

Cross-Cutting Themes for U.S. Contributions to the Ocean Decade

Committee

Larry A. Mayer

Chair

Larry Mayer is the Director of the School of Marine Science and Ocean Engineering, the Center for Coastal and Ocean Mapping, Co-Director of the Joint Hydrographic Center, and Professor of Earth Science and Ocean Engineering at the University of New Hampshire. His research interests include sonar imaging, remote characterization of the seafloor, and advanced applications of 3-D visualization to ocean mapping challenges. Dr. Mayer received his Ph.D. from the Scripps Institution of Oceanography in marine geophysics in 1979, and graduated magna cum laude with an Honors degree in geology from the University of Rhode Island in 1973. At Scripps his future path was determined when he worked with the Marine Physical Laboratory's Deep-Tow Geophysical package, but applied this sophisticated acoustic sensor to study the history of climate. Dr. Mayer has participated in more than 90 cruises and has been chief or co-chief scientist of numerous expeditions, including two legs of the Ocean Drilling Program. He has served on, and chaired many international panels and committees and has the requisite large number of publications on a variety of topics in marine geology and geophysics. He is the recipient of the Keen Medal for Marine Geology, an Honorary Doctorate from the University of Stockholm, the University of New Hampshire's and the University of Rhode Island's Graduate School of Oceanography's Distinguished Alumni Award. Dr. Mayer served on the President's Panel for Ocean Exploration and chaired the 2004 National Academies' Committee on National Needs for Coastal Mapping and Charting. In 2013, he chaired the National Academies' committee on the "Impacts of Deepwater Horizon on the Ecosystem Services of the Gulf of Mexico." He became a member of the National Academy of Engineering in 2018. Dr. Mayer is the chair of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Mark R. Abbott

Vice Chair

Mark Abbott is the tenth director and president of Woods Hole Oceanographic Institution (until end of 2020). Dr. Abbott was dean of College of Earth, Ocean, and Atmospheric Sciences (CEOAS) at Oregon State University. He was an investigator in ONR's Coastal Transition Zone program as well as the Eastern Boundary Current program. He is presently funded by ONR to explore advanced computer architectures for use in undersea platforms. Dr. Abbott has also advised the Office of Naval Research and the National Science Foundation on issues regarding advanced computer technology and oceanography. He was also a member of MEDEA, which advised the federal government on issues of national security and climate change. In 2006, Dr. Abbott was appointed by the President to a six-year term on the National Science Board, which oversees the National Science Foundation and provides scientific advice to the White House and to Congress. Dr. Abbott was appointed in 2008 by Oregon Governor Kulongoski as vice chair of the Oregon Global Warming Commission, which is leading the state's efforts in mitigation and adaptation strategies in response to climate change. In 2011, Abbott was the recipient of the Jim Gray eScience Award, presented by Microsoft Research and presented to a nationally recognized researcher who has made outstanding contributions to data-intensive computing. He is a member of the Board of Trustees for the Consortium for Ocean Leadership as well as the Board of Trustees for NEON, Inc., which is constructing the National Ecological Observatory Network for the NSF, and served as president of The Oceanography Society from 2013-2014. He also served on the Board of Trustees for the University Corporation for Atmospheric Research. Abbott holds a B.S. in conservation of natural resources from the University of California, Berkeley, and a Ph.D. in ecology from the University of California, Davis. Dr. Abbott is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Carol Arnosti

Member

Carol Arnosti is a professor in the Department of Marine Sciences at the University of North Carolina - Chapel Hill. Dr. Arnosti is a marine chemist who works at the intersection of chemistry, microbiology, and molecular ecology to investigate the relationships between the structure of organic matter and the rates and pathways by which it is degraded by microbial communities. She has pioneered new methods to measure the activities of the extracellular enzymes that initiate microbially-driven carbon cycling; she has used these methods to develop a mechanistic understanding of the variable reactivity of marine organic matter, and to reveal structure-function relationships within organic-matter processing microbial communities. Fieldwork for these studies has taken place in the Atlantic, Pacific, and Arctic Oceans, and has resulted in large-scale oceanic transects revealing changing rates and substrate patterns in microbial organic matter utilization. Her extensive research collaborations in Germany have been facilitated by Fulbright and Hanse Fellowships. Dr. Arnosti received a B.A. in chemistry from Lawrence University and a Ph.D. in Chemical Oceanography from the M.I.T./Woods Hole Oceanographic Institution Joint Program in Oceanography. Dr. Arnosti is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Claudia Benitez-Nelson

Member

Claudia Benitez-Nelson is the Associate Dean Associate Dean for Instruction, Community Engagement, & Research and Carolina Distinguished Professor & Endowed Chair in Marine Studies in the College of Arts & Sciences at the University of South Carolina. As an Associate Dean, Dr. Benitez-Nelson has direct oversight of five departments (Biological Sciences, Mathematics, School of the Earth, Ocean & Environment, Psychology, and Statistics) that encompass over 300 faculty and staff, 300 graduate students, and over 2500 undergraduate majors. Dr. Benitez-Nelson's research focuses on the biogeochemical cycling of phosphorus and carbon and how these elements are influenced by both natural and anthropogenic processes. She is a diverse scientist, with expertise ranging from radiochemistry to harmful algal bloom toxins and is highly regarded for her cross-disciplinary research. Over the past two decades, Dr. Benitez-Nelson has authored or co-authored more than 100 articles, including lead author publications in the journals *Science* and *Nature*. She has been continuously supported by substantial, multi-year research and education grants from the National Science Foundation and the National Aeronautics and Space Administration, among others. Her many research honors include the Early Career Award in Oceanography from AGU and Fulbright and Marie Curie Fellowships. In 2015 she was named an AAAS Fellow, and in 2017, was named an ASLO Sustaining Fellow. Dr. Benitez-Nelson is also highly regarded as a teacher and mentor, having received the National Faculty of the Year Award from the National Society of Collegiate Scholars and the University of South Carolina's Distinguished Professor of the Year Award, SEC Faculty Achievement Award, and Outstanding Faculty Advisor of the Year. In 2014, she received the Sulzman Award for Excellence in Education and Mentoring from the Biogeosciences Section of AGU. Dr. Benitez-Nelson is regularly called upon by national and international scientific and policy agencies for her expertise and currently serves or has served as a member of the Advisory Committee to the Geoscience Directorate of NSF, the EPA Science Advisory Board, and the National Academy of Science's Ocean Studies Board. Dr. Benitez-Nelson earned a B.S. in chemistry and oceanography from the University of Washington and a Ph.D. in oceanography from the Woods Hole Oceanographic Institute/Massachusetts Institute of Technology Joint Program in 1999.

Anjali Boyd

Member

Anjali Boyd is a Duke University Ph.D. Student and Dean's Graduate Fellow in the Nicholas School of the Environment. She received her B.S. in Marine Science from Eckerd College as a NOAA Hollings Scholar. Her research examines how species interactions (both intra and inter) and physical forces interact to regulate the recovery of foundation species to environmental stressors. Anjali aspires to develop novel ecosystem-based restoration and management practices to restore foundation species world-wide. She is fiercely committed to increasing representation of women and ethnic minorities' in ocean sciences and elevating the voices and contributions of student and early career scientists. Thus far, she has served as the Chair and Vice-Chair of the Ecological Society of America's Student Section, an appointed member of the Ecological Society of America's Diversity, Equity, Inclusion, and Justice taskforce, Treasurer/Secretary of the Society of Wetland Scientists' Student Section, and member of the Coastal and Estuarine Research Federation Broadening Participation Committee. Additionally, as the Director of iNviTechnology (iNviTECH), she works to combat the underrepresentation of women and ethnic minorities in STEM fields through educational entrepreneurial programs to engage young children ages 0-5 and K-12 students. Anjali also serves as an elected official in her hometown of Durham, N.C. as Durham County Soil and Water Conservation District Supervisor.

Annie Brett

Member

Annie Brett is an Assistant Professor at the University of Florida Levin College of Law, where she teaches and writes in ocean and coastal law and the intersection of law and science. Her scholarship focuses on how scientific data is used in environmental decision-making, including data collected using emerging methods and technologies. In addition to legal venues, Annie has published in leading scientific outlets, including Nature, and presented in national and international policy forums. Prior to joining the University of Florida Levin College of Law, Annie worked on international ocean policy for Stanford University Center for Ocean Solutions and the World Economic Forum. She is an accomplished mariner, recognized as the youngest female vessel captain to operate in the Pacific. Annie received her AB from Harvard University, and JD and PhD from the University of Miami.

Thomas S. Chance

Member

Thomas Chance served as the CEO and Board Chairman of ASV Global, an international leader in autonomous surface vehicle technology (ASV) for nine years. Founding the company in 2010, ASV Global has built more than 90 unmanned vessels and integrated 30 different ocean science payload types for defense, commercial, and academic applications. Mr. Chance's role was product strategy and development. He also founded C & C Technologies in 1992, a global leader in autonomous underwater vehicle (AUV) technology where he was CEO and Board Chairman. C & C was the first company in the world to offer AUV survey services to the offshore oil industry and has since amassed almost a half-million line kilometers of actively propelled AUV data collection. His other work includes maritime technology development for the US Naval Research Laboratory, the Office of Naval Research, and hydrographic survey operations in shallow and deep waters across the globe. With 550 employees and 10 offices worldwide, he sold C & C Technologies to Oceanering International in early 2015. Earlier he was Vice President of Business and Systems Development at Fugro Chance. He was a member of the National Academies' Committee on National Needs for Coastal Mapping and Charting. He has given dozens of conference presentations over the past 30 years. He was Chairman of the National Ocean Industries Association Technology Policy Committee. He has received numerous awards including the BP Upstream Innovation Award, the Marine Technology Corporate Excellence Award, Innov8 Acadiana Award, 1996 Entrepreneur of the Year for the Gulf Coast Region, 2006 LCG International Achievement Award, 2008 Marine Technology Reporter Seamaster of the Year Award, and the 2015 Junior Achievement Business Person of the Year Award. He earned Masters of Science degrees in Engineering as well as Industrial Management at Purdue University. He retired as CEO of ASV Global in May 2019, and is now working as an independent consultant. Mr. Chance is is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Daniel Costa

Member

Daniel Costa is the Director of the Institute of Marine Sciences and Distinguished Professor of Ecology and Evolutionary Biology at the University of California at Santa Cruz. Daniel Costa completed a B.A. at UCLA and a Ph.D. at U.C. Santa Cruz followed by postdoctoral research at the Scripps Institution of Oceanography. His research focuses on the ecology and physiology of marine mammals and seabirds, taking him to every continent and almost every habitat from the Galapagos to Antarctica. He has worked with a broad range of animals including turtles, penguins' albatross, seals, sea lions, sirenians, whales and dolphins and has published over 400 scientific papers. His current work is aimed at recording the movement and distribution patterns of marine mammals and seabirds in an effort to understand their habitat needs. This work is helping to identify biodiversity hotspots and the factors that create them. He has been developing tools to identify and create viable Marine Protected Areas for the conservation of highly migratory species. In addition his research is studying the response of marine mammals to underwater sounds and developing ways to assess whether the potential disturbance may result in a population consequence. He has been very active in graduate education having supervised 22 masters and 30 doctoral students as well as 15 post-doctoral scholars. With Barbara Block he co-founded the Tagging of Pacific Predators program, a multidisciplinary effort to study the movement patterns of 23 species of marine vertebrate predators in the North Pacific Ocean. He is an internationally recognized authority on tracking of marine mammals and birds. He has served as member of a number of international science steering committees including the Integrated Climate and Ecosystem Dynamics program, The Census of Marine Life, Southern Ocean GLOBEC, CLIOTOP, the Southern Ocean Observing System (SOOS) and the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER). Dr. Costa is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Daniel Costa is the Director of the Institute of Marine Sciences and Distinguished Professor of Ecology and Evolutionary Biology at the University of California at Santa Cruz. Daniel Costa completed a B.A. at UCLA and a Ph.D. at U.C. Santa Cruz followed by postdoctoral research at the Scripps Institution of Oceanography. His research focuses on the ecology and physiology of marine mammals and seabirds, taking him to every continent and almost every habitat from the Galapagos to Antarctica. He has worked with a broad range of animals including turtles, penguins' albatross, seals, sea lions, sirenians, whales and dolphins and has published over 400 scientific papers. His current work is aimed at recording the movement and distribution patterns of marine mammals and seabirds in an effort to understand their habitat needs. This work is helping to identify biodiversity hotspots and the factors that create them. He has been developing tools to identify and create viable Marine Protected Areas for the conservation of highly migratory species. In addition his research is studying the response of marine mammals to underwater sounds and developing ways to assess whether the potential disturbance may result in a population consequence. He has been very active in graduate education having supervised 22 masters and 30 doctoral students as well as 15 post-doctoral scholars. With Barbara Block he co-founded the Tagging of Pacific Predators program, a multidisciplinary effort to study the movement patterns of 23 species of marine vertebrate predators in the North Pacific Ocean. He is an internationally recognized authority on tracking of marine mammals and birds. He has served as member of a number of international science steering committees including the Integrated Climate and Ecosystem Dynamics program, The Census of Marine Life, Southern Ocean GLOBEC, CLIOTOP, the Southern Ocean Observing System (SOOS) and the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER). Dr. Costa is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

John R. Delaney

Member

John Delaney is Professor Emeritus in Oceanography at the University of Washington. Early career experiences involved working as an economic geologist, across the western US, searching for base and precious metal deposits, and living for six months on and within multiple Galapagos Volcanoes in the early 1970's. With blessings of the NAS Ocean Studies Board in 1987, Delaney initiated the NSF-sponsored RIDGE Program by working with many colleagues to focus on Mid-Ocean Ridge (MOR) Systems, from the perspective of the feedback loops involving physical, chemical, and biological processes exposed within highly dynamic volcano-hydrothermal systems on the seafloor. RIDGE quickly expanded into "Inter-RIDGE" (international), which continues today, and is being managed by the French at this time. Having made many tens of dives with the deep submersible ALVIN, and with nearly 50 sea-going expeditions, Delaney, again working with colleagues, helped launch an effort focused on gaining long-term, sustained access to myriad processes operating on, below, and above the seafloor off the coasts of Washington and Oregon. This effort involved implementing a tectonic-plate-scale installation of a submarine, electro-optically cabled network of sensors across the Juan de Fuca Plate as part of the NSF-Ocean Observatory Initiative. As of 2020, that Cabled Array has been operating for half a decade and provides continuous real-time data and information, to researchers and educators alike about many processes operating both along the JdF Ridge, and within the Cascadia Subduction Zone. It is also documenting a host of water-column processes off-shore. An important future use of this system will be to capture, for the first time, in real-time, the entire process of a MOR eruption using the cable-power to operate and interact with remote "Resident" Autonomous Undersea Vehicles at the seafloor and in the overlying ocean. In addition to studying the linkages among volcanoes and life here on Earth, Delaney has also been interested in the search for life elsewhere in the solar system. He worked with NASA-JPL to help plan space missions to the moons of Jupiter. He is a Fellow of the American Geophysical Union and recipient of AGU's Athelstan Spilhaus Award for fostering public engagement by conveying to the general public the excitement, significance, and beauty of Earth and Space science. A late-stage focus of Delaney's career has become the "Global Ocean-Human Culture" array of themes involving public elaboration of the broad, interlinked spectrum of ways that human societies have used, or been impacted by, oceans for tens of millennia, and how we may be impacted for centuries to come. The goal is to fundamentally expand public awareness about how crucial the ocean-systems are to the long-term well-being of all humanity from environmental, economic, security, and discovery perspectives. Dr. Delaney is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Angela N. Doerr

Member

Angee Doerr is an Assistant Professor of Practice and Fisheries Extension Specialist with Oregon Sea Grant and Oregon State University (OSU). Prior to this, she spent several years as a Research Scientist with Stanford's Center for Ocean Solutions. At OSU, Angee focuses on fisheries and other marine coastal resources, providing community outreach and education on a range of subjects, to include marine resource management, aquaculture, climate impacts, nearshore energy, and sustainable economic growth for coastal industries. Angee works closely with community partners, including commercial fishers, managers, and researchers, to advance our understanding of fisheries and other marine resources in Oregon and along the U.S. West Coast. She has a B.Sci and an MBA, as well as a PhD focused on socially and ecologically sustainable fisheries. Angee is currently a Commander in the US Navy Reserves, having spent eight years on Active Duty as a Naval Flight Officer and ten years in the Reserves as the Officer-in-Charge of a variety of units.

Scott Glenn

Member

Scott Glenn is a Distinguished Professor in the Department of Marine and Coastal Sciences at Rutgers University and Co-Director of the Center for Ocean Observing Leadership. Dr. Glenn graduated from the Massachusetts Institute of Technology and Woods Hole Oceanographic Institution Joint Program in 1983 with a ScD in ocean engineering. His 35+ year research career of developing and implementing sustained real-time ocean observation and forecast systems began with support for offshore oil exploration at Shell Development Company (1983-1986), moved to supporting submarine fleet operations for the Naval Oceanography Command while at Harvard University (1986-1990), and, at Rutgers (since 1990), he has been a PI or co-PI on over \$140M in research and application projects for NOAA, NSF, Navy, the National Academies' Gulf Research Program, and the offshore energy industry. His research interests include the development of new autonomous ocean observing technologies, their application to scientific research in remote and extreme environments, and the development of a workforce to support broader global participation in ocean observing. A major focal point has been improving our scientific understanding and our ability to operationally forecast rapid co-evolution of the ocean, atmosphere and seabed in hurricanes and typhoons. Dr. Glenn is a Fellow in the Marine Technology Society and has received the international Society for Underwater Technology's Oceanography Award as well as the Carnegie/CASE U.S. Professors of the Year award for New Jersey. He has served as Chair of the U.S. Committee for the Intergovernmental Oceanographic Commission, and is a member of the NOAA Science Advisory Board's Environmental Information Services Working Group responsible for advising NOAA on implementation of the Weather Act. Dr. Glenn is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Patrick Heimbach

Member

Patrick Heimbach is professor at the University of Texas at Austin and holds the W. A. "Tex" Moncrief, Jr., Chair III in Simulation-Based Engineering and Sciences. His research focuses on understanding the general circulation of the ocean and its role in the global climate system. As part of the "Estimating the Circulation and Climate of the Ocean" (ECCO) consortium that originated under the National Oceanographic Partnership Program (NOPP), he and his group are applying formal inverse modeling techniques for the purpose of fitting a state-of-the-art general circulation model (the MITgcm) with much of the available satellite and in-situ observations to produce a best possible estimate of the time-evolving three-dimensional state over the past few decades of the global ocean and sea ice cover. ECCO products support global and regional ocean circulation and climate variability research on time scales of days to decades. Emerging research foci are understanding the dynamics of global and regional sea level change, the provision of formal uncertainties along with these estimates and implications for improving the global ocean observing system for climate. He earned his Ph.D. in 1998 from the Max-Planck-Institute for Meteorology and the University of Hamburg, Germany. Dr. Heimbach is is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Marcia Isakson

Member

Marcia Isakson is the Director of Strategic Programs and a Research Scientist at the Applied Research Laboratories at The University of Texas at Austin (ARL:UT). Dr. Isakson received her B.S. in engineering physics and mathematics from the United States Military Academy at West Point in 1992. Upon graduation, she was awarded a Hertz Foundation Fellowship and completed a master's degree in physics from the University of Texas at Austin in 1994. CPT Isakson served in the United States Army from 1994-1997 at Fort Hood, Texas. She earned a Ph.D. in physics from the University of Texas at Austin in 2002. She has been employed at ARL:UT since 2001 and has served as the principal investigator on over 21 sponsored projects working with the Office of Naval Research, the Naval Oceanographic Office, and ExxonMobil. She is a key principal investigator for ONR's Task Force Ocean initiative working directly with the operational Navy. Her research interests include littoral acoustic propagation, autonomous underwater vehicles, high-frequency sonar and high-fidelity acoustic modeling. She has extensive experience with at-sea experiments, both foreign and domestic. Dr. Isakson has taught underwater acoustics at the University of Texas since 2009. She is a former president and fellow of the Acoustical Society of America (ASA) and a Distinguished Lecturer of the IEEE Oceanic Engineering Society. Dr. Isakson currently serves on the governing board of the American Institute of Physics (AIP) and is is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Lekelia Jenkins

Member

Lekelia “KiKi” Jenkins is an associate professor in the School for the Future of Innovation in Society at Arizona State University. As a National Science Foundation (NSF) Graduate Fellow, Lekelia Jenkins received her Ph.D. from Duke University in 2006 by pioneering a new field of study into the invention and adoption of marine conservation technology. Since then, she has worked as an environmental consultant for the Natural Resource Defense Council, while also actively participating in the burgeoning field of Studies in Expertise and Experience. As an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow with the National Marine Fisheries Service’s Office of International Affairs, she helped implement new regulations to address bycatch and IUU (illegal, unreported and unregulated) fishing by foreign nations. Dr. Jenkins became a Research Associate at the University of Washington in 2009, where her research was supported by the David H. Smith Conservation Research Fellowship and the Ford Foundation Diversity Postdoctoral Fellowship. In 2011, Dr. Jenkins was hired as an Assistant Professor at the School of Marine and Environmental Affairs and has recently been awarded the Alfred P. Sloan Research Fellowship and inducted into the Global Young Academy. Dr. Jenkins is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Sandra Knight

Member

Sandra Knight is a Senior Research Engineer in the Department of Civil and Environmental Engineering at the University of Maryland where she works with her colleagues in the development of water policy, disaster resilience, and flood risk management initiatives to support the Center for Disaster Resilience. Additionally, she is founder and President of WaterWonks LLC in Washington, DC. Her company was formed to capitalize on her extensive experience in federal disaster reduction, flood risk management, and marine transportation policies and programs, having spent more than 30 years administering these and other policies at three federal agencies. Sandra finished her federal career in October 2012 as the Deputy Associate Administrator for Mitigation, FEMA, responsible for the nation’s floodplain mapping, management and mitigation grants supporting the National Flood Insurance Program, environmental compliance for the agency, and oversight of the National Dam Safety Program. At NOAA, 2007-2009, she was responsible for the development of policies and strategies to ensure scientific excellence and improved performance of NOAA's research portfolio. Prior to that, she spent 26 years with the US Army Corps of Engineers. Her last position with the U.S. Army Corps of Engineers was as Technical Director for navigation research. She is a registered professional engineer in Tennessee, a Diplomate Water Resource Engineer, and a Diplomate Navigation Engineer. She is a member of the American Society of Civil Engineers, the American Meteorological Society, the Society of Women Engineers, Sigma Xi, and a Fellow for PIANC. Dr. Knight received a B.S. degree from Memphis State University, and a M.S. degree from Mississippi State University. Dr. Knight holds a Ph.D degree from University of Memphis. All degrees were in civil engineering.

Nancy Knowlton

Member

Nancy Knowlton is a coral reef biologist and the Sant Chair for Marine Science at the National Museum of Natural History, Smithsonian Institution (where she also served as editor-in-chief of the Ocean Portal) and senior scientist emerita at the Smithsonian Tropical Research Institute. She was formerly professor at the Scripps Institution of Oceanography at the University of California, San Diego and founder of the Scripps Center for Marine Biodiversity and Conservation. Her areas of expertise include marine biodiversity and conservation, and evolution, behavior, and systematics of coral reef organisms. Her revolutionary studies of reef bleaching and speciation provide fundamental insights into differentiation and mutualism. Her work has revealed new, unexpected levels of diversity in the marine microbial environment. She is a member of the National Academy of Sciences. Her other honors include the Peter Benchley Award for Science in Service of Conservation (2009), Heinz Award for contributions benefitting the environment (2011), election to the American Academy of Arts and Sciences (2013), and the Women's Aquatic Network Woman of the Year Award (2018). She received a BA in biology from Harvard University and her PhD from the University of California, Berkeley in zoology. Dr. Knowlton is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Anthony MacDonald

Member

Tony MacDonald is currently the Director of the Urban Coast Institute at Monmouth University, West Long Branch, NJ. Mr. MacDonald was previously the executive director of the Coastal States organization from 1998 to 2005. Prior to joining the Coastal States Organization, he was the special counsel and director of environmental affairs at the American Association of Port Authorities, where he represented the International Association of Port and Harbors at the International Maritime Organization on negotiations on the London Convention. He has also practiced law with a private firm in Washington, D.C., working on environmental and legislative issues, and served as the Washington, D.C. environmental legislative representative of the Mayor of the City of New York. He specializes in environment, coastal, marine, and natural resources law and policy and federal, state, and local government affairs. He earned a B.A. from Middlebury College and a J.D. from Fordham University.

Jacqueline McGlade

Member

Jacqueline McGlade is currently Professor of Resilience and Sustainable Development at the University College London Institute for Global Prosperity and Faculty of Engineering, Frank Jackson Professor of the Environment, Gresham College and Professor, Institute for Public Policy and Management, Strathmore University Business School Kenya. She was Executive Director of the European Environment Agency from 2003-2013, where she was on leave from her post as Professor of Environmental Informatics at University College London. Between 2014 and 2017 she was Chief Scientist and Director of the Science Division of the United Nations Environment Programme based in Nairobi. Over the past 40 years Professor McGlade has worked at the interface of sustainable development, science, society and policy. She has established and led science and research initiatives across the United Nations (UN), European Union (EU) and around the world. Professor McGlade is known for her research on data and informatics and the use of earth observation, and assessments on biodiversity, climate change, natural capital accounting and ecosystems, oceans, social dynamics and indigenous knowledge, sustainable development. She is an author of more than 200 publications, including as lead author and editor in chief of more than 45 major EU and UN publications and research reports. She has been awarded a number of prizes and awards for her research. Professor McGlade completed her BSc in Marine Biology, Biochemistry and Soil Science at Bangor University, UK, in 1977. She obtained her PhD in 1980 on aquatic sciences and zoology from the University of Guelph in Canada. From 1987-89, she was Adrien Fellow at Darwin College and obtained a M.A. degree from the University of Cambridge. She holds Honorary Degrees from University of Bangor, Keele and Kent.

Thomas J. Miller

Member

Thomas Miller is a professor of fisheries and population dynamics, as well as the Director of the Chesapeake Biological Laboratory at the University of Maryland Center for Environmental Science. Dr. Miller's research interests include recruitment and population dynamics of aquatic animals, fish early life history, and blue crabs. His relevant National Academies service includes membership on the Committee on Sustainable Water and Environmental Management in the California Bay-Delta, the Panel to Review California Draft Bay Delta Conservation Plan and the Committee on the Review of the Marine Recreational Fisheries Information Program. He is also currently serving as a member of the National Academies Research Associateship Programs Panel on Life Sciences. Dr. Miller received his B.Sc. in human and environmental biology at the University of York, UK. He later received his M.S. at North Carolina State University in ecology, and his Ph.D. in zoology, also from North Carolina State University. He undertook post-doctoral training at McGill University. Dr. Miller is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

S. Bradley Moran

Member

S. Bradley Moran is Dean of the College of Fisheries and Ocean Sciences, and Professor of Oceanography at the University of Alaska, Fairbanks. Prior to his appointment as Dean, he served as Acting Director of the Obama Administration's National Ocean Council, Assistant Director for Ocean Sciences in the White House Office of Science and Technology Policy, and Program Director in the Chemical Oceanography Program at the National Science Foundation. He focused on implementing federal ocean science policy and facilitating interagency efforts and partnerships on a broad range of ocean policy, resource, economic, and national security matters. Dr. Moran's principal research interests include the application of uranium-series and artificial radionuclides as tracers of marine geochemical processes, and fostering economic development partnerships in energy and environmental research, technology, policy, and education. In 2007, he envisioned and implemented the nation's first Masters of Business Administration-Masters of Oceanography dual degree, the "Blue MBA". He is currently an editor for the Journal of Geophysical Research-Oceans and Editorial Board member of the Journal of Marine Science and Engineering and the Journal of Marine Research. Dr. Moran is a member of the Board of Trustees of the Consortium for Ocean Leadership, the Board of Directors of the Alaska Ocean Observing System, the Board of Directors of the North Pacific Research Board, and the Board of the Alaska Sea Life Center. Dr. Moran earned a B.Sc. in chemistry from Concordia University, a Ph.D. in oceanography from Dalhousie University, and conducted postdoctoral research at the Woods Hole Oceanographic Institution. Dr. Moran is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Ruth L. Perry

Member

Ruth Perry joined Shell Oil Company as a Marine Scientist and Regulatory Policy Specialist in 2014. She integrates marine science and ocean technology into regulatory policy advocacy and decision-making in the areas of marine sound, marine spatial planning, ocean observing, and marine mammal and life science, primarily in the Gulf of Mexico. Ruth is also responsible for helping Shell to develop public-private science collaborations, such as real-time monitoring programs with autonomous technology, to improve industry's knowledge of the offshore marine environment. Ruth has over 10 years of ocean technology research and system implementation, field experience and ocean policy analysis, including research cruises to monitor coastal hypoxia and the offshore physical environment, deploying and operating ocean observing systems and marine mammal observing in the Gulf of Mexico, Ecuador, and the Galapagos Islands. She is a member of the National Academies' Ocean Studies Board and Gulf Research Program Loop Current Committee, a Board Member of Gulf of Mexico Coastal Ocean Observing System, and on the Science Advisory Board for Texas OneGulf RESTORE Center of Excellence. She was recently awarded the Marine Technology Society's Young Professional Award for 2017. She earned a doctorate in Oceanography from Texas A&M University in 2013 and serves as a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

James Sanchirico

Member

James Sanchirico is a professor of natural resource economics in the Department of Environmental Science and Policy, and Associate Director of the Coastal and Marine Science Institute at UC Davis. His main research interests are the economic analysis of policy design, implementation, and evaluation for marine and terrestrial species conservation, and the development of economic-ecological models for forecasting the effects of resource management policies. He received the Rosenstiel Award for Oceanographic Sciences in 2012, which honors scientists who, in the past decade, have made significant and growing impacts in their field, the UC Davis Distinguished Scholarly Public Service Award in 2014, and the 2010 and 2000 Quality of Research Discovery Award from the Agricultural and Applied Economics Association. He is currently Co-Editor at the Journal of the Association of Environmental and Resource Economists and principal investigator on the NSF-funded Sustainable Oceans National Research Training program at UC Davis. He served on the Lenfest Fishery Ecosystem Task Force, a National Academies committee evaluating the effectiveness of stock rebuilding plans of the 2006 Fishery Conservation and Management Reauthorization, a National Academies committee to review the U.S. Ocean Acidification Research Plan, a National Academies committee to review the Joint Subcommittee on Ocean Science and Technology (JSOST) Research Priorities Plan, and six years on NOAA's Science Advisory Board (including service on the Ecosystem Science and Management Working Group and Social Science Working Group). Dr. Sanchirico received a B.A. of economics and mathematics from Boston University, and a Ph.D. in agricultural and resource economics from UC Davis. He is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Mark J. Spalding

Member

Mark Spalding is the President of The Ocean Foundation and is an authority on international ocean policy and law. He is the former Director of the Environmental Law and Civil Society Program, and Editor of the Journal of Environment and Development, at the Graduate School of International Relations & Pacific Studies (IR/PS), UC-San Diego. Spalding has also taught at Scripps Institution of Oceanography, UCSD's Muir College, UC Berkeley's Goldman School of Public Policy, and University of San Diego's School of Law. He was a research fellow at UCSD's Center for U.S.-Mexican Studies, a Sustainability Institute - Donella Meadows Leadership Fellow and a SeaWeb Senior Fellow. He is chair emeritus of the National Board of Directors of the Surfrider Foundation, and was the chair of the environmental law section of the California State Bar Association. He holds a B.A. in history with Honors from Claremont McKenna College, a J.D. from Loyola Law School, and a Master in Pacific International Affairs from IR/PS. Mr. Spalding is a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Lynne D. Talley

Member

Lynne D. Talley is a Professor of Oceanography at the Scripps Institution of Oceanography at the University of California, San Diego. Dr. Talley's expertise and research interests include general ocean circulation, hydrography, theory of wind-driven circulation, and ocean modeling. She is co-PI for the US GO-SHIP program; GO-SHIP is an international repeated decadal survey of the deep ocean's physical and chemical properties. She is head of the observational team in the SOCCOM program that is deploying a network of biogeochemical Argo profiling floats throughout the Southern Ocean. She was a Lead Author on the IPCC 4th and 5th Assessment Reports chapter on Ocean Observations, and on the 5th Assessment Report's Technical Summary and Summary for Policymakers. Dr. Talley has an extensive NRC committee background, having served previously on the Climate Research Committee, Global-Ocean-Atmosphere-Land System Panel, Panel to Review the Jet Propulsion Laboratory Distributed Active Archive Center (DAAC), and committees on Abrupt Climate Change, Climate Change Feedbacks, and Future Science Opportunities in the Antarctic and Southern Ocean. She is a member of the CLIVAR Southern Ocean Region Panel, and the U.S. CLIVAR Southern Ocean Working Group. Dr. Talley was a National Science Foundation Presidential Young Investigator in 1987. Dr. Talley received her Ph.D. in Physical Oceanography from the WHOI/MIT Joint Program in Oceanography. She is a fellow of the American Academy of Arts and Sciences, American Geophysical Union, American Meteorological Society, and Oceanography Society.

Robert S. Winokur

Member

Robert (Bob) S. Winokur has over 55 years of experience in marine science and satellite remote sensing and retired as a long-time senior executive after 47 years of federal service. As a senior executive in the federal government and private sector his positions included Deputy Oceanographer of the Navy and Deputy/Technical Director for Oceanography, Space and Maritime Domain Awareness, Office of the Chief of Naval Operations; acting Oceanographer of the Navy; Assistant Administrator for Satellite and Information Services and Acting Director, National Weather Service, National Oceanic and Atmospheric Administration; senior executive positions in the Office of the Assistant Secretary of the Navy and the Office of Naval Research; President, Earth Satellite Corporation; and Vice President, Consortium for Oceanographic Research and Education. His technical experience focused on undersea warfare, ocean policy and satellite remote sensing. He is currently a senior advisor for the Michigan Tech Research Institute and NOAA Satellite Service, consulting on ocean and space policy and programs. Mr. Winokur has a bachelor's degree from Rensselaer Polytechnic Institute and a master's degree from The American University. He has served on numerous government advisory boards and national and international committees on undersea technology, remote sensing, environmental satellite systems, ocean policy, and oceanographic ship management and planning. He is a fellow of the Marine Technology Society, the Acoustical Society of America and the American Meteorological Society and serves as a member of the Ocean Studies Board at the National Academies of Sciences, Engineering and Medicine.

Grace Young

Member

Grace C. Young is a Senior Research Engineer and Lead Scientist at X, Alphabet's Moonshot Factory (formerly called "GoogleX"), where her team is creating radical new technology to protect the ocean while feeding humanity sustainably. An avid sailor, diver and National Geographic Explorer, Grace is passionate about developing tools to better understand, explore and manage the ocean. She earned her BSc in Mechanical & Ocean Engineering from MIT ('14) and her PhD from the University of Oxford ('18) as a Marshal Scholar. She has developed robots, imaging systems, and other technologies for MIT, CERN, NASA, Woods Hole Oceanographic Institution (WHOI), and the National Oceanic and Atmospheric Administration (NOAA). She assists National Geographic in various initiatives to educate and inspire young people about the ocean, including augmented reality exhibitions, games, and classroom outreach. In 2014 she lived underwater for 15 days as a mission scientist on Fabien Cousteau's Mission 31, the youngest Aquarius aquanaut at the time. A former ballerina, she's active in arts communities; her exhibition of ultra-high speed photography captured while living underwater was selected as "Best of Oceans at MIT 2015." Grace was a four-year varsity letterman on MIT's sailing team and sailed across the Atlantic for the non-profit SailFuture. Grace also serves as Chief Scientist for the Pisces VI deep sea research submarine.

Susan J. Roberts

Staff Officer