business, where my primary work was building exploration maps by hand (without computer aid) for my father's company. Going forward in time to my undergraduate and Graduate work at Murray State. The Geosciences department and the Mid-American Remote-Sensing Center (M.A.R.C.) afforded us grad students the opportunity to learn what the professional work of the future would be like ahead of time. They did such a great job that, in my opinion it could not have been done better. We started off as lab assistants teaching Rocks & Minerals lab courses to undergraduate students. I was then afforded the opportunity to teach Introduction to Earth Sciences at Paducah Community College (Course and Lab). I followed up with work on International and state land use analysis projects as well as assisting other graduates with work on their Master's Thesis. When we came out of the program, we were totally ready for the professional market. I recommend Murray State University's Mapping Applications and Resource Center to all upcoming professionals, no matter what business you may be going into. Spatial Science is where it is.

Lance Morris, (right) pictured with MSU graduate student Zach Brown (left) at the Fall 2025 KAMP meeting.

Notes from EES

Emily Johnson's EES 306 Landscapes of the National Parks class spends the day at Mammoth Cave National Park.

EES students in Dr. Loughney's EES 314 Sediments and Soils class investigating soils in LBL.

EES students Laurie Tackett and Monica Collins working clay harvested from LBL for Dr. Venter's ARC 355 Pottery and People class.

Invitation to Share Experiences or Research

The Department of Earth and Environmental Sciences is always on the lookout for alumni willing to speak about their employment experiences or research. Our students greatly value the experience and guidance from our alumni! If you are in the area and would like to present on a subject or employment opportunities, please contact us. Email our administrative assistant, Ms. Tracie Russo, trusso@murraystate.edu, or call 270-809-2591 to schedule.

Giving and Gifting

If you would like to donate to the Department of Earth and Environmental Sciences, we have a number of scholarships to select from, including the Wesler Scholarship, the Matthai-Panzera Scholarship, the Reed-Smith Scholarship, the Alice and George Kipphut Sr. Scholarship and the recently formed Neil and Joan Weber Endowed Scholarship. Gifts to the Department of Earth and Environmental Sciences encourage student success in a variety of ways, by providing grants and scholarships, funding travel, or by purchasing equipment upgrades. Gifts of any size are greatly appreciated and always needed!

Checks should be sent to the Office of Development, Heritage Hall, Murray, KY 42071-3441. Please specify a fund in the memo field. Donations can be made over the phone by calling 1-877-282-0033 or 270-809-3001. Visit murraystate.edu/giving to make an online donation. Thank you for your support!