

Urban Coast Institute

2016

Annual Report



MONMOUTH
UNIVERSITY

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.

UCI Staff

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*Coastal Resilience and
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2016

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A Word from the Director

The Urban Coast Institute has a new address. We kicked off the New Year in a new office suite located in the School of Science's beautiful atrium addition (seen to the left), built with the help of \$1 million set aside from the successful 2014 Marine Science and Policy Initiative Challenge Grant campaign. In addition, a search is underway for a new Endowed Professor of Marine Science, and Dr. Steven Bachrach joined the University as the new Dean of the School of Science. These changes reflect the UCI's growth over the past year and our preparation for the exciting challenges we'll face in 2017.

In late 2016, the White House certified a first-ever Mid-Atlantic Regional Ocean Action Plan that was drafted by a coalition of states, tribal entities and federal agencies. The UCI was active in engaging stakeholders from New York to Virginia and developing a state-of-the-art Ocean Data Portal to inform the Plan's development. A renewed grant from the Gordon and Betty Moore Foundation supported our continued work

on the Portal in 2016 and will again in 2017. We and our partners are now preparing for implementation of the Plan's recommendations as well as working with a new administration in Washington, D.C. whose ocean and coastal management priorities have not yet been made known.

The UCI continues to support student and faculty research on the University vessels *Little Hawk* and *Seahawk*, and we hope to expand opportunities to explore marine environments and engage our students and the public. I am particularly proud that we doubled the number of UCI-funded student research projects from 2015 to 2016, and significantly expanded support for faculty innovation. President Paul Brown has challenged us to keep that momentum going. With your help, I know we can do it.

Please enjoy this glimpse at some of our many projects and achievements over the past year.

Thank you for your continued support!



Tony MacDonald
Director, Monmouth University
Urban Coast Institute

Helping Students Explore the Shore



The UCI is redefining the student summer job at the shore through a pair of innovative programs that provide hands-on experience while making a difference in coastal communities.

More than two dozen students conducted a record 17 research projects in 2016 through the [UCI's Marine Science & Policy Initiative](#) and [Heidi Lynn Sculthorpe Summer Research Program](#). From abandoned cranberry bogs in the Pine Barrens to bustling downtown business districts in Monmouth County, the support provided by the UCI allowed students to take full advantage of the greatest laboratory in the world – the Jersey Shore.

The programs provide competitive grant funding for students to complete research projects that support the UCI's mission, with assistance provided by faculty mentors. Projects are also in keeping with the Monmouth University Strategic Plan's goal for providing students opportunities for transformative learning and immersive personal experiences both inside and outside the classroom.

The UCI appreciates the generous support of [Santander Bank](#) and the many other corporate and private donors who are making these activities possible.

2016 Student Summer Research Projects

Assessment of Vertebrate and Microbial Diversity in Local Ecosystems Using Environmental DNA (eDNA)

Nicole Sivetz, Sara Falotico and Hemangi Patel
Faculty Mentor: Dr. Martin J. Hicks

Coastal Identity in Counseling: Implications for Community Resilience

Christine Hennigan
Faculty Mentor: Dr. Laura Schmuldt

Coastal New Jersey Small Business Website

Morissa Schwartz
Faculty Mentor: Dr. Deanna Shoemaker

Collection and Analysis of Physico-Chemical Parameters of Water for Assessment of Intertidal Coastal Ecosystems

Crystal Diaz, Rebecca Klee, Christina Guarino, Kristen Jezycki, Cayla Sullivan and Kylie Johnson
Faculty Mentors: Dr. Dmytro Kosenkov and Dr. Pedram Daneshgar

Community Succession After Cranberry Bog Abandonment Within the New Jersey Pinelands

Kylie Johnson and Rebecca Klee
Faculty Mentor: Dr. Pedram Daneshgar

Comparing Finfish and Decapod Abundance in New Jersey Coastal Estuaries

Alex M. Salamone, Matt C. Francis, Shannon M. Lavelle and Jeffrey Webb
Faculty Mentor: Dr. Keith J. Dunton

Determining the Presence of the Endangered Atlantic Sturgeon in Sandy Hook Bay

Jeffrey Webb
Faculty Mentor: Dr. Keith J. Dunton

Diet of Atlantic Sturgeon in a Coastal Marine Aggregation

Marissa C. DeTorre
Faculty Mentor: Dr. Keith J. Dunton

Digital Data Mining and Pattern Analysis: Early Hurricane Detection System

Abid Khan, Sravan Kumar Puvvula and Rajesh Veeraball
Faculty Mentor: Dr. Charles Willow

An Examination of Ocean County Municipalities' Participating in the National Flood Insurance Program's Community Rating System

Albert Shalom and David Morales
Faculty Mentor: Dr. Michael Schwebel

Food Recovery Network at Monmouth University

Susan Pagano
Faculty Mentor: Dr. Nancy J. Mezey

Impacts of Increased Salinity on Mangrove Carbon Cycling Processes

Kristina M. Guarino and Kristen E. Jezycki
Faculty Mentors: Dr. Pedram Daneshgar and School of Science Assistant Dean John A. Tiedemann

Mapping of Plastics in the Coastal Marine Environment

Marc Molé and Alex M. Salamone
Faculty Mentor: Professor James A. Nickels

Sandy High Water Mark Initiative

Marc Molé and Brian Drew
Faculty Mentor: Professor James Nickels

Small-Scale Oyster Restoration in Barnegat Bay

Gabriella A. Gerber, Sydney N. Lucas and Cameron S. McMath
Faculty Mentors: Dr. Christine Thompson and Dr. Tiffany Medley

Tracing Nitrogen Deposition Effects on Salt Marshes Using Nitrogen Isotopes

Cayla Sullivan
Faculty Mentor: Dr. Pedram Daneshgar

Wreck Pond Aquatic Vertebrate eDNA Project

Tatiana Castro, Chelsea Soriano and Cayla Sullivan
Faculty Mentors: Dr. Christine Thompson and Dr. Tiffany Medley



Fostering Faculty Research & Development



Monmouth University faculty members are conducting groundbreaking research, enhancing their coursework and fulfilling their professional development goals with support from the UCI.

In 2016, the UCI awarded its first round of Faculty Enrichment Grants and Mini-Grants through the Marine Science & Policy Initiative to support research, curriculum enhancement and multi-disciplinary collaboration. The more than a dozen faculty members who received assistance represented a diverse cross-section of disciplines ranging from physical education to political science to the creative arts – a telling illustration of the ocean’s broad influence on everyday life.

Dr. Keith Dunton and students are studying the behaviors and populations of endangered Atlantic sturgeon in the Sandy Hook Bay area.

The Initiative was launched in 2014 following a successful \$5 million change grant campaign. The program is playing a pivotal role in supporting student-faculty research, the purchase of cutting-edge scientific equipment, facilities upgrades and more. Among the activities supported in 2016 were:

- Research on endangered Atlantic sturgeon populations and behaviors in the Sandy Hook Bay area, including federally restricted waters off Naval Weapons Station Earle, by Dr. Keith Dunton of the Department of Biology.
- Analysis of how local government policies influence pedestrian and bicycle use at the Jersey Shore by Dr. James Konopack of the Department of Health and Physical Education and Dr. Stephen Chapman of the Department of Political Science and Sociology.
- Tests along the New Jersey and Long Island coasts to determine the impacts of human-sourced nitrogen deposition on salt marshes by Dr. Pedram Daneshgar of the Department of Biology.

Endowed Professor of Marine Science

In 2017, the School of Science plans to fill a new Endowed Professor of Marine Science position with funding through the Marine Science & Policy Initiative. The person holding this position will teach courses in support of the BS in Marine and Environmental Biology and Policy (MEBP), conduct marine science research in their area of expertise consistent with the UCI mission, and mentor students, including MEBP honors students and those participating in the School's Summer Research Program.

Seeing the Forest through the Tree Cores

Drs. Pedram Daneshgar and Richard Bastian launched a joint biology and statistics class in the fall focused on a research question: What can tree ring patterns in coastal forests tell us about climate change and severe weather trends along the Jersey Shore?

With UCI grant funding, Daneshgar, of the Department of Biology, and Bastian, of the Mathematics Department, purchased tools called increment borers to extract samples from tree trunks in the pristine coastal woods of Sandy Hook and Island Beach State Park. The researchers and their students are comparing patterns in their thickness, which change in response to their environment, using computer software. The class seeks out the oldest, largest trees it can find — the more years, the more data they can provide.

For now, the project will focus on the two barrier islands in Monmouth and Ocean counties. Next year, Daneshgar hopes to expand the research to cover the entire Jersey Shore, Delaware and other areas in the Mid-Atlantic region.



Monmouth-Rockefeller Partnership Sails Ahead

A partnership forged two years earlier between Monmouth and Rockefeller universities gained full momentum in 2016 when the institutions co-organized a high-profile conference, cross-campus dialogues and joint research efforts.

Over 100 leaders in the marine science field converged in New York City in October for the 2016 National Ocean Exploration Forum, co-convened by UCI Ocean Policy Fellow and Monmouth University President Emeritus Paul Gaffney II and Rockefeller University Program for the Human Environment Director Jesse Ausubel. Scientists and ocean explorers presented an array of amazing discoveries from recent expeditions and discussed how emerging technologies such as drones and ROVs will transform the field over the next decade. The forum was the first of four Marine Science & Policy Series scientific conferences to be co-hosted by Rockefeller and Monmouth annually on alternating campuses. At the event, legendary ocean explorer **Dr. Robert Ballard**, perhaps best known as the discoverer of the wrecks of the *Titanic* and *Lusitania*, was presented with the UCI's National Champion of the Ocean Award.

Ausubel and Gaffney, who chairs the National Oceanic and Atmospheric Administration's Ocean Exploration Advisory Board, are working with scientists from around the world on an International Quiet Ocean Experiment designed to collect data on the impacts of human-generated noise on marine life.

Monmouth faculty and students began collaborating with Rockefeller in 2016 on a broad effort to inventory marine species living in New York-New Jersey coastal water bodies using environmental DNA (eDNA) testing. The emerging approach allows scientists to detect endangered or hard-to-find marine organisms by lab testing water samples for trace amounts of genetic material that marine organisms shed into the water. Ausubel and Rockefeller researcher Dr. Mark Stoeckle made campus visits to Monmouth to discuss the project with students and faculty members.

Monmouth University students (right) are working alongside Rockefeller University researchers to sample coastal water bodies for trace DNA elements that can reveal what types of marine organisms live there. Below, (l-r) Monmouth University President Paul R. Brown, legendary ocean explorer Dr. Robert Ballard and former University Board of Trustees Chair Robert Sculthorpe meet before the 2016 National Ocean Exploration Forum in New York City.





Making Ocean History: The Mid-Atlantic Ocean Action Plan

Ocean history was made in December when the White House adopted a first-of-its-kind Ocean Action Plan for the Mid-Atlantic region. The UCI was a leading voice throughout the process, serving on several committees and work groups tasked with drafting the Plan and managing the development of the Mid-Atlantic Ocean Data Portal.

The UCI received a \$1.2 million Gordon and Betty Moore Foundation grant in the spring to continue its work with the Mid-Atlantic Council on the Ocean, The Nature Conservancy and Rutgers University building the Portal (portal.midatlanticocean.org), a free, state-of-the-art mapping and information site focused on ocean areas from New York through Virginia. The grant enabled the UCI and its partners to greatly expand the content on the site in 2016 with interactive maps showing commercial fishing grounds, military training and testing areas, and a trove of data illustrating marine life distributions throughout the East Coast in greater detail than ever before.

The Portal served as a key information source for the Ocean Action Plan, produced by a Regional Planning Body composed of representatives from six states, tribal entities, federal agencies and the Mid-Atlantic Fishery Management Council. The Plan calls for the Portal to play an increased role in informing ocean management decisions such as siting offshore wind turbines, permitting aquaculture operations, and determining which fishing communities should be consulted when an area is being considered for sand extraction.

The UCI helped facilitate public outreach for the Plan, including by providing live instructional demos for hundreds of visitors at public open houses held throughout the Mid-Atlantic during the summer. New Jersey's open house for the Plan was held on the Monmouth University campus.



"This extraordinary new generation of data products has been developed in consultation with scientists and marine industries to include a vast array of marine resources, including ecosystem information on 150 species of marine mammals, seabirds, and fish, and a wide range of information on human activities including fishing, recreation, shipping, and renewable energy."

— DECEMBER
WHITE HOUSE STATEMENT



Top, UCI Communications Director Karl Vilacoba demonstrates the Mid-Atlantic Ocean Data Portal for visitors at the Virginia Aquarium & Marine Science Center. Bottom, Monmouth University hosted New Jersey's public hearing on the draft Ocean Action Plan in July.



Educating Coastal Communities



As an ocean research and policy institute within Monmouth University – also known as “the Coastal University” – the UCI believes it has a special obligation to engage shore communities on marine issues. To that end, the UCI invited the public on campus for several educational events exploring the deep ties between the ocean and everyday life in our communities.

This year, the UCI’s signature annual event, the Future of the Ocean Symposium, focused on a pressing policy discussion which never took place during the election — coastal and ocean priorities for the next administration and Congress. Former New Jersey Gov. [Christine Todd Whitman](#) and University of Maryland Center for Environmental Science President [Dr. Donald Boesch](#) served as the panelists and were honored with the New Jersey Department of Environmental

Protection’s [David Rosenblatt](#) and [Elizabeth Semple](#) at the subsequent Champion of the Ocean Awards Luncheon, which raised funds for student research activities.

Such funding is instrumental in supporting the kind of work highlighted at the UCI’s spring Student Panel Roundtable. The event, held in conjunction with Student Scholarship Week, gave six current and former students who engaged in UCI-sponsored research the opportunity to describe how their work is

furthering their professional and educational goals.

In a unique union of science and the arts, UCI Director Tony MacDonald moderated a conversation in the fall with three artists whose works were inspired by the ocean. The event allowed visitors to learn the stories behind exhibitions on campus by painter Lucy Kalian (seen in top left photo) and Monmouth University Art & Design photography instructors Mark Ludak and Ira Wagner.

Celebrating 10 Years of Service



A celebration was held at Monmouth University’s historic Wilson Hall in May to mark the 10th anniversary of the UCI’s launch. The event also honored three longtime supporters who’ve played key roles in the Institute’s growth: (from l-r) UCI Ocean Policy Fellow and Monmouth University President Emeritus Paul Gaffney II, and UCI Advisory Committee members Alfred Ferguson and Tavitt Najarian.

The UCI was established in the fall of 2005 as one of Monmouth University’s “Centers of Distinction” – a group of five unique organizations that work to promote awareness of specific issues and meet the needs of local and global communities. Tony MacDonald (pictured top right) was the UCI’s first hire and has served as the organization’s director since its inception. In a highlight of the celebration, UCI staff presented a video package with clips of past Champion of the Ocean honorees congratulating the UCI and MacDonald on the milestone.



Preparing for Future Sandys

Five years after Superstorm Sandy, New Jersey continues to rebuild and probe the sobering lessons from the devastation. The UCI and the New Jersey Sea Grant Consortium, through the expertise of joint Coastal Resilience and Climate Adaptation Specialist Dr. Michael Schwebel, have assisted dozens of coastal communities as they prepare to face and rebound faster from the next extreme storm.

As part of the Post-Sandy High Water Mark Initiative, the UCI and Sea Grant are working with Monmouth County and several waterfront communities to locate the highest points reached by flood waters in prominent areas and place markers there. The goal of the program is to ensure the public remains diligent about taking long-term actions to protect themselves, their property and their communities, and brings an added bonus of lowering flood insurance premiums for homeowners, as participating municipalities earn additional Community Rating System (CRS) program points for greater flood risk awareness. Over the summer, Dr. Schwebel and student researchers also examined the factors influencing Ocean County municipalities' choice of whether or not to participate in the CRS.

In the summer, the UCI joined as key partner in a project led by the Mid-Atlantic Regional Council on the Ocean that is exploring how changing ocean conditions triggered by climate change will impact communities, the economy and environment throughout the Mid-Atlantic region. The project will gather the latest science and build public awareness of the threats posed by trends in sea level rise, ocean acidification and warming sea level rise.

Meanwhile, the UCI continued its work with the New Jersey Department of Environmental Protection and many other organizations as part of a statewide Coastal Resilience Collaborative dedicated to advising local governments on strategies for confronting climate change.

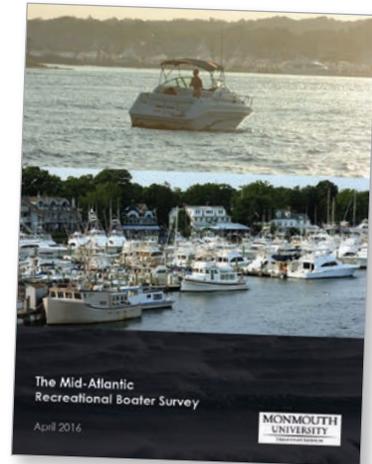


Press conference announcing the High-Water Mark Initiative with (l-r) Middletown Mayor Gerard Scharfenberger, UCI Coastal Resilience and Climate Adaptation Specialist Michael Schwebel, Monmouth University students Brian Drew and Marc Mole, UCI Director Tony MacDonald, UCI Marine Scientist Jim Nickels, Monmouth County Freeholder Serena DiMaso and Monmouth County Sheriff Shaun Golden.



The Economic Impact of Boating

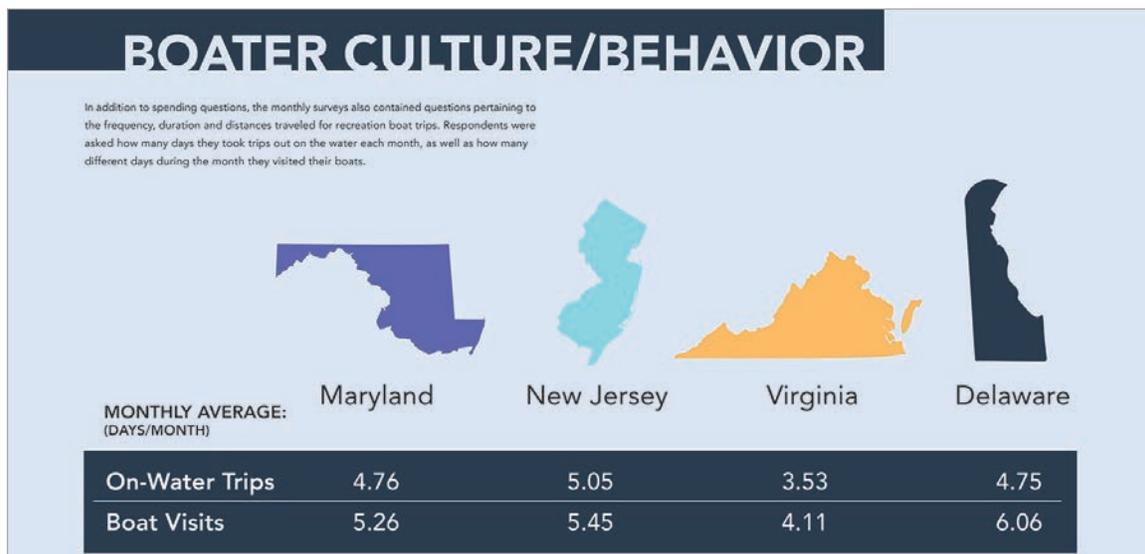
Recreational boat owners in the Mid-Atlantic inject more than \$300 into the economy each time they take to the water, according to a study completed in the spring by the UCI and students from the Monmouth University School of Science. The report was based on survey data collected by the UCI and Mid-Atlantic Regional Council on the Ocean from boaters in New Jersey, Delaware, Maryland and Virginia. In addition, participants used an online program to digitally map their trip routes, which were used to create maps showing boater traffic concentrations on the Mid-Atlantic Ocean Data Portal.



Among the report's other findings:

- The total annual non-trip expenses of owning a boat — such as financing, insurance fees, storage and documentation fees — were placed at \$7,722.
- Boat owners and their parties spent an average of \$727 during visits to their vessels that didn't involve on-water trips.
- New Jersey owners took their boats on the water most frequently throughout the season — 5.05 days per month, while the average for all four states was 4.68 days.

Monmouth University arts student Kelly Young created a series of infographics like this one illustrating the survey data.



Busting 'Ghost Fishing' in Barnegat Bay

UCI Marine Scientist Jim Nickels and Monmouth University students are working to thwart the unseen but lethal menace of “ghost fishing” in Barnegat Bay. Since the winter, the team has been searching the bay floor for abandoned crab traps and other derelict fishing gear that continue to lure, catch and kill crustaceans, terrapins and fish without any purpose.

Using side-scan SONAR equipment and GIS technologies, the crews have discovered hundreds of abandoned traps and removed them with rope lines and grappling hooks. Before disposing of the debris, the team takes photos and note any organisms that were either captured inside or growing on them. This important work, which will continue this year, is being led by the Conserve Wildlife Foundation of New Jersey with grant funding from the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program.



The Year in Photos

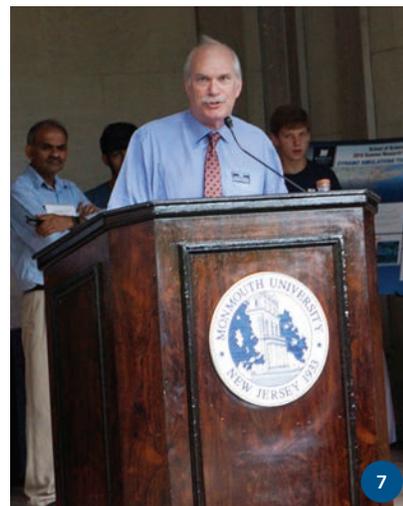
Student Snapshots



Scene Around Campus



1. Gabriella Gerber prepares to deposit tank-grown oysters at an artificial reef in Barnegat Bay.
2. UCI Director Tony MacDonald speaks with presenters at the 2016 School of Science Summer Research Symposium.
3. Students and graduates who have worked with the UCI discussed their experiences during an April roundtable.
4. MacDonald (second from left) with 2016 Champion of the Ocean Award honorees (l-r) Elizabeth Semple, Christine Todd Whitman, Dr. Donald Boesch and David Rosenblatt.
5. UCI Marine Scientist Jim Nickels steers the *Seahawk* on a dawn research trip.
6. Rockefeller University Professor Jesse Ausubel talks with a student following a guest lecture at Monmouth University.
7. School of Science Dean Dr. Steven Bachrach kicks off the Summer Research Symposium.



Financial Summary: 2016 Funding Sources

The Urban Coast Institute's work is made possible through a combination of funding from grants, donations, the Marine Science & Policy Initiative, Monmouth University and vessel contracts. 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 earlier in this report. The chart below reflects the percentage of UCI funding received and dedicated by category in 2016.

53% Grants & Contracts

25% University

22% Gifts &
Donations

(Marine Science & Policy Initiative, Symposium, Misc. Gifts)

Give a Gift Now

Your gift to Monmouth University has a direct impact on the everyday lives of students. If you would like 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 the Heidi Lynn Sculthorpe Summer Research Grants, the Marine Science & Policy Initiative and UCI operations.

www.monmouth.edu/university/give



Order UCI Merchandise

Visit monmouth.edu/uci for apparel featuring the UCI's signature New Jersey marine life icon — including shirts and hoodies designed by the Jersey Shore's own Jetty. Proceeds from your order will support student research activities at Monmouth University.



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