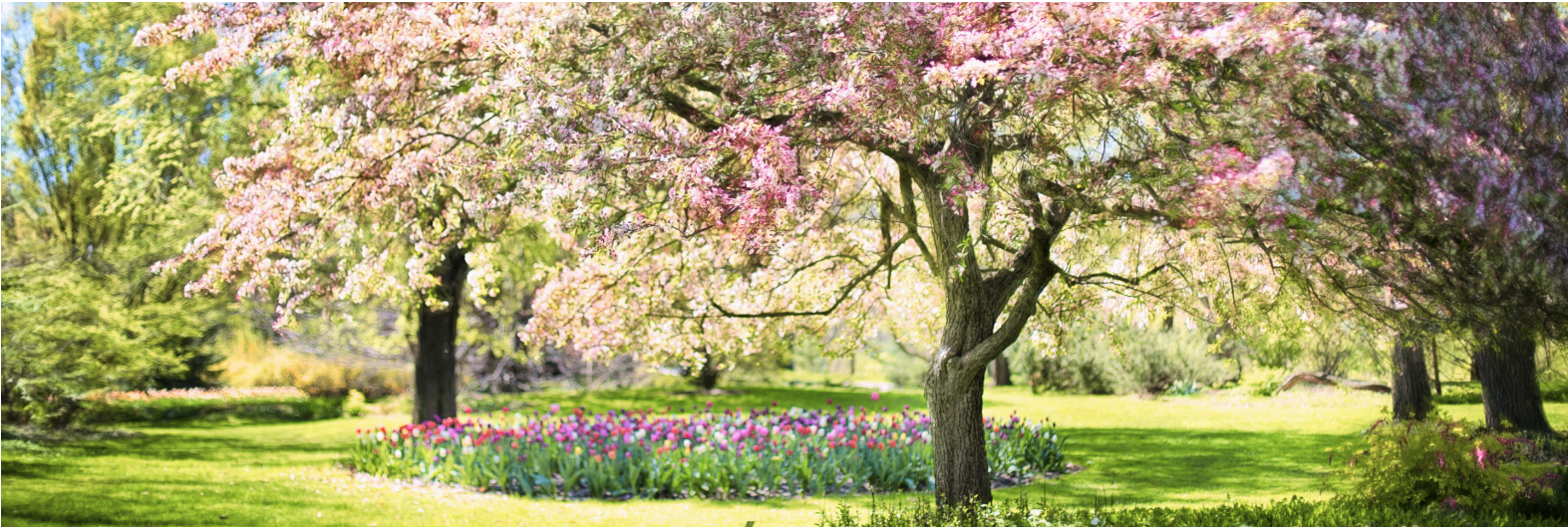


Tennessee Tech University School of Environmental Studies



SPRING 2024 NEWSLETTER

Message from the Director

Greetings and welcome to another edition of the SOES Newsletter. In this issue, you will find our students completing internships, studying abroad, conducting research and engaging in hands-on environmental work locally, regionally and internationally.

This year, the Environmental and Sustainability Studies (ESS) senior capstone group is developing recommendations for enhancing Meadow Creek Park near Monterey, Tennessee. In addition, our Professional Science Master's and Environmental Sciences Ph.D. programs just completed successful external reviews, and the students have been quite productive in their professional internships and research activities. "Field-based learning" is an exciting new effort for students and faculty in the College of Interdisciplinary Studies. The first group of students will be traveling to Scotland in May 2024, and other plans are in the works for a trip to the Rocky Mountains next year. To wrap up the newsletter, we interview Stuart Carroll who is a Tennessee state park manager who offers an ESS course in natural resources and land management. I hope you enjoy these updates and, as always, please stay in touch and keep up the good work!



Hayden Mattingly

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Bachelor of Science

Environmental & Sustainability Studies

2023 - 2024 Capstone

The 2023-2024 ESS capstone team has been working with Monterey Cultural Administrator Rafferty Cleary on a plan for improvements to Meadow Creek Park near Monterey, Tennessee. The group has divided into teams to identify biota present within the park, assess water quality of the lake and streams, preserve and showcase the history of the area (a former coal mine site), develop plans for a pollinator garden, use GIS to visually represent data and place, as well as develop other ways to both improve and promote the park. They have been assisted by students of Mark Green (Ph.D. '12) from Volunteer State Community College.

Current Students

Grady Hicks is an ESS major with a concentration in environmental leadership, communication and policy. He completed an internship in the summer of 2023 with the Tennessee Valley Authority in their Sustainability and Climate division. Grady researched strategies for corporate meetings to be more environmentally conscious, including travel options, food and dining services, and physical materials. He then presented this information at the quarterly business review to other members of the larger team. Grady also assisted in synthesizing carbon accounting data for different plants TVA partners with or manages.

His biggest takeaways from this opportunity are the importance of little details in sustainable work and not losing sight of the overall goal. He is thankful to TVA for adding to a holistic understanding of how to interact with the environment.



Kayla Sorensen studied abroad in the Netherlands at Radboud University during the Spring 2023 semester. There, she completed courses that covered the climate crisis, corporate sustainability and man's relationship with nature throughout the centuries. The Netherlands is an incredible hub of sustainability practices, and being there for an entire term allowed her to explore how other countries practice sustainability on a daily basis. There were many environmentally conscious technologies to grow accustomed to, and she was pleasantly surprised by the general mindset about sustainability and how much of a second nature it is for the locals. Living in the Netherlands and travelling to other countries forged a new perspective for her that she brought back, applying to all facets of her life. The most beneficial of these, though, is in her work as the chair of the Sustainable Campus Committee at Tennessee Tech. Here, she and a group of environmentally driven members of the campus get to listen to project proposals for green project funds generated from Tennessee Tech students. Before working with this group, she had no idea just how committed Tech was to create a sustainable campus. She has had the pleasure of hearing from many organizations across the university about incredible ideas that make a real impact for the students. Being a part of this has not only brought her closer to Tech and its members but has also given her priceless experience in a professional setting.



Professional Science Master's Concentration in Environmental Informatics

William Green, a student in the PSM-EI program, serves as an intern at the Putnam County Emergency Management Agency (EMA). With prior service in the U.S. Army and a bachelor's degree from Tennessee Tech's College of Education, Will comes from a diverse background.

His focus at the EMA involves utilizing geospatial analysis to identify flood-prone areas, contributing to emergency planning and damage mitigation efforts. Beyond his internship, William aims to apply his skills in conservation efforts. With an expected graduation in May 2024, he looks forward to making meaningful contributions to both community and environmental stewardship.



Holly Stripling is creating a series of maps detailing the transportation of solid waste (trash) and recyclables from origination to destination as an intern for the Upper Cumberland Development District (UCDD). The complex journey that solid waste and recyclables experience is best understood through visualization, which is the purpose of these maps. Additionally, she is analyzing the tonnage of materials being transported to active Upper Cumberland landfills in relation to their capacity to predict landfill life expectancy, hopefully leading to a more prepared plan for future handling of solid waste and recyclables. Holly is also considering a remote sensing study to research landfill effects on neighboring vegetation and surface temperature using near infrared and thermal infrared measurements over time. If substantial environmental impact near landfills is found, more public consideration for recycling could result.



GIS Day 2023

GIS Day is celebrated around the country as a way for professionals that use GIS, or Geographic Information Systems, to showcase their work and how they are using GIS and spatial analysis in innovative and exciting ways. A local GIS Day celebration is hosted annually in Cookeville, with participants from agencies, government offices as well as students and faculty of Tennessee Tech University.

Pictured are students, faculty and alumni of Tennessee Tech University at the November 15th, 2023 GIS Day. Most students are from Earth Sciences or the School of Environmental Studies, and many came to GIS Day with posters of their class projects and research to showcase.



Doctor of Philosophy

Environmental Sciences

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

Chris Waters is an environmental science – biology Ph.D. candidate advised by Shawn Krosnick. He considers himself an integrative biologist and is mainly interested in how plant-animal interactions fit into ecosystem function and plant conservation. Projects he has worked on in the past have investigated floral morphology and pollination ecology of Purple Passion Flowers and how fire history drives forest community composition shifts in montane Longleaf Pine ecosystems in northwest Georgia. The work he is currently doing as part of his dissertation involves the pollination ecology of the Globe Bladderpod (*Physaria globosa*).



A federally endangered species found in only 33 populations across Tennessee, Kentucky and Indiana, the pollination ecology of *P. globosa* has been investigated since its listing in 2014. He has been catching floral visitors over the past three years to document what species are visiting and pollinating *P. globosa* flowers across its range. In addition to these collections, he has also utilized environmental DNA metabarcoding and next generation sequencing techniques to detect pollinators from



flowers without direct observation. Using eDNA to monitor pollinator communities over time may provide valuable supplemental data to agencies and conservation groups working to protect *P. globosa*. In addition to this project, he has also worked on eDNA metabarcoding of preserved herbarium specimens and honey samples.

Apart from his research, he teaches Field Botany lectures, Dendrology labs and General Botany labs in the Biology Department. He is also president of the Biology Graduate Student Society, a student organization that represents the interests of, provides integrative networking opportunities for and advocates for the wellbeing of graduate students involved in the natural sciences at Tennessee Tech.

Daniel Adams is an environmental science-integrated research Ph.D. student advised by Peter Li of the Department of Earth Sciences. His work seeks to address problems in climate security by leveraging advanced machine and statistical learning methodologies to enrich remotely sensed building footprint datasets.

Daniel's research is centered around using building footprint-derived morphological features and open-source intelligence data to conduct high-accuracy classification predictions for human occupant building purposes. By integrating inferred building occupant purpose information into human population distribution models, he aims to create more accurate estimations of human population distributions and unveil levels of uncertainty in the current understanding of populations at risk of rising sea levels and water scarcity issues.

Daniel's research is conducted in conjunction with Oak Ridge National Laboratory (ORNL), where he is an associate R&D scientist in the Geospatial Science and Human Security Division. His research supports the LandScan and USA Structures programs at ORNL, where the research outcomes will be used to enhance data actively used by members of the humanitarian and disaster relief communities.



Alumni Updates

Jeff Norman (Ph.D. '03) continues his career with Pfizer totaling over nine years of service. He is now a field medical director in the Internal Medicine and Hospital Field Medical Group. He lives in his hometown of Lynchburg, TN with his wife, Nicole, and two children, Harrison (11) and Hollis (8).



Mieko Camp (Ph.D. '16) (now Ivasauskas) works for the Maryland Department of the Environment as a project manager for the Nontidal Wetlands Protection Program. She lives on Kent Island with her husband, Tomas (another Tennessee Tech alumnus), and son, Leopold. In their free time, they enjoy exploring the region by trail and boat.

Mark Green (Ph.D. '12) has been involved with graduate and undergraduate teaching activities at Tennessee Tech this year with the EVS 7900 Scientific Writing and Grantsmanship course, and the ESS 4001/4002 senior capstone project at Meadow Creek Park in Monterey, TN, with Tammy Boles and Steve Sharp. The capstone project focuses on four aspects: water quality, biota, park improvement and GIS integration. They also have been able to incorporate Mark's environmental class at Volunteer State Community College, effectively bridging the two institutions together on this project. Additionally, Mark has been developing an Outdoor Adventure Series with Volunteer State Community College. They successfully offered kayaking and mountain biking last semester, both of which were taught at Meadow Creek Park. This semester they will be offering five non-credit courses: outdoor



photography, outdoor culinary, rock-climbing, backcountry camping and fly fishing. They also received approval to start a community garden on their campus and have plans to construct a single-track mountain bike trail on the Cookeville campus.

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. He has assumed many roles, including data management for two grant cycles responsible for disbursing \$20 million to volunteer fire departments and rescue squads. He manages several databases including: smoke alarm installation, community risk reduction efforts, fire department recognition, fire fatalities, and efforts to analyze patterns and trends in fire-related incidents. In addition to his work at the Fire Marshal's Office, he 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 are looking to buy a house near Cookeville and working on a guidebook for the 2024 National Speleological Society Convention in Sewanee.

Lahiru Gamage (Ph.D. '19) is completing his postdoctoral appointment at Tennessee State University in Nashville. He has published several climate change related publications in the last two years including N fertilization and bioenergy crop species on soil enzyme activities, N fertilizer effects on soil organic carbon sequestration, N fertilizer effects on dissolved organic carbon and soil pH, temperature simulations in soil incubation experiments and interactive effects of warming and N fertilization on bioenergy crop soils. In addition to postdoctoral research, he is working as a lab manager in the Department of Environmental Sciences at Tennessee State University. He also got married last year.



Russ Skoglund (Ph.D. '15) and his wife spent the month of December visiting Germany, Belgium, Luxembourg, Denmark, Sweden and London. Now he is back to teaching General Biology at Cumberland University. They are looking forward to touring the western U.S. this summer.



Alumni Updates (continued)

Roger Applegate (Ph.D. '19) is semi-retired and teaches General Biology and courses in the Conservation Law Enforcement Program at Husson University in Bangor, ME. He continues to serve as an editor for the book "North American Furbearers" and as associate editor for the Wildlife Society Bulletin. He is writing five chapters for the "Maine Bird Atlas" to be published by the Department of Inland Fisheries & Wildlife in 2026. Other projects include analyzing data from a Maine coyote study.

Robert Paine (Ph.D. '19) is a postdoctoral research associate at the USGS Tennessee Cooperative Fishery Research Unit at Tennessee Tech. His research focuses on the use of environmental DNA and molecular ecology. Animals are always leaving behind skin, slime and feces in their environments, and within all those forgotten biological materials is the building block of life: DNA. He uses DNA to answer questions related to the presence and distribution of aquatic species. He used eDNA to characterize the community of fishes in southeastern Puerto Rico and to determine how far an invasive walking catfish had spread across the island. Also, he recently detected eDNA from the Slender Chub, a small fish that had not been seen in more than 25 years. He is using molecular techniques to explore the reproductive ecology of invasive silver carp in different Tennessee reservoir lakes. He and his husband currently live in Cookeville and will be celebrating their 5-year anniversary this year. His current hobby is cross-stitching, which he thinks his cat loves more than he does because of all the loose string.



Catherine (Kitty) Philips (B.S. '21) was awarded an NSF FEW-Nexus Gadugi Fellowship in Fall 2023 and is thrilled. She attended and presented at the ASB conference. She also presented with another member of the fellowship cohort at the NSF FEW conference. In any spare time, she is working on her dissertation, gardening, hiking and working on her farm. She also volunteers two days a week at The Walnut Street Market, a local farm store.



Joe Cook (P.S.M. '22) is currently employed with Blue Cross Blue Shield of Tennessee in Chattanooga as a security operations specialist. He is being considered for acceptance into the doctoral program of Leadership and Decision-Making at UT-Chattanooga. As a hobby, Joe is slowly locating all pre-1950 buildings within the Chattanooga City Limits in order to identify them for public preservation programs. He hopes to put them into a storyboard and map for public use. Pictured are Joe and his wife, Veronica, at the Tennessee Valley Railroad Museum. He enjoys photographing and learning about trains, which are hobbies he picked up from his great-granddad.



William Ponder (B.S. '20) is a field ecologist with National Ecological Observatory Network (NEON) in the Mid-Atlantic domain based in Front Royal, Virginia. Currently, they are onboarding and training seasonal technicians for what will be his 5th field season with NEON. He is also in his 3rd season of ski patrolling at Massanutten Resort and is attending fire academy during the evenings to become a certified firefighter for the local station where he volunteers. The photo shows him providing fall protection and rescue training for returning technicians who work/climb instrumentation towers.



Tim Cooper (B.S. '22) was at Enterprise South Nature Park (ESNP) for 15 months as the first park ambassador in Hamilton County. After this past Thanksgiving, he accepted a new job at TDEC as an environmental scientist within Water Resources. He has learned a lot and is excited for what the future holds, especially within the state. Pictured is a visitor he had in the visitor center at ESNP right before his job change.



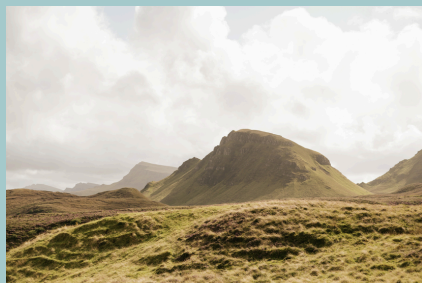
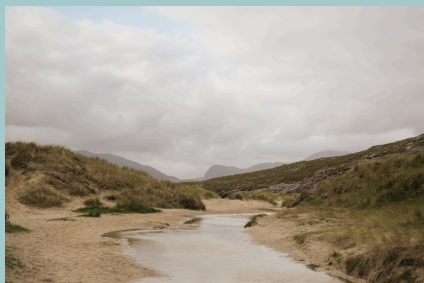
Partnerships

Samantha Allen, Steve Sharp and Dean Mike Gotcher explore study abroad opportunities in Scotland



The landscapes and culture of Scotland have shaped much of our understanding of the environment, with many early immigrants to the United States arriving from areas like Scotland or the UK. In addition to that, Scotland is often referred to as the birthplace of geology. In August 2023, Mike Gotcher, Steve Sharp and Samantha Allen (L to R) visited Scotland with the hopes of connecting with other universities, expanding on the School of Environmental Studies and Tennessee Tech's study abroad opportunities and planning a future faculty-led trip for students. While there, they visited key areas such as Edinburgh, Glasgow, Inverness and the Isle of Skye. They also traveled to one of the more remote areas of Scotland, the Isle of Harris, which is located in the Outer Hebrides.

While on the Isle of Harris, they were able to meet with a group of students and faculty from the Dumfries campus of University of Glasgow to experience and hear from Steven Gillespie on how he and others at University of Glasgow conduct their Environmental Sciences Field Experiences course. Other connections were made with Saint Andrew's University and also with local partners while on the Isle of Raasay, an island identified by the Scottish government as one of six islands aiming to go carbon neutral by the year 2040. Samantha Allen and Professor David Hajdik, along with Jeannette Luna from Earth Sciences, will be leading a team of 11 students back to Scotland in May of 2024 in a Field Experiences course, visiting many sites that are key in the foundational understanding of modern geology, Scotland history, as well as many of the breathtaking landscapes. The group will also visit the Isle of Raasay, where they will partner with the local community to complete a service project and aid in some of the ongoing research that will be a partnership between Samantha Allen, The Water Center, Tennessee Tech students and local partners in Scotland.



Alumni Updates (continued)



Chloe Green (B.S. '22) is a sustainability engineer at Y-12 National Security Complex. She assists with on-site recycling, waste disposition, sustainability initiatives, awareness activities, etc. This is her dream job, and she is thankful to SOES for helping her achieve her goal. Chloe hopes to return to Tennessee Tech soon to start a master's program. She will also be getting married in May.

Rachel Kaiser (Ph. D. '23) recently started with the U.S. EPA, Office of Groundwater and Drinking Water working on the Unregulated Contaminant Monitoring Rule, which monitors public water systems for 30 unregulated contaminants every five years. Along with her team, she is responsible for developing and implementing the policy. The data collected support future National Drinking Water Regulations through the Safe Drinking Water Act. Rachel is also still actively collaborating with the United Nations University Institute for Water, Environment, and Health on antimicrobial resistance in water resources and the Water Without Borders degree program. In her free time, she travels to national parks and was recently certified in scuba diving.



Faculty Spotlight

Stuart Carroll

Adjunct Faculty



Tell us about your current position and your primary responsibilities.

I am currently a park manager 2 for Tennessee State Parks. I am in charge of pulling together and supervising a new park: "Scott's Gulf Wilderness State Park." This park is comprised of the Virgin Falls area, Lost Creek Area, Dog Cove Historic Area and other areas. While attempting to document and create management strategies for the different resources found in these areas, we are also looking at increasing recreational opportunities that don't degrade these resources. We are also trying to reach out to different user groups, folks that you wouldn't normally think of as hard-core park users. We are going to accomplish these tasks with minimal development, staff and facilities: hence this will be a "wilderness" park.

What have been some of the highlights of your career in parks and natural resource management?

I have been blessed throughout my 40-plus year career in state parks to be able to work in some of the most beautiful and interesting areas found anywhere. Whether it be the varied terrain of the Cumberland Plateau with its deep gorges and numerous waterfalls, or the diversity of plant and animal life, I see something different every day at work. I have been able to work alongside some really great folks who are insightful into the resources that we are blessed with and strategic in their efforts to preserve these areas and educate others about them.

What do you most enjoy about offering the ESS special topics course in natural resources and land management?

It is interesting and challenging to describe the resources that are contained within our public lands, and then to articulate strategies for the preservation of those resources. At the same time, it is important that we allow some access so that visitors can fully understand those resources. Students in the class bring in their own views and experiences, which adds to the overall classroom sharing.

Do you have any advice for environmental and sustainability students who are entering the workforce today?

There are many opportunities to work in professions that take care of our resources. Not only are there the traditional public land agencies, such as state and national parks, the wildlife agencies and forestry, but there are also the environmental agencies such as the EPA. There are opportunities in the assessment groups that work on government contracts as well. Also, the nonprofits such as The Nature Conservancy or TennGreen do great work and offer other employment avenues. If a person wants to make a positive impact on protecting our environment, it is important to analyze their own lifestyles to understand their impacts and to figure out ways to minimize that impact. Real changes begin at the individual level.

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