







From the TESI Director

This year has been a year of collaborations at TESI as we work to provide relevant professional development experiences for Florida’s K-12 teachers, connect University of Florida undergraduates to resources that help them pursue environmental leadership, and help scientists share their work with broader audiences.

None of these initiatives would be possible without the scientists we work with on a daily basis. At the center of TESI’s mission, we communicate up-to-date and authoritative research discoveries made by scientists that provide a better understanding of Earth’s natural systems — air, water, land, and life — in Florida and beyond.

But this is something we cannot do alone. We partner with nearly 1,000 Florida scientists who are not only passionate about their research but also about sharing their stories and expertise with TESI audiences, including UF students, K-12 teachers and students, and lifelong learners. Our scientist network has continued to grow every year since we started TESI in 2018.

During the past year, we were able to tap into the scientific expertise of researchers at UF within the College of Liberal Arts and Sciences, the College of Education, the Institute of Food and Agricultural Sciences, the Herbert Wertheim College of Engineering, and the College of Journalism and Communications. As the word gets out about these collaborations, TESI is increasingly becoming known as the “go-to” campus hub for researchers looking to disseminate their science to broader audiences. In fact, many scientists have approached TESI over the past year to develop Broader Impacts outreach activities for their National Science Foundation proposals.

We also have recently developed relationships with other stakeholders around the state, including the Phillip and Patricia Frost Museum of Science and Miami-Dade County Public Schools in South Florida. These partners not only provide expertise, but they also expand our reach into their local communities.

Our partnerships would not be possible without external support. Over the past year, we have sustained a scientist-in-residence in Marion County, funded by the Felburn and Smallwood foundations; and an Environmental Leaders Fellowship, funded by the Henry David Thoreau Foundation.

And we have been fortunate to be part of the university’s AI Across the Curriculum initiative via a recent \$1.3 million National Science Foundation award. Through this grant, TESI will be using shark fossils to help teach middle school students about artificial intelligence and related 21st century careers.

The scientists who participate in TESI outreach activities do so as part of their research but also because many of them feel a responsibility to give back to society to make the world a better place. TESI will continue to disseminate important research and better inform our audiences about the future of Earth’s natural systems and human impacts on our planet.

*Bruce MacFadden*  
Bruce MacFadden



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 front lines 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.

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## 2021-2022 Impact by the Numbers



More than **5,200** lifelong learners explored environmental issues through **10** public outreach events.



**\$83,540** in private funding acquired to support Scientist in Every Florida School STEM learning and TESI outreach projects.



Scientist in Every Florida School coordinated **1,403** scientist visits to classrooms in **357** schools, reaching **50,000** K-12 students in Florida.



**9,248** people followed TESI on social media, and **75,000** unique users visited the TESI website to learn more about institute programs and Florida environmental issues.



More than **1,800** subscribers got TESI news and information delivered to their inbox each month.



TESI faculty and staff worked with nearly **1,000** scientists to disseminate current research to public audiences.



TESI social media channels focused on educational content garnered **603,000** impressions and **40,000** comments, likes, and shares. Educational videos on the TESI YouTube channel received **59,000** views.



More than **5,800** K-12 students and teachers attended **38** virtual field trips and events hosted by Scientist in Every Florida School.



**21** UF undergraduate students learned about effective environmental communication and leadership through TESI internships and fellowships.

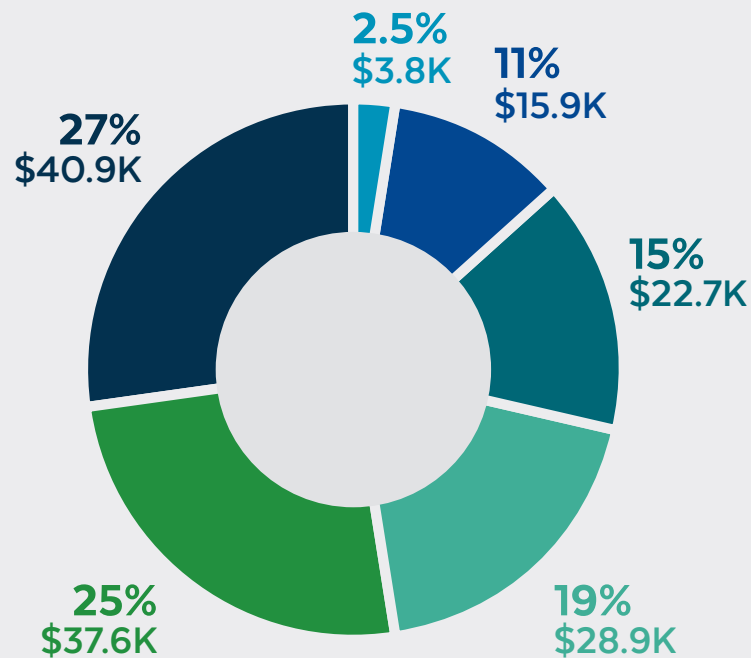


TESI faculty taught **four** classes aimed at helping students understand how to bring academic knowledge to public audiences.



TESI faculty, staff, and grant recipients published **nine** research articles related to science education and outreach in peer-reviewed journals.

## TESI 2021-2022 Expenditures



### Expenditures (Excluding Staff Salaries)

- K-12 Teacher Stipends and Professional Development
- Undergraduate Fellowship Programming
- Undergraduate Student Interns
- Faculty Fellow Support
- Other Operating Expenses
- Travel for Staff and Scientists



## 2021-22 Public Outreach Events:

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 Earth systems science in Florida.

### Science on Tap Series Co-hosted by the Cox Science Center and Aquarium in West Palm Beach

These informal science discussions at South Florida breweries centered around a new exhibit called “Earth Matters.” The researcher-led talks focused on waste reduction, the importance of wetlands, and coral reef restoration.

### UF Campus Earth Week Co-hosted by the UF Office of Sustainability

This annual celebration was an opportunity for students, faculty, and staff to engage with sustainability-related events, initiatives, and volunteer opportunities on campus. The week culminated in a panel discussion, organized by one of TESI’s Environmental Leaders Fellows.

### Florida Springs Film Series: Shifting Baselines Co-hosted by the Florida Museum of Natural History

During the fourth and final event in this series, audience members watched short films by documentary filmmaker Eric Flagg that depict and dive into the baseline shift: how we perceive the health of the springs over time.

### World Sea Turtle Day Celebration Co-hosted by the Archie Carr Center for Sea Turtle Research

Audience members learned more about the important role sea turtles play in our ecosystem and the threats facing them from three experts during an informal discussion at Cypress and Grove Brewing Co.

### Tabling Events

Throughout the year, TESI team members set up outreach tables at busy events. These opportunities allow new audiences to learn more about the institute and environmental issues in Florida. This year we participated in Gator Day at the Florida Capitol, the Silver River Knap-In and Prehistoric Arts Festival, and the Sustainability-in-Action Showcase.





## UF TESI Environmental Leaders Fellowship

### When it comes to helping care for our planet, it's all hands on deck.

Leaders from all disciplines are needed to tackle the immense challenge of protecting the Earth for current and future generations. Funded by a faculty grant from the Henry David Thoreau Foundation, TESI's Environmental Leaders Fellowship (ELF) brought together 12 students from diverse majors and backgrounds and provided them with opportunities to gain the knowledge, skills, confidence, and network to advocate for the planet as they take on leadership roles in their respective careers.

The 2021-22 cohort attended seminars and a scientific conference featuring environmental experts, received mentoring from professionals in environmental fields, worked on community projects, and networked with peers. Throughout the year, fellows learned more about topics like climate change, conflict management, and water quality.

In March, the fellowship culminated in a spring break field experience in which students were able to see some of the topics they had been learning about firsthand.

#### The three objectives of the ELF program were to:

1. Increase environmental science literacy in undergraduate students across diverse disciplines and backgrounds
2. Provide opportunities for students to learn about and become involved in civic engagement
3. Connect students to a network of professional mentors and environmentally engaged peers

#### Spring break field experience activities:

- **Monday, March 7:** Living shoreline tour, visit to Shell Mound Archaeological Site, and community interviews in Cedar Key, Florida.
- **Tuesday, March 8:** Boat tour of clam aquaculture operations in Cedar Key, and a visit to Manatee Springs in Chiefland, Florida.
- **Wednesday, March 9:** Kayaking on the Silver River, private boat tour with a park ranger, shadowing an educational field trip, and a tour of the Silver River Museum in Ocala, Florida.
- **Thursday, March 10:** Tour of the UF Field and Fork Farm and Gardens in Gainesville.



**Meet the Fellows:** The pilot cohort featured 12 students studying 13 unique majors. Nearly all students identify as being from underrepresented backgrounds in environmental sciences, including minority and first-generation college students.



#### Kamya Bates — Marine Sciences, Pre-Vet

"My biggest takeaway from the program is definitely that environmental science does not look like one specific thing."



#### Sarisha Boodoo — Political Science & Sustainability Studies

"Before joining this program, I did not have a really clear indication of what specifically I wanted career-wise. TESI has equipped me with the skills and the knowledge to be a better human on this Earth."



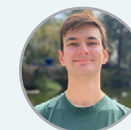
#### Kayla Ehrlich — Biological Engineering & Sustainability Studies

"This fellowship, specifically through the mentorship program, really opened my eyes up to what I could be doing."



#### Isabelle Gain — Health Education & Behavior

"I think my favorite part of the fellowship has just been meeting everyone and the community we've built."



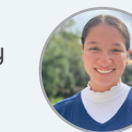
#### Connor Milton — Environmental Science

"My favorite part of the fellowship has been the field experience for sure. It was great to get to go out into Florida and see places that I've never seen before, despite the fact that I had grown up in this state for my entire life."



#### Oriana Molares — Biomedical Engineering

"My favorite part of the fellowship has probably been the field experience. I thought it was a very cohesive way that we got to know each other and our strengths and just be able to have really meaningful discussions."



#### Angie Pinilla — Anthropology

"I feel like this [fellowship] is exactly what I was looking for in the past four years. I'm just really happy that this was an experience that I got to be a part of."



#### Aadil Rahman — Zoology

"This fellowship has really showed me that a career in science communication and outreach is something that I want to do. It really reassured me about what I'm learning and what I want to learn."



#### Dulce Diaz Roa — Family, Youth & Community Sciences

"I think one of the biggest takeaways is definitely communication is key, no matter what population you're serving or what career you go into."



#### Coleen Sailsman — Environmental Science

"My biggest takeaway from this program is that you have to get into the environment to actually learn or put into practice the things that you've learned."



#### Yveline Saint Louis — Anthropology & Medical Geography

"It's been amazing being able to connect with a whole bunch of people from a variety of different majors who are also still passionate about the same issues as you are. It has been very, just powerful."



#### Arran Wass-Little — Economics & Data Science

"As someone not from Florida, being able to see different parts of Florida and see the diversity that Florida has to offer has been the most rewarding part, alongside getting to experience those things with such a diverse and engaged cohort."







TESI Environmental Communicators Internship

Equipped with practical science communication experience, TESI environmental communicators head into the workforce.

TESI Environmental Communicators develop social media content, write newsletter articles, create videos and more, all focused on communicating Earth systems issues to Floridians and beyond. During their time with us, students hone their science communication skills and broaden their knowledge about key environmental issues in Florida and across the globe.

2021-22 Environmental Communicators

During 2021-22, eight undergraduate students worked as TESI environmental communicators.



Riley Gonzalez —  
UF '22 Agricultural Education  
and Communication

*“In the past year, my internship with TESI has allowed me to substantially grow my knowledge of Florida’s natural wonders. Outside of the practical knowledge I’ve gained, this experience has also been rewarding in giving me the opportunity to further develop my skills in writing, design, and research.”*



Kassidy Robinson —  
UF '22 Environmental Science

*“Interning at TESI as an environmental communicator has truly been a highlight of my college experience. As an environmental science major, I went into this internship with a strong understanding of the environment and was eager to put all my newfound knowledge to use. Ultimately, I was shocked at how much I continued to learn every single day as I created content for TESI’s digital outreach campaigns.”*

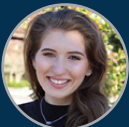


Jessie Moses —  
UF '22 Natural  
Resource Conservation

*“Creating my own content for the Know Your Florida and TESI social media channels also exposed me to a completely new side of the state. As a lifelong Floridian, that’s pretty telling. The TESI staff have been incredibly supportive throughout my time in the office, from upping my journalism skills to helping with my resume. It is a great work environment where every communicator is encouraged to use their unique experiences and interests to create great content.”*

Where are they now?

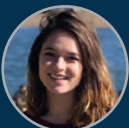
Three of TESI’s former environmental communicators have used the practical skills they learned through the internship to land science communication jobs post-graduation.



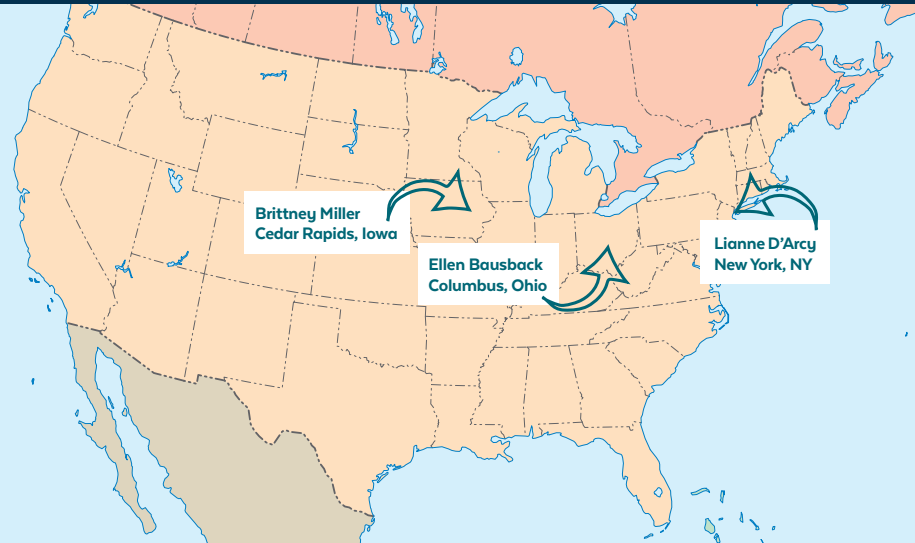
Brittney Miller | Cedar Rapids, Iowa  
Report for America Environmental  
Reporter, The Gazette



Ellen Bausback | Columbus, Ohio  
KX Science Communicator & Writer,  
College of Food, Agricultural,  
and Environmental Sciences,  
The Ohio State University



Lianne D’Arcy | New York, New York  
Senior Coordinator — Education  
and Volunteer Outreach,  
National Audubon Society



TESI Environmental Communicators Named Finalists for 2021 ArcGis StoryMap Challenge for Restoring Our Ocean

TESI’s team of undergraduate environmental communicators — Ellen Bausback, Mindjina Courage, Riley Gonzalez, and Ayla Babanikos — were named finalists in the 2021 ArcGis StoryMaps Challenge for Restoring Our Ocean.

Their project, “By Saving the Sea Cows, We’re Saving Ourselves,” tells the story of how recent manatee deaths paint a bigger picture for the future of Florida’s environment.

“I’m so glad we were able to highlight the numerous threats facing Florida manatees through our project,” said Ellen Bausback, one of the project leads. “It’s been an honor to work with the team to create a compelling narrative and design we are proud of.”

‘What Are Earth Systems’ Video Featured in National Geographic Textbook

TESI’s educational “What Are Earth Systems,” video has garnered more than 58,000 views and has been recently licensed to appear in a National Geographic digital textbook. The video has been played in classrooms around the country and explains the concept of Earth systems science.



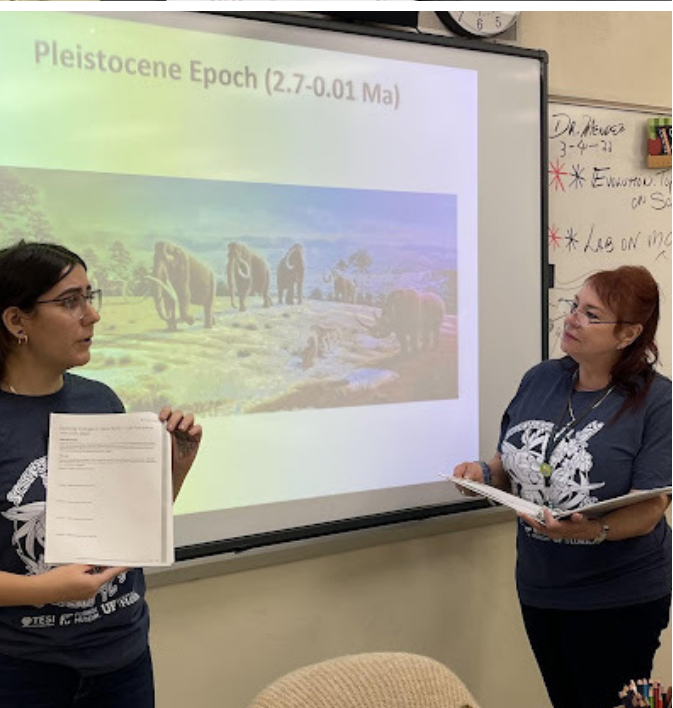
Aligátor vs. Cocodrilo



TESI’s @KnowYourFlorida Instagram Now Publishing Select Posts in Spanish

In Florida, nearly a quarter of the population is Spanish-speaking. And since TESI’s goal with its Know Your Florida digital outreach campaign is to have a broad statewide reach, our team partnered with the Florida Museum of Natural History’s Spanish language interns to produce bilingual Know Your Florida content.





Scientist in Every Florida School

Bridging the gap between academia and K-12 education

Across the state, TESI’s Scientist in Every Florida School program has become known for its ability to match K-12 classrooms with working researchers and science role models. But teacher professional development is also one of the program’s main pillars. Over the past year, 83 teachers representing 25 counties attended three professional development programs hosted by SEFS.

“Through our professional development workshops, we want teachers to feel confident teaching scientific concepts in a way that is hands-on, engaging, and based on current research,” said Stephanie Killingsworth, one of the program’s K-12 education and outreach coordinators.

Professional development workshops for teachers aren’t new, and many educators attend at least one during their summer break. But what makes a SEFS workshop stand out is the fact that teachers are able to work together with scientists to co-develop lesson plans. Even after the workshops conclude, the learning continues throughout the school year as teachers invite scientists to their classrooms.

“By working together, teachers are able to build lasting relationships with scientists,” said Brian Abramowitz, a K-12 education and outreach coordinator for SEFS. “Scientists, in turn, learn teaching and communication strategies for interacting with K-12 students.”

2021-22 Professional Development (PD) Programs

**The Hydrosphere - July 2021:** Fifty-nine Florida teachers representing 22 counties collaborated with scientists to develop lesson plans on a range of water-related issues, from wastewater treatment to tracking tides, during this virtual workshop.

*“This PD helped me become a better informed educator and citizen. I now feel better modeling and explaining how they [my students] can help our environment.”*



**Adaptations, Evolution and Climate Change – January 2022:** During this workshop, co-hosted by the Phillip and Patricia Frost Museum of Science, 14 Miami-Dade County middle and high school biology teachers learned about how animals adapt to climate change through scientist talks, a horse evolution and climate change lesson, and a tour of the new mammoth exhibit at the museum. Participating teachers developed comparative mammoth lessons for the classroom.

*“I hope this PD is offered again with other examples of evolution. I, as well as my science department, will continue to use SEFS, as they are an invaluable source of experience and information.”*

**Fossils, Paleontology, and Ancient Life of Florida – January to April 2022:** Ten teachers from around the state got to get their hands dirty during this truly immersive experience, co-hosted by the Florida Museum of Natural History. While digging for ancient specimens at an active excavation site in Levy County, teachers learned how to identify fossils, why they are important to understanding ancient life, and how they can use them in their lesson plan development. At the end of the four-month program, teachers were tasked with developing a lesson plan and implementing it in their classrooms.

*“This is one of the most useful and informative PDs I have attended in my 10 years of teaching. I got answers to questions from experts in the field. I can connect the information to different standards that I teach across the various classes I have.”*





## TESI Broader Impacts, Outreach & Evaluation

TESI’s team of experienced educators, communicators, and evaluators partners with scientists to develop impactful activities that help advance public understanding of their grant-funded research projects. We specialize in helping researchers fulfill the National Science Foundation’s Broader Impacts requirement. These activities might include K-12 outreach, digital communications campaigns, or public events for lifelong learners.

### 2021-22 Collaborations

#### Andrea Lucky, UF Entomology and Nematology Department

Project name: ARTS: Integrating Phylogenomics and Taxonomic Training to Overcome the Taxonomic Impediment in the Genus *Nylanderia*

Scientist in Every Florida School (SEFS) team is working to develop a grade-specific K-12 curriculum as part of a museum exhibit about invasive plants. TESI will also provide science communication training and education and outreach opportunities for postdocs, graduate students, and principal investigators.

#### Wen-Yuan Song, UF Plant Pathology Department

Project name: Intramembrane Proteolysis in Regulation of the Rice Receptor Kinase XA21

SEFS will co-host a series of four professional development workshops for Florida public high school teachers in which teachers will work with Song’s lab to develop lesson plans based on this funded research.

**Bruce MacFadden, TESI; Pasha Antonenko, UF College of Education; Jeremy Waisome, UF Herbert Wertheim College of Engineering; Victor Perez, Calvert Marine Museum**

Project name: K-12 Shark AI

SEFS will host a series of three professional development workshops for Florida public middle school teachers in which teachers will work with scientists to develop lesson plans using shark fossils to engage interest in artificial intelligence (AI), which ties into UF’s AI Across the Curriculum Initiative.

### Classes taught by UF Faculty

TESI faculty members also teach classes that help UF students learn more about how to disseminate their research to the public and be responsible members of society.

**Broader Impacts of Science on Society (Fall 2021):** Bruce MacFadden and Mariela Pajuelo

**Uncommon Reads (Fall 2021):** Mariela Pajuelo

**Science Communication and Public Education (Spring 2022):** Megan Ennes

**Global Change Ecology and Sustainability (Spring 2022):** Mariela Pajuelo

One way TESI works to reach varying audiences across the state is through partnerships. Over the past year, we have collaborated with the following organizations:



### Private Funding Partners

Smallwood Foundation  
Felburn Foundation  
Henry David Thoreau Foundation

For more information on how to support TESI’s programs and mission, contact:

**Marie Emmerson, Senior Director of Development and Advancement**  
Florida Museum of Natural History  
emmerson@ufl.edu • cell: 352-256-9614



## Commitment to Sustainability

At the Thompson Earth Systems Institute, we are committed to reducing our negative impact on Florida and the planet. We strive to use the latest science to develop institute 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**



Hosting **virtual meetings** when possible rather than meetings that require travel



Encouraging our partners and collaborators to **practice sustainability**

### Contact information:



[Floridamuseum.ufl.edu/earth-systems](http://Floridamuseum.ufl.edu/earth-systems)  
Facebook & Twitter: [@UFEarthSystems](https://www.facebook.com/UFEarthSystems)  
Instagram: [@KnowYourFlorida](https://www.instagram.com/KnowYourFlorida)  
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