

SOES

School Of Environmental Studies

Newsletter

Message from the Director

Greetings and welcome to the spring edition of the SOES Newsletter! I am writing this message on the eve of Earth Day! The “green-up” and spring flowers have been especially beautiful this year in Tennessee. In this issue you’ll find articles about students engaged in internships and community activities along with projects on topics such as stream hydrology, heirloom seed collections and wetlands research. Our capstone students have been studying women-owned woodlands and carbon neutrality for partners such as the Tennessee Chapter of The Nature Conservancy. We are grateful to our wonderful alumni for sending updates and pictures of their latest happenings. Finally, you can read about the SOES leadership transition that will occur this summer with me stepping down as director and Steve Sharp stepping up. It has been a pleasure to serve as director these past seven years and I am glad to pass the baton to the capable hands of Steve with his many talents and abilities. Special thanks to Kate Moffitt and Irene Mauk for their newsletter design and writing skills. As always, please stay in touch with us and keep up the good work.



Hayden Mattingly

Table of Contents

Bachelor of Science	2
Professional Science	
Master’s	3
Doctor of Philosophy	4
Partnerships: SOES	
Local Engagement	5
Alumni Updates	6
SOES Updates	7
Leadership Transition: Hayden Mattingly, Ph.D. & Steve Sharp, Ed.D.	8

BACHELOR OF SCIENCE

Environmental & Sustainability Studies

Student Internships

Fiona Hayward is a senior in Environmental and Sustainability Studies with a concentration in Environmental Technology. She is also minoring in both sociology and geography. This past semester, Fiona completed an internship with the **City of Lebanon's Stormwater Department** where she did data analysis and community outreach. Using the experience she gained from her coursework in the environmental technology program, she says she was well prepared for the fieldwork aspect of this internship such as data acquisition and visual assessment of the stream. Additionally, her courses in ArcGIS and Excel have enabled her to organize the City of Lebanon's stormwater data into easy-to-read maps that have been shared throughout the town in a more organized manner.



As an undergrad at Tennessee Tech, she has had the opportunity to teach labs, hold officer roles in various organizations on campus, such as the Outdoor Club and SOES's very own Evergreen Society, all of which have taught her how to lead the City of Lebanon Stormwater Department's community educational outreach program in the local school systems. She is looking forward to her next project, developing foliage buffer zones along Lebanon's surface waters, and she is researching the sociological and environmental health benefits of introducing additional greenery to the town.

Students in The Community

Kitty Philips is a senior in Environmental and Sustainability Studies with a concentration in Environmental Science with a biology option. Kitty runs her own business, **Kitty's Delights**, where she makes herb and spice blends as well as jams and jellies. She started her business while she was working as a private chef and grew tired of mixing up spices each time she needed a mixture. She started giving them away to friends and family, but as word got around, people wanted to buy them. As a result, Kitty's Delights was born. Kitty has a long list of unique blends and rubs, as well as seasoned salts. Her product list includes a game rub, coffee rub, chocolate rub, and about 20 spice blends, from herbs de Provence to taco seasonings. Her salts include her all-purpose salt blend, smoked salt, truffle salt, basil salt and more. All are hand mixed by Kitty using as many organic ingredients as she can source. She also makes jams and jellies where her jams feature local and in-season fruits and vegetables. Peaches, tomatoes, melons and berries are all among her list of fruits. She produces some unique varieties such as peach and chocolate mint jam, salted cantaloupe jam and carrot cake jam. She also makes several unique jellies including lavender, redbud, basil and wine. She sells her products through Cookeville Locally Grown and at the Walnut Street Market on Saturdays. Cookeville Locally Grown is an organization of local farmers and producers who want to bring local products to the Cookeville area. You can buy their products online or at the Saturday market. Kitty will graduate this spring and plans to continue her education at Tennessee Tech this fall.



PROFESSIONAL SCIENCE MASTER'S

Concentration in Environmental Informatics

Current Student Features

Melody Culver, ESS '19, graduated from the PSM-EI this spring. Her capstone project, titled "Using a GIS Model and Microsoft Excel to Calculate Stream Power and Sediment Transport of a Tennessee Stream for the Estimation of Duration in NRDA Calculations," applies GIS and simple hydrologic modeling equations to help the Tennessee Department of Environment and Conservation (TDEC) with its natural resource damage assessments. This will allow TDEC to charge reparations to individuals who cause damage to water resources. She began working with TDEC during her graduate program as an intern at their Cookeville Environmental Field Office in its Natural Resource Department. Her internship experience alongside her capstone project allowed her to start working with TDEC this spring as an **Environmental Scientist 2** in the groundwater program out of its Nashville Environmental Field Office.

Joe Cook is a current student in the PSM-EI program. He received his bachelor's degree in political science while working for a state representative in Florida and finished it while working as a dispatcher for the Tennessee Highway Patrol. Joe is now a full time communications dispatcher for the **Tennessee Wildlife Resources Agency (TWRA)** in Crossville, Tennessee, and is one of our many students pursuing the PSM-EI on a part-time basis. He is also pursuing supplemental classes in wildlife and fisheries science and hopes to use his degree and experience towards further opportunities within TWRA. He expects to graduate in 2023.



Brandon Yates is currently working as an environmental consultant with TDEC's Division of Water Resources in its Nashville Environmental Field Office. He works with the Natural Resources team which is responsible for making stream determinations, wetland delineations, water quality monitoring, inspecting environmental complaints, and permitting/inspecting both construction sites and alterations to aquatic resources. He has been working on his PSM-EI over the last few years using the tuition waiver available to state employees. His current project uses a maximum entropy (MaxEnt) model to predict suitable habitats and the probability of presence for a species of mole salamander (*Ambystoma barbouri*; "Streamside Salamander"), which was placed on Tennessee's endangered species list in August 2018. He hopes to use presence-only data and environmental predictors along with the MaxEnt program to create a useful tool that will help aid conservation efforts and help regulatory staff and the development community navigate the permitting process in areas where these salamanders breed.



DOCTOR OF PHILOSOPHY

Environmental Sciences

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

Mary Mahan is an environmental sciences-agriculture student. She has been working with a seed collection from the **Sustainable Mountain Agriculture Center (SMAC)**. SMAC houses heirloom bush bean seeds and other crops, such as tomatoes, from Southern Appalachian communities and their families. With over 1,000 lines present in the collection, the goal of her project is to create a core collection to make it more manageable. This process is done by undergoing population genetic studies. Once a core collection is created, the lines will be grown in a field at the Shipley Farm to observe and record their phenotypic characteristics. Some of these characteristics will include flowering time, when the first pod is set, pod color, pod length, etc. One of her goals is to become a part of the academic world and teach those coming to college about plant science. Her advisor is Brian Leckie.



Spencer Womble is a PhD student in Environmental Sciences with a concentration in biology. His research focuses on how hydrology affects ecosystem functioning in restored riparian floodplain wetlands in western Tennessee and Kentucky. Floodplain wetlands function as natural water filtration systems that can reduce downstream nutrient export and improve water quality. To reduce nutrient pollution in agriculture-dominated watersheds, the U.S. Department of Agriculture (USDA) created the Wetlands Reserve Program (WRP) that transitions cropland back to wetlands to restore floodplain wetland ecosystem structure and function. Together they estimate wetland nutrient retention using soil cores collected across the wetlands and expose



them to simulated flooding events. Additionally, they have assembled experimental tubs planted with different types of wetland vegetation to examine how vegetation type and duration of flooding alter nutrient retention potential. Further, they are comparing temporal differences in water surface area among managed shallow water retention areas and beaver ponds. Beavers function as “ecosystem engineers” that can dramatically alter their environment. By comparing beaver-created and human-created impoundments, they can learn how the USDA can improve wetland hydrologic restoration to better mimic natural systems. Evaluating the relationships among hydrology, vegetation and



nutrient retention within these restored wetlands will aid in the planning of future wetland restorations to maximize ecosystem functioning. Funding for this project was provided by **Natural Resource Conservation Service and The Nature Conservancy**. His advisor is Justin Murdock.

PARTNERSHIPS

ESS Capstone Partners with the Tennessee Nature Conservancy

The 2020-2021 ESS Capstone course partnered with the Tennessee chapter of **The Nature Conservancy (TNC)** staff at **Bridgestone Nature Reserve** at Chestnut Mountain. This capstone project was divided into two parts: providing and developing resources for female forestland owners in Tennessee and conducting an energy audit of the Bridgestone Nature Reserve to assist staff with the goal of achieving carbon neutrality.

Women Owned Woodlands

Sixty-five percent of forestland in Tennessee is owned by women, either independently or jointly, but few women-focused resources are available. Capstone students created two databases to enable private forestland owners to realize the full potential of their land and the opportunities available: one as a repository of forestland management resources, funding opportunities and stewardship organizations for landowners, and the other to identify landowners of 10 to 100 acres in the Upper Cumberland. Students also worked to develop curricula to provide educational opportunities specifically for women forestland owners. The course topics include plant identification, foraging, invasive plant eradication and control, watershed ecology, soil ecology, forest management and estate planning. They also identified professionals that are knowledgeable in each topic to serve as potential instructors for the courses. The courses will be taught in a seminar format.

Number of Private Landowner Parcels in the Upper Cumberland	
10-20 acres	80
21-30 acres	104
31-40 acres	62
41-50 acres	66
51-60 acres	43
61-70 acres	26
71-80 acres	31
81-90 acres	21
91-100 acres	16
Total Parcels	449

Number of Current Programs for Landowners	
Federal	12
State	2
Private	2

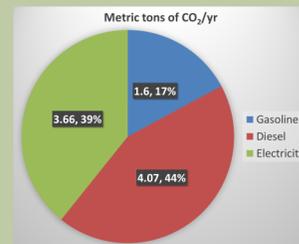
The women-owned woodland group consisted of **Mikayla Wood, Caroline Curtis, Jamie Ownby, Kitty Philips** and **Kyle Evans**. Both databases and the curricula were presented to The Nature Conservancy in Tennessee for their use. They hope that these courses will become an integral part of educating forestland owners in Tennessee about healthy forest stewardship practices. These courses could potentially take place at Tennessee Tech University or the Bridgestone Nature Reserve at Chestnut Mountain. They anticipate the databases that were created can be built upon to further assist private forest landowners in the Upper Cumberland region.

This project won the Research & Creative Inquiry Day Award for the College of Interdisciplinary Studies!

Carbon Neutrality

In an effort to assist TNC with their goal of carbon neutrality, capstone students conducted a basic energy audit for the primary structure (office), as well as secondary structures, vehicles and power equipment, to determine needed energy efficiency improvement. They calculated a rudimentary carbon footprint for the site, based on utility and fuel use data. The energy audit group consisted of **Liam Linton, Riley Roberts, Troy Melton, Sofia Sagan Husin** and **Jake Woody**.

They found that small enhancements, such as adding insulation and replacing appliances, could help to maximize energy efficiency and reduce the carbon footprint at the Bridgestone Nature Reserve.



Students working with GIS analyzed the reserve to determine optimal locations for solar and wind energy usage. The GIS group consisted of **Ethan Flowers, Fiona Hayward** and **Shane Stevens**. They used GIS to determine the best place for solar panels and wind turbines by calculating the solar radiation exposure on the rooftops of the three structures on the reserve (seen right) and the average wind speed on TNC property.



Their final proposal included estimated cost and timeline of transitioning all facilities and equipment from commercial energy production and fossil fuel use to renewable energy. They also identified that use of carbon offsets with forested land is a potential temporary measure to achieve carbon neutrality. Their findings were that full carbon neutrality can be achieved at this facility through a combination of energy use reduction, renewable energy generation, and allocation of a small piece of forested land for carbon sequestration.

ALUMNI UPDATES

Jeff Norman (Ph.D. '03) After an 11-year career with the Jack Daniels Distillery, Jeff transitioned to **Pfizer** in 2015, where he now serves as an oncology account specialist for the state of Tennessee. He still resides in his hometown of Lynchburg, Tennessee, with his wife, Nicole, and two children, Harrison and Hollis.



Amy Stafford (P.S.M. '17) has been living in Idaho Falls, Idaho, working at **Idaho National Lab** where she started a new position in issues management within the environmental support and services division. Her work involves tracking, trending and addressing environmental issues; putting together performance reports for DOE; and collaborating with various organizations and individuals to proactively improve programmatic issues. In her free time, she enjoys skiing, rock climbing and mountain biking.



Johnathan Davis (Ph.D. '10) has been a **professor at Young Harris College** for 10 years now. Last fall he was awarded the Vulcan Teaching Excellence Award by the Vulcan Materials Company and the Georgia Independent Colleges

Association and was promoted to two new roles at the institution. He serves as the chair for the biology department and director of the undergraduate research initiative for the college.

Juan Sanez (Ph.D. '10) was recently hired as an adjunct professor at **Universidade Estadual do Paraná – UNESPAR**, the State University in Parana, Brazil.



Evan Summerville (B.S. '16) is going on his fourth year working at the City of Franklin Tennessee, as a **Water Quality Specialist**. At his job, he currently inspects and manages erosion prevention and sediment control (EPSC) and all green infrastructure installations on about 96 construction sites. He also is in charge of inspecting all stormwater control measures within the city of Franklin (about 3,200 different measures) to ensure that they are functioning properly and are being maintained by best management practices. This year he started a master of engineering degree with a concentration in Construction Engineering Management at the University of Alabama at Birmingham and plans to graduate in 2022.

Samantha Allen (P.S.M. '18) is currently living in Cookeville with her husband, Daniel, and three children Tucker (3), Jack (1), and Emory (newborn). She has finished her coursework and has passed her comprehensive exams for her **Ph.D. in Environmental Sciences – Integrated Research**. 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, tornados and distribution modeling of the endangered pygmy madtom.

Brittany Burke (P.S.M. '19) was promoted from her Geospatial Analyst position at **Wiser Imagery Services LLC** to a **Geospatial Team Lead** position just one year after starting. The publication in which she aided for her internship course has also been published. "A Trail Guide to West Iceland - 17 Top Day Hikes," which features several maps, photos and narratives that she created.



Natalie Robbins (P.S.M. '19) continues to work at **Vanderbilt University** as a research analyst. She has recently purchased her first home in Nashville, Tennessee, and adopted a puppy named Lucy.



SOES UPDATES



SOES Awards

Nick Masto is an environmental sciences – biology PhD student. He won the Best Student Poster Award at the 74th Annual Meeting of the **Southeastern Association of Fish and Wildlife Agencies (SEAFWA)** this year. Nick's poster, titled [“Pre-breeding migration strategies of mallards wintering in the Mississippi Alluvial Valley”](#) detailed an ongoing collaboration with other researchers across the Southeast to understand waterfowl movements in the winter and spring.



Competition for these awards is always fierce so many congratulations to Nick, Abby Blake-Bradshaw and Cory Highway who all worked together on this research project!

Martine Bowombe Toko is an environmental sciences – agriculture student. This past year, she was presented the Sydney B. Meadows Scholarship Endowment Fund Award in recognition of her outstanding scholastic achievement.

Tammy Boles and **David Hajdik** have move their offices into the newly opened Lab Science Commons!



Alumni Updates

Anna Webb (B.S. '19) graduated from **WSU** with her master's this spring. Her manuscript is titled, “Exploring biological and chemical control methods in an integrated pest management approach for mites in honey bee (*Apis mellifera*) colonies.”

Jessi Vannatta (Ph.D. '19) continues to work as an environmental scientist for **California State Parks at Hungry Valley State Vehicular Recreation Area**. She is preparing for her second field monitoring season. In August 2020, Jessi also began a part-time position as an adjunct professor at College of the Canyons (COC), a community college in Valencia, California. She is currently teaching an Introduction to Environmental Science course with a lab and lecture component.



William Ponder (B.S. '20) is currently working as an **aquatic invasive species technician** in Page, Arizona. He has accepted an offer from NEON to return as a fauna team lead technician. He returned to Front Royal, Virginia, in March for the upcoming field season. While in Virginia, he will attend a Wilderness First Aid course so he can apply for a ski patrol position in the NEON off-season.



Aubree Hill (Ph.D. '20) had a busy year! She conducted qPCR screens of wild salamander populations for the presence of the fungal pathogen *Batrachochytrium* salamandrivorans. She became a mother last July and graduated with her Ph.D. in December. She continues to work for the **Department of Biology** as an assistant coordinator, a position she has held since 2013.



LEADERSHIP TRANSITION

Hayden Mattingly, Ph.D., and Steve Sharp Ed.D.

Hayden, tell us about the leadership transition happening in the School of Environmental Studies.

I will be stepping down this summer and Steve Sharp will be assuming the director duties beginning officially on August 1, 2021. I thoroughly enjoyed my seven years as director but realized that I was ready for a change in duties. I was excited to learn that Steve was interested in this opportunity because he brings a wealth of leadership experience to the table, and he understands our student-centered priorities. I will be staying on with the school as a regular professor.

Steve, why were you interested in this leadership opportunity?

Dr. Mattingly has done an excellent job in building a cohesive team within our school. I do not want us to lose that. I want to build on it. While initially hesitant when approached about this opportunity, I have become increasingly excited about building on the solid foundation that Hayden has established.

Hayden, how has SOES changed and grown over the years?

When I assumed the director duties in 2014, our school was still quite young and we had a total enrollment of about 25 students spread across the three degree programs. Our enrollment has climbed steadily and today we have over 100 students majoring in Environmental and Sustainability Studies, Environmental Informatics, and Environmental Sciences. Also, when I first started, we only had one full-time faculty member, Tammy Boles, and one full-time staff member, Irene Mauk. Now we are fortunate to have four full-time faculty members along with a talented group of adjunct faculty. Other notable changes include our dual enrollment agreements with high schools in Nashville, the development of a fully online delivery format for the Environmental Informatics master's program, and the addition of three new concentrations in the Environmental Sciences doctoral program. We also recently added three new minors available to undergraduate students across campus: Natural Resources, Parks and Protected Areas, and Environmental Sustainability. It has been an adventurous time!

Steve, what are some of your goals during your first few years as SOES director?

While these are not explicit goals, I have some potential areas of focus for us in the next few years. For one, we have recently begun revamping our ESS program requirements. We will continue to fine tune those for the benefit of our students. Additionally, we have added some valuable new minors. We will begin promoting those. I would also like to expand the reach of our very accessible PSM program. This program provides students with extremely valuable and marketable skills. I would like to see this program grow globally. Another opportunity for us is to expand our network of potential employers and internship partners. We have had many students discover their career paths and even obtain employment because of successful internship opportunities. I hope we can build an even larger network of entities to partner with. Finally, it is vitally important for us to remember to continuously work to help our students better prepare not only for rewarding careers, but also to be productive contributors and leaders in building, the common good, a sustainable common good.

School of Environmental Studies Faculty and Staff

Hayden Mattingly, Ph.D., Director

hmattingly@tntech.edu | (931) 372-3698

Tammy Boles, Ph.D., Associate Professor

tboles@tntech.edu | (931) 372-6123

David Hajdik, M.S., Professor

dhajdik@tntech.edu | (931) 372-6439

Steven Sharp, Ed.D., Senior Lecturer

ssharp@tntech.edu | (931) 372-6221

Irene Mauk, Administrative Associate

imauk@tntech.edu | (931) 372-6246

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

8

Tennessee Tech does not condone and will not tolerate discrimination against any individual on the basis of race, religion, color, creed, sex, age, national origin, genetic information, disability, veteran status, and any other basis protected by federal and state civil rights law. Tennessee Tech complies with Title IX and prohibits discrimination on the basis of sex in education programs and activities, admissions or employment.

Publication # CISR140-PRNT-21

Inquiries regarding non-discrimination and affirmative action may be referred to the Director of Affirmative Action, Derryberry Hall 156, Box 5132, Cookeville, TN 38505-0001, 931-372-3069, equity@tntech.edu. Inquiries regarding Title IX may be referred to Tennessee Tech's Title IX Coordinator, Derryberry Hall 256, 931-372-3112, titleix@tntech.edu, or to the U.S. Department of Education Office of Civil Rights, 800-421-8339, OCR@ed.gov.