



**Johnson Education Center, FAU Harbor Branch, Fort Pierce, Florida
February 13-14, 2020**

IRLS 2020 Steering Committee

Jeff Beal, Florida Fish and Wildlife Conservation Commission; Leroy Creswell, University of Florida Sea Grant Program; Dennis Hanisak, Harbor Branch Oceanographic Institute at Florida Atlantic University; Kelli Hunsucker, Florida Institute of Technology; Chuck Jacoby, St. Johns River Water Management District; Phyllis Klarmann, South Florida Water Management District; Holly Sweat, Smithsonian Marine Station at Fort Pierce; Linda Walters, University of Central Florida

IRLS 2020 Sponsors

Love Your Lagoon Since 2012, Harbor Branch Oceanographic Institute Foundation has been the Lead Sponsor for the Indian River Lagoon Symposium, providing support through proceeds of the Foundation’s *Love Your Lagoon Gala* event. We thank all of this year’s donors:

Mangrove Sponsors: Mr. Joseph Z. Duke, III and Mrs. Jennifer Johnson Duke; Mr. Michael O’Reilly and Mrs. Marie O’Reilly

Seagrass Sponsors: Ms. Marjorie Raines and Mr. Harold Baker

Dolphin Sponsors: Mr. Michael Brown, Sr. and Mrs. Mimi Brown; William J. Stewart, Esq. and Mrs. Laurie Kaneb Stewart and the Law Firm of Rossway Swan Tierney Barry Lacey & Oliver, P.L.; Mr. Michael Toner and Mrs. Carol Toner

Manatee Sponsors: Mr. Robert E. Campbell and Mrs. Joan M. Campbell; Florida Power & Light; Dr. Ed Lippisch and Mrs. Jacqui Thurlow-Lippisch; Mr. Ed Michelson and the Atlanta Consulting Group; RedSteel Properties; Wells Fargo; Westmark Construction Company

Seahorse Sponsors: Mrs. Boots Carter and The Lucille B. & John A. Carter Family Foundation, Inc.; Cleveland Clinic Martin Health; Dale Sorensen Real Estate; Dr. Joseph Ferro and Mrs. Olivia Ferro; Flare Media; Mr. George Frazza and Mrs. Marie Frazza; Ms. Katha Kissman; Kmetz, Elwell, Graham & Associates, PLLC; Metz, Husband & Daughton, PA; The Mikita Foundation; Oceans, Reefs & Aquariums (ORA); Mr. John Papa and Mrs. Barbara Papa; Mr. Jim Seitz and Mrs. Bonnie Seitz; Mr. Ed Tapley and Ms. Isabelle Tapley; Vero Insurance

We thank Katha Kissman, President & CEO, Debbie Dutton, Director of Operations, and Cyndi Permenter, SLP Marketing & Administrative Assistant, of the Harbor Branch Oceanographic Institute Foundation, for all of their support and the Indian River Lagoon National Estuary Program for its continued support.

HARBOR BRANCH OCEANOGRAPHIC INSTITUTE
— FOUNDATION —



Indian River Lagoon Symposium 2020
Reassessing IRL Biodiversity

Program Schedule – Technical Sessions

Thursday, February 13, 2020

(Note: The presenting author of talks is the first author, unless indicated by underlining.)

- 0715 - 0815 Registration, Set Up Posters, and Coffee & Tea**
- 0815 - 0830 Welcome**
M. Dennis Hanisak, FAU Harbor Branch
- 0830 - 0900 Keynote Address**
Maintaining a Biodiverse Gateway to the Universe: Long-Term Ecological Monitoring and Management at the Kennedy Space Center, Florida
Douglas M. Scheidt, Carlton R. Hall, David R. Breininger, Eric A. Reyier, Jane A. Provancha, Paul A. Schmalzer, Russell H. Lowers, Geoffrey M. Carter, Donna M. Oddy, Tammy E. Foster, Brean W. Duncan, M. Rebecca Bolt, Eric D. Stolen, Resa R. Cancro, Bonnie J. Ahr, Ronald Schaub, Danny K. Hunt, Christopher D. Schumann, Stephanie A. Legare, Timothy J. Kozusko, Stephanie K. Weiss, and Brenton D. Back
Kennedy Space Center Ecological Program/Integrated Mission Support Services, Kennedy Space Center, FL
- 0900 - 1000 Oral Session 1 – IRL Biodiversity: Microbes and Algae**
Session Chair: Holly Sweat, Smithsonian Marine Station
- 0900 - 0915 Microalgal Diversity in the IRL System: How Little We Know**
Paul E. Hargraves
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL & Smithsonian Marine Station, Fort Pierce, FL
- 0915 - 0930 Machine Learning Techniques Applied to Flow Cytometry and Flow Imaging Data to Assess Phytoplankton Community Dynamics in the Indian River Lagoon**
Malcolm McFarland, Dennis Hanisak, Stephanie Schreiber, Nicole Stockley, Rachel Brewton, and James Sullivan
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- 0930 - 0945 A Reassessment of Epiphytic Foraminiferal Diversity in Jupiter Sound, Florida, Indian River Lagoon**
Susan L. Richardson
Florida Atlantic University, Jupiter, FL
- 0945 - 1000 Macroalgal Biodiversity of the Indian River Lagoon**
M. Dennis Hanisak
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- 1000 - 1030 Break**

- 1030 - 1130 Oral Session 2 – IRL Biodiversity: The Next Generation Speaks!**
Session Chair: Geoffrey Cook, University of Central Florida
- 1030 - 1045 **Exploring the Microbial Diversity of the Indian River Lagoon (STUDENT PRESENTATION)**
David J. Bradshaw II, Nicholas Dickens, and Peter J. McCarthy
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- 1045 - 1100 **Quantifying the Effects of Hypoxia and Fish Kills on Fish Community Diversity in the Indian River Lagoon (STUDENT PRESENTATION)**
Dakota M. Lewis¹, Geoffrey S. Cook¹, and Richard Paperno²
¹University of Central Florida, Orlando, FL; ²Florida Fish and Wildlife Conservation Commission, Melbourne, FL
- 1100 - 1115 **Assessing the Response of Mangrove Snapper (*Lutjanus griseus*) Trophic Dynamics to Oyster Reef Restoration in the Indian River Lagoon (STUDENT PRESENTATION)**
Jennifer M. Loch and Geoffrey S. Cook
University of Central Florida, Orlando, FL
- 1115 - 1130 **Diamondback Terrapins in the Southern Indian River Lagoon (STUDENT PRESENTATION)**
Jeffrey Herr¹, Emily Dark², and Jon A. Moore¹
¹Florida Atlantic University, Jupiter, FL; ²Florida Department of Environmental Protection, Indian River Lagoon Aquatic Preserves, Fort Pierce, FL
- 1130 - 1200 Three Minutes, Three Slides**
Session Chair: M. Dennis Hanisak, FAU Harbor Branch
- Spatiotemporal Changes in Phytoplankton Dynamics in the St. Lucie River Estuary (SLE)**
Alexandra Serna¹, Anna Wachnicka¹, Barbara Welch¹, Beth Orlando², William Louda³, and Thomas Frankovich⁴
¹South Florida Water Management District, West Palm Beach, FL; ²Palm Beach County, West Palm Beach, FL; ³Florida Atlantic University, Boca Raton, FL; ⁴Florida International University, Miami, FL
- Developing an Approach to Utilize UAS Derived Multi-Spectral Imagery to Estimating Chlorophyll in the Indian River Lagoon, FL (STUDENT PRESENTATION)**
Aaron Duecaster¹ and Laurent Cherubin²
¹Florida Atlantic University, Boca Raton, FL; ²Harbor Branch Oceanographic Institute at Florida Atlantic University
- Exposure to Multiple Algal Toxins among Young Bull Sharks, *Carcharhinus leucas*, in Florida's Indian River Lagoon (STUDENT PRESENTATION)**
Michelle L. Edwards, Michael McCallister, Luke Yrastorza, Adam M. Schaefer, and Matthew J. Ajemian
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- Intervention Strategies for Diseased Corals in Southeast Florida and Potential Impacts on Mucus Microbial Communities (STUDENT PRESENTATION)**
Erin Shilling¹, Ian Combs¹, Michael S. Studivan¹, Jeff Beal², and Joshua D. Voss¹
¹Harbor Branch Oceanographic Institute at Florida Atlantic University; ²Florida Fish and Wildlife Conservation Commission, Fort Pierce, FL

A Proposed Study of Organic Sediment Impacts on Seagrasses and their Association with Benthic Infauna (STUDENT PRESENTATION)

Sean Crowley and Kevin B. Johnson
Florida Institute of Technology, Melbourne, FL

Patterns of Recovery and Loss: Southern Indian River Lagoon Seagrass 2005-2017

Amanda Kahn
South Florida Water Management District, West Palm Beach, FL

What Might Seagrass Recovery Look Like? How Can We Help?

Robert Virnstein
Seagrass Ecosystems Analysts, East Palatka, FL

Food Web Effects of Eutrophication in the Indian River Lagoon

Rachel A. Brewton, Diana Baladi, and Brian E. Lapointe
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

1200 - 1325 Lunch (provided)

1325 - 1330 Sponsor's Remarks

Katha Kissman, President & CEO, Harbor Branch Oceanographic Institute Foundation

1330 - 1500 Oral Session 3 – Water Quality & Environmental Science

Session Chair: Malcolm McFarland, FAU Harbor Branch

1330 - 1345 Stoichiometry of Nutrient Fluxes in Sediments (STUDENT PRESENTATION)

Iulia Bibire, Austin Fox, Tyler Provoncha, Abigail Gering, and Maria Fernanda Hernandez Garcia
Florida Institute of Technology, Melbourne, FL

1345 - 1400 Comparison of Field and Laboratory Phytoplankton Pigment Fluorescence Measurements in the Indian River Lagoon

Nicole Stockley, Malcolm McFarland, Rachel Brewton, and Stephanie Schreiber
Florida Atlantic University at Harbor Branch Oceanographic Institute, Fort Pierce, FL

1400 - 1415 Prevalence and Intensity of *Perkinsus marinus* (Dermo) Infections in Oyster Populations in the St. Lucie Estuary

Richard Radigan and Melanie Parker
Florida Fish & Wildlife Conservation Commission, St. Petersburg, FL

1415 - 1430 Water Quality Drivers of Microcystin and Saxitoxin Concentrations in the Indian River Lagoon: A Case Study from the Florida Center for Coastal and Human Health

Abdiel E. Laureano-Rosario, Esther Guzmán, Nicole Stockley, Michael Twardowski, Amy Wright, and Malcolm McFarland
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

1430 - 1445 Harmful Algal Bloom-Associated Biotoxins and Health in Juvenile Green Turtles (*Chelonia mydas*) in Three Ecologically Disparate Foraging Grounds in Florida

Annie Page-Karjian¹, Christopher R. Perkins², Matthew J. Ajemian¹, Michael J. Bresette³, Cody R. Mott³, Nicole I. Stacy⁴, Karen Holloway-Adkins⁵, and Justin R. Perrault⁶
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²University of Connecticut, Storrs, CT; ³Inwater Research Group, Jensen Beach, FL; ⁴University of Florida, Gainesville, FL; ⁵East Coast Biologists, Inc., Indialantic, FL; ⁶Loggerhead Marinelifelife Center, Juno Beach, FL

- 1445 - 1500 **Temporal and Spatial Distribution of Saxitoxin in Bottlenose Dolphin Prey Species from the Indian River Lagoon (STUDENT PRESENTATION)**
Edna Sabater¹, Riley Doyle-Odenbach¹, Richard Paperno², James Sullivan³, Adam Schaefer³, and Spencer Fire¹
¹Florida Institute of Technology, Melbourne, FL; ²Florida Fish and Wildlife Conservation Commission, Melbourne, FL; ³Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- 1500 - 1530 Break**
- 1530 - 1540 Remembrances**
- 1540 - 1710 Oral Session 4 – Ecology & Management**
Session Chair: Linda Walters, University of Central Florida
- 1540 - 1555 **Does the Benthic Invertebrate Community Reflect Disturbances in the Central Indian River Lagoon? (STUDENT PRESENTATION)**
Ann Wassick, Kelli Hunsucker, and Geoffrey Swain
Florida Institute of Technology, Melbourne, FL
- 1555 - 1610 **Benthic Foraging Fish Prey Selectivity in Dredged Sediments (STUDENT PRESENTATION)**
Danielle Juzwick, Kevin B. Johnson, and Jonathan Shenker
Florida Institute of Technology, Melbourne, FL
- 1610 - 1625 **Planning, Permitting, and Use of Native Wetland Plants in Coastal Stormwater Management Projects (STUDENT PRESENTATION)**
Miranda White, Robert McKinzie, Abraham DaSilvio, and Hyun J. Cho
Bethune-Cookman University, Daytona Beach, FL
- 1625 - 1640 **Decision-Making Strategies from a Public Perspective: Three Areas in Need of Special Attention in the Indian River Lagoon (STUDENT PRESENTATION)**
Erica Edmonston, Fernando Rivera, Timothy Hawthorne, and Hannah Torres
University of Central Florida, Orlando, FL
- 1640 - 1655 **Hydrodynamic Thresholds of Shoreline ‘Ecosystem Engineers’ and Their Application to Successful Restoration**
Kelly Kibler¹, Melinda Donnelly¹, Giovanna McClenachan¹, Annie Roddenberry², and Linda Walters¹
¹University of Central Florida, Orlando, FL; ²Florida Fish and Wildlife Conservation Commission, New Smyrna Beach, FL
- 1655 - 1710 **Data-Model Fusion as a Tool for Addressing Research Questions and Setting Management Goals**
Oleksandra (Sasha) Hararuk
University of Central Florida, Orlando, FL
- 1710 - 1730 Three Minutes, Three Slides**
Session Chair: Kelli Hunsucker, Florida Institute of Technology
- Natural Language Processing Using Deep Learning for the Indian River Lagoon Algal Bloom Report Analysis (STUDENT PRESENTATION)**
Manit Bhusal, Ashim Ghimire, Juan Calderon, and Hyun J. Cho
Bethune-Cookman University, Daytona Beach, FL

Genetic Analysis of Indian River Lagoon Water Samples for Early Detection of Toxin Producing Organisms (STUDENT PRESENTATION)

Jackie Metz and Guojun Wang

Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

Spatial Distribution of Oxygen in the Indian River Lagoon (STUDENT PRESENTATION)

Tyler Provoncha, Austin Fox, Stacey Fox, Iulia Bibire, Maria Fernanda Hernandez Garcia, and Abigail Gering

Florida Institute of Technology, Melbourne, FL

Impacts of Oyster Reef Restoration on Infaunal and Bird Communities in Mosquito Lagoon (STUDENT PRESENTATION)

Jessica Copertino, Katherine Harris, Michelle Shaffer, Melinda Donnelly, and Linda Walters

University of Central Florida, Orlando, FL.

Exploring the Driving Factors behind Mangrove Colonization of Oyster Reefs within Mosquito Lagoon (STUDENT PRESENTATION)

Megan Witt, Giovanna McClenachan, and Linda Walters

University of Central Florida, Orlando, FL

Microplastic Cycling: Are Eastern Oysters, *Crassostrea virginica*, Capable of Excreting Microplastics? (STUDENT PRESENTATION)

Casey Craig¹, Linda Walters¹, Jessy Wayles², Emily Dark³, Kirk Fusco³, Vincent Encomio^{4,5}, David Fox Jr.⁶, and Lei Zhai⁶

¹University of Central Florida, Orlando, FL; ²Marine Discovery Center, New Smyrna Beach, FL; ³Florida Department of Environmental Protection, Indian River Lagoon Aquatic Preserves, Fort Pierce, FL; ⁴UF/IFAS FL Sea Grant, Stuart, FL; ⁵Florida Oceanographic Society, Stuart, FL, ⁶University of Central Florida, Orlando, FL

Utilizing Biodegradable Mats for Oyster Reef Restoration: Are there Biogeochemical Implications? (STUDENT PRESENTATION)

Chelsea Nitsch, Linda J. Walters, Paul Sacks, and Lisa G. Chambers

University of Central Florida, Orlando, FL

1730 Announcements and Transition to Poster Session & Reception

1730 - 2000 Reception

1930 Announcement of Student Awards (Auditorium)

Notes on How to Vote on People's Choice Student Awards

This year we will again have three People's Choice Student Awards for Best 15-Minute Oral Presentation, Best 3-Minute Oral Presentation, and Best Poster. In the back of each attendee's name badge are three tickets, a red one, a white one, and a yellow one. Please vote for the presentation that you thought was most deserving of this recognition:

Red Ticket: Best 15-Minute Oral Presentation – Write time slot and student's last name

White Ticket: Best 3-Minute Oral Presentation – Write session time slot and student's last name

Yellow Ticket: Best Poster Presentation – Write the poster number and student's last name

**Deposit oral presentation tickets in designated containers
at registration desk in Gallery by 6 p.m.**

**Deposit poster presentation tickets in designated containers
at registration desk in Gallery by 7 p.m.**

1730 - 2000 Poster Session & Reception (Open to the public, too!)

Posters will be displayed in the Education Annex (Posters #1-30) and the Gallery (Posters #31-41). During the poster session, presenters of odd-numbered posters will minimally be at their posters between 1730 and 1815; presenters of even-numbered posters will minimally be at their posters between 1815 and 1900. We also encourage students to be at their posters during the second half of lunch break. **Please join us in the Auditorium for the presentation of student awards at 1930.**

- 1. Influence of Water Quality and Culverts on Mangrove Invertebrate Communities in the Coastal Oaks Preserve (STUDENT PRESENTATION)**
Marina Arnold^{1,3}, Stephanie Buell^{2,3}, Paityn Johnston^{1,3}, Anjaleahmae Leviste^{1,3}, and Marisa Stipanich^{1,3}
¹Sebastian River High School, Sebastian, FL; ²Vero Beach High School, Vero Beach, FL; ³Junior Scientists Program
- 2. Planktonic Signatures of Marine Invertebrate Diversity in the Fort Pierce Inlet and Beyond**
Michael J. Boyle¹ and William B. Jaeckle²
¹Smithsonian Marine Station, Fort Pierce, FL; ²Illinois Wesleyan University, Bloomington, IL
- 3. Analyzing Water Quality in Natural Ponds during Wetland Restoration (STUDENT PRESENTATION)**
Grace Britt^{1,2}, Melissa Dioguardi^{1,2}, Carson Fillizola^{1,2}, and Colton Fillizola^{1,2}
¹Vero Beach High School, Vero Beach, FL; ²Junior Scientists Program
- 4. Assessing Wading Bird Disturbance by Boat Traffic on Oyster Reefs in Mosquito Lagoon Using Video Observation (STUDENT PRESENTATION)**
John Buzby, Linda Walters, and Paul Sacks
University of Central Florida, Orlando FL
- 5. A Comprehensive Diet Description for the Whitespotted Eagle Ray (*Aetobatus narinari*) in Florida Coastal Waters (STUDENT PRESENTATION)**
Brianna V. Cahill¹, Kim Bassos-Hull², Carlos A. Santamaria³, Christelle Bouchard³, Lisa A. Hoopes⁴, and Matthew J. Ajemian¹
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²Mote Marine Laboratory, Sarasota, FL; ³University of South Florida, Sarasota, FL; ⁴Georgia Aquarium, Atlanta, GA
- 6. Monitoring Fish and Water Quality in Historic versus New Culverts at the Coastal Oaks Preserve (STUDENT PRESENTATION)**
Marc Calloway^{1,3}, Thabet Hasan^{2,3}, Preslie Heins^{2,3}, Haylee Jones^{2,3}, and Keegan McCollom^{2,3}
¹Sebastian River High School, Sebastian, FL; ²Vero Beach High School, Vero Beach, FL; ³Junior Scientist Program
- 7. Use of Trophic Structure to Evaluate Ecosystem Services of Estuarine Habitat Restoration**
Melinda Donnelly, Suzanne Connor, Jessica Copertino, Giovanna McClenachan, and Michelle Shaffer
University of Central Florida, Orlando, FL
- 8. Assessing Density and Diversity of Oyster Reef Resident Fishes Following Habitat Restoration (STUDENT PRESENTATION)**
Katie Durham, Dakota Lewis, and Geoffrey S. Cook
University of Central Florida, Orlando FL
- 9. Developing an eDNA Tool for Monitoring Populations of the Dwarf Seahorse (*Hippocampus zosterae*) (STUDENT PRESENTATION)**
Tara Fellows, Pavithiran Amirthalangam, and Michelle Gaither
University of Central Florida, Orlando, FL

10. **Identifying Factors That Impact the Success of *Rhizophora mangle* Living Shorelines (STUDENT PRESENTATION)**
Rebecca Fillyaw, Giovanna McClenachan, Melinda Donnelly, Kristy Lewis, Kelly Kibler, and Linda Walters
University of Central Florida, Orlando, FL
11. **Spatial Variation of Sediment Oxygen Demand in a Subtropical Estuary, the Indian River Lagoon, FL (STUDENT PRESENTATION)**
Abigail Gering, Austin Fox, Stacey Fox, Iulia Bibire, Tyler Provoncha, and Maria Fernanda Hernandez Garcia
Florida Institute of Technology, Melbourne, FL
12. **Cathodically Protected Steel as a Replacement for Plastic in Oyster Reef Restoration Methods (STUDENT PRESENTATION)**
Morgan Gilligan, Kelli Hunsucker, Afanasy Melnikov, Harrison Gardner, Robert Weaver, and Geoffrey Swain
Florida Institute of Technology, Melbourne, FL
13. **Scar Pattern Types and Regionalization on Florida Manatees (*Trichechus manatus latirostris*) Observed at Harbor Branch Oceanographic Institute in Florida (STUDENT PRESENTATION)**
Lauren K. Gomez¹, Susan L. Richardson^{2,3}, and Jon A. Moore^{2,3}
¹Tampa Electric Company, Apollo Beach, FL; ²Florida Atlantic University, Jupiter, FL; ³Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
14. **Cytotoxicity Assessment of Samples Collected Along the Indian River Lagoon**
Esther Guzmán, Tara Pitts, Jill Roberts, Jennifer Sandle, Kirstie Tandberg, Priscilla Winder, and Amy Wright
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
15. **Infaunal Molluscan Abundance and Diversity in Relation to pH and Temperature in the Indian River Lagoon**
Khalila Haque, Michelle Stephens, and L. Holly Sweat
Smithsonian Marine Station, Fort Pierce, FL
16. **Development of a Biogeochemical Model for Understanding Nutrient Cycles and Phytoplankton Blooms in the Northern Indian River Lagoon**
Mingshun Jiang¹, Edward J. Phlips², Susan Badylak², Jordon Beckler¹, Charles A. Jacoby³, and Brian E. Lapointe¹
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²University of Florida, Gainesville, FL; ³St. Johns River Water Management District, Palatka, FL
17. **Oyster Mapping in the St. Lucie Estuary to Support Everglades Restoration**
Phyllis A. Klarmann¹, Gretchen Ehlinger², and Zhiqiang Chen¹
¹South Florida Water Management District, West Palm Beach, FL; ²United States Army Corps of Engineers, Jacksonville, FL
18. **Connecting the Community with the Indian River Lagoon through Public Outreach Efforts (STUDENT PRESENTATION)**
Skyler Klingshirn, Andrew Pressley, Juliet Ruggiero, Madeleine Arencibia, Brandon McHenry, and Gabby Barbarite
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
19. **Optimization of Aquatic Environmental DNA Capture, Preservation and Extraction Methods**
Girish Kumar, Emily Farrell, Ashley Reaume, and Michelle R. Gaither
University of Central Florida, Orlando, FL
20. **Groundwater – Surface Water Interactions in the North Fork of the St. Lucie Estuary**
Brian E. Lapointe, Rachel A. Brewton, and Diana Baladi
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

21. **Nutrient Over-Enrichment and Brown Tide Result in Light Limitation of Seagrass Communities in the Indian River Lagoon**
Brian E. Lapointe, Laura W. Herren, Rachel A. Brewton, and Pamela Alderman
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
22. **Utilizing Wildlife Cameras for Organism Identification and Behavioral Analyses along Restored Shorelines in Canaveral National Seashore (STUDENT PRESENTATION)**
Jason Litwak, Julia Rifenberg, Rebecca Fillyaw, and Linda Walters
University of Central Florida, Orlando, FL
23. **Quantifying the Effects on Nekton Communities following Habitat Restoration in a Dynamic Coastal Estuary (STUDENT PRESENTATION)**
Richard M. Mahoney¹, Jeffrey L. Beal², Dakota M. Lewis¹, and Geoffrey S. Cook¹
¹University of Central Florida, Orlando, FL; ²Florida Fish and Wildlife Conservation Commission, Fort Pierce, FL
24. **Analytics of Textual Data Structures on Visualization in Meteorology (STUDENT PRESENTATION)**
Robert McKinzie, Raphael Isokpehi, and Hyun J. Cho
Bethune-Cookman University, Daytona Beach, FL
25. **Indian River Lagoon Microbiota and Their Potential Roles in Harmful Algal Blooms (STUDENT PRESENTATION)**
René K. Miller-Xavier, Carlie S. Perricone, Guojun Wang, and Nicholas J. Dickens
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
26. **The Manatee Observation Project at Harbor Branch Oceanographic Institute, a Ten-Year Look at Manatee Photo-Identification**
Jon A. Moore^{1,2}, Susan L. Richardson^{1,2}, and Lauren K. Gomez³
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²Florida Atlantic University, Jupiter, FL; ³Tampa Electric Company, Apollo Beach, FL
27. **Assessing the Remote Sensing Viability of Detecting Cyanobacteria in Lake Okeechobee and Other Lakes**
Timothy Moore¹, Hui Feng², Malcolm McFarland¹, Nicole Stockley¹, Nima Pahlevan³, and Steve Ruberg⁴
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²University of New Hampshire, Durham, NH; ³NASA Goddard Space Flight Center, Greenbelt, MD; ⁴NOAA Great Lakes Environmental Research Laboratory, Ann Arbor, MI
28. **Validating Ultrasonography of Shoulder Fat Thickness as a Non-Invasive Technique for Estimating Body Condition in Green (*Chelonia mydas*) Sea Turtles (STUDENT PRESENTATION)**
Marisa Pico¹, Annie Page-Karjian¹, and Justin R Perrault²
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²Loggerhead Marinelife Center, Juno Beach, FL
29. **Oral Histories: What We Learn Can Help Improve the Indian River Lagoon (IRL)**
Paul Sacks, Linda Walters, and Melinda Donnelly
University of Central Florida, Orlando, FL
30. **Establishing an Algal Biodiversity Baseline to Monitor Florida's Waterways via Environmental DNA Sequencing**
Thomas Sauvage, Larissa dos Santos, and Valerie Paul
Smithsonian Marine Station, Fort Pierce, FL

- 31. Studying the Public Health Impacts of Harmful Algal Bloom Exposure in Florida**
Adam M. Schaefer¹, Luke Yrastorza¹, Kathi Harvey², Nancy Harris², Elizabeth I. Hamelin³, Shirley Gordon², Robert Grady¹, Nicole Stockley¹, Malcolm McFarland¹, Michael L Parsons⁴, and John S. Reif⁵
¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²Florida Atlantic University, Boca Raton, FL; ³Centers for Disease Control and Prevention, Atlanta, GA; ⁴Florida Gulf Coast University, Fort Myers, FL ⁵Colorado State University, Fort Collins, CO
- 32. Using Computer Programming to Automate Environmental Data Analyses (STUDENT PRESENTATION)**
Tyler Serio, Michelle Stephens, and L. Holly Sweat
Smithsonian Marine Station, Fort Pierce, FL
- 33. Evaluating Spatial-Temporal Trends of Indian River Lagoon Essential Fish Habitat, Forage Fish and Their Recreationally Important Predators (STUDENT PRESENTATION)**
Michelle Shaffer¹, Kristy A. Lewis¹, Timothy C. MacDonald², and Kevin Thompson²
¹University of Central Florida, Orlando, FL; ²Florida Fish and Wildlife Conservation Commission, St. Petersburg, FL
- 34. Preparing for Environmental Careers: An Immersive Internship Program for At-Risk High School Students**
Amy Durham Shea
The Environmental Learning Center, Vero Beach, FL
- 35. Fifteen Years of Benthic Infaunal Diversity and Composition throughout the Indian River Lagoon: A Comparison across Regions**
Michelle Stephens, Sherry Reed, and L. Holly Sweat
Smithsonian Marine Station, Fort Pierce, FL
- 36. Discovery of Survivin-Targeting Marine Natural Products from the Indian River Lagoon (STUDENT PRESENTATION)**
Kirstie R. Tandberg, Tara P. Pitts, Esther A. Guzmán, Priscilla L. Winder, Peter J. McCarthy, and Amy E. Wright
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
- 37. Using Citizen Science to Monitor Seagrass in the Southern Indian River Lagoon**
Kathryn A. Tiling
Florida Oceanographic Society, Stuart, FL
- 38. Tracking the Lionfish Invasion across the Indian River Lagoon Using Environmental DNA (STUDENT PRESENTATION)**
Katherine R. Viehl, Pavithiran Amirthalingam, and Michelle R. Gaither
University of Central Florida, Orlando, FL
- 39. The Effect of Sea Level Rise on the Health of *Sable palmetto* Hammocks in the Coastal Oaks Preserve (STUDENT PRESENTATION)**
Griffin Wagner^{1,3}, Alex Bounassi^{1,3}, Maxwell Tardif^{1,3}, and Geena Salinas^{2,3}
¹Vero Beach High School, Vero Beach, FL; ²Sebastian River High School, Sebastian, FL; ³Junior Scientist Program
- 40. Evaluating Ecosystem Services of Intact Shorelines and Oyster Reefs in Indian River Lagoon: A Meta-Analysis of Hydrodynamics and Sediment Carbon Storage (STUDENT PRESENTATION)**
Jordyn Washington, Chris Hagglund, OlaToyin Olasimbo, Sam Maldonado, Vasileios Kitsikoudis, and Kelly Kibler
University of Central Florida, Orlando, FL

41. Hematology and Plasma Biochemistry Baseline Reference Values of Free-Ranging Estuarine Elasmobranchs

Luke Yrastorza¹, Grace Roskar¹, Carolyn Cray², Robert Grady¹, Mike McCallister¹, Matthew J. Ajemian¹, and Adam M. Schaefer¹

¹Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; ²University of Miami, Miami, FL

Friday, February 14, 2020

- 0730 - 0815 Registration and Coffee & Tea**
- 0815 - 0830 Welcome**
M. Dennis Hanisak, FAU Harbor Branch
- 0830 - 0900 Keynote Address**
The Indian River Lagoon Species Inventory 25 Years Later: Improving a Unique Biological Resource
Valerie J. Paul and L. Holly Sweat
Smithsonian Marine Station, Fort Pierce, FL
- 0900 - 0905 Sponsor's Remarks**
Duane De Freese, Executive Director, IRL Council & Indian River Lagoon National Estuary Program
- 0905 - 1005 Oral Session 5 – IRL Biodiversity: Seagrasses and Invertebrates**
Session Chair: Valerie Paul, Smithsonian Marine Station
- 0905 - 0920 Dynamic Diversity of Seagrass in the Indian River Lagoon**
Lori Morris, Charles Jacoby, Lauren Hall, Margie Lasi, and Jan Miller
St. Johns River Water Management District, Palatka, FL
- 0920 - 0935 Infaunal Invertebrate Diversity in the Indian River Lagoon System: 15 Years of Data and Counting**
L. Holly Sweat, Michelle Stephens and Sherry A. Reed
Smithsonian Marine Station, Fort Pierce, FL
- 0935 - 0950 Habitat Differences in Epifaunal Community Diversity within the Indian River Lagoon**
Dean S. Janiak, David Branson, and Valerie Paul
Smithsonian Marine Station, Fort Pierce, FL
- 0950 - 1005 Reassessing IRL Biodiversity: The Importance of Oysters in the Indian River Lagoon**
Linda Walters and Paul Sacks
University of Central Florida, Orlando, FL
- 1005 - 1035 Break**
- 1035 - 1135 Oral Session 6 – IRL Biodiversity: Vertebrates**
Session Chair: Jeff Beal, Florida Fish and Wildlife Conservation Commission
- 1035 - 1050 Regional Fish Biodiversity Changes from 1955 to 2020: Which Species Were Here? Which Are Missing? Why?**
R. Grant Gilmore, Jr., Estuarine, Coastal and Ocean Science, Inc., Vero Beach, FL
- 1050 - 1105 Fish Community Diversity in the Indian River Lagoon: 25 years of Changes and Challenges**
Richard Paperno, Derek M. Tremain, and Douglas H. Adams
Florida Fish & Wildlife Conservation Commission, Melbourne, FL
- 1105 - 1120 The Diversity of Elasmobranchs (Sharks and Rays) in Florida's Indian River Lagoon**
Matthew J. Ajemian, Grace Roskar, Michael P. McCallister, and Adam M. Schaefer
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

- 1120 - 1135 **Biodiversity of the Indian River Lagoon System: A Cautionary Tale from the Birds**
Richard L. Turner
Florida Institute of Technology, Melbourne, FL
- 1135 - 1300 **Lunch (provided)**
- 1300 - 1400 **Oral Session 7 – IRL Biodiversity: Management and Outreach**
Session Chair: Chuck Jacoby, St. Johns River Water Management District
- 1300 - 1315 **Indian River Lagoon Biodiversity: Looking Back Four Decades and Thinking Ahead to 2030 with Consideration for a Question Posed by the Late Dr. Kerry B. Clark: “Are Our Sea Slugs Slipping Away?”**
Duane E. De Freese
Indian River Lagoon National Estuary Program, Sebastian, FL
- 1315 - 1330 **Risks to Indian River Lagoon Biodiversity Caused by Climate Change**
Randall W. Parkinson¹, Valeri Seidel², Clay Henderson³, and Duane De Freese⁴
¹RWParkinson Consulting, Inc., Melbourne, FL; ²The Balmoral Group, Winter Park, FL, ³Stetson University, DeLand, FL; ⁴Indian River Lagoon National Estuary Program, Sebastian, FL
- 1330 - 1345 **Living Shorelines, Lessons Learned and Patterns Uncovered in Their Implementation as Tools for Citizen Science and Runoff Mitigation**
Adeljean L.F.C. Ho, Miranda C. White, Abraham DaSilvio, and Hyun J. Cho
Bethune-Cookman University, Daytona Beach, FL
- 1345 - 1400 **Empowering the Community to Build a State-of-the-Art Aquarium and Indian River Lagoon Conservation Center**
Keith Winsten
Brevard Zoo, Melbourne, FL
- 1400 - 1430 **Three Minutes, Three Slides**
Session Chair: Zack Jud, Florida Oceanographic Society
- An Introduction to Restoring Lagoon Inflow Research Phase I**
Gary Zarillo, Robert Weaver, Ashtok Pandit, Kevin Johnson, Ralph Turingan, Austin Fox, and Jeff Eble
Florida Institute of Technology, Melbourne FL
- Is Sediment Aeration an Effective Strategy for Muck Management in the IRL?**
Austin Fox, Maria Hernandez, Abigail Gering, Iulia Bibire, Stacey Fox, and Tyler Provoncha
Florida Institute of Technology, Melbourne, FL
- On a Wing and a Prayer: Seeking New Nesting Habitats for Beach-Nesting Birds**
Kirk Fusco, Irene Arpayoglou, Matthew Anderson, and Emily Dark
Florida Department of Environmental Protection, Indian River Lagoon Aquatic Preserves, Fort Pierce, FL

Assessing the Impacts of Oyster Reef Restoration on Macroinvertebrate Community Assemblages in Mosquito Lagoon, Florida

Adam R. Searles^{1,2}, Emily E. Gipson¹, Linda J. Walters¹, and Geoffrey S. Cook¹

¹University of Central Florida, Orlando, FL; ²Florida Fish and Wildlife Conservation Commission, Melbourne, FL

Mineral Accretion: An Environmentally Friendly Alternative to Plastic for Oyster Restoration

Kelli Hunsucker, Afanasy Melikov, Morgan Gilligan, Harrison Gardner, Robert Weaver, and Geoffrey Swain

Florida Institute of Technology, Melbourne, FL

Grasses in Classes: Using Native Plants to Engage Students with Hands-on Restoration

Callie Shaffer and Jake Zehnder

Brevard Zoo, Melbourne, FL

Lagoon Academy Homeschool: Connecting Homeschoolers to the Lagoon through Placed-Based and Hands-on Education

Nicole Lemmo Saini

The Environmental Learning Center, Vero Beach, FL

1430 Closing Comments

Remembrances

Cynthia Lott

March 20, 1949 – October 18, 2019

Cindy Lott swam away late last year after a long battle with cancer. Cindy was born into a military family in Norfolk, VA. With her Navy father, Cindy began her world-wide travels at an early age, living in Virginia, Cuba, Puerto Rico, Texas and Florida. An avid surfer and sailor, Cindy worked on the British schooner *Sir Cloudesley Shovell* with Captain Bob Gascoine for many years. They, along with Sir Peter Scott of the World Wildlife Fund, studied marine habitats throughout the Caribbean and filmed *Kingdom of the Dolphins* for PBS in 1983.

Cindy earned a Bachelor of Science Degree in Natural Sciences and Microbiology and a Masters Degree in Conservation Biology from Florida Institute of Technology. After a stint with Mote Marine Laboratory in Sarasota, Florida, she worked for the Department of Environmental Protection (DEP). After retirement from DEP, she worked with Ecological Associates, Inc. of Jensen Beach FL on coastal management and regulatory issues. Cindy worked on numerous reef, mapping and marine habitat projects in the Turks & Caicos Islands; Bonaire, Netherlands Antilles; and Micronesia in the South Pacific.

Always the teacher and passionate about protecting the environment and all forms of life, Cindy was a mentor and inspiration to many budding biologists and ecologists. She also devoted countless hours as a mentor and volunteer with numerous public and private groups and agencies in their efforts to protect coastal resources, including Florida Reef Resiliency Program, Florida Oceanographic Society, Florida Fish & Wildlife Conservation Commission, The Nature Conservancy, Florida Public Archaeology Network, Palm Beach County ERM, Florida State Parks, the Indian River Lagoon Envirothon, and Stichting National Parken Bonaire, Netherlands Antilles.

Cindy always said, "Marine biology is a way of life, not a job." She enjoyed instigating, attending, and hosting countless parties with her pirate, mermaid, and environmentalist friends, with one of her favorite expressions, "Don't Stop the Party".



Contributed by Irene Arpayoglou

Sherry Anne Reed

February 2, 1959 – December 16, 2019



Sherry Reed passed away on December 16, 2019 at the age of 60, following a brief battle with cancer. Sherry is known to hundreds of scientists for the unparalleled field and lab support she provided during her 36-year career at the Smithsonian Marine Station (SMS). Joining SMS in August 1983, shortly after earning a degree in Biology from Wheaton College, she served as Research Assistant and SMS Diving Officer until her promotion to Station Manager in 2015.

Sherry approached all her work with a unique blend of grit, determination and kindness, for which she has been described by her friends and colleagues as the "heart of the Smithsonian Marine Station". Sherry served on the Board of Directors of both the American Academy of Underwater Sciences and the International Women Divers Hall of Fame. Donations to honor Sherry may be made to the "Sherry Reed Undergraduate Marine Conservation/Marine Biology Scholarship" at wdhof.org.

Contributed by Holly Sweat