TESI®

Thompson Earth Systems Institute

2020–2021 Annual Report

From the TESI Director

It is impossible to reflect on the past year without the lens of the ongoing global pandemic. With millions of lives lost and counting, our hearts remain heavy.

The tragedy surrounding COVID has also further highlighted our human connection to and impact on the Earth's natural systems — air, water, land and life. As global travel shut down, air pollution dwindled and wildlife changed their habits. We witnessed how masks — an essential tool in the fight against COVID — may be having an impact on our oceans in the form of marine debris. We learned how the disease itself, and others like it, could be a byproduct of deforestation and increased human-wildlife encounters.

These types of connections are precisely what the TESI team strives to communicate. Through our work, we aim to equip people with the information necessary to make informed decisions and be effective stewards of our planet. This past year, we combined our team's expertise in science communication and education with the use of technology like videoconferencing software, social media and Artificial Intelligence (AI) to demonstrate why these Earth systems changes matter in our everyday lives and what we can do about them. By communicating in this virtual space, we have been able to expand our bandwidth to reach new audiences across the state that include teachers, students and lifelong learners from Pensacola to Miami.

More than 200 Florida public school teachers applied to participate in this summer's entirely virtual professional development workshop and some of our webinars and livestreams were attended by more than 1,000 lifelong learners. This participation demonstrates that the programs we deliver have value, no matter the medium. I would also like to stress that none of our work would be possible without our network of scientists who volunteer their time to visit classrooms, deliver public programs and inform various digital outreach campaigns.

TESI's mission — to help Floridians better understand the Earth systems changes affecting us — is relevant now more than ever; and in this annual report we are pleased to share some of the many ways we accomplished this during an incredibly challenging year.

Mission:

To advance communication and education about Earth systems science in a way that inspires Floridians to be effective stewards of our planet.

What is Earth systems science?

The study of the interactions among air, water, land and life on Earth, and how these systems are influenced by human activities.

Vision:

Florida is on the frontlines of massive Earth systems changes that are threatening our environment, our economy and our way of life. Now more than ever, science-based information needs to be communicated in a way that resonates with all Floridians so they can make informed decisions about their natural resources. Our vision is to lead the way to a healthier planet by cultivating a responsible and curious society that values, trusts and has access to science.

Program areas:

2020-2021 Impact by the Numbers

More than **1,100 lifelong learners** explore environmental issues through **17 public outreach events**.

770,000 potential readers learn about TESI and SEFS programs through nine news articles.

$116,000 in **private funding** acquired to support Scientist in Every Florida School STEM learning programs and TESI outreach projects.

Scientist in Every Florida School coordinates more than **1,700 scientist visits to classrooms** representing more than **400** schools, reaching **55,000 K-12 students in Florida**.

7,070 people follow TESI on social media and **56,000 unique users** visit the TESI website to learn about Institute programs and **Florida environmental issues**.

More than **8,000 K-12 students and teachers** attend **137 virtual events** and **field trips** hosted by the Scientist in Every Florida School Program.

50 scientists, journalists and industry professionals learn best practices for sharing complex subject matter through TESI-led science communication professional development workshops.

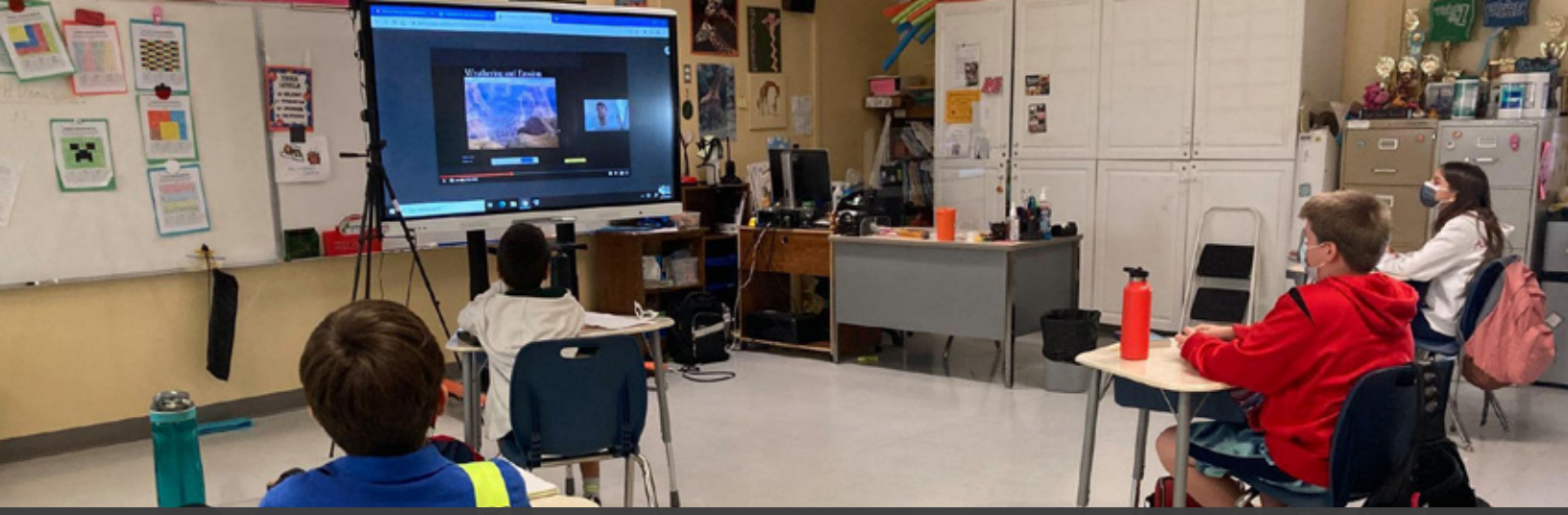
$17 Million Raised for Florida Museum Expansion to House TESI

A new expansion project that will house TESI's administrative offices is closer to reality at the Florida Museum of Natural History. The renovations and additions will engage diverse audiences about Earth systems science. Using a holistic approach to learning and science, this ambitious project is in the conceptual phase with plans to house TESI's administrative offices, a grand atrium, learning theater, high-tech classroom, an exhibition gallery, open labs and a conference and community meeting room. This multi-faceted space will be intentionally designed to meet the needs of a dynamic 21st-century museum.

We would like to thank Jon and Beverly Thompson, Ken and Linda McGurn, Ann Powell, and an anonymous donor for their lead gifts, and to gratefully acknowledge the support of many others who helped us reach this $17 million goal. Thanks to their generosity, we can begin the initial search for an architect to lead this project.

We are continuing to fundraise for this project and welcome your support. To make a gift, contact:

Marie Emmerson
Senior Director of Development
Florida Museum of Natural History
emmerson@ufl.edu | 352-256-9614

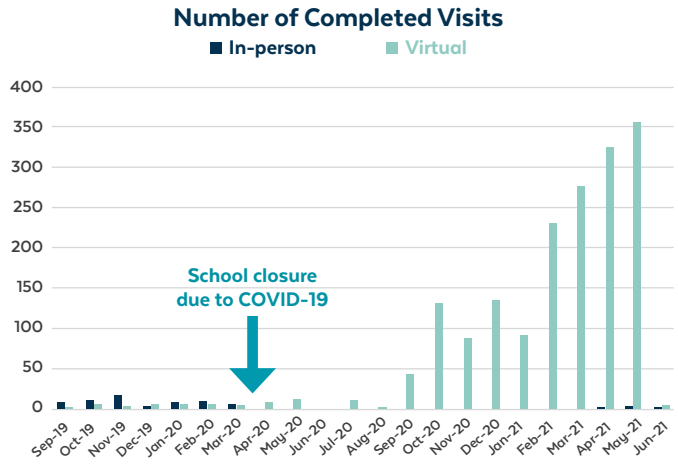


Scientist in Every Florida School

Scientist in Every Florida School has the potential to position Florida as a leader in innovative STEM education. Through this free program, our mission is to engage Florida K-12 students and teachers in cutting-edge research by providing science role models and experiences that inspire the future stewards of our planet.

TESI's flagship Scientist in Every Florida School Program, or SEFS, was one of eight pilot programs launched in 2019 with funding from the University of Florida's $17 million moonshot initiative. During SEFS professional development workshops, teachers are able to work alongside scientists to develop novel, standards-based lesson plans focused on Florida's environment. SEFS is also the first of its kind to match teachers with scientists who can deliver lessons via classroom visits and serve as role models for the next generation of environmental stewards. The program is simple: K-12 public school teachers in Florida request a scientist who fits in with an upcoming lesson, and the SEFS team takes it from there.

During the 2020-2021 school year, the SEFS program coordinated more than 1,700 scientist visits to classrooms in about 500 public schools throughout Florida, reaching tens of thousands of K-12 students.

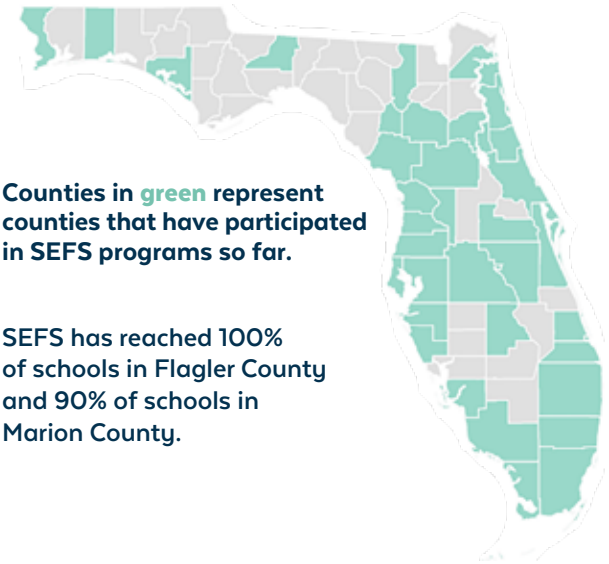


Virtual Visits Expand SEFS Reach

As the COVID-19 pandemic disrupted traditional classroom learning for a second school year, the SEFS team remained resilient and continued to offer its services virtually using videoconferencing technology and streaming software.

The ability to go virtual at a time when classrooms were moving online helped launch the SEFS program beyond its five pilot counties. To date, SEFS has been implemented in nearly 60% of Florida's counties and counting, with a particular focus on Title I schools in underserved regions.

With distance no longer an issue, the SEFS team has been able to match teachers with a greater range of scientists and topics for classroom visits. SEFS also hosted a variety of virtual field trips and livestreams, giving K-12 students and teachers the opportunity to interact with people and places far from home.



Counties in green represent counties that have participated in SEFS programs so far.

SEFS has reached 100% of schools in Flagler County and 90% of schools in Marion County.

Scientist in Residence: Reaching Rural Students

In 2020, SEFS hired its first "Scientist in Residence," who is embedded in a school district and dedicated to reaching students in that region. Alan Ivory, a graduate of UF's Department of Wildlife Ecology and Conservation, was named TESI's K-12 Smallwood Foundation Fellow at the start of the 2020-2021 school year through the generous support of the Smallwood Foundation. Although part-time at first, the Felburn Foundation complemented this funding and was therefore able to promote Ivory to a full-time SEFS staff member for the rest of the school year.

Ivory has helped expand SEFS programming into Levy and Marion County schools, 98% of which receive Title I funds that help provide additional resources to low income students. His hard work enabled 90% of the schools in Marion County to work with SEFS. Both counties serve rural schools and students who belong to families of migrant farmworkers and/or speak English as a second language.

This upcoming year, through the continued support of the Smallwood and Felburn Foundations, Ivory will be stationed out of a revitalized environmental science lab in the Silver River Museum in Marion County. There, students can come to the museum, collect data and analyze it on-site — all with a scientist to mentor them.

"The ability to, in a single school day, both collect from a local waterway and then take it back to a lab to conduct chemistry on it is very valuable," Ivory said. "It can be very fulfilling for students to see a project through from beginning to end like that."

Equipping STEM Teachers with Novel Science Tools

Through professional development workshops, the SEFS team connects teachers with scientists so they can develop hands-on and enticing lesson plans rooted in current research. One of the goals of these workshops is to narrow the gap between academic research and K-12 education. This past year, SEFS hosted three of these workshops and reached 59 elementary, middle and high school teachers.

By the Numbers

Scientists within the SEFS network make more than **1,700 visits to classrooms** representing **500** schools, reaching more than **55,000** students across the state.

Growing SEFS network **supports collaboration** among **850** public school teachers and more than **600** scientists.

SEFS hosts **137 virtual field trips and livestreams**, attracting an audience of nearly **8,000** students and teachers.

SEFS hosts **three** professional development workshops, equipping **59** teachers with tools to develop **novel lesson plans** rooted in current research.

Virtual Field Trips

Into the Garden with Mounts Botanical Garden of Palm Beach County: Students learned about important plants and insects in Florida and the scientists who study them.

Ocean Expert Exchange with the ANGARI Foundation: Students took a deep dive into ocean conservation by exploring research vessels and meeting oceanographers.

2020-21 SEFS Professional Development Workshops

July 2020: Nature of Science Professional Development | Forty science teachers representing 10 counties worked with scientists from around the state to develop lesson plans that help students better understand the tools, theories and skills used to carry out research — what's known in education as the nature of science.

December 2020: Paleontology Professional Development
Ten teachers designed lesson plans about microfossils from the Florida Museum of Natural History's Montbrook dig site to use in their classrooms.

May 2021: Integrating Artificial Intelligence | Flagler County teachers learned about how AI is used in a variety of fields and how to implement AI into their teaching repertoire.

Student Mentoring & Science Communication Professional Development

Housed at the University of Florida, a crucial part of the TESI mission is helping students from a variety of disciplines connect their work to the future of Florida's environment. Through for-credit courses, workshops and paid internships, TESI aims to instill the importance of environmental stewardship in students who will bring this knowledge into their future careers. TESI's workshops and paid internships also focus on the art of sharing science with the public through effective science communication. We help early-career scientists and aspiring science communicators hone their outreach skills to disseminate science-based information to broader audiences.

TESI Faculty Teach Importance of Science in Society

TESI's three faculty members teach UF courses that help students understand how science can help solve many of the environmental problems we are facing today. Some courses taught by TESI faculty include:

- **Broader Impacts of Science on Society**: *This seminar-format course explores how scientists can increase their impact on society and provides students with the tools to prepare successful outreach plans. This course is particularly geared toward STEM majors. (Taught by Bruce MacFadden and Mariela Pajuelo)*
- **(un)Common Reads**: *This book-based UF Honors course helps introduce various environmental issues to students through literature. (Taught by Megan Ennes and Mariela Pajuelo)*
- **Science Communication and Public Education**: *This course provides an introduction to science communication, environmental education and public outreach. (Taught by Megan Ennes)*

Inspiring Environmental Leaders

In addition to traditional UF courses, TESI offers several paid internships and mentoring workshops to help UF students from a variety of majors connect their work to the betterment of the environment.

- **TESI Environmental Communicators Internship**: Through this paid internship, four UF undergrads developed valuable digital outreach and education skills to teach Floridians about various topics related to the state's environment. TESI's Environmental Communicators curated social media content, developed educational videos and produced the Institute's monthly Earth to Florida newsletter.

- **UF Environmental Justice Media Intensive**: Hosted in collaboration with the UF Levin College of Law, six science and journalism students teamed up to write stories showing the connections between the environment and social justice issues. Students were mentored by editors who taught them reporting and interviewing skills.

- **Creative B Science and Me**: During this virtual summer workshop, 10 UF students from underrepresented communities learned how to develop, film and edit a short video about their journeys to becoming scientists. Through these videos, the students hope to inspire future scientists.

- **Science Off Tap Professional Development Program for Early-Career Scientists**: During this six-week workshop, scientists learned how to find their angle, make their language accessible and incorporate storytelling techniques in public outreach talks. Their final project was a live virtual presentation during one of TESI's Science Off Tap events, hosted in collaboration with the Florida Museum.

UNIVERSITY OF FLORIDA
ENVIRONMENTAL JUSTICE
MEDIA INTENSIVE

By the Numbers

six courses that help UF students **understand their connection** to Florida's environment and what they can do to help.

25 UF students learn **communication and outreach skills** through TESI science communication professional development workshops.

Science OFF Tap: Changes on the Horizon

"During this training, I learned how important it is to identify a singular theme or goal for my presentation and then to identify and use specific pieces of evidence to achieve that goal. Framing my presentation around the 'so what' instead of the 'how' was important and I think led to more relatable and understandable presentation."

-A.J. Reisinger, participant, Science Off Tap Professional Development Program

Innovative Public Programming

Our team of trained science communicators and environmental educators works with scientists, peer organizations, nonprofits and decision-makers to curate and share the latest science-based information related to Florida environmental issues through public outreach events. For a second year, TESI hosted public events virtually, opening them up to statewide audiences.

BYOB: Science on Tap Goes Virtual

TESI continued to offer its staple Science on Tap program in collaboration with the Florida Museum and First Magnitude Brewing Company. However, instead of gathering in a brewery warehouse, the "Science Off Tap" series took place on Zoom. This year's theme, "Changes on the Horizon," focused on how environmental changes will affect the future of Florida. A total of 265 attendees cozied up on their couches with their laptops and a beverage of their choice to learn about urban streams, mangroves and wildlife trafficking.

In the past, scientists were selected based on what topics were lined up for the series. But this time speakers were selected as part of a new Science on Tap Professional Development Program for Early-Career Scientists. To apply, scientists studying air, water, land or life submitted an audition video detailing their research topic and why they believe it's important to Floridians.

During the six-week training, scientists learned how to build trust and support for science, the best practices of storytelling, and techniques for giving engaging talks in a virtual setting. Their Science Off Tap talks were considered their final project in the program.

2020 Science Off Tap: Changes on the Horizon

Urban Streams: A.J. Reisinger, assistant professor of urban soil and water quality at the UF Soil and Water Sciences Department

CSI Wildlife: Madelaine Verbeek, UF master's student studying wildlife forensic sciences and conservation

Mangroves on the Move: Julie Walker, Marine Conservation Fellow at UF's Whitney Lab for Marine Bioscience

Floridians Take a Deep Dive Into Florida Springs Through Virtual Film Series

In early 2020, TESI and the Florida Museum hosted the first Florida Springs Film Series in the museum's Denny Gallery. More than 150 guests learned about how water moves through our aquifer during the documentary "Water's Journey" followed by a panel discussion. We continued the series in 2020-2021 with two events — one centered around the documentary "Lost Springs," which focused on efforts to free the Ocklawaha river and one featuring several short films that focused on springs biodiversity. While gathering together to watch the films on the big screen was off the table, the team got creative.

Attendees had a few days to watch the films on the Florida Museum's YouTube channel and gather what questions they might have. Then, on the day of the panel discussion, they heard from experts who could provide more context about the film and answer their questions. In total, 224 curious individuals viewed the films and joined the lively discussion around Florida's unique freshwater springs.

TESI Celebrates Earth Day, Every Day

On Earth Day 2021, TESI hosted award-winning conservationist and author Audrey Peterman as the keynote speaker for the monthlong "Earth Day, Every Day" celebration in partnership with the Florida Museum. Floridians from across the state tuned in to Peterman's talk, titled "From Love to Exposure to Action: Mobilizing Advocates for our Earth." Peterman outlined the often-mischaracterized history of preserving outdoor spaces in the U.S., how physical distancing has brought us closer to our Earth and what that means for the future of our planet.

By the Numbers

More than **1,100** lifelong learners **explore environmental issues** through **17 public outreach events.**

100% of events are streamed live via Zoom or Facebook, expanding **reach and access**.

64% of TESI public programs engage audiences through **interactive live polling tools**.

Floridians **learn about 17 different topics** ranging from **pollution in urban streams** to the **importance of insects**.

Developing partnerships to expand reach

Based on TESI's reputation for hosting successful virtual events, several organizations reached out to our team to co-host and partner on various public programs related to the environment. These events helped TESI tap into new audiences, which included 498 students, lifelong learners and industry professionals around the state.

UF Office of Sustainability and UF Bob Graham Center for Public Service: *Sustainability Into Action Series*

City of West Palm Beach Office of Sustainability: *Climate Conscious Chats*

Florida Association of Native Nurseries: *Communicating the Importance of Insects*

Florida Museum's Randell Research Center and Shell Point Retirement Community: *Facing Florida's Future Series*

Digital Outreach

Through online platforms, our student-led digital outreach team curates information about Florida's environment and natural resources and packages it in a way that is digestible, understandable and solutions-oriented. At the same time, UF students learn valuable communication skills to take with them in their future careers.

Earth to Florida

TESI's Earth to Florida newsletter has been a foundation of the Institute's digital outreach since 2019. Each monthly issue provides a snapshot of Florida's environmental news, packaged in a way that explains what's going on, why it matters and what we can do about it. For the past two years, it's been largely student-produced, giving UF undergraduates a chance to sharpen their science communication skills through mentorship by the TESI staff.

"While crafting stories and putting together content, I've been able to both challenge my creativity and communications skills while developing completely new ones," said Lianne D'Arcy, a graduate from UF and a TESI intern for 1.5 years. "It's because of TESI that I now also think of myself as a researcher, video producer, graphic designer, environmental educator and more."

Educational Videos

To supplement Earth to Florida content, TESI environmental communicators also created videos for the Institute's YouTube channel. These videos, which are also promoted through the Scientist in Every Florida School program, help explain environmental topics ranging from sinkholes to sea level rise to nutrient pollution.

The No. 1 most-watched video, by far, is one that explains the science behind Earth systems and how they relate to TESI's mission. The video has garnered 28,000 views to date — and counting.

"I got to combine animation, writing and audio skills to create this project," said Ellen Bausback, a rising UF senior who created the video. "It took a lot of dedication and editing, but the final video has been shared with students and classrooms throughout the state. It was extremely rewarding to see my work having a real impact on Floridians."

Virtual field trips and livestreams hosted by the Scientist in Every Florida School program are also showcased on the Institute's YouTube channel so that teachers and students can revisit these topics at any time. In total, the team added 50 new videos to the YouTube channel in 2020-21, garnering more than 53,000 views — greater than 10 times the total views from the previous year.

Know Your Florida

TESI's Know Your Florida Instagram campaign aims to help Floridians learn more about our state's wildlife, climate, history and outdoor spaces. For this account, interns research and create informative graphics on topics like invasive species, state parks and more. The campaign was started in 2019 to generate appreciation for the Sunshine State, especially since more than 900 new Floridians move here every day. It has since garnered more than 2,000 followers on the platform – more than doubling over the past year alone.

"From capybaras to horseshoe crabs, here at TESI, I don't just get to teach others about the special secrets of our state, but I get to unearth them for myself," D'Arcy said.

The Insect Effect Education and Outreach Awareness Campaign

Spanning from September 2020 to November 2020, TESI's digital outreach team worked with Florida Museum scientists to launch "The Insect Effect," a campaign consisting of educational materials and resources to help Floridians better understand why insects are important, the threats they face and how we can protect them. The team produced two feature stories, multiple educational videos and spotlighted more than a dozen native Florida "Insect Influencers."

Through this campaign, 42,000 Floridians learned about concrete actions they can take and how they can spread the word to their friends. One of the most successful aspects of the effort was an iNaturalist Bioblitz project, where people around the state documented the insects in their yards. More than 11,000 insect observations were identified, representing nearly 1,500 species.

By the Numbers

7,070 followers across TESI digital outreach channels learn about **Florida's environmental issues**, as well as its wildlife, natural history and people.

487 people subscribe to the TESI YouTube channel, a **382% increase from last year**.

TESI and SEFS educational videos garner more than **53,000 views**.

Earth to Florida and Know Your Florida content garners **416,000 impressions** and **52,000 likes, comments and shares**.

Earth to Florida stories receive **47,890 unique web views**, accounting for **47%** of **TESI website traffic**.

654 people receive the **Earth to Florida newsletter** in their inbox each month, a **26%** increase from last year.

TESI Environmental Communicators Lead Institute's Digital Outreach

TESI's digital outreach is led by UF student interns. Dubbed "TESI environmental communicators" these students develop social media content, produce educational videos and write feature stories about Florida's most pressing environmental issues, like climate change and water quality.

"Looking back at all the work I've done for TESI, I can see just how expansive my skills have grown through my work responsibilities and projects," said Brittney Miller, a graduate from the UF who interned at TESI for 1.5 years. "Every shift, I came out feeling more confident in my science communication skills."

Ellen Bausback UF '22:
Journalism major and environmental science minor

Mindjina Courage UF '22:
Political science and English double major

Lianne D'Arcy UF '21:
Journalism with a concentration in environmental science major and nonprofit management minor

Brittney Miller UF '21:
Journalism and biology double major

TESI's Education & Outreach Grant Recipients

Each year, TESI awards education and outreach grants to support projects led by UF students and postdoctoral researchers that communicate Earth systems science research to either K-12 students and teachers or lifelong learners. This annual grant competition helps foster collaboration, leverages the Institute's capacity to reach a broader audience and encourages students to think about how they can communicate their own science. To date, TESI has awarded 13 education and outreach grants, totaling around $25,000.

2020-2021 Recipients

Stephanie Wheeler

Ph.D. student, Department of Biology in the UF College of Liberal Arts and Sciences

Feathered, Fearless, and Fabulous Friends: Get to Know Your Backyard Birds!

Stephanie Wheeler is designing a pop-up exhibit to help teach the public about the impacts they have on birds, and vice versa. Once the exhibit is complete, it will be set up at community parks around Gainesville.

"It can be really empowering to realize that you can identify even the most common birds, plants or other things that you are surrounded by," Wheeler said. "I want to help people tap into that pride and joy that can be found in the wildlife closest to them. And I think knowing what something is, and a few facts about it also helps people to form a sense of stewardship. Being aware of something improves our ability to take care of it."

Scott Miller

Ph.D. candidate, Department of Geological Sciences in the UF College of Liberal Arts and Sciences

Creating Earth's Dipolar Magnetic Field in a Jar: A Combination of Science and Art

Scott Miller is developing Do It Yourself (DIY) Earth magnetic field jar kits to help non-scientists better understand the importance of Earth's magnetic field. The kits will be used at various events so participants can create, observe and keep their own visual models of Earth's magnetic dipole.

"I think it's important to teach people about Earth's magnetic field in a tactile, visual way because the magnetic field is most often invisible, imperceptible, and evolving on longer-than-human timescales," Miller said.

2020-2021 Grant Recipient Accomplishments

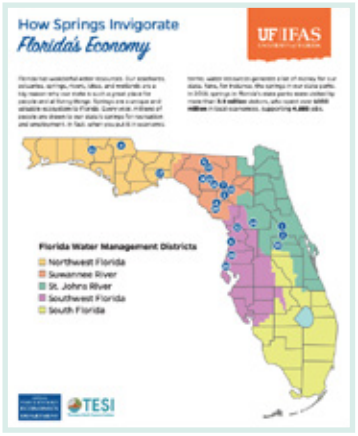
TESI funding helps recipients develop communication deliverables that are useful after the project has ended. This past year, several former TESI grant recipients have produced education and communications products to help Floridians better understand their environment.

Jacqueline Aenlle, *Ph.D. student in the Department of Agricultural Education and Communication in the UF College of Agricultural and Life Sciences*

Urban to Agriculture Podcast: 2019-2020 TESI grant recipient Jacqueline Aenlle created a series of podcast episodes about the Florida panther and red tide for her podcast called "From Urban to Agriculture." The podcast, which can be found on Spotify, Apple Podcasts and Google Play, connects curious consumers with agricultural professionals to learn more about food, agriculture, environmental sciences and natural resources.

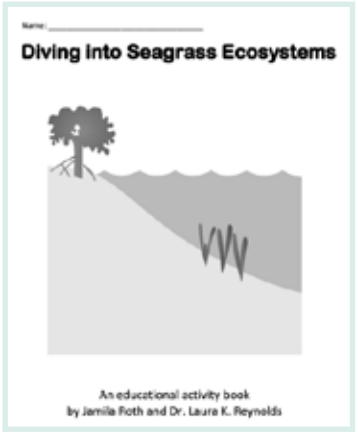
Fei He, *Ph.D. student in the Food and Resource Economics Department in the UF College of Agriculture and Life Sciences.*

Economic Value of Water Resources Fact Sheets: 2018-2019 grant recipient Fei He developed a collection of fact sheets to help Floridians better understand the economic benefits of Florida's many freshwater springs and coastal waterways. Her goal with these fact sheets is to garner a better appreciation for Florida's water among decision-makers and help ensure its sustainability in the future. With funding from TESI, she was able to print the fact sheets for use at public education events.



Jamila Roth, *Ph.D. student in the School of Natural Resources and the Environment in the UF College of Agricultural and Life Sciences.*

Educational Seagrass Activity Book: Jamila Roth used TESI funding and her research on the effects of warming temperatures and nutrient additions on seagrass communities to create an educational activity book. Her goal with the book is to educate Florida K-12 students and lifelong learners about seagrass communities, the ecosystem services they provide and the effects of human activity on these ecosystems by creating and sharing lesson plans. She also created an interactive exhibit and worked with student science clubs.



Our Commitment to Sustainability

We are committed to reducing our negative impact on Florida and the planet. We strive to use the latest science to develop policies that support a sustainable and healthy future. As part of our organizational culture, our commitments to sustainability include:

- Minimizing our **use of paper** and **recycling** any necessary paper materials
- Utilizing **reusable or compostable** dishware and utensils during catered events
- Encouraging **walking, biking, public transportation** and **carpooling** to meetings and events
- Selecting promotional items that serve a necessary function and that are made from **sustainable materials,** when possible.
- Hosting **virtual meetings** when possible rather than meetings that require travel
- Encouraging our partners and collaborators to **practice sustainability**

Contact information:

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