

Long-term Coastal Zone Dynamics: Interactions and Feedbacks between Natural and Human Processes along the U.S. Gulf Coast

Committee

H. Tuba Ozkan-Haller

Chair

TUBA OZKAN-HALLER (Chair) is a professor at the College of Earth, Ocean, and Atmospheric Sciences and School of Civil and Construction Engineering at Oregon State University. Her research program focuses on the use of numerical, field, laboratory, and analytical approaches to predict water motion and bathymetric change in bays, inlets, and the continental shelf. She has developed models to predict surf zone wave fields, conducted research to understand the effects of wave energy converters on the nearshore wave field, and investigated the mechanisms that control nearshore rip currents. Dr. Ozkan-Haller has more recently been involved in studies dealing with oxygen consumption in the coastal ocean. She is a member of the Ocean Studies Board of the National Academy of Sciences, Engineering, and Medicine and served on the Committee on An Evaluation of the U.S. Department of Energy's Marine and Hydrokinetic Resource Assessments for the National Academy of Sciences, Engineering, and Medicine. Dr. Ozkan-Haller is the recipient of the Office of Naval Research Young Investigator Award and the Outstanding Faculty Member Award at the University of Michigan. She holds a B.S. in civil engineering from Bogaziçi University in Istanbul and a M.C.E. and Ph.D. in civil engineering from the University of Delaware.

Gregory A. Carter

Member

GREGORY A. CARTER is a Professor of Geography in the Department of Geography and Geology at the University of Southern Mississippi. His research interests lie in physical geography, remote sensing, biogeography, and landscape ecology of terrestrial and aquatic components of northern Gulf of Mexico coastal systems. Dr. Carter's recent work on terrestrial systems focuses on changes in habitat type on the Mississippi-Alabama barrier islands and in coastal wetlands. He uses remote sensing techniques to investigate how elevation, land area, and water table influence the formation of plant communities and their resilience to sea-level rise, erosion, subsidence, and the impact of tropical storms. Dr. Carter received a B.S. and M.S. in botany from Auburn University and a Ph.D. in botany from the University of Wyoming.

Just Cebrian

Member

JUST CEBRIAN is a professor in the Department of Marine Sciences and the University of South Alabama and a Senior Marine Scientist at the Dauphin Island Sea Lab in Alabama. His research focuses on the impacts that humans have on the functioning of coastal ecosystems to better understand coastal resiliency for more informed management of policies. His field and experimental work follows a community-integrated approach to study the main communities of coastal ecosystems including phytoplankton communities, sediment flats inhabited by benthic microalgae, macroalgal beds, seagrass meadows, and marshes. Dr. Cebrian also studies how coastal ecosystems compare with terrestrial ecosystems using a number of functional metrics including trophic processes and energy flows. He obtained a B.A. in biology from the University of Barcelona and a M.S. in oceanology from the University of Perpignan in France. He received his Ph.D. in marine sciences at the University of Politecnica Catalunya in Barcelona.

Robert A. Dalrymple

Member

ROBERT A. DALRYMPLE is the Willard and Lillian Hackerman Professor Emeritus of Civil Engineering at Johns Hopkins University. His major research interests are in the areas of coastal engineering, wave mechanics, fluid mechanics, littoral processes, and tidal inlets. His research currently explores water wave modeling, tsunamis and their impacts on shorelines, and the interaction of water waves with the seabed, specifically mud bottoms. Dr. Dalrymple was elected to the National Academy of Engineering in 2006. He chaired the National Academy of Sciences, Engineering, and Medicine's Committee on the Review of the Louisiana Coastal Protection and Restoration Program and the Committee on Sea Level Rise in California, Oregon, and Washington. He also serves as chair of The Water Institute of the Gulf Science and Engineering Advisory Council. Dr. Dalrymple received his A.B. degree in engineering sciences from Dartmouth University, his M.S. degree in ocean engineering from the University of Hawaii, and his Ph.D. degree in civil and coastal engineering from the University of Florida.

Jordan R. Fischbach

Member

JORDAN R. FISCHBACH is a policy researcher at the RAND Corporation, Co-Director of the Water and Climate Resilience Center, and a member of the Pardee RAND Graduate School faculty. Dr. Fischbach has expertise in risk analysis, exploratory simulation modeling, and Robust Decision Making, a method designed to better manage deep uncertainty and develop robust and adaptive plans through quantitative scenario analysis. He works with government agencies to better incorporate deep uncertainty into their long-term climate and coastal adaptation planning efforts. He is currently leading the storm surge and flood damage assessment for the State of Louisiana's 2017 Coastal Master Plan and is the principal investigator in charge of developing RAND's Coastal Louisiana Risk Assessment (CLARA) model. He is also co-leading a project to develop an integrated strategic plan for coastal investment in Queens after Hurricane Sandy. Dr. Fischbach was awarded a President's Choice award at RAND in 2012. He earned a B.A. in history from Columbia University and a Ph.D. in policy analysis from the Pardee RAND Graduate School.

Jennifer L. Irish

Member

JENNIFER L. IRISH is a Professor of Coastal Engineering in the Department of Civil and Environmental Engineering at Virginia Tech. Previously, she was the Coastal Engineering Regional Technical Specialist at the U.S. Army Corps of Engineers' North Atlantic Division and New York District and a research coastal engineer at the U.S. Army Coastal and Hydraulic Laboratory (formerly Coastal Engineering Research Center). Dr. Irish's research involves the physical impacts of coastal hazards including storm surge, tsunami inundation, and storm-induced erosion; coastal hazard probability and risk assessment; impacts of climate change and sea level rise at the coast; and the role of natural and nature-based features in coastal hazard mitigation including wetlands, coastal forest, dunes, and beaches. She has received numerous awards including Virginia Tech's College of Engineering Faculty Fellow in 2015 and the Department of the Army's Superior Civilian Service Award. Dr. Irish serves on multiple editorial boards including the journal of Coastal Engineering. She is also the chair and Executive Committee Member of the American Society of Civil Engineers' (ASCE's) Committee on Technical Advancement and was formerly Secretary of ASCE's Coasts, Oceans, Ports, and Rivers Institute. Dr. Irish received her B.S. and M.S. in civil engineering from Lehigh University and her Ph.D. in civil engineering from the University of Delaware.

Alexander S. Kolker

Member

ALEXANDER S. KOLKER is an associate professor in the Louisiana Universities Marine Consortium, and teaches in the Department of Earth and Environmental Science at Tulane University. Dr. Kolker's research lab investigates interactions between sedimentary and hydrological processes in the coastal zone and the ways in which those processes affect and are affected by the morphology of coastal wetlands. His work spans the natural and anthropogenic processes that govern coastal systems, the role of atmospheric processes on short-term sea level dynamics, and works to understand how climate and other human activities influence coasts and wetlands. Current projects include the development of subsidence map of the Louisiana coast; an examination of the influence of the Mississippi River and its delta on the oceanography and ecology of the Gulf of Mexico; investigations into natural analogues for coastal restoration in Louisiana; and studies that investigated the pathways and processes associated with groundwater discharge in the Mississippi River Delta. He holds a B.A. in biology at the University of California, Santa Cruz, and a M.A. in biological sciences and Ph.D. in marine and atmospheric science at the State University of New York, Stony Brook.

Shubhra Misra

Member

SHUBHRA MISRA is a marine facilities engineer with Chevron Energy Technology Company, based in Houston, TX. He serves as a marine and coastal subject matter expert on Chevron's oil, gas and petrochemical projects globally. His primary experience is with multi-disciplinary coastal and marine projects, with a focus on site selection, conceptual and detailed design, constructability and operation of marine and coastal infrastructure (fixed and floating), intakes/outfalls, dredging/reclamation, numerical and physical laboratory modeling of coastal processes (waves, water levels, currents, sediments) and vessel motions, meteorological-ocean studies, risk assessments, modeling wave-structure interactions, and marine environmental impact assessments. Prior to his position at Chevron, Dr. Misra worked at several marine and coastal infrastructure design and engineering consulting firms as a coastal engineer. He received his M.S. and Ph.D. degrees at the University of Delaware in Civil and Environmental Engineering (Coastal Engineering) in 2000 and 2005.

Laura J. Moore

Member

LAURA MOORE is an associate professor and Director of the Coastal Environmental Change Lab in the Department of Geological Sciences and the Curriculum for the Environment and Ecology at The University of North Carolina at Chapel Hill. Her interdisciplinary research program focuses on merging observational and numerical approaches to investigate the response of low-lying coastal environments to climate change. Her recent and ongoing work includes investigation of barrier island response to sea level rise; coastal foredune dynamics; couplings among barriers, back-barrier marshes, and bays; large-scale coastline response to changing wave climate; two-way couplings between human activities and natural processes that affect coastline evolution; and novel arts-based approaches to climate change education. Much of her research involves collaboration with ecologists, social scientists, and dramatic artists. Dr. Moore has been a principal investigator at the Virginia Coast Reserve Long-term Ecological Research site since 2008, is the co-editor of a forthcoming volume titled *Barrier Dynamics and Response to Changing Climate* to be published by Springer, and is a recipient of the W.M. Keck Foundation Fellowship in Natural Sciences, among others. Dr. Moore has a B.A. in geology from Colgate University and a Ph.D. in earth sciences at the University of California, Santa Cruz.

Martin D. Smith

Member

MARTIN D. SMITH is the George M. Woodwell Distinguished Professor of Environmental Economics in the Nicholas School of the Environment at Duke University and also has an appointment in the Department of Economics at Duke University. Dr. Smith's research focuses on the economics of the oceans including fisheries, marine ecosystems, seafood markets, and coastal climate adaptation. He has written on a range of policy-relevant topics including economics of marine reserves, seasonal closures in fisheries, ecosystem-based management, nutrient pollution, the global seafood trade, organic agriculture, and coastal responses to climate change. He is best known for identifying unintended consequences of marine and coastal policies that ignore human behavioral feedbacks. Smith's methodological interests span micro-econometrics, optimal control theory, time series analysis, and numerical modeling of coupled human-natural systems. He serves on the Ocean Studies Board of the National Academy of Sciences, Engineering, and Medicine and was selected for the Quality of Research Discovery Award from the Agricultural and Applied Economics Association. He is Editor-in-Chief of *Marine Resource Economics* and has a B.A. in public policy from Stanford University and a Ph.D. in agricultural and resource economics from the University of California, Davis.

Torbjorn Tornqvist

Member

TORBJÖRN E. TÖRNQVIST is the Vokes Geology Professor and chair (until June 30, 2017) of the Department of Earth and Environmental Sciences at Tulane University. Dr. Törnqvist is a Quaternary scientist who studies sea-level change, coastal subsidence, delta evolution, and paleoclimatology. More specifically, he examines the sedimentary record of the Louisiana coast to investigate sea-level change over timescales ranging from the past decade to the past 10,000 years. Sea-level records provide insights on a variety of issues including rates of ice-sheet melt during past warm periods as well as subsidence mechanisms, rates, and their spatial patterns. Dr. Törnqvist's research group also examines the response of coastal and deltaic environments to accelerated rates of sea-level rise including studies that seek to assess how deltaic processes can be harnessed to benefit coastal restoration. He received his M.S. and Ph.D. degrees in physical geography from Utrecht University.

Gabrielle Wong-Parodi

Member

GABRIELLE WONG-PARODI is an assistant research professor in the Department of Engineering and Public Policy at Carnegie Mellon University (CMU). Her research focuses on applying behavioral decision research methods to promote environmental sustainability and community resiliency along the coastline. Dr. Wong-Parodi uses behavioral science approaches to create evidence-based strategies for informed decision making with a particular focus on building resilience and promoting sustainability in the face of a changing climate. She has a background in energy resources, climate change adaptation and mitigation, and risk perceptions of emerging technologies such as unconventional shale gas development. She was an invited speaker at the Sackler Colloquia at the National Academy of Sciences, Engineering, and Medicine. Dr. Wong-Parodi is an affiliate at Lawrence Berkeley National Laboratory, the Peace and Innovation Lab at Stanford University, and is the social science research liaison for CMU at Skoll Global Threats. Dr. Wong-Parodi received her B.S. in psychology and her M.A. and Ph.D. in risk perceptions and communication from the University of California, Berkeley.