

SOES

School Of Environmental Studies

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Newsletter

Message from the Director

Welcome to the Winter 2019-2020 edition of the SOES Newsletter. Exciting things are happening with all of our degree programs. Our undergraduate students have participated in internships from Cookeville all the way to the other side of the world. This past summer, students participated in programs in Costa Rica and Hawaii. The Evergreen Society members continue to promote environmental stewardship and bring attention to our carbon footprint. Our graduate students in the PSM-EI and EVS PhD programs are also staying busy with their projects and research. Their work addresses many different environmental problems in areas ranging from the sky to below the water's surface and everything in between. I hope you enjoy this newsletter, and don't forget to let us know anything exciting that is happening in your life. Thanks so much to Irene Mauk and Bailey Carter for putting the newsletter together.



Tammy Boles

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BACHELOR OF SCIENCE

Environmental & Sustainability Studies

Student Internships



During summer 2019, **Emma Jones** interned at the **Ostional Wildlife Refuge** in Costa Rica, working on a sea turtle conservation project. Emma heard about this opportunity through the Study Abroad office on campus. During her time there, she conducted hands-on research with **Olive Ridley Sea Turtles**, including counting eggs, recording measurements and nesting locations of turtles. Emma also did hatchery maintenance, beach clean ups, nest densities and transect sampling. Once every month, there was an “arribada,” which means mass arrival, where hundreds to thousands of sea turtles would arrive on the beach in the span of 3-5 days. This was the busiest time spent on the refuge; every night you could expect to see hundreds of sea turtles lining the beach.



Madison Lester completed a month-long internship in Maui, Hawaii, with the **Hawaii Wildlife Fund** during Summer 2019. She spent the majority of her time at Ho’okpia beach working to collect data on how many **green sea turtles** beached every day and how many tourists were around. At times, they recorded more than 100 turtles on the beach. Madison also helped educate the public on the turtles’ behaviors, why they were endangered and the laws for endangered species. Along with this, she also participated in a few beach cleanups. The biggest area was a place called “Jaws” which hosts a big wave surfing competition every winter. They cleaned up debris deposited by a Japanese tsunami many years ago. About halfway through her internship she also started doing Dawn Patrols where she looked for **hawksbill** turtle tracks in the mornings leading to possible nesting sites. Madison was also invited to a city council meeting and the case at hand was Hawaii Wildlife Fund v. County of Maui and involved pollution discharges under the Clean Water Act.



On-Campus Involvement

Students in the **Evergreen Society** recently participated in the **Recycling Center Adoption** program and cleaned up the recycling center behind Tech Village. The society has future plans to hold a fundraiser for the **Sierra Club** where students will have the opportunity to calculate their carbon footprint and learn about climate change and ways to help. The Evergreen Society participates annually in **Earth Day Celebrations** as well as holding cleanups throughout the area.

If you are interested in becoming a part of the Evergreen Society please reach out!

Email: evergreensocietyttu@gmail.com

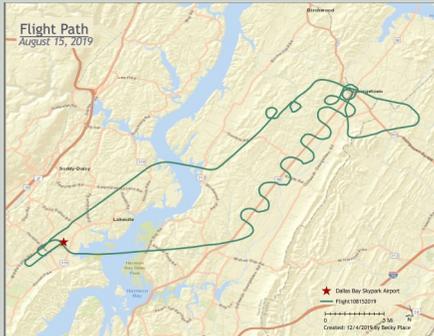
Instagram: [@ttuevergreensociety](https://www.instagram.com/ttuevergreensociety)



PROFESSIONAL SCIENCE MASTER'S

Concentration in Environmental Informatics

Professional science master's student **Becky Place** spent ten months recording flight and fuel data with **Hixson Aviation** in Hixson, Tennessee. For her internship, Becky worked closely with the Hixson Aviation Chief Pilot Paul Ibach, the flight instructor staff, as well as student and licensed pilots to obtain data crucial to training aircraft performance. She also spent time with an airframe and powerplant mechanic to learn about aircraft engines. The Hixson Aviation training aircraft fleet consisted of two Cessna 172 Skyhawks, two Cessna 152s and one Cessna 152 Aerobat. Becky



used her GIS skills to analyze and compare fuel aircraft performance with aircraft manufacture performance charts. Using GIS, Becky was able to produce training flight paths, analyze a mock emergency off-field landing, compare climb-out performance and calculate actual fuel consumption for each training aircraft. Data was specifically obtained throughout the year for seasonal affect. Since fuel management is the sixth leading cause of aircraft accidents, Becky wanted to look closely at fuel consumption. After analyzing over forty-five training flights, Becky was able to obtain average seasonal fuel consumption for each Hixson Aviation training aircraft. Knowing how the training aircraft respond seasonally can assist pilots in flight planning and will hopefully prevent some aircraft accidents.

Wesley Giddens is a second year PSM-EI student. Originally from Tampa, Florida, Wesley earned his bachelor's degree in Environmental Studies, with a concentration in Ecology and Biology, from the University of North Carolina, Asheville. It was during this time, while collaborating with the N.C.



Wildlife Resource Commission on an undergraduate research project, that his passion for aquatic organisms, crayfish in particular, emerged. After graduation, Wesley worked as an aquatic biological technician at the Joseph W. Jones Ecological Research Center in southwest Georgia. There, he continued pursuing his passion by working with a wide variety of aquatic critters in a number of unique habitats. After his wife, Jessica Davis, completed her Master of



Science in Ecology at the University of Georgia, they spent six months journeying across the United States. Highlights of their trip include swimming in Crater Lake, rafting the Clark Fork, and boldly navigating their Toyota Yaris up treacherous forestry roads. Wesley's graduate assistantship is supported jointly through **The Water Center** and **Tennessee Wildlife Resources Agency (TWRA)**. Under the advisement of Hayden Mattingly, Ph.D., he is currently studying the life history of the Brawleys Fork crayfish (*Cambarus williamsi*), a near threatened species endemic to central Tennessee. In addition, he will be assisting fellow Ph.D. student Tanya Kahn on an upcoming habitat study of the Brawleys Fork crayfish. Wesley is excited to be a part of the PSM-EI program, as it gives him the opportunity to further develop his biological interests through data and spatial analysis.



DOCTOR OF PHILOSOPHY

Environmental Sciences

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

Tanya Khan is a first-year Environmental Sciences – Biology Ph.D. student. Her research interests lie in freshwater systems, specifically in the ecology and conservation of crayfishes. The southeastern United States is a biodiversity hotspot for freshwater organisms, and it holds the highest number of crayfish species in the world. In North America, over 77% of the 500+ crayfish species known to science are considered imperiled. Despite the region’s diversity, there is a lack of basic data such as distribution and ecology; in some cases the species has not even been described yet. Baseline data helps stakeholders assess the conservation needs of a species or ecosystem and develop management plans. Freshwater ecosystems are becoming increasingly degraded by human impacts and with more data, scientists and managers can build more effective and efficient conservation strategies. In the hopes of filling a small part of the



knowledge gap, Tanya’s current research focuses mainly on the Brawleys Fork crayfish (*Cambarus williamsi*). This species is a Tennessee endemic, meaning it occurs only in this state, restricted to two counties: Cannon and Warren. The Brawleys Fork crayfish is a state endangered (S1) species. The study is supported by the Tennessee Wildlife Resources Agency (TWRA) and Tennessee Tech’s Water Center. PSM-EI student Wesley Giddens has begun a life history study (data on reproduction, growth, etc.) and will also be assisting Tanya with a study on habitat utilization of adults versus juveniles. Tanya is under the advisement of Hayden Mattingly.



Sabrina Buer is an Integrated Research Environmental Sciences Ph.D. student, under the advisement of Pedro Arce. As the amount of human and industrial waste in the environment



increases, the need for more effective and efficient water treatment methods is higher than ever. Current wastewater treatment processes have been found to be ineffective against a growing number of contaminants, including pharmaceutical compounds. This coupled with the necessity for pharmaceutical-free water and affordable, clean, and easily-produced energy, such as hydrogen gas, is a growing societal need. Sabrina’s research project will address these issues from two perspectives: (1) the photocatalytic degradation of a chosen pharmaceutical contaminant via ultraviolet light and platinum-doped titanium dioxide thin films (*first figure with the TiO₂ molecule*),

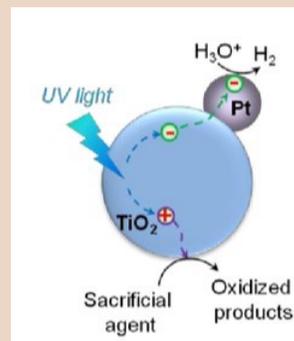


Figure 2

Mass	$-2\bar{v}_z \left[1 - (r/R)^2 \right] \frac{\partial c_i}{\partial z} + \frac{1}{r} D_i \frac{\partial}{\partial r} \left(r \frac{\partial c_i}{\partial r} \right) + \Omega_i = 0$	(1)
Reaction Rate	$\Omega = k I_{r,z} C_A$	(2)
Radiation	$\frac{1}{r} \frac{\partial}{\partial r} (r I_r) = \pm I_r$	(3)

Figure 3

and (2) a mathematical model of the radiation field inside the reactor. The mathematical model is based on the Species Mass Conservation Equation (1) and the Radiation Conservation Equation (3), which are coupled by way of the Reaction Rate Equation (2) (shown in the third figure). The experimental and mathematical approaches in this research project will be used to develop an up-scaled model of the reactor for use in industry.

PARTNERSHIPS

Tennessee Tech Office of Sustainability

In fall 2015, the Office of Sustainability was established to help with the promotion and documentation of sustainable initiatives on Tennessee Tech's campus. From the student-funded Green Fee that is collected, Tennessee Tech has implemented a free Bike Share Program, created a Green Fitness Room, purchased electric vehicles, installed hydration stations and many other sustainable projects that promote a sustainable and



green campus. The Office of Sustainability also serves as a great partner for the School of Environmental Studies.



The Office of Sustainability has partnered with several of the Senior Capstone groups to help with projects. Funding was provided to the 2018 capstone class for upgrades to Tennessee Tech's Appalachian Center for Craft including outdoor LED lighting, bottle refill stations and a recycling, composting and trail maintenance student worker position. The capstone class of 2019 participated in the Putnam Proud Trash-Off, along with other campus

organizations, in which the Office of Sustainability provided the students with clean-up supplies as well as the application fee for the event. All funding was provided through the Green Fee.

The Office of Sustainability works closely with The Evergreen Society and its members. Participation in Earth Day and Sustainability Day Celebration is a major focus of the club. Many students and faculty from the School of Environmental Studies also serve on the Sustainable Campus Committee, where members can vote on the disbursement of the student Green Fee and other sustainable initiatives throughout campus.





ALUMNI UPDATES

Russell Skoglund (Ph.D. '15) is starting on his 36th year with the **Tennessee Wildlife Resources Agency (TWRA)**. It has taken a definite new twist since last hunting season when Chronic Wasting Disease (CWD) was found in the southwest portion of the state. As an agency, they are all hands on deck to slow the progression of the disease. Russell is also teaching at Cumberland University in Lebanon as an adjunct faculty instructor.

Amy Stafford (P.S.M. '17) recently moved to Idaho and started a job at **Idaho National Laboratory (INL)** working as an environmental compliance professional. Amy's work is focused on National Environmental Policy Act (NEPA) Compliance, and she is working on updating INL's NEPA process and increasing engagement with key personnel. Amy also had an opportunity to return to Africa this past May and spent two weeks in Zimbabwe connecting with multiple organizations and ministries. Currently, Amy is taking courses for a Master Gardener certification in the hopes of developing a sustainable community gardening program through her church.



Kristin Willis (B.S. '18) previously worked for the **Tennessee Division of Forestry** as crew lead of the HWA strike team. Her crew traveled to state parks and conservation easements treating the hemlock trees from the invasive species, the woolly adelgid. They treated 867 acres and nearly 10,000 trees in four months. Currently, Kristin is working for **Tennessee State Parks** as a park ranger at South Cumberland State Park.

Robert Paine (Ph.D. '19) currently lives in Cookeville, Tennessee, with his husband, Sawyer. They were married on



Halloween 2019. He has been working as a post-doctoral researcher at Tennessee Tech under Mark Rogers in the **Cooperative Fishery Research Unit** in the Biology Department. As a molecular ecologist, he uses his skills to monitor and track the presence of various animals, e.g., fish and insects, using the DNA in the environment. He is slated to travel to Puerto Rico in Spring 2020 to monitor the invasion of an African walking catfish.

Jessi Vannatta (Ph.D. '19) moved to California shortly after graduation to start her new position as an environmental scientist with the **California Department of Parks and Recreation**. She is stationed at Hungry Valley State Vehicular Recreation Area. Jessi is responsible for monitoring all vegetation and wildlife within the park to make sure there is a balance between conservation and management of natural resources and recreation.



Grady Wells (Ph.D. '19) is the chemistry lab coordinator at **The University of the South** in Sewanee. In this position, Grady sets up instructional labs, manages work study students, tutors and graders; manages hazardous waste; and orders supplies for the chemistry department. Grady started the position in August 2019. Pictured is Spencer Hall where Grady works.





SOES UPDATES

ALUMNI UPDATES CONT.

Alumni Updates

Natalie Robbins (P.S.M. '19) recently relocated to Nashville and accepted a job as a research analyst at Vanderbilt University. She is funded under the **Vanderbilt Initiative for Interdisciplinary Geospatial Research (VIIGR)** and collaborates on spatial projects with faculty across campus, as well as community partners.



Li Sun Chin (B.S. '19) moved to Florida for an internship with **Gulf Specimen Marine Lab.**

They collect all types of sea life from the Gulf of Mexico for universities and aquariums all over the country. Their customers include Yale, Harvard, the Georgia Aquarium and even our very own Tennessee Tech! After her internship, Li was then hired to work as an aquarist. Her days are very different with work consisting of web design, water chemistry, feeding sharks, diving for urchins and giving guided tours for school groups. Li is currently planning on applying for grad school to get a master's in marine biology.



Oliver Wade (P.S.M. '19) began an internship working at **Oak Ridge National Laboratory (ORNL).** His job is split between the Fields & Operations and Environmental Protection Services Divisions. The work consists of making online maps and applications for various departments that require data to be displayed spatially. Oliver states it has been a valuable experience to see how a large organization, with many different stakeholders, manages and uses its spatial data.

Connie Robbins (B.S. '19) became the director of two daycare facilities in Crossville. They are part of the **LBJ&C** program located in Cookeville. Connie's duties consist of planning the budget, checking payroll, W-2 for tax purposes, and all other administration duties.

Mike Bolan (B.S. '19) currently lives in Nashville and is working for an environmental consulting company called **SWCA**, based out of Phoenix, Arizona. Mike is part of the Land Development and Acquisition Team for renewable energy production. He works remotely from home and travels to various sites in Alabama, Mississippi and Tennessee that are picked by the clients for solar projects. Mike represents large solar developers throughout the southeast, and works with rural landowners to lease land for utility-scale solar farms. They provide land services for the connection of new solar projects to the existing grid while allowing farmers to utilize their land for renewable energy and provide income to rural communities.

DEAN INTERVIEW

Mike Gotcher, Ph.D.
Dean
College of Interdisciplinary Studies



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

As far as my education journey goes, I first earned a bachelor's degree at Austin Peay State University (APSU), then a master's degree from the University of Florida and finally a Ph.D. at Louisiana State University.

Before coming to Tennessee Tech, I served as the executive director of Online and Distance Education at Austin Peay. I was responsible for the development of online programming and directing the educational programs at Fort Campbell (a military base outside Clarksville, Tennessee) and two other satellite sites, one being in Honduras. Fort Campbell is the home of the 101st Airborne division. Before serving as the executive director, I was interim dean of the College of Graduate Studies, chair of the Department of Communication, and a professor. I was at APSU for 30 years.

What is your favorite part about being the dean of the College of Interdisciplinary Studies?

I truly enjoy interacting with the staff, faculty and students in the College of Interdisciplinary Studies. The people are wonderful. The staff and faculty truly care about the success and well-being of students. I enjoy coming in every day.

In addition to the people, I appreciate the opportunity to make a difference in the educational environment. The creativity and enthusiasm of the college facilitates the development of new programs and initiatives. We are always looking for ways to enhance the educational environment. With the Department of Communication joining the college, we are given the chance to establish more interdisciplinary crosswalks that will enhance the professional opportunities of our students.

Are there any new plans in the works for the College of Interdisciplinary Studies?

We are in the process of developing new concentrations in communication for the Master of Professional Studies. The concentrations will be: (1) Corporate Communication and (2) Media and Strategic Communication. Also, we are looking to develop new courses in National Parks and Land Management. We are looking at ways to shape the Ph.D. program in Environmental Sciences in ways that will attract more students. In the area of Religious Studies, we are expanding course offerings which will strengthen the minor. We are always searching for pathways to improve student success.

During the Fall 2019 semester, we established a college-level recruitment team that is actively recruiting for all areas of the college.

What is a fun fact about yourself?

I enjoy playing golf as well as hiking. Last December, I hiked Bryce Canyon in the snow. The snow was almost two feet deep. I had to wear chains on my shoes to keep from falling.

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