Tennessee Tech University | Winter 2016-2017

SOES

School Of Environmental Studies

Newsletter

Message from the Director

Welcome to the second issue of our school's newsletter! It has been a busy semester and we are excited to share our latest happenings. In this issue, you can learn about student research projects, conference presentations, awards, internships and other activities. Our student club, the Evergreen Society, has been especially active this year and we have a page highlighting their efforts. Several of our wonderful alumni sent updates that are included here. We also have an interview with Tammy Boles, who was the first faculty member to join our school after its creation four years ago. When previewing this issue, I noticed that our students and faculty are interacting with a wide array of community organizations and governmental agencies. We thrive on these connections and look forward to strengthening them as our programs continue to grow. Thanks to all who contributed to this issue, especially Amy Stafford for her writing and design work. Please stay in touch by sending updates and ideas for future newsletters. Here's wishing everyone a productive and rewarding new year!

Hayden Mattingly

Table of Contents

Bachelor of Science 2

Professional Science Master's 3

Doctor of Philosophy 4

Student Activities: The Evergreen Society 5

Alumni Updates 6-7

Honors and Awards 7

Faculty Interview: Tammy Boles, Ph.D. 8

Bachelor of Science
Environmental & Sustainability Studies

Undergraduate Research

Grady and **Sara** presenting their poster at Tennessee Academy of Science

ESS student **Sara Kenney** was awarded one of the **Creative Inquiry Summer Experience (CISE)** grants offered to undergraduates at TTU, with Hayden Mattingly serving as her faculty mentor. During summer 2016, Sara had the opportunity to work with Mattingly, Environmental Sciences Ph.D. student **Grady Wells** and Earth Sciences faculty member Jeanette Wolak on their research of habitat requirements for madtom catfishes in the Clinch and Duck rivers in Tennessee. Sara and Grady collected fish and sediment samples at various study sites, sorted sediments in the laboratory and then described sediment preferences of the mountain madtom in the Clinch River. Sara recently presented her team's research at the annual Tennessee Academy of Science meeting at Austin Peay State University in Clarksville. Sara stated that the CISE program is a great opportunity for undergraduates to get research experience, which in turn makes it easier to apply for graduate school and jobs.

Internships and Extracurricular Activities

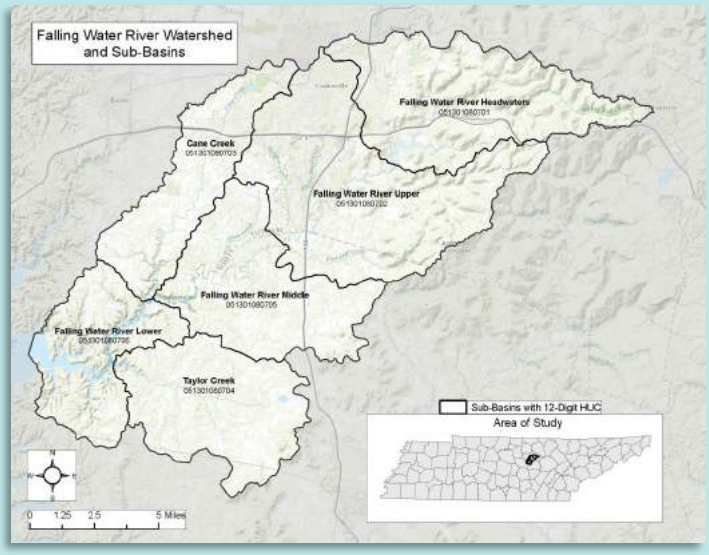
Along with undergraduate research projects, ESS students have been taking advantage of internship opportunities and a number of other extracurricular activities this year. For example, **Sara Kenney** completed an internship this fall with the Tennessee Department of Environment and Conservation at the agency's Cookeville Environmental Field Office. This spring, **Kevin Turner** and **Emily Warren** are beginning internships with the U.S. Fish & Wildlife Service at the Tennessee Field Office, also located in Cookeville. Through ESS, **Lindsay Mills** started working for the **Keep Putnam County Beautiful Clean Commission (KPCBCC)** during her freshman year. She began as a student intern working for volunteer credit hours and then joined the committee as a board member and now is serving as vice president. In addition, she is currently a student intern in the TTU Office of Sustainability, working with DeLayne Miller. As another intern for KPCBCC, **Rafael Diaz** has worked with several environmental organizations. His internship included partnering with **White Plains Academy** to reduce food waste in the cafeteria, as well as teaching sustainable gardening practices to 2nd graders at **Northeast Elementary**. In addition, Rafael presented Property Enhancement Awards to several Cookeville residents during August 2016, which was later featured in Cookeville's newspaper, *The Herald-Citizen*, on September 18.

Lindsay in a promotional video for KPCBCC.

Rafael holding an educational board for Northeast Elementary

Professional Science Master's
Concentration in Environmental Informatics

P.S.M. student **David Bailey** has been working on the Falling Water River Watershed project funded by the **Tennessee Department of Environment and Conservation** under the direction of Tania Datta in the TTU Water Center. David is utilizing his GIS skills and database management knowledge to compile and create a geodatabase (a collection of spatial databases) of numerous sources of data from different agencies involved in the management of the watershed. The Falling Water River watershed includes the City of Cookeville and has a number of impaired tributary streams with water quality issues that could be improved for current and future users. The goal is to achieve a product which can be utilized by different organizations that have an interest in the watershed as a means to search, acquire and share available data detailing the watershed. The geodatabase will improve the efficiency of watershed management by making data available to researchers, managers and other key stakeholders.



Ernesto Sanz Sancho began the P.S.M. program this fall and works as a teaching assistant for Earth Sciences and Environmental Studies courses through his graduate assistantship with the School of Environmental Studies. For his internship, Ernesto is working with the **U.S. Fish & Wildlife Service** under the guidance of his TTU supervisor, Peter Li, studying Short's Bladderpod (*Physaria globosa*), an endangered species from the mustard family. The species typically grows on sloping outcrops or cliffs near rivers in Kentucky and Tennessee, with a single population occurring in Indiana.


© U.S. Fish & Wildlife Service

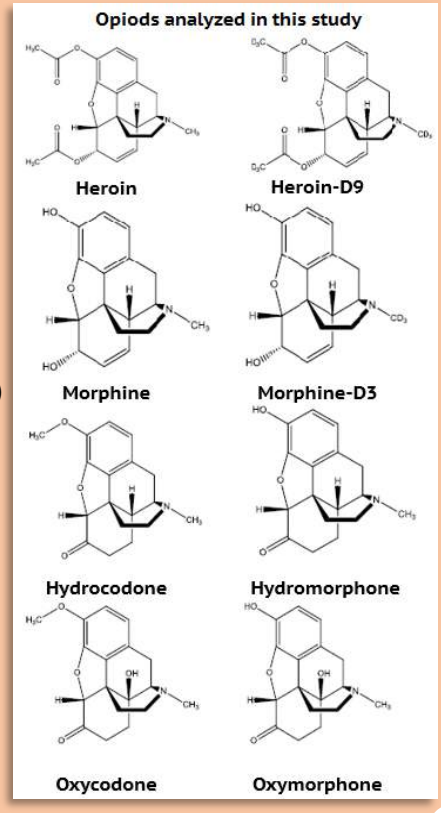
The main threats to this species are habitat loss due to human development and overshading due to vegetation succession and invasive non-native plants. For his project, Ernesto will be modelling the bladderpod's distribution using its location and environmental variables such as precipitation, digital elevation models, slope and geology. He is currently working on preparing the data to be compatible with MaxEnt, a species modelling software. The final aim is to produce a map showing the areas of optimal and suboptimal conditions for Short's Bladderpod and, if time allows, to find new populations in areas of optimal or suboptimal conditions where no populations have been previously recorded.

Doctor of Philosophy

Environmental Sciences

Concentrations in Biology or Chemistry

Faranak Mahmoudi is an Environmental Sciences-Chemistry student studying the detection and measurement of opioid compounds in urban wastewater and surface water. The rate of consumption of opioid painkillers in Tennessee is higher than the national average, so there is an urgent need for research in this area. By determining the concentration of opioid compounds in untreated wastewater, it is possible to back-calculate the measurements to accurately quantify the intake of drugs by the local population. Faranak is using multiple analytical approaches in the lab including liquid chromatography, mass spectroscopy, nuclear magnetic resonance spectroscopy and computational programs to determine the molecular structure of the opioids in solution. Faranak recently presented her work at the American Chemical Society's (ACS) national meeting in Philadelphia as well as at the Southeastern Regional Meeting of the ACS in Columbia, South Carolina. Faranak's advisors are William Carroll and Tammy Boles.



Environmental Sciences-Biology student **Aubree Hill** is working to develop a treatment for amphibians infected with a deadly fungus called *Batrachochytrium dendrobatidis* (*Bd*). She is specifically researching the salamander microbiome—or community of naturally occurring bacteria on the skin—and whether it can inhibit or eliminate growth of the fungus. Aubree and her team captured, swabbed and released more than 350 salamanders this year. They then isolated the bacteria from the swabs and challenged them against *Bd* to determine their ability to inhibit fungal growth. These so-called candidate probiotic species may then be recommended for therapeutic treatments of infected amphibians. Aubree also hopes to gain a better understanding of the structure of the amphibian skin microbiome as a whole and whether it varies across taxonomic groups of salamanders, habitat types and seasons. She will use TTU's new Illumina MiSeq DNA sequencing instrument to help make these comparisons.

Aubree recently presented her research on the salamander microbiome at the Tennessee Herpetological Society annual meeting in Knoxville. Her advisor is Donald Walker.

Student Activities

The Evergreen Society

The **Tennessee Tech Evergreen Society** is a campus organization devoted to promoting environmental awareness among students, faculty and the community at large through education and active service within the university campus and around Cookeville. Founded in Spring 2016, the Evergreen Society aims to bring students and faculty together under the common goal of promoting sustainable practices and bettering the environment.

This fall, the Evergreen Society kicked off the semester by participating in Dancing on Dixie, where members passed out free reusable glass mason jars to promote zero waste. Many new members joined after the club held a hike and picnic at Cummins Falls and picked up trash along the way. The club then participated in a campus-wide campaign called Zero Emissions Week alongside Bike Share and the Sustainable Campus Committee and promoted low- or zero-emission methods of commuting.

In addition, the Evergreen Society has participated in multiple cleanups, including the Window Cliffs State Park Annual Cleanup, and periodically cleans up Cedar Avenue in Cookeville as a part of Adopt-a-Road.

Currently, the group meets on the first Tuesday and third Thursday of each month at 11 a.m. in Southwest Hall.

For more information, contact club president **Lindsay Mills** at lemills42@students.tntech.edu

Window Cliffs State Park
FIRST ANNUAL CLEANUP
September 24, 2016

Alumni Updates

Juan Sánez (Ph.D. '10) will soon be entering his fourth year as a post-doc within the **Hydric Resources and Environmental Engineering Graduate Program** at the Federal University of Paraná, ranked among the top 10 universities in Brazil. His lab, led by Sandro Froehner, is currently researching petroleum geochemsitry and its relation to the environment and is specifically working to track and understand pollution, paleoclimate and land use using different biomarkers, such as n-alcanos, fatty acids, PAHs, fecal sterols, bile acids and several other molecules.

Russell Skoglund (Ph.D. '15) recently moved to Baxter, Tennessee, to continue to work as a Wildlife Manager 3 in Region 2 (middle Tennessee). He is currently a member of the **Tennessee Wildlife Resources Agency** (TWRA) Deer Team, Bear Team and Cougar Action Team. His main job responsibility is assisting in the writing of the management plans for each of these species. His current emphasis is to document black bear population expansion, collect cervid retropharyngeal glands to be analyzed for chronic wasting disease (CWD) and document occurrences of cougars in Tennessee. Russell is in his 34th year of wildlife management and 32 have been with TWRA.

At the start of the new year, **Joe Martin** (P.S.M. '14) will be moving into a new role with a new company as a land surveyor after working for two years in the telecom industry as a fiber engineer. Joe hopes to use this experience to obtain his Registered Surveyors License in the future. Joe, his wife and their recent son live in Denver, Colorado where they enjoy trips to the mountain with their golden retriever, Strider.

In November, **Taylor Frye** (B.S. '16) started in a full-time position as a water compliance specialist in the Environmental Protection Services Division at **Oak Ridge National Lab** after completing a summer internship through the Higher Education Research Experiences Program. In this position, Taylor works with environmental regulatory compliance to improve the reservation's water quality through team-directed research projects with the Water Quality Protection Plan.

In January, **Matt Snider** (P.S.M. '15) will be relocating to Lafayette, Louisiana, to continue work with the **U.S. Fish & Wildlife Service**. He will be working with the Gulf Restoration Program conducting GIS analysis and creating maps to help restoration efforts that are a result of the 2010 Deepwater Horizon Oil Spill.

Ian Jasitt (P.S.M. '16) shared that he underwent corrective surgery for sleep apnea, which should help improve his overall health. After fully recovering from his surgery, Ian plans to begin looking for employment within a state or federal environmental agency in early February 2017. His goal is to work for approximately two-to-three years within the GIS field before looking for a similar job in Scotland, where he hopes to live and work permanently.

Honors and Awards

In October 2016, Environmental Sciences-Biology Ph.D. student **Roger Applegate** received a prestigious inaugural award from **The Wildlife Society** (TWS). TWS recently established the W.L. McAtee and G.V. Burger Award for Outstanding Service as an Associate Editor. McAtee was the founding editor for the *Journal of Wildlife Management*, serving in the role from 1937 to 1942, while Burger was the first editor of *The Wildlife Society Bulletin*, serving 1973 to 1975. Roger was notified that he was selected among the associate editors for *JWM* and *WSB* as the first recipient of the award. The official presentation came at the TWS Annual Conference in Raleigh, North Carolina. Roger serves the **Tennessee Wildlife Resource Agency** as its Furbearer, Small Game and Wildlife Health Program Leader. TWS has been influencing the future of wildlife and wild places for the benefit of generations to come. Founded in 1937, TWS's mission is "To inspire, empower and enable wildlife professionals to sustain wildlife populations and habitats through science-based management and conservation." TWS enhances its nearly 10,000 members' networking and learning opportunities, professional and career development and provides numerous ways for them to get more involved in creating a better future for wildlife and their habitats. TWS's Awards Program annually honors professional excellence, recognizes outstanding achievement and highlights contributions to wildlife science and management. Through the years, many new awards have been established, including the one that Roger received this year, to recognize accomplishments in wildlife publications, management, science and professionalism. Special recognition by TWS promotes the professional growth of its members, provides membership with role models and strengthens the image of its membership in the eyes of their peers, employers, leadership and society. Roger's advisor at TTU is Steven Hayslette.

Roger Applegate (left) receiving his service award from the President of TWS, **Gary Potts**.

Article modified from an original by Lee Wilmot, TWRA. Used with permission.

Daniel Samples (B.S. '16) lives in Cookeville while working remotely for **TechEmergence**, a Silicon Valley market research firm specializing in machine learning and artificial intelligence. His job has given him the opportunity to travel to San Francisco and work with some of the biggest tech companies, including Google, Facebook, Airbnb and Accenture.

Chuck Sutherland (P.S.M. '16) is working at the **Upper Cumberland Development District** providing GIS support for Economic & Community Development. His work tasks are varied and include GIS and demographic analysis, cartography, assisting in surveys and helping communities apply for grant money. Chuck's photography has been used on a number of projects, including some regional advertising that may appear on billboards on I-40 in the near future.

university innovation fellows

d. HASSO PLATTNER Institute of Design at Stanford

Justin Medley (P.S.M. '16) is pursuing a Ph.D. in engineering with a concentration in computer science at TTU. He was accepted and confirmed as a University Innovation Fellow by **Stanford University**. The fellowship involves webinar trainings, networking with fellows from other universities and will incorporate a Silicon Valley meet-up this fall with over 1,000 UI fellows. There, Justin will research the interface of HoloLens, virtual reality and the music industry in a partnership between Stanford, Microsoft and Pandora.

Faculty Interview

Tammy Boles, Ph.D., Assistant Professor

Tell us a little about your background. What brought you to the position you are currently in?

I was actually an undergraduate student at TTU for three years. I met my future husband here, married him and then we moved to Columbia, South Carolina. While he worked on his Ph.D. in chemistry, I finished my B.S. in chemistry and then my M.S. in chemistry at the University of South Carolina. In 1994, we found our way back to Cookeville and I worked in the TTU Water Center as a metals chemist for 10 years. In 2004, I was hired to be a coordinator and academic advisor in what was then the School of Interdisciplinary Studies and Extended Education (ISEE). I was able to work on and complete my Ph.D. in Environmental Science-Chemistry in 2009. In 2012, ISEE became the College of Interdisciplinary Studies, and the School of Environmental Studies was created under the college. I applied for a tenure-track position and became the first assistant professor in the School of Environmental Studies in January 2013.

What is your favorite thing about your current position?

I've always liked working at the university. I think it keeps me young, and I get exposed to new ideas. I like teaching our students, although I would have never dreamed that I could teach.

On a day-to-day basis, what do your normal tasks look like?

I usually teach classes two days each week, and on the day in between, I hold office hours. I try to keep one to two days open each week for research. My research lab is in Foster Hall, so I usually spend two days each week there.

Are you currently doing any research and do you have opportunities for students to get involved?

Yes, my research is on licit and illicit drugs in wastewater. I currently supervise research for a doctoral student, a master's student, and five undergraduate students. Of these seven students, two are within the School of Environmental Studies, with the doctoral student in the Environmental Sciences-Chemistry concentration and an undergraduate student in the Environmental Science-Biology option.

What advice would you give students who are preparing to enter the environmental workforce or attend graduate school?

I always encourage students to participate in some type of undergraduate research, whether it's with me or another professor on campus. I think that gives students valuable experience that sets them apart from other students who apply for graduate school or for a job. I also encourage students to take the internship class, ESS 4900. We've had several students take the class, and all of them thought it was beneficial.

School of Environmental Studies Faculty and Staff

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

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

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

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

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

Publication # CISR172-PRNT-17

The TTU policy on nondiscrimination can be found at www.tntech.edu/aa.