

TENNESSEE TECH UNIVERSITY | FALL 2021

SOES

School Of Environmental Studies

Newsletter

Message from the Director

It is my privilege to follow Drs. Tammy Boles and Hayden Mattingly in leading the School of Environmental Studies. This is my eighth year at Tennessee Tech, and I have enjoyed immensely working with the excellent team within SOES. As you will see in the following pages, there is much that is happening beyond the classroom for our undergraduate and graduate students, from internships at state parks and a capstone project focused on outreach to women forest landowners to various practical applications of GIS and fascinating karst and herpetological studies. You will also notice that our alumni are engaged in a variety of activities helping to preserve and improve this magnificent planet. Enjoy reading!



Steve Sharp

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BACHELOR OF SCIENCE

Environmental & Sustainability Studies

Capstone Experience

The 2020-2021 ESS capstone students worked with the Director of Forest Carbon Programs, Trisha Johnson, and Conservation Forester, Britt Townsend, at The Nature Conservancy's Bridgestone Nature Reserve to address several needs. One team of students assessed energy use at the facility, focusing on ways to conserve energy and convert to renewables, with a goal of becoming carbon neutral at the reserve. A second team identified small forest landowners in the Upper Cumberland and began developing curricula for training programs for landowners with a specific target of women forest landowners. The 2021-2022 ESS Capstone class will continue with these same projects.

Current Students

Jamie Ownby is a senior in environmental & sustainability studies with a concentration in society, culture, and communication. She is also minoring in social science. Jamie has had the opportunity to intern with the Tennessee State Park Service at Burgess Falls State Park during the Fall 2021 semester. Working for the state park service entails a multitude of different tasks and responsibilities. Various responsibilities of her internship include organization of research, artifacts, and filing historical documents into different categories. Other responsibilities include trail upkeep, general landscaping, and the rehabilitation of wildlife and endangered tree species. Jamie also interacts with park guests by answering their questions about the park and responding to any concerns that may arise. Lastly, she is also helping the state park rangers at Burgess Falls on a new project monitoring trail cams throughout the area. They will use their findings to study the interactions of wildlife within the park. At Tennessee Tech, Jamie also serves in the Evergreen Society as secretary and has participated in Tennessee Tech's Water Professionals club and the Wesley Foundation. Following graduation, Jamie hopes to begin a career doing field work to protect our natural resources and continue to study the complex interaction of human impact on the environment.



Hayley Reed is a senior in environmental & sustainability studies with a concentration in natural resources. She is working as a Tennessee State Park seasonal interpretive ranger at Cummins Falls State Park. During her time there, Hayley has helped build trails, do trail maintenance, reintroduce American Chestnut trees, pick up litter and present programs to the public. She is known as the "recycling queen" at Cummins Falls, as she practices a lot of eco-friendly lifestyle choices, which lead her to winning the Mack Prichard scholarship. She says, "In many ways I am very similar to Mack. I tend to influence the people around me while also protecting the environment as much as I can." On campus, she is the president of the Outdoor Club where she helps host hiking and rock climbing adventures with other students. This fall, she will be taking the capstone course and is looking forward to working with the Nature Conservancy's Bridgestone nature preserve at Chestnut Mountain on educating female landowners about the forest on their properties while finding ways to get the most energy out of solar panels and windmills. After graduation, Hayley hopes to find a job in conservation, but before doing so, she would like to travel abroad and volunteer with conservation groups.

PROFESSIONAL SCIENCE MASTER'S

Concentration in Environmental Informatics

Current Students

Lori Nabors is in her final year of the PSM-EI program. She previously graduated with her bachelor's degree in geology from Tennessee Tech. Currently, she is working on her internship/capstone project with the Tennessee Tech Water Center, in conjunction with U.S. Fish and Wildlife Service, the Southeast Aquatic Resources Partnership, and the U.S. Geological Survey. Lori's thesis project is an analysis of road-stream crossings in the Elk River watershed to address threats to listed and at-risk species. Applying GIS tools available through the U.S.



Geological Survey and LiDAR, her goal is to create a process that can be duplicated for a quick analysis of road-stream crossings. A faster analysis would allow for the prioritization of crossings that pose the greatest threat with minimal on-the-ground effort. She hopes to continue her education at Tennessee Tech working toward her Ph.D. in Environmental Sciences and working on future projects that contribute to environmental conservation.

Olivia Dixon is a current PSM-EI student. Olivia earned her bachelor's degree in geology and environmental studies, with a concentration in geology, from the University of Tennessee-Knoxville. She is currently working in the office of the College of Graduate Studies on a diversity fellowship. Her capstone project is with Putnam County 911 working with real-time water sensors. With this project, she is helping the College of Engineering and university Information Technology Services establish a GeoEvent server for real-time flood sensors monitoring around Putnam County. The research



from this project will help Putnam County 911, so they can use real-time flood monitors in places that are prone to flooding, and therefore, potentially help save lives. Olivia is expected to graduate in fall of 2021.

DOCTOR OF PHILOSOPHY

Environmental Sciences

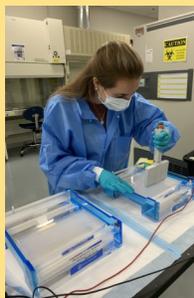
Concentrations in Agriculture, Biology, Chemistry, Geosciences or Integrated Research

Current Students



Rachel Kaiser is an environmental sciences-geosciences student. Her research focuses on studying the prevalence of antimicrobial resistance (AMR) in water resources, which have been established as a hotspot for antimicrobial resistance, threatening

human health through consumption and other routes of exposure in partnership with the USDA Agricultural Research Service and the EPA. The prevalence of antibiotics and AMR have been extensively researched in wastewater, surface water, stormwater, and groundwater, but there has been little focus on karst groundwater, particularly urban karst groundwater, as a reservoir for resistance. This is a serious gap within AMR research and surveillance as nearly a quarter of the global population relies on karst groundwater as a drinking water resource and the complex nature of karst groundwater movement may prove significant in AMR development and dissemination. The goal of this research is to understand the prevalence of resistance within this landscape and how environmental determinants, such as water quality and spatiotemporal trends, could influence the development of AMR in urban karst groundwater. Through this understanding, Rachel can define a potential source of AMR that may need stewardship to combat further source water contamination. This understanding, along with a global and national AMR policy and program analysis, in partnership with the United Nations University Institute for Water, Environment and Health, will also contribute to the development of an integrated framework of antimicrobial resistance stewardship for water resources utilizing the pillars of surveillance, mitigation, prevention, and innovation. After completing her dissertation, Rachel hopes to work with the EPA or the United Nations focusing on water resource stewardship and public health. Rachel's advisor is Tania Datta.



Cody Davis Godwin is an environmental sciences-biology student. His research is on snake fungal disease (SFD), a mycosis affecting numerous North American snake species including snake species in Tennessee. His dissertation focuses on the immunological,



physiological and population effects the novel fungal pathogen, *Ophidiomyces ophidiicola*, has on snakes in Tennessee. One of his dissertation chapters, "Testing the Febrile Response of Snakes inoculated with *Ophidiomyces ophidiicola*, The Causative agent of Snake Fungal Disease," was accepted for publication in the Journal of Thermal Biology and was published in August of 2021. In addition to



publishing his dissertation research, he has also published a SFD information packet for Southeastern Partners of Amphibian and Reptile Conservation (SEPARC). This information packet is intended to be a reference guide for biologists/managers interested in SFD and provides best practice advice to reduce the accidental spread of *Ophidiomyces ophidiicola*. In

addition to studying SFD, Cody collaborates with a team of researchers in the Outback of Australia studying the nesting and spatial ecology of the perentie (*Varanus giganteus*). While his research has been paused due to the pandemic, his team regularly publishes natural history notes and observations on the herpetofauna of the Outback. Cody's primary research interests include herpetology, natural history, reptile and amphibian pathogens and immunology, physiology, reproductive ecology and conservation. While teaching as a graduate student, he has discovered his passion for teaching and intends on teaching at the college level when he completes his degree. Cody's advisor is Chris Brown.

AWARDS & RECOGNITION

Grants Awarded and Research & Creative Inquiry Day Winners

Student Awards

Hayley Reed, an ESS-natural resources student, received a \$1,000 scholarship from the Mack S. Prichard Foundation. Hayley is a Tennessee State Park seasonal interpretive ranger at Cummins Falls State Park. The Prichard Foundation encourages individuals to work in the TN State Parks as a profession.

Rachel Kaiser, an EVS PhD - geosciences student, was awarded the first Dr. Rengao Song Water Research Scholarship from AWWA and Louisville Water Company in the amount of \$10,000 for the upcoming academic year.

Chioma Onwuchekwa, an EVS PhD - chemistry student, recently won the Graduate TA award from the chemistry department. She was also featured on Study International with an [interview](#) about her experience at Tennessee Tech.

Natalie Robbins, '19 P.S.M., recently received the College of Interdisciplinary Studies' 2021 Alumna of the Year award! Natalie currently works as a research analyst with Vanderbilt University's Initiative for Interdisciplinary Geospatial Research where she developed the [Tennessee COVID-19 Data Portal](#) and the [Parsing the Pandemic](#) Grand Challenge Initiative site.

Research & Creative Inquiry Day Winners



Research and Creative Inquiry Day is an annual event designed to promote student research and creative inquiry and provide a venue for presenting that work. This event is open to undergraduate and graduate students from all departments who want to display their research and creative projects.

Congratulations to all our SOES winners below!

PhD Biology Winners: Primary Author, Shrijana Duwadi, and Co-Authors, Spencer Womble and Robert Brown. Their project is titled, [*"The relation of microbial biomass carbon with denitrification and nutrient retention in restored floodplain wetlands."*](#)

PhD Chemistry Winners: Primary Author, Lesta Kocher, and collaborator, Stephen Okine. Their project is titled, [*"A study on the Spectrophotometric Analysis of Hg\(II\) using Dithizone under Conditions Pertinent to Hg\(II\) Reduction in Aquatic Systems."*](#)

Undergraduate Sociology and Political Science Winner: Primary Author, Grady Hicks. His project is titled, [*"Examination of a Bottle Bill in Tennessee."*](#)

Undergraduate Environmental Studies Winners: Primary Author, Mikayla Wood and Co-authors/Collaborators, Caroline Curtis, Jamie Ownby, Kitty Philips, and Kyle Evans. Their project is titled, [*"Providing Resources for Female Forestland Owners."*](#)

ALUMNI UPDATES



Steven Hewett (P.S.M. '16) is still working in Clovis, New Mexico, as a **GIS Specialist**. Over the past year, he has maintained the city's COVID infection map and ran an AI program to evaluate the streets for their Public Works department.

Chuck Sutherland (P.S.M. '16) will be teaching the introductory geology course at Tennessee Tech. This year he is celebrating five years with the **Upper Cumberland Development District**. Currently, he is working on projects to make dashboards for each of our 14 communities for each of the Development District and Human Resource Agency's programs. In March of last year, during the pandemic, his house was destroyed by a tornado, but he was able to live with his brother for four months while it was rebuilt and repaired. Oddly, despite it being such a terrible event, the outpouring of love from his friends and community far outweigh any of the negative.

Rafael Diaz (B.S. '16) has accepted a position at **Henry Horton State Park** in Chapel Hill, Tennessee, as a Horton Inn & Restaurant staff member. The flexibility of this new position will give him the opportunity to enlist in the Army.

Grady Wells (Ph.D. '19) will be teaching Field Investigation in Biology at Sewanee, and Environmental Science at Motlow State Community College during the Fall of 2021. His recent publication with alumna Hannah Wood is titled "**Aggregations of Madtoms and Darters in the Clinch River, Tennessee,**" and is published in *Southeastern Naturalist* 20(2): 259-263.

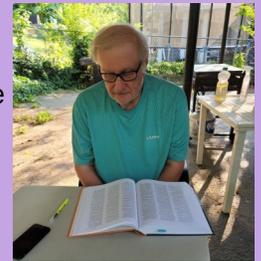
Daniel Adams (P.S.M. '19) is the **SECAS Blueprint Data Science Coordinator**. He recently received the Regional Director's Honor Award for his work on the South Atlantic Coastal Study, Planning Aid Report Team where he served as the GIS Lead.

Javion Lee (P.S.M. '19) is an **environmental scientist** for an environmental consulting firm in Austin, Texas. This year makes two years with the company and he has recently been promoted to senior project scientist!



Oliver Wade (P.S.M. '19) started a new position as a **GIS Specialist** with the City of Cookeville Planning Department in June 2021. His previous position was as a GIS Intern at Oak Ridge National Laboratory. Oliver is pleased to be staying in Cookeville, which he has made his home, where he lives with his partner Chloe and three cats. Oliver is also a member of Cookeville's first improv comedy troupe, Storyteller Improv.

Roger D. Applegate (Ph. D. '19) is working with the **Tennessee Wildlife Resources Agency** as a statewide leader for small game and furbearer programs. He is transitioning away from wildlife health activities by mentoring another full-time biologist and a part-time biologist in program



activities. Extracurricular activities include working on two chapters and the co-editing of a revision of the North American Furbearer Management and lead authoring a chapter for the 9th edition of the *Wildlife Techniques Manual*. He also co-authored two chapters in the book, *Harvest of Fish and Wildlife*, published by CRC Press/Taylor and Francis. He is very active in The Wildlife Society Tennessee State Chapter and International Organization and serves as an associate editor for the *Wildlife Society Bulletin*.

Samantha Allen (P.S.M. '19) is still living in Cookeville, Tennessee, with her husband, Daniel, and their three kids. She has completed her coursework for the **Ph.D. in environmental sciences with a concentration in integrated research** here at Tennessee Tech. She is now working on her dissertation and other collaborative research projects. Her current work is focused on karst features, water quality and aquatic species distributions throughout the Arnold Air Force Base in Tullahoma, Tennessee. Other collaborations she is working on include an assessment of the watersheds affected by the 2020 Putnam County, Tennessee, tornadoes and distribution modeling of the endangered pygmy madtom. She hopes to graduate with her Ph.D. in 2022.

Graduates & Alumni Updates

2020-2021 Graduates

Bachelor of Science

Caroline Curtis
Annabelle Dempsey
Ethan Flowers
Fiona Hayward
Gracie Huff
Sofia Sagan Husin
Liam Linton
Kitty Phillips
Michele Williams
Mark Witt
Mikayla Wood

Professional Science Master's

Bailey Carter
Wesley Giddens
Johnathan Nixon
Melody Phillips

Doctor of Philosophy

Aubree Hill



Continuation of Alumni Updates

Alyson Chin (E.S.S. '19) is currently working at **FAU's Harbor Branch Oceanographic Institute** as an aquaculture lab assistant in Fort Pierce, Florida. Her job focuses on the husbandry of finfish like the Florida Pompano (*Trachinotus carolinus*) and Spawning Bonefish (*Albula goreensis*), and laboratory work, like lipid analysis to assess fish health, the effectiveness of different diets, and more.

Willam Ponder (B.S. '20) is enjoying his second season with **NEON** in their MidAtlantic domain where he is working as a lead field technician. He has also been attending R statistical classes through his job and is excited to develop projects using the data he has collected. Pictured is Will's favorite plot in the Mid-Atlantic domain.



Emma Jones (B.S. '20) recently completed a summer internship at **Bald Head Island Conservancy** performing sea turtle nighttime monitoring and tagging. She patrolled the beach nightly searching for nesting Loggerhead sea turtles (*Caretta caretta*). She applied or identified passive integrated transponders (PIT tags) and flipper tags, took biological samples, took morphological measurements, relocated imperiled nests and conducted nest excavations. She also completed an independent research project that analyzed false crawl and nesting density data from the 2010-2020 seasons to examine the impact of beach re-nourishment on nesting activities. As of October 5th, the season statistics are 93 nests, 128 false crawls, and 77 nests hatched. Emma is currently working in Georgia as a veterinary technician at Hill High Animal Hospital and searching for sea turtle rescue and rehabilitation positions.

FACULTY INTERVIEW

MARK GREEN PH.D.



Tell us a bit about your educational and professional journey that led you to Tennessee Tech.

I was the nontraditional student. I went back to Tennessee Tech after spending a few years in the Army and later working as a dispatcher for Averitt Express. I knew I wanted more out of life and elected to finish my degree in biology. The original plan was to simply earn a wildlife degree and become a park ranger, but one look under the microscope during an ecology class was all it took to shift my direction. I completed my undergraduate degree in microbiology in 1999. I decided that I would continue my studies, at the time I was still working a night shift with Averitt, but after long hours and many sleepless nights, I finished my master's degree in botany by 2005. After that, I was focused on completing my doctorate. I was accepted into the PhD program and worked closely with H.T. Andrews, Ph.D., and John Gunderson, Ph.D. My dissertation completion was somewhat unorthodox as I moved to South Carolina to accept a faculty position with Horry-Georgetown Technical College during the final stage of my degree. During this time, I was accepted as a visiting scholar with Duke University, as well as the University of Alabama where I completed the majority of my lab work and over the course of a couple of years, I was able to complete my research and was awarded my Ph.D. in 2012.

What courses do you teach at Tennessee Tech and what do they entail?

I have instructed Scientific Writing and Grantsmanship in tandem with Hayden Mattingly, Ph.D., during this past fall and spring semesters. Also, several years ago, while working as the laboratory coordinator with the biology department, I instructed botany and genetics.

What aspects of teaching said course do you enjoy most?

I enjoyed the challenge of helping Hayden Mattingly make the most out of our virtual learning experience this past academic year. Of course, Hayden Mattingly has been teaching this course for some time and was able to bring a good deal of experience to the table. I have instructed and developed countless online courses, so the two of us working together was a perfect match.

Why is it important for our students to understand said course?

The EVS 7900 (Scientific Writing and Grantsmanship) course serves as an invaluable tool that provides students with the necessary skills to help them communicate their research more effectively.

What is a fun fact about yourself?

I was the stand-in for Tom Hanks during the making of the movie, *Sully*.

School of Environmental Studies Faculty and Staff

Steven Sharp, Ed.D., Interim Director
ssharp@tntech.edu | (931) 372-6221

Tammy Boles, Ph.D., Associate Professor
tboles@tntech.edu | (931) 372-6123

Hayden Mattingly, Ph.D., Professor
hmattingly@tntech.edu | (931) 372-3698

David Hajdik, M.S., Professor
dhajdik@tntech.edu | (931) 372-6439

Irene Mauk, Administrative Associate
imauk@tntech.edu | (931) 372-6246

Southwest Hall 177 | 200 West 10th St. | Cookeville, TN 38501