



TESI

Thompson Earth Systems Institute

Inaugural Annual Report

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

From the Director

Florida has had a hard few years. Multiple hurricanes whisked through the state leaving little in their wake. Harmful algal blooms lingered around the entire Florida coastline. Cities in South Florida routinely flooded during high tides. **It is no secret that Florida is facing environmental challenges from every angle.** Now more than ever, science-based information needs to be communicated in a way that resonates with all Floridians.

That's why I'm especially humbled to be writing as the first director of the UF Thompson Earth Systems Institute. Founded in 2018, TESI's mission is **to advance communication and education about Earth systems science in a way that inspires Floridians to be effective stewards of our planet.**

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

Human activities interact with these spheres and impact our state in potentially dramatic ways. Only by understanding the interactions between Earth systems will we be prepared to respond to these threats. Making the university's research on these issues accessible to all Floridians is fundamentally important to the future of our state. Because of our research prowess and position as the state's flagship university, UF is uniquely poised to become a national leader in communication and advancing public understanding of Earth systems science.

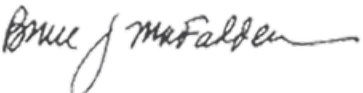
This past year has been busy. We have assembled our core team, launched our first grants competition, held our first annual event and established vital partnerships that will help us fulfill our mission.

We have also launched one of our first major initiatives — the Scientist in Every Florida School Program, which has the potential to impact 2.6 million K-12 students in Florida and bring important research into the classroom. I believe one way to make a strategic impact that would positively affect our state is better education of the next generation, our future decision-makers.

As our first year comes to an end, I am incredibly proud of the TESI team for rallying together to create a culture of learning, communication, aspiration and action.

We are heading into our second year as an Institute ready to tackle some of the most urgent issues facing Florida by streamlining our efforts to fit four focus areas: climate responsibility and natural hazards, habitats and biodiversity, healthy waterways, and Earth systems and the economy.

This first report is a just a starting point for many great things to come — for Florida, and beyond. Thank you for your continued support and concern for our state, and our planet.



Bruce MacFadden



About the Institute

In June 2018, the University of Florida launched the Thompson Earth Systems Institute, an outreach-focused center that aims to advance public understanding of the most pressing environmental challenges in Florida and beyond.

Housed at the Florida Museum, 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.

“Only by understanding the interactions between Earth systems will we be poised to respond to these threats.”

—Bruce MacFadden, Director

Audiences We Serve



- Lifelong learners
- K-12 teachers and students
- UF undergraduates
- Decision makers and opinion leaders
- Researchers

Focus Areas



- Climate responsibility and natural hazards
- Habitats and biodiversity
- Healthy waterways
- Earth systems and the economy

Funding sources



- A \$10 million gift to UF by Fort Myers couple Jon and Beverly Thompson provided the cornerstone funding for the Institute.
- UF's Office of Research and the Florida Museum provided additional funding for the Institute.



Meet the donors

This Institute is the vision of Jon and Beverly Thompson of Fort Myers, Florida.

Jon Thompson, a University of Florida alumnus, is the former President of Exxon-Mobil Exploration Company. As a retired teacher, Beverly Thompson continues to pursue her passion for K-12 education, which will shape the next generation of scientists.

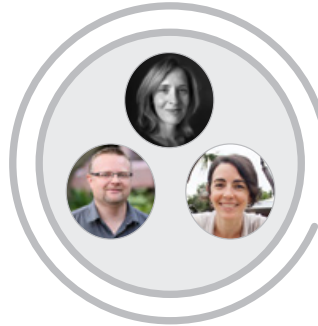
“The research carried out at the University of Florida is critical to our understanding of Earth's systems,” the Thompsons said. “We believe it is essential that our university step forward to continue research on problems such as biodiversity and environmental conservation.”



2018

2019

June: The University of Florida launches the UF Thompson Earth Systems Institute. Florida Museum Distinguished Professor Bruce MacFadden is named Director of TESI.



July: TESI officially opens for business and a budget is established. Three faculty fellows focused on Earth systems outreach are recruited.

August: A program coordinator, postdoctoral researcher, evaluator and educator join TESI's core team. An initial strategy to fulfill TESI's mission is developed.



September: TESI announces a grants program to fund Earth systems outreach projects. TESI wins funding for its Scientist in Every Florida School Program (SEFS), one of eight projects selected for UF's "moonshot" initiative.

October: TESI team presents to 20 K-12 educators and 40 science supervisors about Earth systems education at the Florida Association of Science Supervisors (FASS) and Florida Association of Science Teachers (FAST) annual conferences in Miami.



November: Funding for six projects that aim to communicate Earth systems research to the Institute's audiences are announced as part of TESI's grant program.

January: K-12 educators from five pilot counties in Florida work with scientists to brainstorm ways to collaborate during the Scientist in Every Florida School Kickoff Retreat, located at the Florida Museum's Randell Research Center.



February: TESI communications manager is hired and launches TESI newsletter. Florida Museum Director Douglas Jones and Development Director Marie Emmerson lead a development reception in Gainesville unveiling the Institute's vision and new planned facility.



March: TESI team presents and leads Earth systems related field trips at 5th Life Discovery Conference in Gainesville.



April: TESI hosts two public events about the impacts of red tide — one panel discussion and one Science on Tap brewery talk. TESI tables at the UF Sustainability Fair, engaging with UF undergraduates. Facebook and Twitter channels launched.



May: TESI launches Earth to Florida newsletter. Two communications interns are hired. TESI team visits the Seminole County Environmental Studies Center to discuss future programming and collaboration.



June: TESI hosts second Science on Tap brewery talk about importance of seagrass. MacFadden plans collaborations with UF Center for Public Interest Communications to produce inspiring science content. Two SEFS K-12 education and outreach coordinators are hired.

Meet our Team

In its first year, TESI grew its founding team from one to seven members, each of whom come from different fields of study and bring diverse perspectives when it comes to communicating to the Institute’s many audiences.

Thanks to the hard work of the Institute’s founding team members, TESI had an impactful inaugural year. *Pictured back row from left to right: Shari Ellis, Jennifer Bauer, Bruce MacFadden, Rebecca Burton. Front row left to right: Adania Flemming, Sadie Mills*



Current Core Team Members



Bruce MacFadden, Director
B.S., Cornell University
Ph.D., geology, Columbia University



Stephanie Killingsworth, K-12 Education & Outreach Coordinator
TESI Scientist in Every Florida School Program
B.S., biology, University of Kansas



Brian Abramowitz, K-12 Education & Outreach Coordinator
TESI Scientist in Every Florida School Program
B.A., secondary education and Earth sciences, Syracuse University
M.S., education, Hunter College



Sadie Mills, Educator & Coordinator
B.S., ecology and evolutionary biology, University of Arizona
B.A., anthropology, University of Arizona
M.S., environmental studies, University of North Carolina Wilmington



Rebecca Burton, Communications Manager
B.S., journalism and mass communication, Florida International University
M.A., science/health communication, University of Florida



Mariela Pajuelo, Assistant Scientist
B.S., biology, Universidad Nacional Mayor de San Marcos
M.S., zoology, University of Florida
Ph.D., zoology, University of Florida

To learn more about our team members, visit: <http://bit.ly/TESlteam>



2018-2020 TESI Faculty Fellows

TESI’s inaugural faculty fellows each possess two things: the ability to do incredible science and the willingness to share scientific results with broader audiences. Our faculty fellows help advance the Institute’s mission by finding innovative ways to teach complex subject matter.



Andrea Dutton is an associate professor of geology in the UF College of Liberal Arts and Sciences department of geological sciences. Her research looks into Earth’s past to better predict future sea level rise.

As a faculty fellow with TESI, Dutton hopes to continue conducting public outreach to help Floridians understand the “bigger picture” of climate change, a concept that mirrors one of the Institute’s main goals.

“We can only understand what is going to happen by bringing scientists from different academic fields together,” Dutton said. “We are working in the natural world and the natural world is complex. If you know your little piece, that’s great. But you can’t say something about the bigger picture unless you understand everything that’s acting on it.”

In 2019, Dutton left UF for an associate professor position at the University of Wisconsin-Madison. She was recently named a MacArthur Fellow, commonly known as a “genius grant.”



Pasha Antonenko, is an associate professor of curriculum and instruction in the UF College of Education. He is working to make science more accessible in the classroom.

As a TESI faculty fellow, Antonenko hopes to use his expertise in educational technology to help fulfill the Institute’s mission to increase public understanding of Earth’s natural systems.

“I am excited to collaborate with the TESI team and other faculty fellows to create technology that sparks curiosity and increases knowledge of scientific and environmental issues.”



Andrea Lucky, is an assistant professor of entomology in the UF/IFAS College of Agricultural and Life Sciences. Her citizen science project School of Ants calls upon individuals around the nation to help her answer several questions about invasive species.

As a TESI faculty fellow, she hopes to launch similar projects that get people involved with Earth systems science.

“A major goal of my work is to make science accessible and available to the general public, particularly to make the process of doing science accessible to non-scientists,” Lucky said. “I am excited to be collaborating with the TESI team to achieve this goal.”

To learn more about our faculty fellows, visit: <http://bit.ly/TESIfellows>

TESI Grants Program

In October 2018, TESI initiated its inaugural grants program and received 16 applications representing 23 students and postdoctoral associates across 13 UF departments. Six projects that aim to communicate Earth systems research to the Institute’s audiences were funded, helping leverage the Institute’s capacity to reach a broader audience.



Coding in the Environmental Sciences: A Field Trip and Hands-On Experience

Amy Kendig, Postdoctoral researcher in plant disease ecology, UF/IFAS College of Agricultural and Life Sciences

Environmental scientists use coding to understand and protect the complex systems on Earth. During this free workshop, underrepresented students will visit an outdoor research site, a greenhouse, and a computer lab to see current ecological research at UF and learn basic coding skills used to answer questions in ecology.

During this one-day workshop, “Coding in the Environmental Sciences,” 14 students learned how to use coding techniques to understand invasive species and plant diseases, much like scientists in the real world.

“The students picked up their coding skills really quickly and they got to experience the messiness that is science,” Kendig said. “I am thankful to TESI for the support in hosting this program. I look forward to doing it again in the future.”



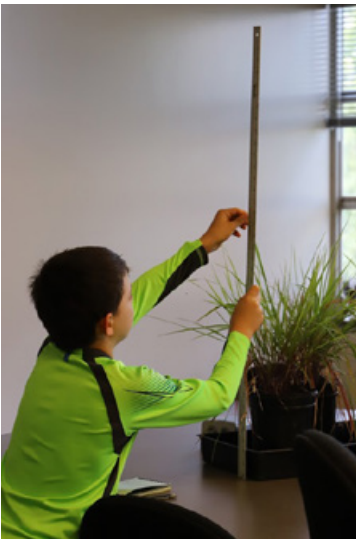
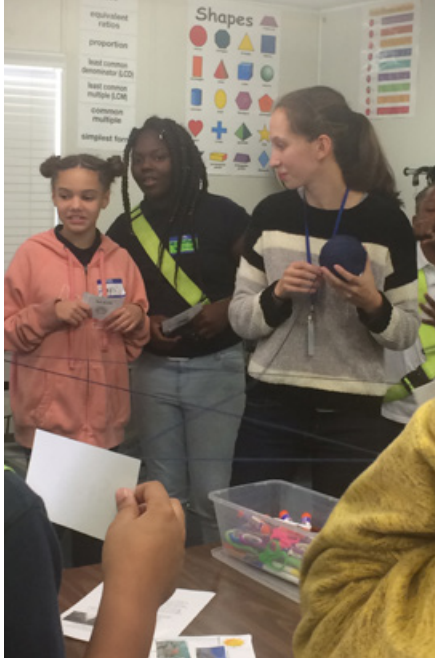
Virtual Climate Scientist: A Polar Ice Cap Expedition

Daniel Pimentel, Ph.D. student and lab coordinator, UF College of Journalism and Communications. Faculty Advisor: Dr. Sri Kalyanaraman, UF College of Journalism and Communications

The Virtual Climate Scientist project is a 10-minute immersive virtual reality experience that allows individuals to visit a polar ice cap, use equipment to extract an ice core, inspect its geological markers for global climate change indicators and learn how scientists use this information to make predictions of future climate change. The simulation is designed to be publicly disseminated through civic organizations, public libraries, public schools and museum pop-ups.

The first demonstration of his project was given to 91 seventh graders at P.K. Yonge Developmental Research School in Gainesville in March 2019.

“Research shows that immersive storytelling platforms, like virtual reality, can help both students and adults understand social and environmental problems at a more visceral level,” Pimentel said. “Virtual scientists can have a positive effect on students’ learning experiences and ultimately serve as realistic influences over how students view themselves.”





Effects of multiple stressors on seagrass meadows: an exploration of how human activity can impact coastal ecosystems

Jamila Roth, Ph.D. student in interdisciplinary ecology, UF/IFAS School of Natural Resources and the Environment. Faculty Advisor: **Dr. Laura Reynolds**, UF/IFAS School of Natural Resources and the Environment

Nearly a third of the global areal coverage of seagrass has disappeared in the last 150 years, likely due to human activity. Roth is educating 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 and an interactive exhibit.

Over the past year, Roth has traveled to science clubs in East Gainesville to teach students in this underserved community about how complex ecosystems are interconnected.

“My objective was to increase student understanding of key science concepts linked to the learning targets for their grade level, as well as student knowledge of an important type of coastal ecosystem in Florida that provides numerous ecosystem services, thereby increasing interest in science and highlighting the importance of marine conservation.”



Water resources and human society: educating Floridians about the value of water resources

Fei He, master's student in natural resources, UF/IFAS College of Agricultural and Life Sciences

Florida is blessed with an abundant amount of water, but our state's water resources face challenges with both quality and quantity. This project will develop a strategy to disseminate information to the public and the next generation of decision-makers about the economic value of Florida's water resources.

He is currently producing outreach products to be used by UF/IFAS extension agents in Florida.

“The goal of this project is to develop a strategy to ensure water resource sustainability by disseminating information to the public and the next generation of decision-makers about the economic value of Florida's water.”



Endangered butterflies in a changing climate: Risks and challenges of the Miami blue butterfly in the Florida Keys

Geena Hill, M.S. student in interdisciplinary ecology, Florida Museum of Natural History, UF/IFAS School of Natural Resources and the Environment | **Sarah Steele Cabrera**, M.S. student in entomology, Florida Museum of Natural History, Department of Entomology and Nematology

The Florida Keys are home to many species, many of which are at risk of extinction. This project uses a federally endangered butterfly, the Miami blue, to illustrate the challenges that many of these species face from climate change impacts.

The team developed an exhibit that is now displayed at the Florida Keys National Wildlife Refuge Complex's new nature center, which attracts 25,000 visitors annually. The exhibit also includes educational coloring books for children to take home.

“The educational presentation to volunteers was fantastic. With great graphics and educational info it was much appreciated and goes a long way in making volunteers feel their efforts in helping save this endangered species are appreciated and worthwhile,” said Kristie Killam, park ranger at the Florida Keys National Wildlife Refuges Complex.



The ImportANTS of Ants

Jenna Allen, Undergraduate biotechnology major, UF/IFAS College of Agriculture and Life Sciences | **Sara Zollota**, Undergraduate microbiology major, UF/IFAS College of Liberal Arts and Sciences | **Patricia Perez**, Undergraduate environmental science major, UF/IFAS College of Agriculture and Life Sciences | **Marina Asuncion**, Postdoctoral researcher, UF/IFAS Emerging Pathogens Institute

This outreach project uses ants as a way for young students to learn about our natural environment, organisms that live in it and how invasive species can have detrimental effects on it.

For the pilot program, they created a lesson plan that included an in-person visit to a biological research station and a set of inquiry-based, hands-on learning activities about ants, social insects and invasive species. The team brought the pilot program to fifth graders at Melrose Elementary School.

“We believe this program has the potential to reach many more students, kids, and families and we are excited to bring it into other classrooms in Florida.”

TESI Public Events 2018-2019

One strategy TESI is using to fulfill its mission is public programming. In its first year, the Institute hosted and co-hosted three public events aimed at researchers, educators and lifelong learners. We also presented about TESI at three conferences. In total, we've reached 455 people through our public events both in person and virtually.

By the numbers



139 Floridians learn more about the economic, public health and environmental impacts of red tide in Florida.



210 participants learn about the benefits of seagrass and how scientists are saving sea turtles from red tide during our Science on Tap series.



155 K-12 teachers and UF students, faculty and staff reached through conference presentations, tabling and outreach events.



60% of event attendees participate in audience discussion using interactive tools, like Mentimeter.



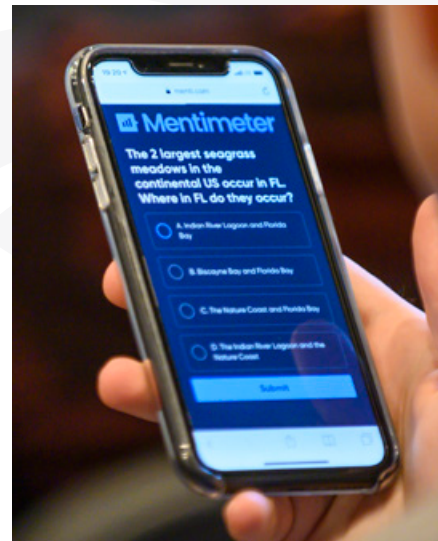
100% of our events were streamed live, broadening our reach and making events accessible to those who could not attend in person.

Using technology to increase audience engagement

For our events, we used an interactive presentation application called Mentimeter to test audience knowledge and encourage engagement. More than 60% of event attendees participated using Mentimeter. Live results were shown on the screen. Since Mentimeter is used online, those watching via Facebook Live were able to participate in the conversation as well. We plan to use this innovative tool at future TESI events.

Presentations & Outreach Displays:

- **Florida Museum of Natural History Educator Open House**
Reach: 30 K-12 teachers
- **Florida Association of Science Teachers Conference**
Reach: 20 K-12 teachers
- **University of Florida Sustainability Showcase**
Reach: 75 UF faculty, staff and students



Our first event, *Beyond Dead Fish: How Red Tide Affects All Floridians*, was certified as a sustainable event by the University of Florida, meaning we took extra steps to eliminate waste, encourage alternative transportation methods and reduce our use of single-use plastics. We have made it our mission to ensure every event hosted by TESI is as sustainable as it can be.



Beyond Dead Fish: How Red Tide Affects All Floridians

This free public panel addressed the economic, public health and environmental impacts of harmful algal blooms.

Speakers:

- **Lisa Krinsky** — UF/IFAS Florida Sea Grant water resources regional specialized agent
- **Dail Laughinghouse** — UF/IFAS assistant professor, algae scientist
- **Andy Reich** — scientific advisor to the Chief of the Bureau of Environmental Health at Florida Department of Health

Co-sponsors:

- UF Bob Graham Center for Public Service
- UF Water Institute

The event was also streamed live.

Attendees (in person and virtual):

139 UF faculty, students & staff and lifelong learners.

Science on Tap: Sea Turtles and Red Tide

This free and informal discussion was led by sea turtle biologist and director of research for the Loggerhead Marinelifelife Center, Justin Perrault. Participants learned how scientists have been monitoring sea turtles in the midst of red tide.

Speaker:

- **Justin Perrault** — Director of research, Loggerhead Marinelifelife Center

Co-sponsors:

- Florida Museum of Natural History
- First Magnitude Brewing Company

Attendees (in person and virtual):

100 lifelong learners

Science on Tap: Secrets of Seagrass

This free informal discussion was led by Savanna Barry, Florida Sea Grant agent with the UF/IFAS Nature Coast Biological Station. Participants learned about Florida's vast seagrass meadows and the wildlife they support.

Speaker:

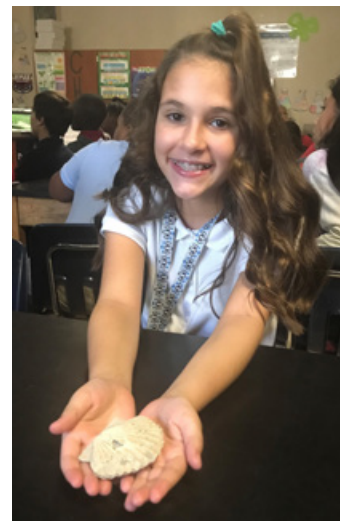
- **Savanna Barry** — Florida Sea Grant agent with UF/IFAS Nature Coast Biological Station

Co-sponsors:

- Florida Museum of Natural History
- Cypress and Grove Brewing Company

Attendees:

110 lifelong learners



Scientist in Every Florida School

TESI's Scientist in Every Florida School Program is a major initiative to connect scientists with every K-12 school in the state through in-person and virtual classroom visits, web-based learning and scientist-teacher networking opportunities. The project was one of eight selected for UF's "moonshot" initiative, a \$17-million effort to solve some of society's most urgent problems.

By the numbers:

- University of Florida grants TESI \$730,000 to launch Scientist in Every School Program
- Florida K-12 teachers participate in brainstorming on how to build connections with UF scientists
- TESI hires two K-12 education & outreach coordinators to lead the Scientist in Every Florida School Program

This far-reaching program has the potential to impact nearly 2.3 million K-12 students and thousands of teachers statewide. The pilot program will focus on five Florida counties: Alachua, Escambia, Lee, Palm Beach and Seminole.

To kick off the program, the Institute hosted a one-day workshop in January 2019 at the Randell Research Center on Pine Island, Florida. Teachers from five Florida counties, Florida Museum staff, and UF faculty gathered to discuss needs, brainstorm strategies and chart a path forward.

In July 2019, TESI hired two K-12 education and outreach coordinators, Stephanie Killingsworth and Brian Abramowitz, to lead the program.

"I am very excited to bring my experience to this role," Abramowitz said. "As someone who has a great passion for environmental education, I am thrilled to connect scientists and educators to facilitate interactions for our next generation of lifelong learners, critical thinkers and potential future scientists."

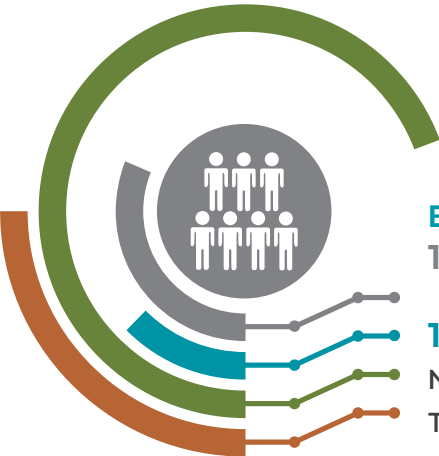
-Brian Abramowitz

"Florida's K-12 science education system can strategically align the teaching standards with real time scientific research happening at the university level like never before. While many teachers often have to struggle to find novel, innovative ways to communicate scientific concepts to their students, this program custom-pairs teachers with a team of scientists to hit a home run in the classroom. I'm so excited to spread this experience to my fellow teachers."

-Stephanie Killingsworth

Communications Report

TESI launched its first monthly newsletter, established its social media channels and developed its first official communications and media plan.



By the numbers:
111 curious Floridians subscribe to TESI’s Earth to Florida newsletter, launched in May 2019
17 Florida researchers interviewed for Earth to Florida blog posts
News coverage of TESI reaches a potential **60,000** Florida readers
TESI Facebook page reaches an average of **10,892** people each month

Earth to Florida

The Earth to Florida newsletter curates the state’s environmental news and puts it in context by getting expert insight from researchers and scientists. The first newsletter was launched in May 2019.



- Subscribers as of June 2019: **111**
- Average open rate: **53.70%** (compared to 14.9% industry average)
- Average click rate: **24.1%** (compared to 1.7% industry average)
- Researchers interviewed: **17**

“Reaching out on behalf of Archbold Biological Station and Archbold’s Buck Island Ranch to let you know how much we enjoy your newsletter – full of well-crafted scientific information, relevant, and also engaging articles – just great.” –Deborah Pollard, Archbold Biological Station director of philanthropy

Social media

Our Facebook and Twitter accounts went live in April 2019. These numbers are based on a three-month average.



- Followers (as of June 2019): **744**
- Average monthly reach: **10,892**
- Average monthly engagement rate: **15.19%** (compared to 0.12% higher education average)
- Average monthly video views: **1,347**



- Followers (as of June 2019): **358**
- Average monthly impressions: **40.1K**
- Average monthly engagement rate: **1%** (compared to 0.079% higher education average)



TESI in the News

- **University of Florida News/Florida Gator Magazine:**
Leadership defined: Jon and Beverly Thompson bring Earth systems to Florida and the world (10,000 potential reach)
- **Gulf Coast Live:** *We Learn About UF’s Thompson Earth Systems Institute* (10,000)
- **WUFT:** *A Complex Issue with Many Factors: Red Tide Focus of UF Panel This Week* (23,000 potential reach)
- **The Fishing Wire:** *Free Virtual Webinar on Red Tide Today* (2,000 potential reach)
- **The Independent Florida Alligator:** *Science on Tap: Sea Turtles and Red Tide*
- **UF Explore Magazine:** *Science Class: Connecting Science with Teachers and Students*



Partners & Collaborators

- Florida Museum of Natural History
- UF Water Institute
- UF Bob Graham Center for Public Service
- Seminole County Environmental Studies Center
- UF Center for Public Interest Communications
- Streaming Science



Contact information:

Floridamuseum.ufl.edu/earth-systems
Facebook/Twitter: [@UFEarthSystems](https://www.facebook.com/UFEarthSystems)
earthsystems@floridamuseum.ufl.edu



Support the Institute:

To support the UF Thompson Earth Systems Institute Endowment, Capital Project Expansion of the Florida Museum, and the Scientist in Every Florida School Program, contact:

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