



**Johnson Education Center, FAU Harbor Branch, Fort Pierce, Florida  
February 6-7, 2014**

**IRLS 2014 Steering Committee**

Jeff Beal, Florida Fish and Wildlife Conservation Commission; Grant Gilmore, Estuarine, Coastal and Ocean Science, Inc.; Patti Gorman, South Florida Water Management District; Dennis Hanisak, Harbor Branch Oceanographic Institute at Florida Atlantic University; Chuck Jacoby, St. Johns River Water Management District & IRL National Estuary Program; Seabird McKeon, Smithsonian Marine Station at Fort Pierce; Mark Perry, Florida Oceanographic Society; Chris Wilson, University of Florida; John Windsor, Florida Institute of Technology

**IRLS 2014 Sponsors**

Generous sponsorship under the auspices of the Harbor Branch Oceanographic Institute Foundation has helped to underwrite the cost of this symposium, the *Luncheon on the Lagoon* event, and *Love Your Lagoon*, a dinner event on February 7 at HBOI to raise funds to support research on the Indian River Lagoon. We thank all of our donors:

Mangrove Sponsor: PNC Bank

Seagrass Sponsor: Joe and Jennifer Duke; Jim and Gretchen Johnson

Oyster Sponsor: Florida Atlantic University; John N. and Marilyn McConnell, Jr.; Michael and Marie O'Reilly

Dolphin Sponsor: Evans Properties, Inc.; Katha Kissman; Ethel K. Marran and The Ethel Kennedy Foundation; Ed Lippisch and Jacqui Thurlow-Lippisch; Michael & Misty Minton and the Law Firm of Dean, Mead, Minton and Zwemer; Scripps Treasure Coast Newspapers; J.J. Taylor Companies, Inc.

Manatee Sponsor: Atlanta Consulting Group; AT&T; Mrs. Jean Geddes; Marilyn C. Link; William J. and Laurie Stewart, Esq.; Southeastern Printing; Stuart Magazine; Michael and Carol Toner; Wells Fargo

Seahorse Sponsor: Adams Ranch; Aesthetic Dentistry of Palm City; Berger, Toombs, Elam, Gaines & Frank; C. Amos Bussmann and Sea Technology Magazine; Florida Power & Light Company; Hach Hydromet; Marine Bank & Trust; Kevin & Marsha Powers; Tom and Sherry Plymale; Mr. Robert Stilley and The Honorable MaryLynn Magar; John and Nan Warner

Special thanks also to the South Florida Water Management District and the Treasure Coast Chapter of the Florida Association of Environmental Professionals for their sponsorships.

We also thank Katha Kissman, Interim Executive Director, and Colleen Brennan, Director of Operations of the HBOI Foundation, for all of their support.

**Indian River Lagoon Symposium 2014**  
*The Indian River Lagoon – Lagoon Biodiversity*

**Program Schedule – Technical Sessions**  
**Thursday, February 6, 2014**

(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**  
**Spatial Heterogeneity: A Driver of Biodiversity in the IRL**  
Robert Virnstein  
Seagrass Ecosystems Analysts, East Palatka, FL
- 0900 - 1000    Oral Session 1 – Lagoon Biodiversity**  
Session Chair: Kevin Johnson, Florida Institute of Technology, Melbourne, FL
- 0900 - 0915    **The Indian River Lagoon Species Inventory: Promoting Biodiversity for Two Decades**  
Valerie Paul, Joseph Dineen, and L. Holly Sweat  
Smithsonian Marine Station, Fort Pierce, FL
- 0915 - 0930    **Roughness-driven Diversity and Composition of Benthic Diatom Communities in the Indian River Lagoon**  
L. Holly Sweat and Kevin B. Johnson  
Florida Institute of Technology, Melbourne, FL
- 0930 - 0945    **Temporal Variation of Benthic Communities and Water Quality Data at the FIT Static Immersion Test Platform North of Sebastian Inlet in the Indian River Lagoon, Florida**  
Kody Lieberman, Kelli Zargiel, and Geoff Swain  
Florida Institute of Technology, Melbourne, FL
- 0945 - 1000    **Avian Diversity at MC-2: One of the Most Important Bird Nesting Sites in the Indian River Lagoon**  
D. Greg Braun  
Sustainable Ecosystems International, Jupiter, FL
- 1000 - 1045    Break**

- 1045 - 1200 Oral Session 2 – Lagoon Health Update**  
Session Chair: Lori Morris, St. Johns River Water Management District, Palatka, FL
- 1045 - 1100 **IRL Update and Review of Upcoming Efforts**  
Charles Jacoby<sup>1,2</sup>, Ronald Brockmeyer<sup>2</sup>, Robert Chamberlain<sup>2</sup>, Whit Green<sup>2</sup>, Margaret Lasi<sup>2</sup>, Lori Morris<sup>2</sup>, and Joel Steward<sup>2</sup>  
<sup>1</sup>Indian River Lagoon National Estuary Program, Palatka, FL; <sup>2</sup>St. Johns River Water Management District, Palatka, FL
- 1100 - 1115 **Mesozooplankton Populations in the Northern Indian River Lagoon, Florida**  
H.G. Kolb, L.H. Sweat, and K.B. Johnson  
Florida Institute of Technology, Melbourne, FL
- 1115 - 1130 **Investigations into Multispecies Mortality Events in the Indian River Lagoon**  
Jan H. Landsberg and Martine de Wit  
Florida Fish and Wildlife Conservation Commission, Saint Petersburg, FL
- 1130 - 1145 **Estuarine Impacts on Coral Reef Health and Implications for Water Resource Management in Southeast Florida**  
Joshua D. Voss<sup>1</sup>, Jeff Beal<sup>2</sup>, Maureen Williams<sup>1</sup>, Lisa Cohen<sup>1</sup>, and Courtney Klepac<sup>1</sup>  
<sup>1</sup>Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL;  
<sup>2</sup>Florida Fish and Wildlife Conservation Commission, Fort Pierce, FL
- 1145 - 1200 **Florida Oceanographic Oyster Restoration Education**  
Vincent Encomio and Eleanor Van Os  
Florida Oceanographic Society, Stuart, FL
- 1200 - 1230 Three Minutes, Three Slides**  
Session Chair: M. Dennis Hanisak, FAU Harbor Branch
- The First Record of the Turtle Barnacle, *Chelonibia testudinaria*, on an Artificial Surface Mimicking a Slow-Moving Ocean Vessel**  
Kelli A. Zargiel, Emily A. Ralston, L. Holly Sweat, Abe P. Stephens, Kevin B. Johnson, and Geoffrey W. Swain  
Florida Institute of Technology, Melbourne, FL
- Taxonomic Descriptions of Novel Cyanobacteria with Ecological and Biomedical Relevance in the Indian River Lagoon**  
Niclas Engene and Valerie J. Paul  
Smithsonian Marine Station, Fort Pierce, FL
- Effects of Land Use on Nitrogen and Phosphorus Inputs to the Indian River Lagoon**  
Katelyn K. Lynch<sup>1</sup>, Laura W. Herren<sup>1</sup>, Brian E. Lapointe<sup>1</sup>, and J. William Louda<sup>2</sup>  
<sup>1</sup>Harbor Branch Oceanographic Institution at Florida Atlantic University, Fort Pierce, FL;  
<sup>2</sup>Florida Atlantic University, Boca Raton, FL
- Shift in Fine-scale Habitat Use by Foraging Manatees after Unprecedented Seagrass Loss in the Northern Indian River Lagoon**  
Daniel H. Slone<sup>1</sup>, James P. Reid<sup>1</sup>, Charles J. Deutsch<sup>2</sup>, Lori J. Morris<sup>3</sup>, Susan M. Butler<sup>1</sup>, and Margaret E. Barlas<sup>4</sup>  
<sup>1</sup>United States Geological Survey, Gainesville, FL; <sup>2</sup>Florida Fish and Wildlife Conservation Commission, Gainesville, FL; <sup>3</sup>St. Johns River Water Management District, Palatka, FL; <sup>4</sup>Florida Fish and Wildlife Conservation Commission, St. Petersburg, FL

**Glycosidic Toxins Isolated from the Red Alga *Gracilaria tikvahiae* in the Indian River Lagoon and the Potential Ecological Impacts**

Brian E. Lapointe, Margaret A. Vogel, and Laura W. Herren

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

**Effects of Brown Tide on Eastern Oyster Recruitment in Mosquito Lagoon**

Panayiota Makris and Linda Walters

University of Central Florida, Orlando, FL

**Brevard Oyster Partnership for the Indian River Lagoon (Oyster PIRL): Brevard Residents Will Help Restore Our Lagoon by Raising Native Eastern Oysters along their Waterfronts**

Jody B Palmer<sup>1</sup>, Virginia Barker<sup>2</sup>, Samantha Anderson<sup>1</sup>, and Holly Abeels<sup>3</sup>

<sup>1</sup>Brevard Zoo, Melbourne, FL; <sup>2</sup>Brevard County Natural Resources Management, Melbourne, FL; <sup>3</sup>Brevard County Extension Office, Cocoa, FL

**Genetic Connectivity among Red Mangrove (*Rhizophora mangle* L.) Populations in the Caribbean Sea and Florida**

John Paul Kennedy<sup>1</sup>, Maria W. Pil<sup>2</sup>, Donna J. Devlin<sup>1</sup>, C. Edward Proffitt<sup>1</sup>, Walter A. Boeger<sup>3</sup>, and Alice M. Stanford<sup>4</sup>

<sup>1</sup>Florida Atlantic University, Fort Pierce, FL; <sup>2</sup>University of Missouri-St. Louis, St. Louis, MO; <sup>3</sup>Universidade Federal do Paraná, Curitiba, Brazil; <sup>4</sup>University of the Virgin Islands, St. Thomas, U.S. Virgin Islands

**IRLscience.com, Bringing Together Scientists, Teachers, Students, Legislators, and the Public to be Better Informed about Issues Affecting Our Indian River Lagoon**

Sarah E. Krejci

Bethune-Cookman University, Daytona Beach, FL

**1230 - 1345    Lunch (provided)**

- 1345 - 1445 Oral Session 3 – Water Quality**  
Session Chair: Hyun J. Cho, Bethune-Cookman University, Daytona Beach, FL
- 1345 - 1400 **Indian River Lagoon Experiment 2012 (IRLEX2012): 3 Days of Water Quality and Inlet Surveys**  
Robert J. Weaver<sup>1</sup> and Bret M. Webb<sup>2</sup>  
<sup>1</sup>Florida Institute of Technology, Melbourne, FL; <sup>2</sup>University of South Alabama, Mobile, AL
- 1400 - 1415 **Chlorophyll *a* ‘Blooms’ and Water Quality in the Indian River Lagoon System from Jupiter to Ponce Inlets: Using Long-term Monitoring Data from SJRWMD and SFWMD to test Alternative Causal Hypotheses by Structural Equation Modeling**  
C. Edward Proffitt  
Florida Atlantic University, Fort Pierce, FL
- 1415 - 1430 **Impacts of On-Site Sewage Disposal Systems on Urbanized Canals and Tidal Creeks in Southeast Florida**  
Brian Lapointe<sup>1</sup>, Marie Tarnowski<sup>1</sup>, and Steve Krupa<sup>2</sup>  
<sup>1</sup>Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL;  
<sup>2</sup>South Florida Water Management District, West Palm Beach, FL
- 1430 - 1445 **Copper Release and Dispersion from an Indian River Lagoon Marina**  
Yuchao Yan and John H. Trefry  
Florida Institute of Technology, Melbourne, FL
- 1445 - 1530 Break**
- 1530 - 1615 Oral Session 4**  
Session Chair: Vincent Encomio, Florida Oceanographic Society, Stuart, FL
- 1530 - 1545 **Toxic Microalgae in the IRL: Impending Doom or False Menace?**  
Paul E. Hargraves  
Harbor Branch Oceanographic Institute and Smithsonian Marine Station, Fort Pierce, FL
- 1545 - 1600 **Phototaxis of Copepods in Relation to Derived Habitat**  
Xiao Ma and Kevin Johnson  
Florida Institute of Technology, Melbourne, FL
- 1600 - 1615 **The Restorative Capabilities of *Ruppia maritima* and *Halodule wrightii* in the Indian River Lagoon**  
Joseph A. White and Hyun J. Cho  
Bethune-Cookman University, Daytona Beach, FL
- 1615 - 1645 Three Minutes, Three Slides**  
Session Chair: Seabird McKeon, Smithsonian Marine Station, Fort Pierce, FL
- Transport Pathways of Fresh Water Leaving the St. Lucie Estuary**  
Ned P. Smith  
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

**Assessment of Benthic Mapping using Hydroacoustic, Aerial, and Satellite Sensor Data**

Ali Simpson<sup>1</sup>, Hyun Jung Cho<sup>1</sup>, and Lori Morris<sup>2</sup>

<sup>1</sup>Bethune-Cookman University, Daytona Beach, FL; <sup>2</sup>St. Johns River Water Management District, Palatka, FL

**Benthic Habitat Mapping in the Indian River Lagoon, Florida Using Hyperspectral Imager for the Coastal Ocean**

Deya Banisakher<sup>1</sup>, Hyun Jung Cho<sup>1</sup>, Deepak Mishra<sup>2</sup>, and Lori Morris<sup>3</sup>

<sup>1</sup>Bethune-Cookman University, Daytona Beach, FL; <sup>2</sup>University of Georgia, Athens, GA; <sup>3</sup>St. Johns River Water Management District, Palatka, FL

**Water Correction Model for Improved Benthic Mapping**

Philip Bellamy and Hyun Jung Cho

Bethune-Cookman University, Daytona Beach, FL

**Indian River Lagoon Observatory: Lessons Learned from Real-time Water Quality Monitoring in a Highly Productive, Dynamic Environment**

Kristen Davis, M. Dennis Hanisak, and Ben Metzger

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

**After the Blooms: Is Seagrass Recovery in the Indian River Lagoon Recruitment Limited?**

M. Dennis Hanisak<sup>1</sup>, Robert Chamberlain<sup>2</sup>, John Hart<sup>1</sup>, Lori Morris<sup>2</sup>, and Robert Virnstein<sup>1,3</sup>

<sup>1</sup>Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL;

<sup>2</sup>St. Johns River Water Management District, Palatka, FL; <sup>3</sup>Seagrass Ecosystems Analysts, Palatka, FL

**Use of Floating Individuals of *Halodule wrightii* for Restoration**

Jacob J. Berninger

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

**The Indian River County Junior Scientists Fellows Program: Research by the Next Generation to Preserve Our Natural Resources for All Generations**

M. Dennis Hanisak<sup>1</sup>, John Hart<sup>1</sup>, Ken Grudens<sup>2</sup>, and Julie Hanson<sup>2</sup>

<sup>1</sup>Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL;

<sup>2</sup>Indian River Land Trust, Vero Beach, FL

1645

**Closing Comments and Transition to Poster Session & Reception**

## 1730 - 1900 Poster Session & Reception (Open to the Public, too!)

Posters will be displayed all day in the Education Annex. There will be a coffee station there during breaks. We also encourage all students to be at their posters during the second half of lunch break. During the poster session, presenters of odd-numbered posters will be at their posters between 1730 and 1815; presenters of even-numbered posters will be at their posters between 1815 and 1900.

- 1. The Effect of Dikes on Fiddler Crab Populations in the Indian River Lagoon Wetlands**  
Sarah Abdelhameed<sup>1,3</sup>, Nathan Duerr<sup>2,3</sup>, Katrina Prezioso<sup>1,3</sup>, and Kasia Wake<sup>2,3</sup>  
<sup>1</sup>Vero Beach High School, Vero Beach FL; <sup>2</sup>Indian River Charter High School, Vero Beach FL;  
<sup>3</sup>Indian River County Junior Scientist Fellows Program
- 2. Persistent Organic Pollutants in the Indian River Lagoon: Stingrays and Sharks as Monitoring Tools**  
Douglas H. Adams<sup>1</sup>, Liesbeth Weijs<sup>2</sup>, Nathalie Briels<sup>2</sup>, and Adrian Covaci<sup>2</sup>  
<sup>1</sup>Florida Fish and Wildlife Conservation Commission, Melbourne, FL; <sup>2</sup>University of Antwerp, Antwerp, Belgium
- 3. Pathogenic *Vibrio* Bacteria in the Indian River Lagoon and their Potential Threat to Human Health**  
Gabby Barbarite and Peter J. McCarthy  
Harbor Branch Oceanographic Institute at Florida Atlantic University
- 4. Seasonal Carbon, Nitrogen, and Phosphorus Dynamics in the St. Lucie Estuary with Variable Inflows from 2002-2008**  
C. Buzzelli<sup>1</sup>, Y. Wan<sup>1</sup>, P. H. Doering<sup>1</sup>, and J. N. Boyer<sup>2</sup>  
<sup>1</sup>South Florida Water Management District, West Palm Beach, FL; <sup>2</sup>Plymouth State University, Plymouth, NH
- 5. Using a Community-Based Social Marketing Approach for Ecosystem Protection in the Indian River Lagoon**  
Donna Campbell, Denise DeLorme, and Linda Walters  
University of Central Florida, Orlando, FL
- 6. Water Quality and Seagrass Coverage in the Indian River Lagoon South**  
Zhiqiang Chen, Teresa Coley, and Rebecca Robbins  
South Florida Water Management District, West Palm Beach, FL
- 7. The Distribution of Seagrass Species Adjacent to the Coastal Oaks Preserve**  
Ian Debus<sup>1,3</sup>, Lauryn Pedreira<sup>2,3</sup>, and Valerie Dos Santos<sup>1,3</sup>  
<sup>1</sup>Vero Beach High School, Vero Beach, FL; <sup>2</sup>Indian River Charter High School, Vero Beach, FL;  
<sup>3</sup>Indian River County Junior Scientist Fellows Program
- 8. Dietary Preference and Gill Raker Morphology of *Albula* sp. cf. *vulpes* in the Indian River Lagoon, FL**  
Mary C. Draghetti and Jonathan Shenker  
Florida Institute of Technology, Melbourne, FL
- 9. Land Use Changes in the St. Sebastian River Watershed: A 25-Year Comparison**  
Laura W. Herren  
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL

- 10. Coral and Zooxanthellae Responses to Seasonal Fluctuations and Freshwater Discharge**  
Courtney Klepac<sup>1</sup>, Joshua D. Voss<sup>1</sup>, and Jeff Beal<sup>2</sup>  
<sup>1</sup>Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL; <sup>2</sup>Florida Fish and Wildlife Conservation Commission, Fort Pierce, FL
- 11. Expansion of the Shoreline Restoration Project: Incorporating Oyster Reef Restoration to Protect Sensitive Shorelines and Increase Biodiversity within the Indian River Lagoon**  
Dana Maira  
Florida Department of Environmental Protection, Fort Pierce, FL
- 12. Blue Crab Population in Peril in the Indian River Lagoon System: Survival of the Fittest?**  
Jesse Martin  
Odyssey Charter School, Palm Bay, FL
- 13. Making Lemonade from Ecological Lemons: Isolating Anticancer Compounds from Bloom-Forming Cyanobacteria**  
Kevin Olsen, Sarath P. Gunasekera, and Valerie J. Paul  
Smithsonian Marine Station, Fort Pierce, FL
- 14. A Comparison of Two Commonly Used Oyster Reef Restoration Methods**  
Angela Pulcini<sup>1</sup>, Elizabeth Hoogkamp<sup>1</sup>, and Vincent Encomio<sup>2</sup>  
<sup>1</sup>Indian River State College, Fort Pierce, FL; <sup>2</sup>Florida Oceanographic Society, Stuart, FL
- 15. The Ghost of Fouling Communities Past: The Effect of Original Community on Subsequent Fouling after Cleaning and Transplant**  
Emily Ralston and Geoffrey Swain  
Florida Institute of Technology, Melbourne, FL
- 16. Evaluating Salinity Targets for Protecting Seagrass in the St. Lucie Estuary and Adjacent Indian River Lagoon**  
Becky Robbins, Mayra Ashton, Barbara Welch, and Beth Orlando  
South Florida Water Management District, West Palm Beach, FL
- 17. Monitoring Changes in Fish Community Composition Relative to the Occurrence of an Extended Algal Bloom Event and the Associated Loss of Seagrass Habitat**  
Agustin P. Sebastian, Shawna Landers, and Richard Paperno  
Florida Fish and Wildlife Conservation Commission, Melbourne, FL
- 18. Mangroves on the Move: How Important is Flotation Time and Light Availability?**  
Lorae' T. Simpson<sup>1,2</sup> and Ilka C. Feller<sup>1</sup>  
<sup>1</sup>Smithsonian Environmental Research Center, Edgewater, MD; <sup>2</sup>Smithsonian Marine Station, Fort Pierce FL
- 19. Long-term Benthic Monitoring and the Effect of Freshwater Influx on Biodiversity in the Indian River Lagoon and St. Lucie Estuary**  
Miranda Steffler and Seabird McKeon  
Smithsonian Marine Station



- 20. Model Evaluation of Potential Impact of Freshwater Release on the Southern Indian River Lagoon**  
Detong Sun and Yongshan Wan  
South Florida Water Management District, West Palm Beach, FL
- 21. The Indian River Lagoon Research Institute: Integrating Scientists, Engineers, and Educators to Improve and Sustain Lagoon Health**  
L. Holly Sweat, Kelli A. Zargiel, Kevin B. Johnson, and Robert J. Weaver  
Florida Institute of Technology, Melbourne, FL
- 22. Oyster Reef Restoration in Mosquito Lagoon: Long-Term Data and Successes**  
Linda Walters<sup>1</sup>, Paul Sacks<sup>1</sup>, Jody Palmer<sup>2</sup>, and Kirk Fusco<sup>2</sup>  
<sup>1</sup>University of Central Florida, Orlando, FL; <sup>2</sup>Brevard Zoo, Melbourne, FL
- 23. ADCIRC Forecast Model for the IRL**  
Robert J. Weaver, Andrew Kledzik, and Joshua Todd  
Florida Institute of Technology, Melbourne, FL
- 24. St. Lucie Estuary Oyster Bed Water Quality Monitoring**  
Barbara Welch, Mayra Ashton, and Yongshan Wan  
South Florida Water Management District, West Palm Beach, FL
- 25. Water Quality and Coliform Presence in DOT Canal**  
Van Williamson<sup>1,2</sup>, Alissa Albrecht<sup>1,2</sup>, Angelica Bodine<sup>1,2</sup>, and Deanna Bowman<sup>1,2</sup>  
<sup>1</sup>Sebastian River High School, Sebastian, FL; <sup>2</sup>Indian River County Junior Scientist Fellows Program
- 26. Adapting a Method to Detect and Quantify BMAA in Organisms from the Indian River Lagoon**  
Priscilla L. Winder and Amy E. Wright  
Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL