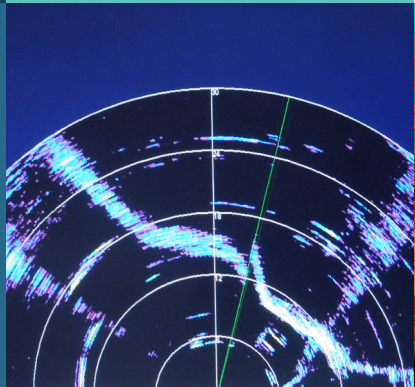
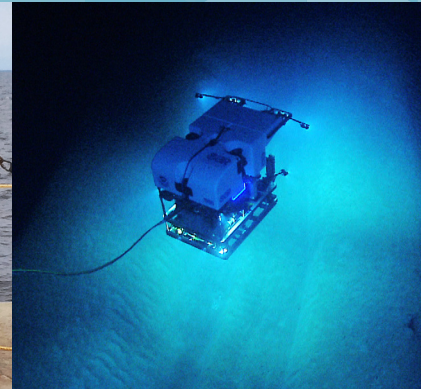
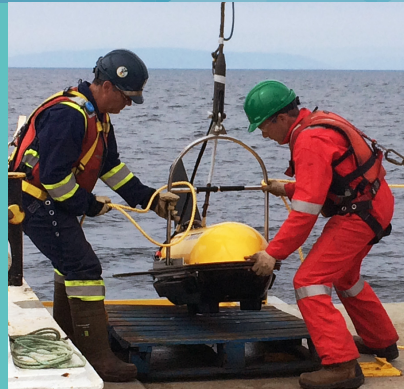


NATIONAL OCEAN EXPLORATION FORUM

Beyond the Ships 2020-2025

October 20-21
2016

The
Rockefeller
University



The Marine Science & Policy Series



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About the Monmouth-Rockefeller University Partnership

In 2015, Monmouth University and The Rockefeller University entered into a five-year agreement to pursue a trio of collaborative activities supporting ocean research, education, and marine policy. The partnership is the fruit of Monmouth University's successful philanthropic Marine Science and Policy Initiative Challenge Grant campaign. Collaboration between Monmouth University's Urban Coast Institute (UCI), an emerging marine policy center, and The Rockefeller University's Program for the Human Environment (PHE), a first-tier research-university group and an ocean exploration leader, offers an unprecedented opportunity for timely, flexible support of marine science and policy. The trio of activities address enhancement of ocean exploration, application of cutting-edge DNA techniques to detect marine life, and improved understanding of the changing ocean soundscape and its implications for life.

To help focus the initiative and amplify its impact, the PHE, led by Jesse Ausubel, and the UCI, led by Tony MacDonald, will jointly plan and conduct scientific symposia of regional and national interest. The 2016 National Ocean Exploration Forum is the first of four annual conferences in the Marine Science & Policy Series, which will alternate between the campuses of Monmouth in West Long Branch, New Jersey, and Rockefeller in New York City. The Monmouth-Rockefeller partnership will extend to cutting-edge research projects on topics such as ocean noise, emerging marine exploration technologies and the use of environmental DNA fragments, or eDNA, to detect the presence of aquatic species. The partnership will enable access to national and international experts, and engage in complementary programs that reflect the priorities and strengths of each institution.

Advisory Panel: Michael Kubin, RADM Richard Larrabee, Russell Pennoyer, Steven Ramberg, Howard Rosenbaum, Robert Sculthorpe

National Ocean Exploration Forum Sponsors

- Monmouth University- Rockefeller University Joint Marine Science and Policy Initiative
- NOAA Office of Ocean Exploration and Research
- Schmidt Ocean Institute
- Dr. James Austin

2020 Vision for Ocean Exploration

On behalf of our sponsors, welcome to *Beyond the Ships: 2020-25, the fourth National Ocean Exploration Forum*. Title XII of the 2009 Public Law 111-11, the Integrated Coastal and Ocean Observation System Act, mandates the Forum.

This Forum also marks the first of four annual events in a series organized by The Rockefeller University and Monmouth University in a collaboration called the Marine Science & Policy Initiative. It is an honor for us to launch the series with such a valuable purpose and outstanding group of participants.

We may be at a hinge in ocean exploration in quantity and style. We see, over the next decade, a growing need for more varied access to undiscovered ocean areas. And technical opportunities allow America to broaden its exploration portfolio in exciting ways in addition to dedicated, venerable exploration vessels like *E/V Nautilus*, *E/V Falkor* and *NOAA Ship Okeanos Explorer*.

More frequent and ambitious ocean exploration campaigns can, and should, be undertaken by deploying new ships, technologies and other platforms capable of measuring, sampling and imaging yet-to-be-explored areas. To advance these efforts, new and emerging technologies must be identified, adapted, and adopted by the greater ocean exploration community and integrated into the plans and proposals we'll soon begin to write.

We cannot offshore this job to the Planet Neptune. We, the great ocean exploration community of the USA, must jointly examine these challenges and excel in meeting them.

Professor Jesse Ausubel

Director, Program for the Human Environment, The Rockefeller University

Vice Admiral Paul Gaffney, USN (Ret.)

Fellow, Monmouth University, Urban Coast Institute

National Ocean Exploration Forum Advisory Committee Members

James Austin

University of Texas Institute of Geophysics

John Kreider

Oceaneering International

Lance Towers

The Boeing Corporation

Rick Rickoski

Hadal Inc.

Shirley Pomponi

Florida Atlantic University and CIOERT

Frank Herr

Office of Naval Research

Alan Leonardi

NOAA Office of Ocean Exploration and Research

Victoria Tschinkel

former Secretary, Florida Dept of Environmental Regulation

Jerry Schubel

Aquarium of the Pacific



AGENDA

Thursday, October 20, 2016

- 11:30–1:00** *Registration and casual buffet lunch* Greenberg Building | Lower Level
- 1:00–1:45** *Goals of the Forum*
Beyond the Ships: What might ocean exploration look like in 2020-2025?
Jesse Ausubel, The Rockefeller University | Carson Auditorium
- 1:45–2:30** *Introduction to geographic foci*
SE US Atlantic Coast Bight: Amanda Demopoulos, U.S. Geological Survey
Gulf of Mexico: Russell Callender, NOAA, National Ocean Service
Arctic: Jeremy Mathis, NOAA Arctic Research Program
- 2:30–3:10** *What technologies will be available?*
- 2:30–2:40** Acoustics/bathymetry: Larry Mayer, University of New Hampshire
- 2:40–2:50** Biological/chemical: Shirley Pomponi, Florida Atlantic University
- 2:50–3:00** Geological: Ruth Blake, Yale University
- 3:00–3:10** Telepresence/cyber: Dwight Coleman, University of Rhode Island
- 3:10–3:30** *Challenge to Breakout Groups* - Integrated exploration campaigns
VADM Paul Gaffney, Monmouth University Ocean Policy Fellow
General discussion
- 3:30–3:45** Coffee break and transition to team rooms to develop campaign concepts
- 3:45–5:45** *Parallel sessions of Breakout groups*
US SE Atlantic Bight A: Jerry Schubel (Aquarium of the Pacific) & Eric King (Schmidt Ocean Institute)
US SE Atlantic Bight B: Amanda Demopoulos (US Geological Survey) & Jamie Austin (University of Texas, Austin)
Arctic A: Frank Herr (Office of Naval Research) & Larry Mayer (University of New Hampshire)
Arctic B: Jeremy Mathis (NOAA Arctic Programs) & James Thomson (Applied Physics Lab - University of Washington)
Gulf A: Tony Knap (Texas A&M University) & Victoria Tschinkel (1000 Friends of Florida)
Gulf B: VADM Scott Van Buskirk (Oceaneering International) & Nancy Rabalais (Louisiana State University)
- 5:45–6:15** Team leaders confer with Co-Chairs to discuss highlights & issues
- 5:45–8:30** *Reception & dinner*
Remarks: Alan Leonardi (NOAA), Jamie Austin (practitioner), Eric King (Schmidt Ocean Inst., introducing video from Ms. Wendy Schmidt), Dominique Rissolo (Qualcomm Institute, University of California San Diego, host of NOEF 2017)

Friday, October 21, 2016

- 7:30–8:00** Light breakfast buffet
- 8:00–8:45** *Plenary: Selected highlights and issues* from initial team sessions summarized by Jesse Ausubel and Paul Gaffney
- 8:45–10:30** *Break-out groups* resume
- 10:30** Transition back to Carson Family Auditorium
- 10:40–11:45** *Group reports by six team leaders to plenary* (10 minutes each)
- 11:45–12:15** *Summary:* A Vision for Ocean Exploration 2020-2025, Paul Gaffney
Discussion of needed actions and commitments; plans for Forum report
- 12:15** Adjourn/Move to formal lunch
- 12:30** *Lunch* Abby Dining Room | Abby Aldrich Rockefeller Hall
- 12:40** *Champion of the Ocean Award* presented by Monmouth University President Paul Brown and UCI Director Tony MacDonald to honoree Dr. Robert Ballard
- 12:45** *Challenges in national ocean exploration*, Dr. Robert Ballard
- 1:30** End



Conveners

JESSE HUNTLEY AUSUBEL

Jesse Huntley Ausubel is Director of the Program for the Human Environment at The Rockefeller University in New York. The program elaborates the technical vision of a large, prosperous society that emits little harmful and spares large amounts of land and sea for nature. Mr. Ausubel both conducts and manages research. Programs he has helped conceive and lead include the Census of Marine Life, to assess and explain the diversity, distribution, and abundance of life in all oceans; the Barcode of Life Initiative, to provide short DNA sequences that identify animal, plant, and fungal species; Encyclopedia of Life to create a webpage for every species; Deep Carbon Observatory, to search for the origin and limits of life and for the roots of petroleum and natural gas, and International Quiet Ocean Experiment to survey the ocean soundscape and assess effects on marine life of sound added by human activities. Author or editor of 150 publications, Mr. Ausubel is an adjunct scientist of the Woods Hole Oceanographic Institution. Mr. Ausubel served on President Clinton's Panel on Ocean Exploration in 2000 and co-chaired the 2012 decadal review of the US government program in ocean exploration. In 2010 he received the Blue Frontier/Peter Benchley prize for ocean science and in 2012 was named America's National Ocean Champion. His portrait was included in an exhibit on two dozen leading ocean explorers in 2013.

VICE ADMIRAL PAUL GAFFNEY

Vice Admiral Paul Gaffney, USN (Ret.), is President Emeritus of Monmouth University and a Fellow in the Urban Coast Institute at Monmouth University. He also served as President of the National Defense University. He is a former Chief of Naval Research and former Commander of Naval Meteorology and Oceanography. He was appointed as a Commissioner, U.S. Commission on Ocean Policy and served during its full term, chaired the Ocean Research Advisory Panel and currently Chairs the Ocean Exploration Advisory Board. Along with Professor Ausubel, he co-chaired the Decadal Review of the National Ocean Exploration Program. The National Academy of Engineering selected him as a Member and he serves on the National Academies Gulf Research Board.

Speakers

RUTH BLAKE

Ruth Blake is a Professor in the departments of Geology & Geophysics and Environmental Engineering, and in the School of Forestry & Environmental Studies at Yale University. Dr. Blake's areas of expertise include marine biogeochemistry, stable isotope geochemistry and geomicrobiology. Her recent work focuses on developing new stable isotope tools, geochemical proxies and biomarkers to study marine/microbial phosphorus cycling and evolution of the phosphorus cycle from pre-biotic to recent. Dr. Blake is engaged in a range of studies on co-evolution of earth and life and the impacts of both on biogeochemical processes occurring in the oceans, deep-sea sediments, seafloor hydrothermal systems and the sub-seafloor deep biosphere. Dr. Blake has participated in several ocean exploration/ research expeditions including cruises to: FeMO observatory at Loihi undersea volcano, 9°N EPR, Orca Basin in the Gulf of Mexico and North Pond in the mid-Atlantic. She has also served as shipboard scientist on Ocean Drilling Program and R/V Atlantis /DSV ALVIN platforms. Ruth Blake holds a BS degree in geology from Wayne State University and a MS degree in hydrogeology from the University of Texas and graduated from the University of Michigan in 1998 with a PhD in geochemistry.

RUSSELL CALLENDER

Dr. Russell Callender is the assistant administrator for NOAA's National Ocean Service (NOS). The NOS addresses evolving economic, environmental and social pressures on our oceans and coasts. As assistant administrator, Dr. Callender provides strategic vision for NOS. He leads the implementation of activities to promote coastal resilience, advance coastal intelligence, and support place-based conservation. Prior to being selected as

assistant administrator, Dr. Callender served as the deputy assistant administrator, overseeing NOS's financial, administrative, and performance activities for more than 1,700 staff members located at more than 50 places around the country. Previously, Dr. Callender was the director the National Centers for Coastal Ocean Science (NCCOS), a network of seven coastal laboratories and centers located in four states. In this position, Dr. Callender managed programs that provided harmful algal bloom forecasts; national-scale contaminant monitoring; impact assessment of coastal ecosystems; and research to understand how climate change affects coastal ecosystems. Dr. Callender previously directed the Center for Coastal Monitoring and Assessment in NCCOS; managed the science and policy office in NOAA's Office of Oceanic and Atmospheric Research; served as the assistant director of the Virginia Sea Grant Program. Dr. Callender holds a Ph.D. in Geology from Texas A&M University and was a Sea Grant Knauss Fellow.

DWIGHT COLEMAN

Dr. Dwight F. Coleman is a Marine Research Scientist and the Director of the Inner Space Center at the University of Rhode Island Graduate School of Oceanography in Narragansett, RI. He is a frequent expedition leader onboard the E/V Nautilus and a member of the "Corps of Exploration" with the Ocean Exploration Trust, under the leadership of Dr. Robert Ballard. Dr. Coleman also works closely with NOAA's Ocean Exploration program providing technical and operational support for the telepresence-enabled missions of the NOAA Ship Okeanos Explorer. More recently he has installed and utilized portable telepresence systems onboard a variety of research vessels, including several ships in the UNOLS fleet. The Inner Space Center (ISC) is a facility that utilizes telepresence technologies to establish real-time connectivity between



Speakers (continued)

scientists on shore and remotely operated vehicle operations at sea. Dr. Coleman and his team at the ISC develop innovative solutions to expand the telepresence paradigm to other platforms and conduct live educational outreach broadcasts about ocean research and exploration. Dr. Coleman has a bachelor's degree in geology from the University of New Hampshire and master's and doctoral degrees in marine geology and geophysics from the University of Rhode Island Graduate School of Oceanography.

AMANDA DEMOPOULOS

Amanda Demopoulos is a Research Benthic Ecologist for the U.S. Geological Survey (USGS) at the Southeast Ecological Science Center in Gainesville, Florida. Her work examines the community structure and function of animals found in sediments, or infaunal benthos. After completing a post-doctoral fellowship at Scripps Institution of Oceanography, she obtained her current position at USGS, where she conducts research on the community ecology of coastal wetlands, seagrass habitats, shallow and deep-sea coral reefs, and seeps. Demopoulos received a B.S. in Oceanography from the University of Washington (1996), and M.S. (2000) and Ph.D. (2004) in Biological Oceanography from the University of Hawaii at Manoa.

JEREMY T. MATHIS

Jeremy is the Director of NOAA's Arctic Research Program (ARP) in the Climate Program Office of the Office of Ocean and Atmospheric Research. Before joining the ARP, Jeremy was the Director of the Ocean Environment Research Division at NOAA's Pacific Marine Environmental Laboratory in Seattle, WA, from 2012 - 2015 and a Professor of Oceanography at the University of Alaska Fairbanks from 2008 - 2012. Jeremy has an extensive background in engineering, oceanography, and climate

science. His work focuses on improving understanding of climate change and ocean acidification, particularly in the Arctic. Jeremy has published more than 80 peer-reviewed journal articles on his work. He serves as U.S. representative to the Sustaining Arctic Observing Networks (SAON) and is co-chair of the Observing Coordination Team for the Interagency Arctic Research Policy Committee (IARPC).

LARRY MAYER

Larry Mayer is a Professor and the Director of the School of Marine Science and Ocean Engineering at the University of New Hampshire. He received a Ph.D. from the Scripps Institution of Oceanography in Marine Geophysics in 1979 and that same year was selected as an astronaut candidate finalist for NASA's first class of mission specialists. Larry has spent over 75 months at sea and has been chief or co-chief scientist of numerous expeditions including two legs of the Ocean Drilling Program and nine mapping expeditions in the ice covered regions of the high Arctic. He is the recipient of the Keen Medal for Marine Geology and an Honorary Doctorate from the University of Stockholm. He was a member of the President's Panel on Ocean Exploration and chaired National Academy of Science Committees on national needs for coastal and ocean mapping and the impact of the Deepwater Horizon Spill on ecosystem services in the Gulf of Mexico. He is currently the Chair of the National Academies of Science's Oceans Studies Board, a member of the Ocean Research Advisory Panel, the State Dept.'s Extended Continental Shelf Task Force and in 2016 was appointed by President Obama to the Arctic Research Commission. Larry's research deals with sonar imaging and remote characterization of the seafloor as well as advanced applications of 3-D visualization to ocean mapping problems and applications of mapping to Law of the Sea issues, particularly in the Arctic.

Authors

AMBASSADOR CAMERON HUME

Cameron Hume, a former career Foreign Service Officer, served as ambassador to Algeria, to South Africa, and to Indonesia. Earlier he was chief of mission in Khartoum, in addition to assignments at the United Nations, the Holy See, Tunisia, Syria, and Lebanon. He has published three books and numerous articles on foreign policy. He was a Peace Corps Volunteer in Libya. He currently teaches at Georgetown University and advises a large Indonesian conglomerate on environmental matters.

MARK HANNINGTON

Mark Hannington is the Goldcorp Chair in Economic Geology at the University of Ottawa and Helmholtz Professor at GEOMAR's Center for Ocean Research in Kiel, Germany. Prior to joining the University of Ottawa in 2005 and GEOMAR in 2014, he was a senior research scientist at the Geological Survey of Canada for 15 years. He is currently Head of the Marine Minerals Research Group at GEOMAR. His research combines the study of ancient ore deposits and mineral resources on the modern seafloor. He and his students have worked extensively on Precambrian volcanogenic massive sulfide deposits and also have participated on more than 35 research cruises exploring for active volcanic systems throughout the world's oceans. Dr. Hannington has been consulted extensively by industry and government agencies about the potential of ocean mineral resources. From 2001 to 2008, he served as editor of the premiere journal in the field of mineral deposits research, *Economic Geology*. He is the recipient of the Duncan Derry Medal of the Geological Association of Canada (MDD) and the Silver Medal of the Society of Economic Geologists. He was made a Fellow of the Royal Society of Canada in 2012.

BRUCE MARTIN

Bruce Martin (Dalhousie University) has been working in acoustic data collection and analysis since 1991. From 1991 – 2007 he was involved with the development of combined active-passive sonar processing algorithms as a contractor at Defence Research and Development Canada. His final position in this role was as the Principal Engineer for the Multi-Sensor Torpedo Detection, Classification and Localization Technology Demonstration Project. In 2007 Bruce switched to environmental acoustic data collection and analysis. He has been a Principal Investigator on projects including the Chukchi Sea acoustic monitoring project (2007–2014), Tappan Zee Acoustic Monitoring, Pile Driving Demonstration and Production Monitoring projects (2010–2014), as well as the Outer Continental Shelf Acoustic Monitoring project for BOEM (2009–2014). Bruce is currently a part-time PhD student at Dalhousie University where his research interest is in soundscape ecology, primarily automated techniques for quantifying the contribution to the soundscape from natural, anthropogenic, and biologic sources.



Authors (continued)

JENNIFER L. MIKSIS-OLDS

Dr. Jennifer L. Miksis-Olds is the Associate Director of Research and Research Professor in the School of Marine Science & Ocean Engineering at the University of New Hampshire, also holding a position in the Center for Coastal and Ocean Mapping. She is a member of the Scientific Committee of the International Quiet Ocean Experiment Program and serves as a Scientific Advisor to the Sound and Marine Life Joint Industry Programme (International Oil & Gas Producers) which is devoted to the study of effects of sound on marine organisms. Dr. Miksis-Olds was the recipient of an Office of Naval Research Young Investigator Program award in 2011 and the Presidential Early Career Award in Science and Engineering in 2013. She is also a newly elected Fellow in the Acoustical Society of America. Dr. Miksis-Olds received her A.B. cum laude in Biology from Harvard University, her M.S. in Biology from the University of Massachusetts Dartmouth; she was a guest student at Woods Hole Oceanographic Institution, and then received her Ph.D. in Biological Oceanography from the University of Rhode Island.

SHIRLEY POMPONI

Dr. Shirley Pomponi is Research Professor and Executive Director of the NOAA Cooperative Institute for Ocean Exploration, Research, and Technology at Harbor Branch Oceanographic Institute, Florida Atlantic University, in Fort Pierce, Florida, and Special Professor in Marine Biotechnology in the Bioprocess Engineering Group at Wageningen University, Netherlands. She received her Ph.D. in Biological Oceanography from the University of Miami. Her research focuses on understanding why and how sponges produce chemicals that may be developed into drugs to treat diseases like Alzheimer's and cancer. Dr. Pomponi discovered a sponge from which a potent anti-cancer chemical was discovered and licensed for development. She has authored or co-authored more than 100 peer-reviewed scientific publications and is co-inventor on several patents. She served on the President's Panel on Ocean Exploration, was vice chair of the National Academy committee on Exploration of the Seas, and co-chaired the National Academy study on ocean science priorities for the next decade, "Sea Change: 2015 – 2025 Decadal Survey of Ocean Sciences."

Papers

Discussion Paper on Marine Minerals, Mark Hannington and Sven Petersen

Emerging Technologies for Biological Sampling in the Ocean, Shirley Pomponi, Mark Stoeckle, Peter Girguis and Jesse Ausubel

Exploring the Ocean through Sound, Jennifer L. Miksis-Olds and Bruce Martin

New National Leadership for Ocean Exploration, Ambassador Cameron Hume

Positioning Ocean Exploration in a Chaotic Sea of Changing Media, Jerry R. Schubel

Authors (continued)

JERRY R. SCHUBEL

Jerry Schubel, Ph.D. has been president and CEO of the Aquarium of the Pacific since 2002. He is president emeritus of the New England Aquarium, and from 1974-1994 was Dean of Stony Brook University's Marine Sciences Research Center. For three of those years he served as the University's provost. He has a Ph.D. in oceanography from Johns Hopkins University and received an honorary doctorate from the Massachusetts Maritime Academy. He has published more than 200 peer-reviewed papers, and authored, co-authored, or edited seven books. He is a past member of NOAA's Science Advisory Board and is a member of the Science Advisory Team for California's Ocean Protection Council and the California Ocean Science Trust. He co-chaired the first national forum on ocean exploration, Ocean Exploration 2020: A National Forum in 2013, and presented one of the keynote addresses at the 2015 national forum in Baltimore. He recently chaired a National Academy committee on the "Value and Sustainability of Biological Field Stations, Marine Laboratories, and Natural Reserves in 21st Century Science, Education, and Public Outreach" (2013-14), and numerous other panels. At the Aquarium of the Pacific he established and directs the Marine Conservation Research Institute, the Aquatic Academy, and the Aquatic Forum. The focus of all of these initiatives is to bring together experts with policy-makers and stakeholders to explore alternative solutions to complex and often controversial environmental issues.

MARK STOECKLE

Mark Stoeckle is Senior Research Associate in the Program for the Human Environment at The Rockefeller University. Dr. Stoeckle's interests include environmental genomics, DNA barcoding, and visual representation of information. Dr. Stoeckle is a graduate of Harvard University and Harvard Medical School and completed his medical training in Internal Medicine and Infectious Diseases at The New York-Presbyterian Hospital-Weill Medical College in New York City. During 1984-1989 he was a Research Associate at The Rockefeller University under Dr. Purnell Choppin in the Laboratory of Virology and Dr. Hidesaburo Hanafusa in the Laboratory of Molecular Oncology. Dr. Stoeckle helped organize the early meetings that laid the foundation for the DNA barcoding initiative, and helped lead the international All Birds Barcoding Initiative. His DNA investigations with high school students have attracted wide attention including front-page articles in The New York Times ("Sushi-gate") and The Washington Post ("DNAHouse"). In addition to his scientific and research interests, Dr. Stoeckle is an accomplished graphic artist and has won awards for his photography of animal and plant life on Atlantic Ocean beaches.



Ocean Champion Award Luncheon Presenters

PAUL R. BROWN

Paul R. Brown, Ph.D. is the eighth president of Monmouth University where he has completed a comprehensive strategic plan and overseen substantial improvements to academic programs and campus facilities. He has led Monmouth University to its highest levels of outside financial support including a \$5 million Marine Science & Policy Initiative challenge grant for the Urban Coast Institute during the three highest consecutive fundraising years in school history. Dr. Brown served as dean of the College of Business and Economics at Lehigh University immediately prior to accepting the presidency post at Monmouth University. Brown previously spent more than 20 years at New York University's Stern School of Business where he held a variety of senior academic and administrative positions at both the school and university level. He is the author of *Foundations of Financial Statement Analysis*, and co-author of *Financial Reporting, Financial Statement Analysis, and Valuation: A Strategic Perspective*. Brown graduated Phi Beta Kappa from Franklin & Marshall College where he received his Bachelor of Arts degree, and he received both his Ph.D. and MPA degrees from the University of Texas at Austin.

TONY MACDONALD

Tony MacDonald is the director of the Urban Coast Institute (UCI) at Monmouth University and was previously the Executive Director of the Coastal States Organization (CSO) from 1998-2005. CSO, based in Washington, DC, represents the interests of the Governors of the United States' 35 coastal states and territories on coastal and ocean policy matters. Prior to joining CSO, Tony was the special counsel and director of Environmental Affairs at the American Association of Port Authorities, where he represented the International Association of Ports and Harbors (IAPH) at the International Maritime Organization on negotiations on the London Convention. Tony has also practiced law with a private firm in Washington, DC, working on environmental and legislative issues, and served as the Washington, DC, environmental legislative representative for the Mayor of the City of New York.

Monmouth University Urban Coast Institute Champion of the Ocean *Award Luncheon*

October 21, 12:15 p.m. | Abby Dining Room | Abby Aldrich Rockefeller Hall
Guests Must Be Registered



HONOREE: DR. ROBERT D. BALLARD

Dr. Robert D. Ballard is President of the Ocean Exploration Trust which owns and operates the E/V Nautilus. He is also a Full Professor of Oceanography at the University of Rhode Island's Graduate School of Oceanography, where he serves as the Founding Director of the Center for Ocean Exploration, which houses the Inner Space Center. He is Senior Scientist Emeritus in the Department of Applied Ocean Physics and Engineering at the Woods Hole Oceanographic Institution, served as a Commander in the U.S. Navy, is an Explorer-in-Residence for the National Geographic Society, past Co-Chair Ocean Exploration Advisory Working Group for

NOAA's Science Advisory Board on which he also served. Dr. Ballard was of member the President's Panel for Ocean Exploration, which led to the creation of the Office of Ocean Exploration and Research and was appointed as a Commissioner to the U.S. Commission on Ocean Policy. He has participated in or lead over 150 ocean expeditions; was Co-Chief Scientist of the 1977 Galapagos Rift Expedition that discovered the first hydrothermal vents, discovered the first Black Smokers in 1979 as well as numerous maritime and ancient shipwrecks including the *RMS Titanic*, the German Battleship *Bismarck*, the *USS Yorktown*, and President Kennedy's PT-109.

CAMPUS MAP

EAST RIVER

FRANKLIN D

EAST RIVER ESPLANADE
FUTURE STAVROS NIARCHOS FOUNDATION-DAVID ROCKEFELLER RIVER CAMPUS

WEISS RESEARCH BUILDING
Café

BIOSCIENCE CENTER

64th STREET GATE DELIVERIES

ROCKEFELLER RESEARCH BUILDING

FRICKE HALL

BRONK LABORATORY

IT PAVILION

GASSER HALL

HOSPITAL

GRADUATE STUDENTS RESIDENCE

NURSES RESIDENCE

WELCH HALL (Markus Library)

FOUNDER'S HALL

66th ST GATE MAIN ENTRANCE VISITORS

CASPARY HALL

CASPARY AUDITORIUM

FLEXNER HALL

ABBY ALDRICH ROCKEFELLER HALL

COLLABORATIVE RESEARCH CENTER

Carson Family Auditorium

Abby Dining Room

GREENBERG BUILDING

Faculty and Students Club

Philosophers Garden

SMITH HALL ANNEX

SMITH HALL

Tennis Court

PRESIDENT'S HOUSE

Additional Resources

Visit <https://phe.rockefeller.edu/noef/> for additional resources from this forum, including the five featured research papers and links to reports from previous National Ocean Exploration Forums. Documents, videos and other multimedia from the forum will be also added to this page as they become available.

National Ocean Exploration Forums

2017 Fifth Annual National Ocean Exploration Forum, Qualcomm Institute, University of California San Diego

2016 Beyond the Ships 2020-2025, Rockefeller University, New York City

2015 National Ocean Exploration Forum, National Aquarium, Baltimore, Maryland

2014 National Ocean Exploration Forum, National Aquarium, Baltimore, Maryland

2013 Ocean Exploration 2020: A National Forum, Aquarium of the Pacific, Long Beach, California

Passage—immediate passage! the blood burns in my veins!
Away, O soul! hoist instantly the anchor!
Cut the hawsers—haul out—shake out every sail!
Have we not stood here like trees in the ground long enough?
Have we not grovell'd here long enough, eating and drinking like mere brutes?
Have we not darken'd and dazed ourselves with books long enough?

Sail forth! steer for the deep waters only!
Reckless, O soul, exploring, I with thee, and thou with me;
For we are bound where mariner has not yet dared to go,
And we will risk the ship, ourselves and all.

O my brave soul!
O farther, farther sail!
O daring joy, but safe! Are they not all the seas of God?
O farther, farther, farther sail!

—From Walt Whitman's *Passage to India*

The Marine Science & Policy Series



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