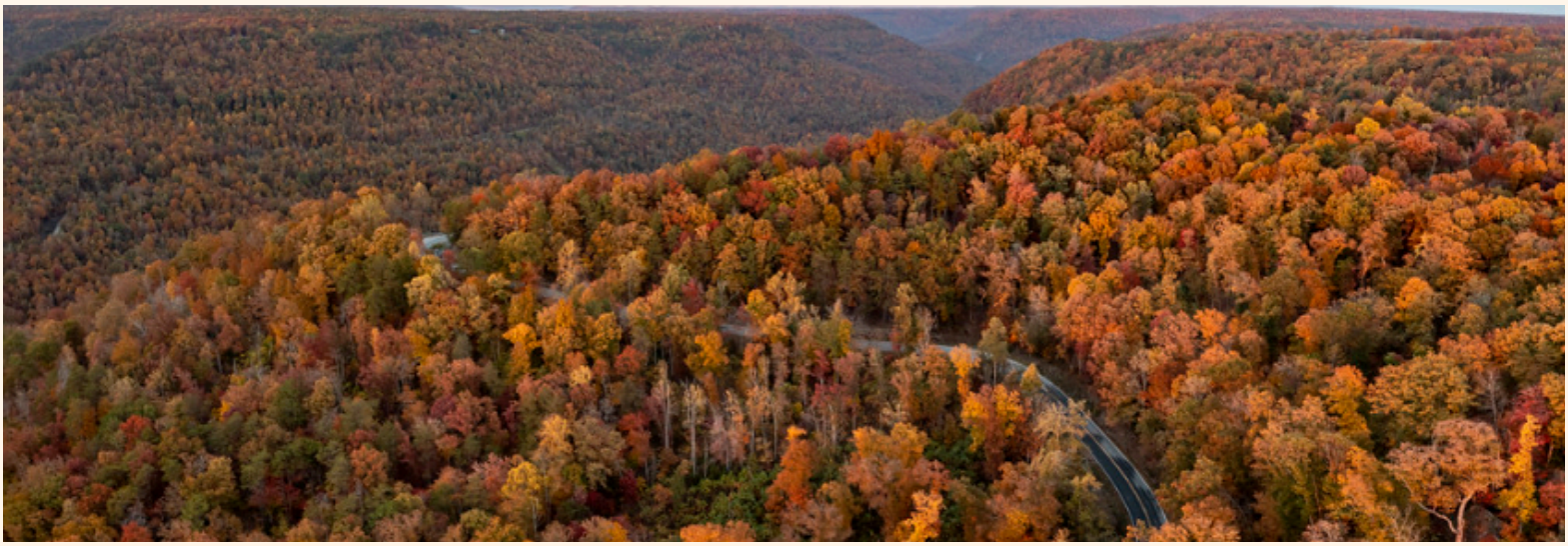
Tennessee Tech University
School of Environmental Studies



East Fork Obey River Valley, Overton County, TN by Chuck Sutherland

Fall 2024 Newsletter

MESSAGE FROM THE DIRECTOR

Greetings and welcome to the Fall 2024 edition of the SOES Newsletter. In this issue, you will find feature articles about student internships, research activities and awards, the study abroad trip in Scotland, along with the always-interesting updates from our accomplished alumni. Our graduate enrollment numbers continue to increase, with record numbers in the PSM and EVS programs this year, and the undergraduate enrollment is holding steady at approximately 60 students. We are pleased to continue offering these degree programs and we're also excited to be working on two new concentrations for the PSM program (more on this in the Spring 2025 newsletter). Special thanks to Lauren Watson and Irene Mauk for their design, writing and production work on the newsletter. Please stay in touch and, as always, keep up the good work.

Hayden Mattingly

IN THIS ISSUE:

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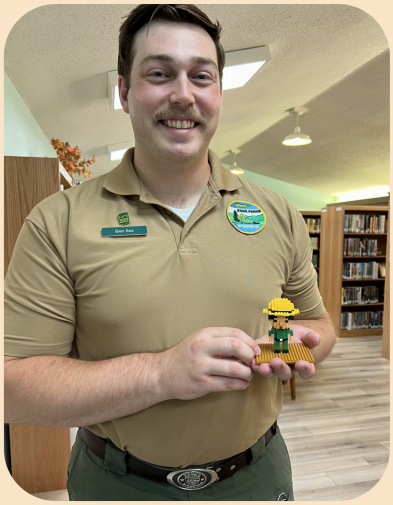
Bachelor of Science Environmental & Sustainability Studies

Ben Iles worked at Norris Dam State Park this summer for his second year as a Seasonal Interpretive Ranger (SIR) with Tennessee State Parks. His previous year as an SIR was on the Cumberland Trail State Scenic Trail and two years of seasonal maintenance at Burgess Falls and Cedars of Lebanon. The hands-on experience from his earlier positions proved invaluable, easing his transition into leading events and engaging with the public. As an SIR he focused on educational programs like "Creek Critters," using benthic macroinvertebrates as bio-indicators of water quality. Leading hikes, crafting creative trinkets and inviting the public to come volunteer at the park was also a huge part of Ben's job. He also introduced new activities such as the "From the CCC to ACC" program, connecting historical Civilian Conservation Corps efforts to modern conservation initiatives.

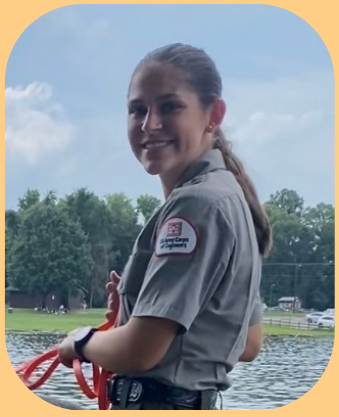


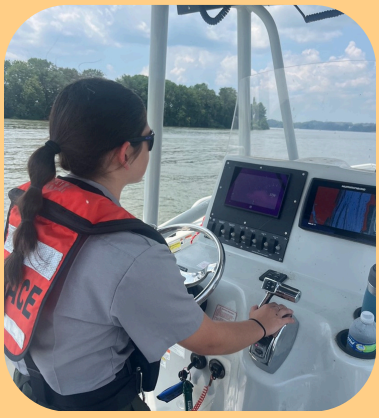
One of Ben's favorite aspects of Norris Dam State Park is the W.G. Lenoir Museum, which he encourages everyone to visit and see Mike, the museum coordinator. Other summer highlights include collaborating with Keep Anderson County Beautiful, leading hikes for National Trails Day with Ranger Holly, going to Booker T. Washington State Park with other Senior Interpretive Rangers to share CCC history with a diverse audience, and ensuring visitor safety by responding to emergencies like a carry-out from a mountain bike accident.

As Ben approaches graduation in May, he aims to secure a full-time park ranger position with Tennessee State Parks. In the meantime, he will continue volunteering, guiding students through Eagles Outdoors and expanding his knowledge by taking courses at TN Tech, such as National Parks & Protected Areas with Professor Hajdik.

Hailey Pippin had the opportunity to discuss water safety with over 2,000 people and participate in 13 programs over the summer with the US Army Corps of Engineers as a summer ranger. At Old Hickory Lake, Hailey made personal connections with coworkers and visitors, learned about natural resources and got an inside look at the field of environmental science.

One of Hailey's favorite aspects of being a park ranger was the outreach programs. Typically, these programs consisted of visiting lake beaches, partnering with other parks and marinas, and doing events with local educational programs, often at Bledsoe Creek State Park. Hailey also had the opportunity to work alongside an experienced ranger. Hailey and the ranger took the boat out to patrol and write formal warnings and citations to visitors who were putting wildlife or other people in danger. They also conducted vessel inspections by checking boats for the required equipment such as lifejackets, fire extinguishers and kill switches.



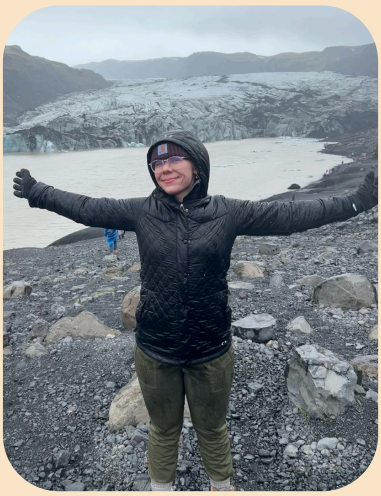


Hailey also had the opportunity to issue and update dock permits using GIS to record reports of the property, setting up traps for invasive moths and meeting with the local Girl Scouts to do cosmetic work on the Environmental Study Area, near the Old Hickory Lake resource office, which will eventually become an official arboretum.

Ultimately, Hailey's experience allowed her to apply her skills from the classroom to a real-life setting. She looks forward to gaining more hands-on experience through her ESS capstone class and her research on stream fish dynamics with Dr. Wheeler.

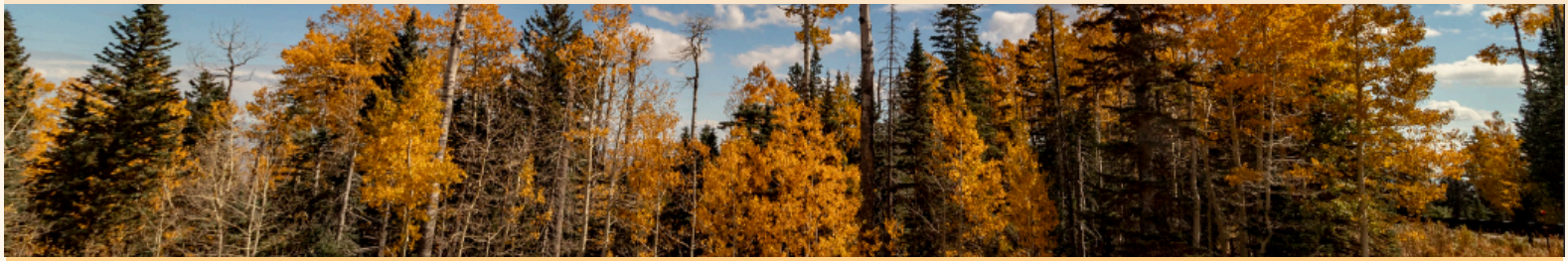
Professional Science Master's Concentration in Environmental Informatics

Jessee Griffith has embarked on her research journey driven by her passion for conservation, climate change and community outreach. She is one of the first master's students to choose the "thesis option" in the new PSM program update that is set to go into effect the summer of 2025.

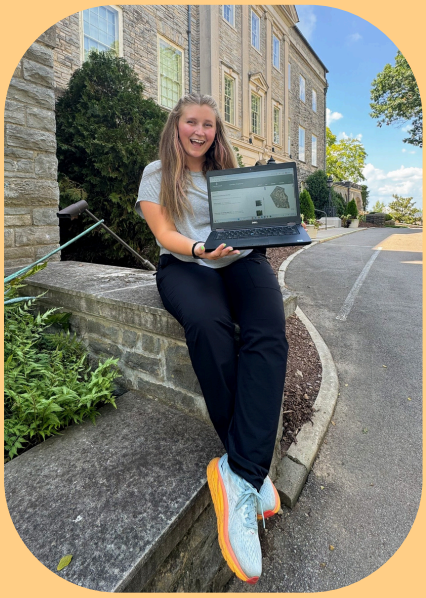


Jessee graduated from Tennessee Tech in 2023 with her bachelor of science in environmental and sustainability Studies (ESS) with a biology focus. She then started the PSM environmental informatics program that fall, along with the National Science Foundation 'Spirit of Gadugi' grant that focuses on food, energy and water issues in rural and indigenous communities. Jessee's thesis is a case study on the Calfkiller River in White County, Tennessee. She will be looking at land management and development in the county, precipitation data over time for the river, and analyzing stormwater infrastructure to determine if White County is prepared for the forecasted impacts of climate change. As more farmland in the county is being converted to housing, this will cause more storm runoff to flow into the storm drains and then into the Calfkiller. Using remote sensing and machine learning techniques through ArcGIS Pro, the goal of the project is to display the areas around the Calfkiller that are at risk for flooding in the coming years.

Jessee's research along with others will work to influence future rural climate change policy decisions and infrastructure plans in local and state governments.



Hannah Stowers had the privilege this past summer of working at Cheekwood Botanical Garden in Nashville. Hannah developed a project centered on a comprehensive arboretum tour, utilizing GIS software and GPS mapping tools to highlight honorary and memorial trees. She also incorporated a statistical analysis of plant losses over the past three years to assist the garden's department in future planning and decision-making.



This analysis plays a critical role in identifying patterns and trends in plant losses, which is essential for optimizing future plant selection. By pinpointing which species are particularly susceptible to loss, the department can make informed decisions regarding which species to prioritize or replace with more resilient alternatives. Additionally, understanding the scope and underlying causes of plant losses allows for more effective allocation of resources. The insights gained from this analysis enable the department to implement targeted preventive measures, such as improving soil quality, refining watering practices and enhancing pest management strategies. The overall goal of Hannah's work is to mitigate future losses and ensure the long-term sustainability of the garden.

Doctor of Philosophy

Environmental Sciences

Concentrations in Agriculture, Biology, Chemistry, Geosciences and Integrated Research

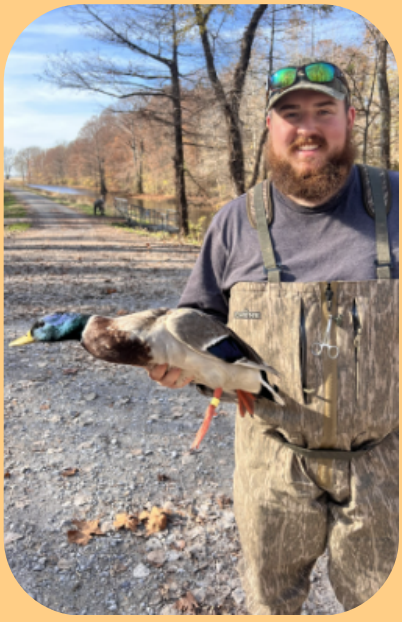
Martine Patiance Bowombe Toko is an environmental sciences - agriculture Ph.D. student who is originally from the Republic of Cameroon, Central Africa (Mbanga, Moungo Division, Littoral Region), and is working under the guidance of Dr. Douglas Airhart, professor of horticulture in the School of Agriculture. Martine's research focuses on periodical cicadas and the damage they cause on young trees grown in the fields of Tennessee nurseries. The title of her dissertation is, "Determining control strategies for periodical cicadas in commercial ornamental nursery plants in Tennessee." During the 2021 cicada emergence (17-yr Brood X*), "an experimental study of insecticides (natural and synthetic) took place at Tech's Shipley Farm, and evaluation of crop damages was made at a Kentucky commercial nursery. "

During the 2024 cicada emergence (13-yr Brood XIX**), they tested the efficacy and lethality of selected biopesticide sprays against adult cicadas under shade house conditions. A field study was conducted at a cooperating Middle Tennessee field nursery to assess the repellency of a physical barrier such as netting, *Liquidambar styraciflua* (L.) extract, and Onyx Pro® insecticide (Bifenthrin) on adult periodical cicadas.

The collaboration with Dr. Jason Oliver (graduate faculty at Tennessee State University, Otis Floyd Nursery Research Center) helped Martine get involved in the field of nursery production practices in Tennessee, and develop an advanced understanding of periodical cicadas. She also used her research to answer questions raised by nursery businesses. After graduating from the Ph.D. degree program, Martine welcomes a career in which she can continue her research.

(*):17-year cycle: *Magicicada septendecim, M. cassinii, M. septendecula*
(**):13-year cycle: *M. tredecim, M. neotredecim, M. tredecassini, M. tredecula*

Cory Highway is originally from Grand Rapids, Michigan. He is an avid outdoorsman and spends most of his free time hunting, fishing and camping. Cory's outdoor passions pushed him to pursue his Ph.D. in environmental sciences - biology further developing his academic and research experience in wildlife research and management.



Cory's research focuses on optimizing wintering waterfowl distribution and hunter opportunities through strategic wetland design, and he is advised by Bradley Cohen in the Department of Biology. Cory is studying the ecology of wintering mallards in western Tennessee and experimentally manipulating anthropogenic disturbance on the landscape to better understand the interactions between hunters and wintering waterfowl. Primary investigation methods include the deployment of over 1,000 backpack-style GPS/GSM transmitters on wintering waterfowl, as well as unmanned aerial vehicle surveys and detection of shotgun volleys with autonomous recording units. Cory's Ph.D. project is a continuation of his master's research, which investigated the spatiotemporal factors influencing mallard foraging and activity dynamics. This research is funded by the Tennessee Wildlife Resources Agency (TWRA) with a goal of improving hunter opportunities and waterfowl conservation through strategic habitat management. Cory's research is also made possible through his strong collaborations between a wide range of partners including the US Fish and Wildlife Service, St. Jude Children's Research Hospital, Ducks Unlimited and numerous private landowners and conservationists. In the future, Cory is seeking a career in natural resources management where he can incorporate applied scientific research into conservation initiatives.

Faculty, Staff, & Student Awards

Irene Mauk won the TN Tech Outstanding Clerical and Support Staff Award for 2024.

Dr. Samantha Allen has been awarded the TechTrendsetters Grant, led by the Center for Innovation in Teaching and Learning (CITL) at TN Tech, which is designed to boost faculty engagement and proficiency in incorporating emerging technologies into their curricula. The CITL grant has given Dr. Allen the opportunity to take the Online Learning Consortium Foundation's 10-week course, designed to aid in the ongoing improvement and design of the newly developed Fundamentals of Environmental Spatial Analysis course. The grant also helped with the purchase of drone and GPS unit technologies to incorporate into this course and others within the PSM program. It is through the CITL grant that Dr. Allen can continue to propel the growth and improvement of the PSM program.

Cory Highway, an EVS Ph.D. student, was awarded the Waterfowl Research Foundation Fellowship from Ducks Unlimited. This prestigious international award recognizes a graduate student who is engaged in research that will provide critical scientific information about waterfowl and wetland conservation. Cory's research will focus on examining how waterfowl respond to a network of private land rest areas. He works closely with government agencies, private landowners and NGOs to enhance the impact of his research.

Brooke Grubb, an EVS Ph.D. student, specializes in crayfish conservation and has been honored with the Robert D. Hevey and Constance Filling Fellowship in Invertebrate Zoology at the Smithsonian Institution's National Museum of Natural History (NMNH). Brooke's research with NMNH focuses on improving researchers' understanding of crayfish diversity by exploring how the environment can shape a crayfish's body plan. Leveraging NMNH's extensive crayfish collections, Brooke will collaborate with NMNH staff to expand her research impact and contribute to the broader understanding of crayfish conservation.

Dr. Samantha Allen, Dr. Steven Sharp and Professor David Hajdik are redesigning ESS 1100, Introduction to Environmental Studies, to include a combination of new materials and open educational resources (OER). Upon this undertaking, FlatWorld granted the professors a scholarship for up to 300 students to receive free online access to all of their "Environmental Science: A Need for Living Sustainably," resources for the 2024-25 academic year. This is valued at around $11,000 and saves students a total up to $45,000 (using the previous textbook and assuming they all purchased a new paper copy at a published price of $149.32).

Research and Creative Inquiry Day - Congratulations to our SOES winners!

Ronnie Dunn, EVS Ph.D., Agriculture Award
Response of tomato yield and yield-correlated morphology to hydroponic nutrient solution application regimes
Sahar Salimi, EVS Ph.D., Biology Award
Characterization and Organization of Telomeric Linked Helicase (TLH) Gene 2 Families in *Fusarium oxysporum.*
Ben Lane, PSM, Earth Sciences Award (pictured at left)
Determining Watershed Pollution Environmental Justice Scenarios Using Data from Ambient Water and Fish Tissue

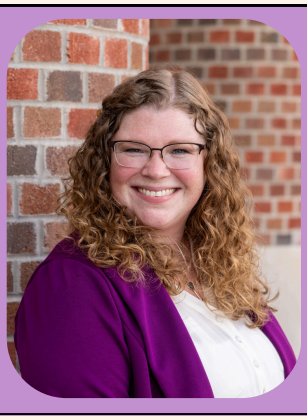
Research Colloquium

The First Annual Research Colloquium was co-hosted by the School of Environmental Studies and the Department of Biology on April 5, 2024. Ph.D. students gave presentations on a variety of research topics. Featured SOES students and their presentations included:

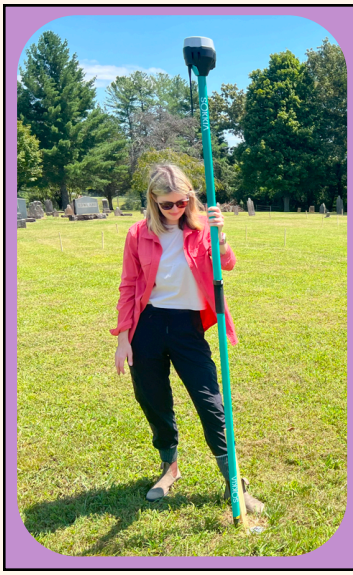
Kitty Philips - Ethnobotany among Cherokee women
Cory Highway - Wintering mallard response to habitat and environmental conditions when predation risk drives activity patterns
Brooke Grubb - The Reticulate Crayfish complex - an example of shifting perspective on crayfish morphology and taxonomy
Chris Waters - Environmental DNA metabarcoding as a new tool to detect historical pollinator-plant interactions
Peter Blum - Freshwater insect-mediated persistent organic pollutant transport

Alumni Updates

Amanda Carroll (Ph.D. '12) has been promoted to the position of master lecturer in the Department of Chemistry at Tennessee Tech. She continues to serve as the chair of the American Chemical Society (ACS) Undergraduate Student Advisory Board (USAB) and is on the ACS Committee on Education (SOCED). She was also selected as the SOCED representative on the ACS Future of Meetings taskforce.

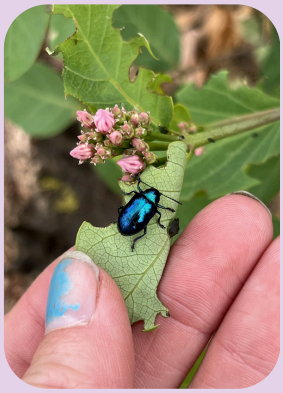


Chuck Sutherland (P.S.M. '16) has been working for the State Fire Marshal's Office as a fire prevention geospatial analyst for just over a year. Chuck also works as an adjunct professor at Tennessee Tech in the Department of Earth Sciences where he teaches Theory of GIS I and Theory of GIS II. Chuck and his wife Kelli also bought a house recently.

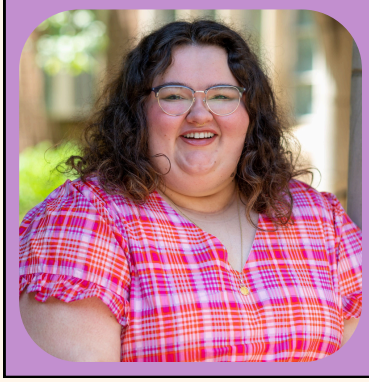


Natalie Robbins (P.S.M. '19) is working at Vanderbilt and currently serves as the secretary for the Tennessee Geographic Information Council (TNGIC). 2024 has been a big publication year for Natalie, with five publications coming out in AIDS Health, AIDS, Sustainability, Chungará and the Journal of Environmental Health. Natalie is also conducting several field work projects, including surveying the Mud Creek Shiloh Cemetery in Rock Island, TN, to uncover 103 potential unmarked burials using ground penetrating radar.

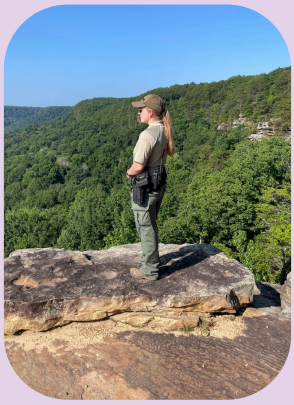
Anna Webb (B.S. '19) is going into her second year as a forest health protection entomologist with the U.S. Forest Service and is based out of Boise, Idaho. Anna provides technical assistance on forest health-related matters, particularly those related to disturbance agents such as native and non-native insects, pathogens and invasive plants. Anna's favorite part about her job is being outside so frequently and continuing to learn something new every day.



Mikayla Wood (B.S. '21) is the STEM librarian for engineering and assistant professor at the University of Tennessee, Knoxville. Mikayla finished her Master of Science in Information Sciences degree at UTK in May 2023 and is loving her work as an academic librarian. Some of her responsibilities include providing research assistance and library instruction to engineering faculty, staff and students. She lives in Knoxville with her husband Alex and cat Baba.

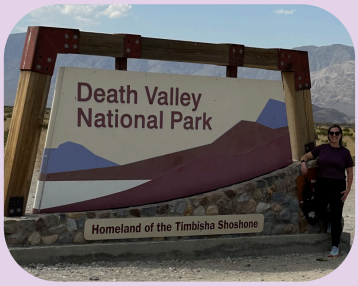


Jamie Ownby (B.S. '21) began as an intern at Burgess Falls State Park where she focused on maintaining natural resources and cultural/historical compilation and organization. After graduating from TN Tech, Jamie served with AmeriCorps at Seven Islands State Birding Park, and also worked as a seasonal interpretive recreator at Norris Dam State Park. In Summer of 2023, Jamie was hired as a full-time park ranger at Savage Gulf State Park.



Madison Moffitt (P.S.M. '22) is working with the state at the Tennessee Advisory Commission on Intergovernmental Relations, or TACIR for short. Kate has recently worked on a housing affordability report and a utility-scale solar report. She is currently leading a research study on forensic crime labs in the state. The goal is to address the issue of backlogged evidence and propose solutions for the state and forensic crime labs to address this issue.

Rachel Kaiser (Ph. D. '23) works for the U.S. EPA, Office of Groundwater and Drinking Water on the Unregulated Contaminant Monitoring Rule, which monitors drinking water systems across the US for unregulated contaminants as part of the Safe Drinking Water Act. In her free time, Rachel has been busy traveling this year and has visited 22 states, 13 National Parks and two countries!



Graduates & Alumni Updates

2023 - 2024 Graduates

Bachelor of Science

Steven Bakaletz
Lydia Burton
Gabriela De Almeida
Lydia Dudley
Eli Galloway
Kyla Gravil
Grady Hicks
Mitchell Kanak
Jonathan McCaig
Elizabeth McCurry
Mya Moseley
Sydni Perkins
Chloe Ray
Kayla Sorensen
Elijah Vaughn
Wade Webster
Courtney Wells
Holden Winton

Professional Science Master's

William Green
Jacob Landfield
Benjamin Lane
Tara Pedraza
Breanna Roy
Holly Stripling
Noah Trostle

Doctor of Philosophy

Abigail Blake-Bradshaw
Robert Brown
Shrijana Duwadi
Erik Koehler
Mary Mahan
Nick Masto
Kenny Pierce
Spencer Womble

Continuation of Alumni Updates

Mary Mahan (Ph.D. '23) is currently working as an adjunct online professor for Southern New Hampshire University teaching a general course on sustainability. Mary and her husband have also welcomed their first son, Isaac, into their family this April.

Grady Hicks (B.S. '23) has been working with the National Ecological Observance Network (NEON) in Fairbanks, Alaska. He has conducted field sampling of flora, fauna, aquatic and soil specimens. His research with this group is in conjunction with a nationwide, 30-year climate survey to properly track climate trends across a long period of time with a variety of different lenses. It has been a great opportunity for Grady to travel and to see a radically different climate.

Steven Bakaletz (B.S. '23) started at Frozen Head State Park as an AmeriCorps member doing school programs, leading guided hikes and helping out around the park. Soon, Steven will be working at the historic site owned by the park, the Stonecipher-Kelly house, which is over 200 years old. He is hopeful to start a career as a park ranger with Tennessee State Parks in the near future.

Jennifer Nwafor (P.S.M. '24) spent her summer interning with the City of Cookeville capturing over 6,000 photos of grave markers at the Cookeville City Cemetery. Her dedication led to a complete modernization of the GIS application used in storing records. Jennifer is currently doing her Ph.D. in chemical engineering at TN Tech, focusing on pharmaceuticals in waste water in the Cumberland Plateau.

Please consider making a donation to the School of Environmental Studies Student Scholarship Fund

To give, navigate to the link by scanning the QR code. Select Other from the drop down menu, and type in the School of Environmental Studies Student Scholarship Fund.

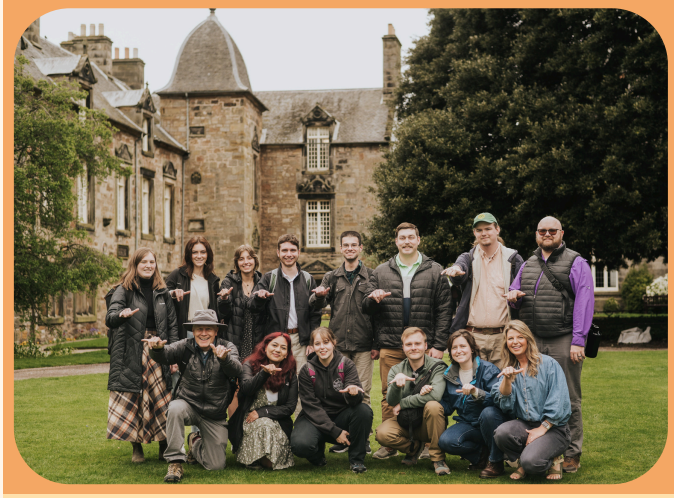
Thank you so much for your generosity in helping students in the School of Environmental Studies for years to come!

www.tntech.edu/giving

Study Abroad in Scotland

Dr. Allen and Professor Hajdik from the School of Environmental Studies, along with Mr. Roberson, lab manager in the Earth Sciences department, embarked with students on a 12-day study abroad trip to Scotland this past May.

The group traveled Scotland by van, visiting urban and rural destinations. They hiked to the summit of King Arthur's Seat in the remains of an ancient volcano, and met with faculty and students at the University of St. Andrews (founded 1413) School of Earth and Environmental Science. They visited the noted conservationist John Muir's Birthplace home in Dunbar and explored Siccar Point representative of early geologic discoveries by James Hutton and his Unconformity formations. The group explored various historic and cultural sites including castles and Culloden Battlefield. Other sites visited were Cairngorms National Park, Loch Ness in Scottish Highlands, Troup Head Nature Preserve and Isle of Skye.



The students also had the opportunity to work on service projects on the Isle of Raasay, which is part of the Carbon Neutral Islands Project where the Scottish government aims for the islands to have no net release of carbon dioixde emissions by 2040. Project work included ripping invasive rhododendron out of the ground, helping with a farm and investigating methods that could be used to measure bank erosion on the island's coast.

The faculty say that the trip gave students the opportunity to broaden their worldview by learning about the sustainability practices of a different culture, and that the trip was truly a once in a lifetime experience.

Thank you to the the College of Interdisciplinary Studies, the School of Environmental Studies, the Department of Earth Sciences and the Office of the Provost for all the support in making this trip happen!

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