

Tennessee Tech University

School of Environmental Studies



Campsis radicans, Murfree Spring Wetlands, Rutherford County, Tennessee by Chuck Sutherland

FALL 2025 NEWSLETTER

MESSAGE FROM THE DIRECTOR

Greetings and welcome to another edition of the SOES Newsletter. In this issue we feature several articles about undergraduate and graduate student internships, extracurricular activities and research projects. We are excited to announce that our first SOES student scholarships are being awarded this fall. We also include brief descriptions of two new concentrations along with a thesis option for the PSM degree program. When reading the updates section, I was especially impressed and inspired by the wide range of activities and happenings of our alumni—you all are having such a positive impact in the world! The newsletter concludes with an in-depth interview with Manuel Jara, the newest faculty member to join our school. Please keep up the good work and stay in touch.



Hayden Mattingly

IN THIS ISSUE:

Bachelor of Science	2
Professional Science Master's	3
Doctor of Philosophy	4
Recent Grads, New PSM Concentrations and Spring Research Colloquium	5
Alumni Updates	6
Alumni Updates and Scholarship Fund	7
Faculty Spotlight	8

School of Environmental Studies
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Bachelor of Science Environmental & Sustainability Studies (ESS)

Megan Dunsmore is an ESS major with a concentration in environmental science who has been involved in an array of environmental projects and organizations throughout her undergraduate experience at Tennessee Tech. For her senior capstone project, Megan, alongside her fellow ESS students Lucas Christian and Savannah Johnson, have focused on combatting environmental challenges at Meadow Creek Park. The park was previously an abandoned coal mining site and now serves as a recreational area and a secondary water source for the town of Monterey, TN. Their capstone project included creating a riparian buffer along the bank using native perennial plants. This buffer will stabilize the shoreline, filter runoff, improve water retention and foster healthy habitats for wildlife, all while enhancing the park's natural beauty and recreational value.

Megan also serves as club president of the Evergreen Society, a club focused on learning, action and awareness for environmental stewardship. Megan organizes activities including park litter clean-ups, sustainable workshops, bake sales, group hikes and environmental activism. She has also been involved in lobbying for environmental causes at Tennessee's State Capitol building in Nashville, TN.

Megan uses her passion for academic research, leadership and community engagement in ways to further sustainability efforts both on and off campus. She is eager to apply her knowledge and passion to advancing conservation projects and promoting sustainable practices in her future career.



Ellie Masters is an ESS major with a concentration in natural resources who spent her summer working with the Tennessee Wildlife Resources Agency (TWRA) as the region 2 ANS fisheries intern, gaining hands-on experience in fisheries management and aquatic ecology. Her primary field site was the Duck River, one of the most biologically diverse rivers in North America.

During her internship, Ellie participated in various fish population sampling techniques, including boat electrofishing, backpack shocking, barge shocking and kayak shocking. Most sampling efforts consisted of 30-minute runs: the first 20 minutes were dedicated to collecting game fish species like catfish and bass, followed by 10 minutes targeting all fish species. Afterward, the team weighed, measured and identified each specimen. They also collected genetic samples from various bass species for ongoing research.

Additionally, Ellie contributed to a range of hatchery and outreach efforts. At Normandy Hatchery, she assisted with seining crappie ponds, transferring fish between ponds and relocating fry to other hatcheries. She also participated in the release of walleye into Tims Ford Lake and Watts Bar Dam. Her responsibilities extended to creel surveying, where she interviewed anglers about their catch, target species, travel distance and daily expenses. Beyond these duties, Ellie supported aquatic biodiversity sessions at the Tennessee Forestry Camp at Fall Creek Falls and joined a two-day invasive species management project at Buffalo Ridge, where she learned tagging, netting and otolith extraction for silver carp.

Overall, Ellie's internship deepened her understanding of the complex factors that influence fish populations and their ecosystems. Since completing the internship, Ellie has launched her Capstone project focusing on fish biodiversity. She has also volunteered with TWRA to sample trout in the North River, begun taking the steps to do crayfish research and scientific writing with one of her professors, and started working at the Tims Ford State Park Nature Center, where she educates visitors about the importance of wildlife and environmental stewardship.



Professional Science Master's (PSM)

Concentrations in Environmental Informatics, Environmental Science, Environmental Sustainability

Emmalee Basham is a PSM – Environmental Science student who served as a seasonal interpretive ranger (SIR) at Cordell Hull Birthplace State Park, where she blended environmental education with hands-on conservation work. Emmalee developed and led interpretive programs to educate the public on the ecological and historical significance of Tennessee State Parks. She led guided cave tours and introduced visitors to species like the Tennessee Cave Salamander, emphasizing the importance of habitat protection for



the cave's sensitive ecosystem. Emmalee also helped maintain the park's biodiverse pollinator garden and led an invasive plant removal hike. Throughout her internship, Emmalee engaged in environmental outreach and contributed to meaningful projects that support the long-term health and sustainability of the park's natural resources.

Kayla Sorensen is a PSM – Environmental Sustainability student that spent the summer interning in the Office of Sustainable Practices (OSP), a non-regulatory sector of Tennessee's Department of Environment and Conservation (TDEC). The OSP's mission is to advance sustainability by engaging stakeholders and providing regulatory, technical, and financial support. At TDEC, she aided her team members with tasks for their multi-faceted programs, undertaking the first phase of a federally funded battery recycling program for Tennessee. For the program, Kayla developed educational materials, a branding package and a website. Kayla's 12-week internship with TDEC was filled with growth, gratitude and lifelong, impactful connections. She's confident that Tennessee's sustainable future is in great hands and is thankful to everyone who contributed to her success!



Josh Loiacono is a PSM – Environmental Informatics student who traveled to the island of Raasay in Scotland this past May. While there, he carried out his thesis project using Geographic Information Systems (GIS) to conduct biodiversity surveys and measure vital spread factors of invasive rhododendron. Josh, along with Tony Lamantia and his advisor Samantha Allen, managed to avoid sinking into



peat bogs and being eaten by native biting flies, while hiking up mountains and navigating dense thickets of rhododendron. His work aims to assist local efforts in rhododendron removal, as part of the larger Scottish Carbon Neutral Islands project. Josh's research will be part of a growing database that aims to promote awareness of Raasay's environment, history and culture.

Lauren Watson is a PSM – Environmental Informatics student who spent the summer interning as an environmental planning intern at HNTB's new Nashville office. There, she prepared National Environmental Policy Act (NEPA) environmental reviews for the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA), including Categorical Exclusions and Tennessee Environmental Evaluation Reports. She also created project location maps using ArcGIS Pro and reviewed civil engineering plans to assess NEPA compliance.

Lauren gained an interdisciplinary understanding of federal policies governing historic preservation, archeological resources, wildlife refuges, recreational areas and tribal consultation—each a key element of the NEPA process. Ultimately, Lauren enjoyed working on real-world client projects for HNTB, a firm known for being both innovative and inclusive.



Doctor of Philosophy

Environmental Sciences (EVS)

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

Namal Abeysooriya is an EVS – Chemistry student working under the supervision of Tammy Boles, Ph.D. He completed the Erasmus Mundus Joint M.Sc. degree in environmental contamination and toxicology in France, Portugal, Spain and the Netherlands, as well as a B.Sc. (Honors) degree in environmental science from Sri Lanka. Namal's doctoral research examines the interactions between microplastics (MPs) and emerging organic pollutants, including pesticides and personal care products, in aquatic systems. He investigates adsorption and desorption dynamics (kinetics, isotherms, and thermodynamics), the influence of plastic aging and the role of environmental conditions in pollutant binding and release, as well as the combined toxicity of these pollutants. His work employs advanced chemical analysis techniques such as GC/MS and LC/MS, material characterization techniques including SEM, FTIR, XRD and particle size analysis, as well as in vitro and in vivo toxicity assays to evaluate combined effects on aquatic organisms. Through his work, Namal aims to develop risk mitigation strategies for policy applications.



At the 20th Annual Tennessee Tech Research and Creative Inquiry Day, Namal was awarded Best Poster Presentation in the Environmental Sciences, Ph.D. category. He also earned the Dr. David F. Ludwig Memorial Student Travel Scholarship from the Association for Environmental Health and Sciences Foundation. Beyond his research, Namal is actively engaged in academic leadership at TN Tech, serving as a student representative on university committees and as President of the American Chemical Society Graduate Student Organization.

Philip Roberson is a Ph.D. candidate in EVS – Geosciences. He earned a bachelor's degree in geosciences from Tennessee Tech in 2015 and a master's degree in environmental geology from Murray State University.

Philip's research integrates stratigraphic and sedimentologic principles with paleobiological data to reconstruct the depositional environments, paleoecological dynamics and biostratigraphy of reef-like structures that developed following a major mass extinction event. His work combines detailed field observations, sedimentary facies analysis and quantitative fossil census data to better understand how marine ecosystems recover and reorganize after global crises. In addition to his Earth-based work, Philip also investigates the application of facies modeling to extraterrestrial environments such as the Lunar south pole.



Beyond his research, Philip serves as the laboratory manager for the Department of Earth Sciences. In this role, he coordinates and instructs multiple introductory geology lab sections each semester and mentors both undergraduate and graduate teaching assistants. He is dedicated to creating engaging, inquiry-based learning experiences that help students connect classroom concepts to real-world geoscience. His leadership in the lab program has enhanced student success and fostered a collaborative environment that supports both teaching and professional development. Philip's passion for teaching, research and outreach reflects a commitment to advancing geoscience education and inspiring the next generation of Earth scientists.

2024-2025 Graduates

Bachelor of Science

Spencer Burritt
Steven Christian
Diana Denemark
Benjamin Iles
Vada Jakalski

Bradley Keathley
Madison Kibbe
Jocelyn McLaughlin
Zoe Penn
Jackson Wood

Professional Science Master's

MacKenzie Garner
Alana Hicks
Karo Joshuiel Mittagadapa
Jennifer Nwafor
Sarah Terpstra
Vennela Vakapalli

Doctor of Philosophy

Daniel Adams
Martine Patiance Bowombe Toko
Christopher Waters



New PSM Concentrations



As of Summer 2025, the Professional Science Master's (PSM) program expanded from one concentration to three, and now offers a thesis and non-thesis track. Students now have even more choices to tailor their graduate-level environmental degree to their interests and career goals. All three concentrations are offered as a 30 credit-hour degree program.

Environmental Informatics

The original environmental informatics degree focuses on the application of geographic information systems (GIS) and spatial analysis as powerful tools for informed decision-making. Students can choose to learn skills in remote sensing or GIS programming either through an in-person or online format.

Environmental Science

The environmental science concentration provides students the opportunity to integrate coursework from agriculture, biology, chemistry, environmental studies, geology, mathematics and other areas to more effectively address ongoing and emerging problems in environmental science.

Environmental Sustainability

The environmental sustainability concentration equips learners with the knowledge and skills to address complex issues through economic and environmental perspectives, helping them balance environmental stewardship with profitability using data-driven, sustainable solutions.

To learn more about the program, visit the [School of Environmental Studies PSM webpage!](#)

Spring Research Colloquium

On April 4th, graduate students from the School of Environmental Studies presented at the 2025 Research Colloquium. Students discussed their research over a range of scientific topics through poster presentations, lightning talks and extended talks. Doctoral student presentations included:

Cory Highway – Optimizing Wintering Waterfowl Distribution and Hunter Opportunities through Strategic Wetland Design

Miranda Gaupp – Hot Genes, Cool Salamanders: Thermal Response and Comparative Gene Expression in Streamside Salamander Populations

Peter Blum – PFAS Bioaccumulation and Biomagnification in Middle Tennessee Freshwater Food Webs

Cadence Miller – L-Shaped FTMW Spectrometer with Narrowband and Broadband Capabilities Integrated with a Python Interface

Zoe Porter – Seasonal Variability in Nutrient and Greenhouse Gas Cycling in Surface and Shallow Groundwater within Restored Agricultural Floodplain Wetlands

Kitty Philips – The History of Ethnobotany among Cherokee Women

Tong Chen – Genes within the channel catfish sex determination region are drastically differentially expressed in the gonad of blue catfish

Alumni Updates



Chuck Sutherland (P.S.M. '16) has been a member of the State of Tennessee Real Estate Asset Management (STREAM) strategy team since March 2025. His primary focus is on developing and enhancing GIS deliverables related to state-owned properties. Among his key projects is the State Owned Lands Dashboard, a high-profile, public-facing tool that he continuously updates and improves.

Chuck lives near Cummins Falls with his wife, Kelli Lewis-Sutherland, and they recently celebrated their fifth wedding anniversary.



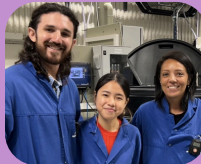
Roger Applegate (Ph.D. '19) retired from his regular day job and relocated to Maine, where he had previously worked as a wildlife biologist during the 1980s and 1990s. He currently serves as an adjunct instructor at Husson University, teaching students in the Conservation Law Enforcement program as well as those pursuing a new major in wildlife, fish and conservation biology. Roger also periodically teaches ecology and evolutionary biology at the University of Maine-Orono. Roger continues to consult for the Bangor Land Trust, focusing on beaver management and wetland conservation.



Melody Philips (B.S. '19) recently left the Tennessee Department of Environment and Conservation (TDEC) after four years of service. She served with the Natural Resources Unit (NRU) which administers the statewide Aquatic Resource Alteration Permit (ARAP) program, which works to critically protect water quality for all Tennesseans. This fall, Melody is launching TN Environmental—an education and outreach business designed to provide easy-access resources that help Tennesseans better understand their natural environment and how to navigate TDEC's water resource permitting processes.



Li Sun (B.S. '19) started her Ph.D. this fall in Integrative Biology at FAU Harbor Branch. Her research focuses on developing nutrient detection methods using machine learning in aquaculture. Li is currently in Norway working on a collaborative project studying Atlantic cod.



Anna Cassidy Webb (B.S. '19) works as a forest health entomologist for the U.S. Forest Service, focusing on forest ecology and insect-related issues. She assists with forest health concerns, particularly those involving disturbance

agents such as native and non-native insects, pathogens and invasive plants. Due to federal workforce reductions, Anna is now one of only 31 professionals in her position nationwide. Despite the increased workload, she's acquired new skills in tree climbing, wildland firefighting and hopes to initiate prescribed burns in the future.



Emma Jones (B.S. '20) currently lives in Charleston, South Carolina where she manages the Wildlife Center at Magnolia Historical Gardens. The Wildlife Center showcases native South Carolina wildlife, including foxes, bobcats, raccoons, alligators, a great-horned owl, and a red-tailed hawk, among others. All of the animals in the center's care are considered non-releasable due to prior injury or abandonment. As a manager, Emma oversees daily animal care, routine veterinary support, training, enrichment and leads a variety of educational programs. Through her work, Emma helps guests of all ages learn how to be responsible stewards of the Earth.



Ethan Flowers (B.S. '21) works at the National Center for Testing and Innovation. He's been training in mass spectrometry analyzing chromatography to identify semi-volatile contaminants in soil and water samples.



Ethan and his team have also contributed to emergency response efforts for an oil and gas spill in the western U.S. He's grateful that his role allows him to help protect families and businesses impacted by the environmental disaster. Ethan is excited to see what the next year brings for his career.

Catherine (Kitty) Philips (B.S. '21) continues to work on her Ph.D. focusing on building an AI model to query the medicinal plants of the Cherokee tribe. In May, Kitty traveled with her family to Mongolia, where they camped in tents and traditional gers, witnessed the last truly wild horses in the world and explored the Gobi Desert by camel and the steppes by horseback. In August, she joined fellow NSF/NRT Gadugi Fellowship participants on a visit to the Cherokee Nation in Oklahoma. The experience included meetings with tribal members, museum visits and deeper engagement with Cherokee history.



Alumni Updates (continued)

Joe Cook (P.S.M. '22) works as a state trooper on patrol in Bledsoe County, and is also attending his second semester for the Learning and Leadership Doctorate at the University of Tennessee – Chattanooga.



Ashley Daniel (B.S. '22) has been working at Oak Ridge National Lab (ORNL) for three years. She started as a waste services representative focusing on chemical waste management. Six months ago, she became a pollution prevention technical specialist developing strategies to minimize waste

and environmental impact at the source. Ashley says that her coursework in sustainability and environmental policy has been incredibly valuable in this role.

Robert Brown (Ph.D. '23) worked as a postdoc with the U.S. EPA and Forest Service to evaluate aquatic habitat responses to wildfire in the Pacific Northwest using long-term monitoring data. He now works as a postdoc in the Environmental Sciences Division with ORNL. Robert recently visited Oregon to share skills in field sample collection and assess watershed-scale responses to wildfire in the HJ Andrews Experimental Forest. Robert's work continues to span different projects that he has been a part of over the last six years.



Elliot Payne (B.S. '23) serves as the tree initiative assistant and ambassador coordinator for the Tennessee Environmental Council (TEC). Elliott helps organize the annual Tennessee Tree Day and also assists with the Urban and Community Forestry Initiative.

Sarah Terpstra (P.S.M. '24) was recently promoted to environmental manager over the Water Based Systems unit within TDEC's Division of Water Resources. The unit is responsible for protecting Tennessee's surface waters by writing and issuing National Pollutant Discharge Elimination System (NPDES) permits. In the past few months, she was asked to present her capstone project on a new predictive TN wetland model to different audiences five different times.



Sarah also welcomed a daughter Ruth, who was born on Sarah's birthday in May. Incredibly, Ruth and Sarah also share birthdays with Sarah's mother, making Ruth the third generation of girls to be born on the same day.

Jessee Griffith (P.S.M. '25) currently works as an intern at ORNL with the Environmental Protection Services division. In her role, Jessee has worked on several projects pertaining to GIS spatial analysis for stormwater flood control measures. She has conducted fieldwork to monitor the accumulation of radioactive material in native fish populations, and has studied PCB bioaccumulation strategies for wetlands. Additionally, Jessee got married in June and is now living in Sparta with her husband Alec.



Isaac Hollingsworth (P.S.M. '25) is currently working as a geospatial scientist at HX5 on the NASA JETS II contract at the Johnson Space Center in Houston, Texas. In this role, Isaac supports the Artemis Geospatial Data Team, where he develops specialized cartographic products, geospatial standards and analytical workflows to aid NASA's ongoing lunar exploration efforts.

We have given four scholarships to environmental and sustainability studies students through the SOES Student Scholarship Fund!

Thanks to generous donations, this fall we were able to award the first Environmental and Sustainability Studies (ESS) scholarships to four ESS students through the SOES Student Scholarship Fund!

Be a part of supporting the next generation of undergraduate environmental and sustainability scholars by donating to the SOES Scholarship Fund. Only through the support of generous donors like you can we continue to provide this much needed support for our students.

To donate, scan the QR code. Click to view the list of options and choose the College of Emerging and Integrative Studies. Then, leave a comment that you'd like to donate to the School of Environmental Studies Scholarship Fund. Thank you!



www.tntech.edu/giving

Faculty Spotlight

Dr. Manuel Jara

Dr. Jara, please tell us a bit about your educational and professional background before you became an instructor in the School of Environmental Studies.

I earned my Ph.D. in evolutionary biology and ecology from the University of Lincoln in the United Kingdom, where I explored how vertebrates adapt to our rapidly changing world. Before that, I completed dual bachelor's degrees in natural resources biology and engineering in natural resources at the Catholic University of Temuco in Chile. My work has always been interdisciplinary, taking me from wildlife conservation and vertebrate ecology to studying the genetics behind viruses, bacteria and fungi. After completing my doctorate, I held two postdoctoral research appointments at North Carolina State University, where I focused on how infectious diseases spread and how antimicrobial resistance evolves. My work often brought together genomic, ecological and climate data to look at the bigger picture. Most recently, I worked as a research associate in NC State's Department of Population Health and Pathobiology before becoming an instructor in the School of Environmental Studies at Tennessee Tech.

Why do you like studying evolutionary biology and ecology to address global environmental and health challenges?

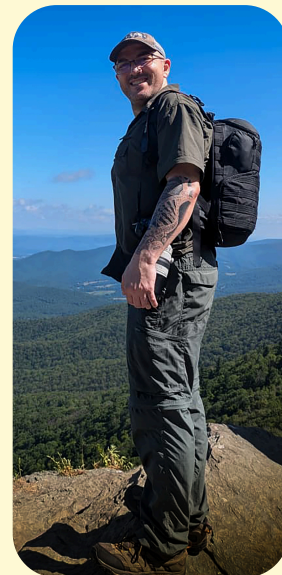
What excites me most about evolutionary biology and ecology is their power to connect scales of life, from molecules to ecosystems, while offering insights into pressing global issues. I am especially interested in how anthropogenic climate change reshapes species distributions, pathogen emergence and the evolution of antimicrobial resistance. My research integrates bioinformatics, phylogenetics and ecological modeling to investigate how organisms, including microbes, adapt to shifting environments. Ultimately, I see evolutionary ecology as a bridge discipline, helping us anticipate risks, inform policy and design more sustainable responses to global change.

Why do you like teaching Scientific Writing and Grantsmanship (EVS 7900) and why do you think it's important for graduate students to take this course?

Being part of the Scientific Writing and Grantsmanship course is rewarding for me because it enables me to assist graduate students in turning their concepts into projects that are understandable, appealing and financially feasible. Creating narratives that engage reviewers, collaborators and wider audiences is just as important to scientific writing as conveying findings. I believe every graduate student can benefit from this course. Strong writing and proposal development abilities enable students to share their science, obtain resources and leave a lasting impact in their fields, regardless of whether they choose to pursue careers in academia or industry. Besides, I did not have a course like this so I had to figure out the tips and tricks of scientific writing through trial and error, which made the process longer and more confusing.

What are some fun facts about yourself?

Outside of teaching and research, I enjoy wildlife photography and drawing wild animals. You can find some of my work on Instagram at [wildlifephotography_mjara](#). I also relax by watching anime, which sparks creativity in unexpected ways. Most importantly, I love spending time with my wife and our two-year-old daughter, whether we are outdoors exploring nature or just enjoying quiet family moments together.



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