## ANNUAL 2018 REPORT

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# MONMOUTH UNIVERSITY

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URBAN COAST INSTITUTE

# Our Mission

To serve Monmouth University and the public as a forum for research, education and collaboration in the development and implementation of science-based policies and programs that support stewardship of healthy, productive and resilient coastal ecosystems and communities.

ABOUT THE COVER: MONMOUTH UNIVERSITY ASSISTANT PROFESSOR KEITH DUNTON AND STUDENTS TAG AND RELEASE A SHARK. PHOTO BY TOM LYNCH. REPRINTED WITH PERMISSION FROM MONMOUTH MAGAZINE. COPYRIGHT © 2018. ALL RIGHTS RESERVED.

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### UCI Staff

**Tony MacDonald, Esq.** *Director* 

Thomas Herrington, Ph.D Associate Director

Doris Meyer Administrative Assistant

Jim Nickels Marine Scientist

Karl Vilacoba Communications Director

### **Affiliated Faculty**

Randall S. Abate, Esq. Rechnitz Family Urban Coast Institute Endowed Chair in Marine and Environmental Law and Policy

**Dr. Jason Adolf** Endowed Associate Professor of Marine Science

### **Ocean Policy Fellow**

Vice Admiral Paul G. Gaffney II, USN (Ret.) Monmouth University President Emeritus





# Set Sail!

The past year was a time of significant growth for the UCI and we have many accomplishments that we are proud of. However, there were also many reminders of the mounting challenges we face. This is not a time to rest on our laurels; there is much work to do.

"To reach a port," Franklin D. Roosevelt once said, "we must set sail. Sail, not tie at anchor. Sail, not drift."

The UCI will not drift. We are committed to strengthening our programs, expanding our collaborations, and increasing opportunities for Monmouth students and faculty to tackle these challenges. The acquisition of the University's newest and largest research vessel, the Heidi Lynn Sculthorpe, presents exciting new opportunities for our students and staff to conduct research and build partnerships. Work is already underway to study contaminants in New York Harbor, marine life distributions and the behavior of endangered Atlantic sturgeon.

Released in the fall, the *Fourth National Climate Assessment,* of which I was a contributing author, documented how sea level rise, warming seas, ocean acidification and other impacts for climate change will disrupt our lives in the Northeast. This report recognizes the need not only for improved science and understanding of climate impacts, but also the need to inform policy options and adaptation actions.

The UCI is committed to helping New Jersey to be a leader on community resilience and adaptation.

We hosted the New Jersey Department of Environmental Protection's fall summit on resilience, where it was announced that they were launching work on a comprehensive, statewide coastal resilience plan. The University also brought aboard Professor Randy Abate, one of the nation's top experts on the policy and legal implications of climate change, as the Rechnitz Family/UCI Endowed Chair in Marine and Environmental Law and Policy. This adds to the work already underway by UCI Associate Director Tom Herrington and Endowed Assistant Professor of Marine Science Jason Adolf.

One of the major focus area for the University and UCI in 2018 was to strengthen collaboration and integration with academic programs. As illustrated by several of the stories in this report, UCI supports numerous opportunities for students to develop expertise and apply what they learn to solving real community and societal problems. UCI Scholars supported by research and faculty enrichment grants are undertaking innovative work to build a better understanding of our ocean and the Jersey Shore's unique marine environments. In addition to these opportunities, thanks to the generosity of donors, three endowed UCI-related scholarships were established in 2018, making a Monmouth education more accessible.

On a final note, I'd like to extend a special thanks to President Grey Dimenna for his stewardship of the University. We wish him the best of luck in his retirement and future endeavors.

### "Set sail!"



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**TONY MACDONALD** Director, Urban Coast Institute



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With a crash of the ceremonial champagne bottle, Monmouth University's newest and largest research vessel was christened in October as the *R/V Heidi Lynn Sculthorpe*.

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The 49-foot vessel was named in memory of Heidi Lynn Sculthorpe, a lifelong Shore area resident who loved to surf and spend time at the beach with her family and friends. Ms. Sculthorpe's father, Robert B. Sculthorpe, is a graduate of Monmouth and former chair of the University Board of Trustees.

"I have been proud to watch Monmouth's marine programs grow into some of the finest in the country," Mr. Sculthorpe said. "This vessel is an asset few universities can match, and will help Monmouth attract new students and expand its partnerships with other research institutions. I look forward to all of the new discoveries our students and faculty will make aboard the *Heidi Lynn.*"

The vessel was donated to Monmouth by the National Oceanic and Atmospheric Administration (NOAA) and launched over the summer. Gifts from George Kolber, of Middletown, and the Fairleigh Dickinson Jr. Foundation made it possible for the University to restore the vessel and outfit it with enhanced technologies. A gift from Mr. Sculthorpe will ensure the maintenance and operation of the vessel to support faculty and student research for years to come.

I look forward to all of the new discoveries our students and faculty will make aboard the Heidi Lynn."

-Robert. B. Sculthorpe, '63

The acquisition of the *Heidi Lynn* has enabled the University to conduct research, educational and contract work at a larger scale than ever before. It will substantially enhance in-house research and monitoring capabilities to meet increasing faculty and student demand within the School of Science's Marine and Environmental Biology and Policy program across the University.

The vessel can take full classes on the water and work on the open ocean up to 20 nautical miles offshore. The *Heidi Lynn* will provide Monmouth with a platform for expanding collaborative research with NOAA and other regional partners.

"We are very pleased that the vessel will continue to play an important role in our strong and growing cooperation with Monmouth University in pursuit of our shared vision to responsibly manage our marine resources," said Jon Hare, director of NOAA's Northeast Fisheries Science Center, which includes the NOAA Sandy Hook Laboratory.

### **Current Work**

Examples of work underway aboard the *Heidi Lynn* include:

- A multi-year study of sediment contamination levels in New York Harbor and its tributaries
- Research on marine life distributions in an area off Long Island that has been leased for clean energygenerating wind turbines
- Ongoing research on distributions and behaviors of the endangered Atlantic sturgeon and sharks off the New Jersey and New York coasts
- The vessel supported a half-dozen classes in its first active semester, with more planned this year



# UCI Scholars: Exploring Our Coast

UCI Scholars funding supported six summer research projects in 2018 completed by 20 students and faculty members representing a wide range of academic disciplines. Another nine faculty members and administrators representing six departments were supported through Faculty Enrichment Grants. (See next page for list.)

The competitive grants are awarded through the UCI Scholars program for hands-on research projects that provide real world experience for students while helping make a positive impact in coastal communities.

## **Discovering the Ecological Self**

A group of middle school students slipped on colorful, 3-D printed masks patterned after symbols like scallops, breaking waves and crabs – a step meant to strengthen their bond with nature. Then, with UCI and School of Science staff and students as guides, they immersed themselves in the natural scenery of the Navesink-Shrewsbury watershed, seeking inspiration for new works of art.

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The experience was one of many organized last year through a project called *Discovering the Ecological Self,* created by Assistant Professor of Art and Design Kimberly Callas. The initiative, which received support through the UCI Scholars program, provides at-risk youth an opportunity to take field visits and classroom lessons focused on naturebased topics, explore them from philosophical and cultural perspectives, and create works such as their masks based on what they've learned.

Grant funding was provided for a student to create a website with image galleries, video, blogs and other media highlighting the artwork.

A UCI Faculty Enrichment Grant made it possible for Dr. Megan Delaney of the Department of Professional Counseling to study whether the experience changed the youths' perspectives on coastal stewardship. Building on the project's success, Callas accepted an opportunity to develop *Discovering the Ecological Self* further this year through a prestigious arts residency at Spain's Joya: arte + ecología.



# 2018 UCI Scholars

### **Summer Research Grants**

### Classification and Measurement of Aerial Imagery with TensorFlow

**Student Researchers:** Steven P. Cassidy, Mahmoud E. Shabana and Nianqi Tian

Faculty: Gil Eckert, Dept. of Computer Science/Software Engineering; UCI Marine Scientist Jim Nickels

## Conservation and Demographics of NJ Coastal Sharks and Sturgeon

Student Researchers: Lauren Kelly, Troy Ohntrup and Charlie Vasas Faculty: Keith Dunton, Dept. of Biology

Discovering the Ecological Self Student Researcher: Lia Stiles Faculty: Kimberly Callas, Dept. of Art

## Exploring Nest-Site Selection in Northern Diamondback Terrapins

Student Researcher: Taylor Donovan Faculty: Pedram Daneshgar, Dept. of Biology

### Harmful Algal Blooms in Monmouth County Coastal Lakes, Estuaries, and Ocean

Student Researchers: Erin Conlon, Skyler Post and Katelyn Saldutti Faculty: Jason Adolf, Dept. of Biology

#### The Impact of Environmental Factors on Government Stability in Guatemala

Student Researchers: Justin Dritschel and James Hawk

Faculty: Ken Mitchell, Dept. of Political Science and Sociology

### SUPPORT UCI SCHOLARS

### **Faculty Enrichment Grants**

Aerial Drone Applications in Environmental Mapping and Education

Faculty: Geoffrey Fouad, Dept. of History and Anthropology; UCI Marine Scientist Jim Nickels; Richard Veit, Dept. of History and Anthropology; Pedram Daneshgar, Dept. of Biology; UCI Associate Director Thomas Herrington

#### Beach Towels – Artwork Inspired by the Physical Data Collected During Sandy

Faculty: Karen Bright, Dept. of Art and Design

Cyanobacterial Harmful Algal Blooms in New Jersey Coastal Lakes: An Experimental Assessment of Deal Lake in Monmouth County

Faculty: Jason Adolf, Dept. of Biology

### Discovering the Ecological Self and Assessing Student Outcomes of Discovering the Ecological Self

Faculty: Kimberly Callas, Dept. of Art and Design; Megan Delaney, Dept. of Professional Counseling; Pedram Daneshgar, Dept. of Biology

#### Disappearing Cattails: Documentary Video Project

Faculty: Dickie Cox, Dept. of Communication; Pedram Daneshgar, Dept. of Biology Establishing a Gillnet Survey to Examine Population Demographics of Atlantic Sturgeon within the Restricted Waterways of Naval Station Earle and Sandy Hook Bay

Faculty: Keith Dunton, Dept. of Biology

Impact of Interdisciplinary Team Teaching on Development of Student Critical Thinking Skills

Faculty: Heide Estes, Dept. of English; School of Science Associate Dean Catherine Duckett

Service Learning and Community Engagement (SLCE) Oral History of Asbury Park Residents

**Faculty:** Deanna Shoemaker, Dept. of Communication

### Using Population Genetics to Inform Management of New Jersey Fisheries

Faculty: Megan Phifer-Rixey, Dept. of Biology; School of Science Assistant Dean John Tiedemann

### What Lies Beneath?

Faculty: Richard Veit, Dept. of History and Anthropology; UCI Marine Scientist Jim Nickels

You can support innovative projects emphasizing close student-faculty interaction by giving to the UCI Scholars fund, or by establishing an endowed or annual scholarship. The UCI thanks the Ferguson, Mangan and MacDonald families for their generosity in creating endowed scholarships, in 2018. To learn more about giving opportunities, contact Karen Keene at **kkeene@monmouth.edu** or Tony MacDonald at **amacdona@monmouth.edu**.





# Planning for a More Resilient Coast

The signs of climate change are increasingly apparent in New Jersey, with communities experiencing flooding, beach erosion and intense coastal storms with greater frequency. The UCI is dedicated to improving our understanding of these challenges and how the region can best prepare to face them and adapt to the changes.

The New Jersey Department of Environmental Protection (NJDEP) launched work on a comprehensive plan to make coastal areas more resilient to the impacts of severe storms and sea level rise at Monmouth University in October. The two-day **New Jersey Coastal Resilience Summit**, hosted by the UCI, gathered 200 of the state's leading experts on climate and resilience topics to discuss threats facing coastal resources, communities and economies and determine what actions need to be taken.

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Among the UCI's many other activities centered on climate change and coastal resilience in 2018:

- UCI Director Tony MacDonald co-authored the **Fourth National Climate Assessment's** chapter on the Northeast. The influential document was published by the federal government to help inform policymakers, utility and natural resource managers, public health officials, emergency planners and other stakeholders.
- The UCI was a partner in the Mid-Atlantic Regional Council on the Ocean's **Planning for a Changing** Ocean project, which examined the economic implications from trends such as climate change, ocean acidification and shifting marine life habitats. The project culminated with the release of the report *Climate Change Vulnerabilities in the Coastal Mid-Atlantic Region*, which is available for download on the UCI website.
- A webinar hosted by UCI Associate Director Tom Herrington focused on how sand and sediments from dredge projects can be reused to improve coastal resilience. He prepared a guidance document summarizing best practices and case studies for this **Regional Sediment Management** approach in the Mid-Atlantic.
- **Congressman Frank Pallone** held a meeting with the UCI and New Jersey environmental leaders at Monmouth University to discuss the urgent need to address climate change.
- The UCI maintains the **Mid-Atlantic Coastal Acidifcation Network** website (midacan.org), an online resource for scientific information about ocean acidification from New York through Virginia.

# Building Community Partnerships to Protect Coastal Lakes

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Monmouth University has launched a Coastal Lakes Community Observing Network (CLONet) focused on improving the health of Monmouth County lakes, thanks to a \$150,000 grant from the Jules L. Plangere, Jr. Family Foundation. The UCI and Monmouth University School of Science staff and students will partner with municipalities and community groups to organize citizen science efforts, workshops and on-campus conferences dedicated to understanding the causes of environmental problems facing lakes in Monmouth County. The project will also yield lessons and best practices that can be applied to other coastal lakes.

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Monmouth County has 12 lakes along its shoreline that have historically provided a variety of recreational opportunities and served as important habitats for fish and wildlife. Intense development around the lakes has introduced pollution from stormwater drainage, litter and other sources, degrading these aquatic ecosystems.

A number of coastal lake organizations and commissions have formed to preserve and restore their local lakes. Beginning in 2019, Monmouth staff will work alongside and train members of these organizations to monitor water quality as well as physical and biological parameters in the lakes. Workshops will be held



in the communities to mentor each community group on analysis techniques and future restoration plan development and implementation. Water sampling data and other resources will be shared on a publicly accessible website.

# **Confronting Chronic Flooding in Ocean City**

The New Jersey barrier island community of Ocean City has seen nuisance flooding increase in frequency and severity over the years. High tides can cause disruptions and damage even when there's no rain. UCI Associate Director Tom Herrington returned to his hometown in 2018 to work with members of a grassroots community flooding group to examine the causes of the problem and identify long-term solutions that would remain effective in the face of sea level rise and the more intense storms wrought by climate change.

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Herrington's Ocean City work is being carried out through the American Geophysical Union's Thriving Earth Exchange (TEX) program, which pairs scientists with local communities to solve problems on a pro bono basis. Herrington has volunteered his time to the effort in his capacity as both a UCI staff member and New Jersey Sea Grant Consortium coastal community resilience specialist.

Through the partnership, Herrington has trained local residents to conduct citizen science work that will help build a better understanding of the issues. The residents have begun discussions with city and state officials about implementing some of their ideas.



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## Monmouth Poll on Climate Change

Conducted with 802 U.S. adults in November 2018. View full results at monmouth.edu/uci.

# **78%** believe climate

change is occurring

**71%** view it as a serious or very serious problem 54%

say there's still time to prevent the worst effects

**69%** 

want more government action to reduce its causes

# Mapping the Mid-Atlantic Ocean



With aggressive clean energy targets set by the governors of New Jersey and New York, the pace of deliberations on offshore wind development picked up last year, and so did interest in the Mid-Atlantic Ocean Data Portal (portal.midatlanticocean.org). The free and publicly accessible site has become influential in discussions concerning where turbines can be constructed while posing the least possible disturbance to commercial fishing, maritime traffic and wildlife.

The UCI is a member of the project team that maintains the Portal and is a nationally recognized leader in the field of regional ocean planning.

Since President Trump issued his 2018 executive order on ocean policy, the UCI has worked with state and federal agencies, tribal entities and fishery management officials to implement its call for collaboration on coastal and ocean issues. UCI Ocean Policy Fellow Paul G. Gaffney II and Ocean Conservancy CEO Janis Searles Jones published a joint op-ed in *The Hill* which called for a continued federal commitment to making ocean data available to the public. The Portal houses 4,000 interactive map layers showing commercial fishing hot spots, vessel traffic concentrations, Naval training zones, submerged infrastructure and much more.

Maps from the site were used to guide discussions at a federal Bureau of Ocean Energy Management meeting geared toward gaining input on proposed offshore wind areas from New Jersey commercial fishing stakeholders, held at Monmouth University in May.

If you're interested in scheduling a Portal training, contact Karl Vilacoba at kvilacob@monmouth.edu

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# Rockefeller, Monmouth Give Coastal Waters a DNA Test

Monmouth University staff and students gathered with 100 of the nation's leading practitioners of environmental DNA (eDNA) science in the fall to share discoveries, state-of-the-art technologies and new methods for this groundbreaking marine life detection method. The National Conference on Marine Environmental DNA, held at The Rockefeller University in New York City, was the third in a series of high-level annual symposia co-hosted by the two institutions.

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The UCI's partnership with The Rockefeller University Program for the Human Environment will enter its fourth year in 2019, providing Monmouth University students and faculty continued opportunities for scientific collaboration.

Sampling for eDNA is an approach that allows scientists to confirm the presence of fish and other organisms by testing for trace amounts of genetic material that they shed into the water. The technique holds the promise of being less expensive, more humane and more revealing than other longstanding methods that rely on physically catching or observing animals.

Monmouth will continue sampling local waters this



year such as Sandy Hook Bay, the Navesink and Shrewsbury rivers. UCI staff also plan to work with Rockefeller University and the New Jersey Department of Environmental Protection on collecting and analyzing water samples from its regular trawl surveys.



## WELCOME

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## Abate Joins as Rechnitz Family/UCI Chair in Marine and Environmental Law and Policy

Randall S. Abate, Esq. Was named Monmouth University's inaugural Rechnitz Family/Urban Coast Institute Endowed Chair in Marine and Environmental Law and Policy. In this new position, Abate is conducting research and teaching courses on environmental, climate change, marine and coastal, animal, and constitutional law and policy.

Abate serves as a tenured professor in the Political Science and Sociology Department while also being affiliated with the UCI. He has 25 years of full-time teaching experience at six U.S. law schools. Professor Abate has published five influential books and is currently working on a sixth, "Climate Change and the Voiceless," to be published in 2019.



## CONGRATULATIONS 2018 Champion of the Ocean Award Honorees



The UCI presented its highest honor, the National Champion of the Ocean Award, to former New Jersey Governors and New Jersey Climate Adaptation Alliance Co-Chairs **Thomas Kean** and **James Florio** (above) at the 14th Annual Coastal and Ocean Champion Awards, held at Monmouth University in October. The event celebrated the 40th anniversary of New Jersey's Coastal Management Program and recognized four additional individuals who have made significant contributions to its success with Coastal and Ocean Leadership Awards: David Kinsey, Mark Mauriello, Norbert Psuty and John Weingart.



National Academy of Sciences President **Marcia McNutt** (above) also received the National Champion of the Ocean Award at a special ceremony following the National Conference on Marine Environmental DNA, held at The Rockefeller University in New York City in November.

# 2018 UCI Reports & Publications

Visit the ÚCI website to view these and many other documents released last year. Hard copies may be available upon request

Final Report from The National Conference on Marine Environmental DNA

Fourth National Climate Assessment, Chapter 18: Northeast

New Jersey's Coastal Management Program: 40 Years of Coastal Protection, Policy and Progress 1978-2018

Regional Sediment Management in the Mid-Atlantic: Conserving Funds and Resources through Coordination

Climate Change Vulnerabilities in the Coastal Mid-Atlantic Region

Understanding and Predicting the Gulf of Mexico Loop Current: Critical Gaps and Recommendations

# MONMOUTH UNIVERSITY

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CONSERSUS STUDY REPORT Understanding and Predicting the Gulf of Mexico Loop Current



THE NATIONAL CONFERENCE ON MARINE EN<u>VIRONMENTAL DNA</u>









# Yearbook





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- 1. Students Rebecca Klee, Kaitlyn Smith and Taylor Donovan enjoy themselves at a UCI fundraiser.
- UCI Director Tony MacDonald (r.) accepts EarthShare New Jersey's Environmental Education Award with fellow honoree Russell Furnari of the New Jersey Corporate Wetlands Restoration Partnership.
- Beth Phelan represents the National Oceanic and Atmospheric Administration at a press conference unveiling the R/V Heidi Lynn Sculthorpe.
- UCI Advisory Committee Chair Ken Pringle speak to the media at the Coastal and Ocean Champion Awards.
- Champion of the Ocean honoree Gov. Thomas Kean (I-r) greets UCI Advisory Committee member Tavit Najarian, Joseph DiLorenzo and Vajira Gunawardana.
- School of Science Dean Steven Bachrach (I) and Monmouth University President Grey Dimenna cut the ribbon on the remodeled Edison Hall.
- UCI Marine Scientist Jim Nickels and Monmouth University Trustee Henry Mercer chat aboard the *R/V Heidi Lynn Sculthorpe*.



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# Financial Summary: 2018 Funding Sources

The Urban Coast Institute's work is made possible through a combination of funding from gifts, grants, contracts, foundation support, the Marine Science and Policy Initiative and Monmouth University. The Marine Science & Policy Initiative was launched following a successful \$5 million challenge grant campaign in 2014, and supports many of the student activities, Monmouth-Rockefeller University research efforts and faculty projects described in this report.

## **Gifts/Donations**

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# Give a Gift Now

Your gift to Monmouth University has a direct impact on the academic experience and post-graduate success of Monmouth University students. To make a tax deductible gift to the Urban Coast Institute, please use the contribution form at the link listed below. Monetary gifts to the Urban Coast Institute support UCI Scholars student-faculty research projects and UCI operations.

## www.monmouth.edu/university/give

## **Staff Public Engagement and Service**

### TONY MACDONALD, ESQ.

NOAA Integrated Ocean Observing System, National Advisory Committee

NJ Climate Adaption Alliance, Advisory Committee Coastal States Stewardship Foundation, Board Member NY/NJ Baykeeper, Board Member

US Global Change Research Program, 4th National Climate Assessment, Northeast Chapter, co-author

National Academy of Sciences Ocean Studies Board Member

### THOMAS HERRINGTON, Ph.D.

American Shore and Beach Preservation Association, Board Member

NJ Sea Grant Consortium, Board Member, Coastal Community Resilience Specialist American Geophysical Union Thriving Earth Exchange Scientist

Jersey Shore Partnership Board of Directors FEMA Coastal Outreach Advisory Team

Journal of Marine Environmental Engineering

Editorial Board member

Northeast Shore & Beach Preservation Association, Vice President

Jamaica Bay Science and Resiliency Institute Project Advisory Committee member

#### VICE ADMIRAL PAUL G. GAFFNEY II, USN (RET.)

Rockefeller University-Monmouth Marine Science and Policy Initiative (co-lead with RU Professor Jesse Ausubel)

National Academy of Sciences, Gulf Research Program, Advisory Committee; Chair, Committee on Gulf of Mexico Loop Current Dynamics

Joint Ocean Commission Initiative, Leadership Committee

Ocean Exploration Trust, Board Member

NOAA Ocean Exploration Advisory Committee, immediate past Chair

#### JIM NICKELS

NJ Water Monitoring Council, Member Barnegat Bay Partnership, Science and Technical Advisory Committee Marine Academy of Science and Technology Advisory Board

## UCI Advisory Committee

Kenneth Pringle, <i>Chair</i>	Frederick Kaeli
David Apy	Josh Kohut
Chris Benosky	Susan Kyrillos
Laura Brinkerhoff	<b>Richard Larrabee</b>
Nancy Byrne Reinhart	Gordon Litwin
Bradley Campbell	Rita Mangan
Jay Cosgrove	Tavit Najarian
David Ennis	Philip Orton
Alfred Ferguson	Beth Phelan
Jim Ferris	Stephen Souza
Russell Furnari	Dennis Suszkowski
Nickitas Georgas	Amy Tuininga
William Hanson	Nancy Washington

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