

Advancing Understanding of Gulf of Mexico Loop Current Dynamics -

Committee

Paul G. Gaffney, II

Chair

VADM Paul Gaffney is a retired Navy vice admiral and president emeritus of Monmouth University, having served as president from 2003 to 2013. He was president of the National Defense University from 2000 to 2003. Prior to assuming those duties, Admiral Gaffney was the chief of naval research with responsibility for the Department of the Navy's science and technology investment. He commanded the Navy's Meteorology and Oceanography program headquartered in St. Louis, Missouri, and was the commanding officer of the Naval Research Laboratory. He was appointed to the U.S. Ocean Policy Commission in July 2001 and served during its full tenure from 2001 to 2004. His distinguished naval career spanned over three decades, including duty at sea, overseas, and ashore in six executive and command positions. Admiral Gaffney was assigned to duties in Indonesia, Japan, Spain, and Vietnam. He is a 1968 graduate of the U.S. Naval Academy and upon graduation he was selected for immediate graduate education and received a master's degree in ocean engineering from The Catholic University of America, where he is honored on its engineering "Wall of Fame." He attended the Naval War College, graduating with highest distinction. He completed an M.B.A. at Jacksonville University. The University of South Carolina, Jacksonville University, and Catholic University have awarded him honorary doctorates. He has been recognized with a number of military decorations and the Naval War College's J. William Middendorf Prize for Strategic Research. Admiral Gaffney is a member of the National Academy of Engineering. He chaired the federal Ocean Research/Resources Advisory Panel (ORRAP) and chaired the federal Ocean Exploration Advisory Board (OEAB). He is a member of the Steering Committee of the Joint Ocean Commission Initiative, a fellow in the Urban Coast Institute at Monmouth University, and a director of Diamond Offshore Drilling, Inc. He is currently chairing a National Academies of Sciences, Engineering, and Medicine's Transportation Research Board study on the domestic transportation of energy fluids.

Shuyi S. Chen

Member

Dr. Shuyi S. Chen is a professor of Atmospheric Sciences at the University of Washington. Her research interests include observations and modeling of the tropical atmosphere and the ocean with a focus on air-sea interaction from weather to subseasonal time scales, development of coupled atmosphere-wave-ocean-land models, and prediction of extreme weather events, including hurricanes and winter storms, the Madden-Julian Oscillation, and the upper ocean circulation and transport over the Gulf of Mexico. Dr. Chen has led and participated in many major field campaigns, including CBLAST, RAINEX, ITOP, DYNAMO, GLAD, LASER, SPLASH, and CPEX-2017. Dr. Chen received the National Aeronautics and Space Administration (NASA) Group Achievement Award for tropical cloud systems and processes and is a member of the NASA Ocean Vector Wind and Precipitation Measurement Missions science teams. She was an editor of AMS's Weather and Forecasting. Currently, she serves as the vice chair of the National Academies of Sciences, Engineering, and Medicine's Board on Atmospheric Sciences and Climate (BASC), the Decadal Survey for Earth Science and Applications from Space (ESAS 2017) Steering Committee, and the University Corporation for Atmospheric Research (UCAR) Board of Trustees. Dr. Chen is a fellow of American Meteorological Society. She received her Ph.D. in meteorology in 1990 from The Pennsylvania State University.

Steven F. DiMarco

Member

Dr. Steven F. DiMarco is a professor in the Department of Oceanography and Ocean Observing Team leader in the Geochemical and Environmental Research Group at Texas A&M University (TAMU). Prior to this position, Dr. DiMarco served as an associate professor, an associate research scientist, and an assistant research scientist in the Department of Oceanography at TAMU. He is a charter member of the National Science Foundation—University National Oceanographic Laboratory System (UNOLS) Ocean Observing Science Committee and has previously served on the UNOLS Regional Class Research Vessel Science Oversight Committee. Dr. DiMarco is an observational oceanographer whose research has focused on interdisciplinary studies in which physical and biogeochemical processes overlap. He is deeply involved in regional, national, and international programs focused on implementing new technologies and methodologies associated with ocean observing systems and involve applied problems associated with societal concerns of human impact on the marine environment. The results of his research have been used to guide management policies and drive agency decisions in the United States and abroad. In 2013, Dr. DiMarco was honored with the Dean's Distinguished Achievement Award for Research and was recognized as a leader in the Gulf of Mexico physical oceanography community for his important contributions to understanding basic physical processes in the Gulf. He has authored or co-authored more than 50 peer-reviewed journal publications, 20 technical reports, and more than 130 conference abstracts. He obtained his master's degree in physics in 1988 and his Ph.D. in physics in 1991 from The University of Texas at Dallas.

Scott Glenn

Member

Dr. 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. His research interests include the development of new autonomous ocean observing technologies, their application to scientific research in remote and extreme environments, and the demonstration of new educational paradigms. His technology development work focuses on autonomous systems that can be operated remotely as distributed networks to improve the spatial sampling of complex environments. A major scientific focus of his is extreme events, including storms, hurricanes, and typhoons, investigating with observations and numerical models the linkages among the ocean, the atmosphere above, and the seabed below. Dr. Glenn's educational activities are designed to better prepare students to meet the challenges of a changing environment using modern observatories to explore the global ocean. After graduating from the Massachusetts Institute of Technology and Woods Hole Oceanographic Institution Joint Program in 1983 with an Sc.D. in ocean engineering, he began a more than 30-year research career of implementing sustained real-time ocean observation and forecast systems for offshore oil exploration at the Shell Development Company (1983-1986), then for the Naval Oceanography Command supporting fleet operations while at Harvard University (1986-1990), and, since 1990, for a wide range of scientific and societal applications at Rutgers University. In the only U.S. national program to recognize excellence in undergraduate teaching, he was named one of the U.S. Professors of the Year representing the State of New Jersey by the Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education. He recently received the international Society for Underwater Technology's Oceanography Award for outstanding contributions to the field of oceanography.

Ruoying He

Member

Dr. Ruoying is a Distinguished Professor in the Department of Marine, Earth, and Atmospheric Sciences at North Carolina State University. His research expertise spans from coastal circulation dynamics, air-sea interaction, to biophysical interactions. As the director of the Ocean Observing and Modeling Group in Department of Marine, Earth & Atmospheric Sciences, he conducts coastal ocean observations, remote sensing data analyses, and also leads the development of prediction models of ocean circulation, air-sea-wave interactions, physical-biogeochemical couplings, as well as data assimilation. Dr. He served as an associate editor for the Journal of Geophysical Research-Oceans, and as a guest editor for Ocean Dynamics. He also serves on the editorial boards of several other scientific journals and on the organizing committees of several major international science meetings. Dr. He has served as a reviewer for 20 journals including the Journal of Atmospheric and Oceanic Technology, Journal of Geophysical Research, Journal of Physical Oceanography, Nature, Ocean Modelling, Oceanography, and Science. He was the vice-chair of the Gordon Research Conference on Coastal Ocean Modeling in 2015 and will co-chair the Gordon Research Conference on Coastal Ocean Dynamics in 2017. He is presently a member of UNOLS Ocean Observing Science Committee, a member of Integrated Ocean Observing System- National Modeling Steering Team, and a science team member of International GODAE OceanView project. His honors and awards include: Distinguished Professor, North Carolina State University (2014); National Aeronautics and Space Administration (NASA) Young Investigator Award (2006); the Sears Collaboration Award (2006), the Coastal Ocean Research Award (2005), and the Green Innovative Technology Award (2004) from the Woods Hole Oceanographic Institution; and the Sackett Innovative Research Award (2004) from the University of South Florida. He was inducted into the Phi Kappa Phi Honor Society in 2000. Dr. He holds a PhD in physical oceanography from the University of South Florida (2002).

Joseph Kuehl

Member

Dr. Joseph Kuehl is an assistant professor in the Department of Mechanical Engineering at the University of Delaware. He is also an Air Force Office of Scientific Research Young Investigator; a member of the NATO working group STO/AVT-240 Hypersonic Transition; and a board member and fellow of The Institute of Ecological, Earth and Environmental Science (TIEEES), a fellow of the Center for Spatial Research (CSR), and an adjunct faculty member at The University of Texas Marine Science Institute. Dr. Kuehl conducts cutting-edge research in three different fields of study: hypersonic boundary-layer stability and transition, geophysical fluid dynamics, and nonlinear vibrations. His current research in the area of geophysical fluid dynamics focuses on Loop Current systems, bottom boundary-layer processes, and the influence of topography on fate and transport modeling. Dr. Kuehl has been invited to give talks at several universities and conferences/meetings, including the Michigan Technological Institute (2016), the NATO STO-AVT-240 Meeting (2016), the University of Rhode Island (2016, 2012), The University of Texas Marine Science Institute (2015), Gulf of Mexico Oil Spill & Ecosystem Science Conference (2015), The University of Texas Dallas (2015), the University of Delaware (2013), The University of Texas at Austin (2012), and Texas A&M University (2009). Dr. Kuehl holds a Ph.D. in mechanical engineering and applied mechanics and a Ph.D. in physical oceanography, both of which were obtained in 2009 from the University of Rhode Island.

Robert Leben

Member

Dr. Robert Leben is a research professor in the Department of Aerospace Engineering Sciences at the University of Colorado Boulder and a member of the Colorado Center for Astrodynamics Research (CCAR). His primary area of expertise is satellite altimetry and its application to ocean circulation monitoring. He has published more than 50 peer-reviewed publications in this area. He is currently a principal investigator (PI) on the OSTM/Jason-2 satellite altimeter mission, and was a co-investigator on the TOPEX/POSEIDON, Jason-1, and Envisat missions. He has also made significant contributions to oceanographic research in the Gulf of Mexico. He has been a PI or co-PI on research programs in the Gulf, including the Minerals Management Service/Bureau of Ocean Energy Management (U.S. Department of the Interior) funded programs such as the Louisiana/Texas Shelf Physical Oceanography Program Eddy Circulation Study; GulfCet II-Cetaceans, Sea Turtles and Seabirds in the Northern Gulf of Mexico: Distribution, Abundance and Habitat Associations; Desoto Canyon Eddy Intrusion Study; Exploratory Study of Deepwater Currents in the Gulf of Mexico; Survey of Deepwater Currents in the Northwestern Gulf of Mexico; Survey of Deepwater Currents in the Eastern Gulf of Mexico; Gulf of Mexico Loop Current Study; A Lagrangian Approach to Study the Gulf of Mexico's Deep Circulation; and the National Science Foundation Collaborative Research Program: Why does the Loop Current have such an irregular eddy shedding cycle? He has also assisted in the development and skill assessment of ocean circulation nowcast/forecast systems for the offshore oil and gas industry working in the Gulf of Mexico and off the southeast Brazilian coast. He received his Ph.D. in aerospace engineering sciences from the University of Colorado.

Pierre F. Lermusiaux

Member

Dr. Pierre Lermusiaux is a professor of mechanical engineering and ocean science and engineering at the Massachusetts Institute of Technology (MIT). His research thrusts include understanding and modeling complex physical and interdisciplinary oceanic dynamics and processes. With his group, he creates, develops, and utilizes new mathematical models and computational methods for ocean predictions and dynamic diagnostics, optimization and control of autonomous ocean systems, uncertainty quantification and prediction, and data assimilation and data-model comparisons. Dr. Lermusiaux received a Fulbright Foundation Fellowship in 1992, the Wallace Prize at Harvard in 1993, the Ogilvie Young Investigator Lecture in Ocean Engineering at MIT in 1998, and the MIT Doherty Chair in Ocean Utilization from 2009–2011. In 2010, the School of Engineering at MIT awarded him with the Ruth and Joel Spira Award for Distinguished Teaching. He is on the editorial board of the International Journal of Ocean & Oceanography (2005–present), and serves as associate editor for Ocean Dynamics and Ocean Modeling (2008–present). He has served on numerous committees and boards, including the Advisory Board, European Coastal-shelf Sea Operational System (ECOOP) from 2007–2010, the IMUM (International workshop on Multiscale (Un)-structured mesh numerical ocean Modeling) 2010 Scientific Committee (chair, 2009–2010), and the National Science Foundation (NSF) Physical Oceanography Review Panel, NSF PIONEER Array MIT-Rep. (2011). He served on the Advisory Board of the European Stochastic Assimilation (SANGOMA) and Maritime Integrated Surveillance Awareness (MARISA), and was a member of the National Academies of Sciences, Engineering, and Medicine's Committee on U.S. Research Agenda to Advance Subseasonal to Seasonal Forecasting. Dr. Lermusiaux has more than 100 refereed publications. He obtained a master's in applied physics in 1993 from Harvard University–DEAS and a Ph.D. in engineering sciences in 1997 from the same university.

Ruth L. Perry

Member

Dr. Ruth Perry is a Marine Scientist and Regulatory Policy Specialist responsible for offshore marine environmental regulations and policy for Shell Exploration and Production Company. In this capacity, Dr. Perry integrates marine science and ocean technology into regulatory policy advocacy and decision-making in the areas of oceanography, marine sound, marine resources, ocean observing, and marine mammal and life science, primarily in the Gulf of Mexico. She is also responsible for helping Shell develop public-private science collaborations, such as real-time ocean monitoring programs, to improve industry's and communities' knowledge of the offshore marine environment. Her recent projects with Shell include working with the National Oceanic and Atmospheric Administration (NOAA) and the University of Southern Mississippi to deploy autonomous underwater vehicles to better understand the Gulf of Mexico physical environment relative to improving storm and hurricane intensity predictions and Loop Current forecasting. Near the Shell Stones field, she and colleagues are establishing a long-term time series metocean station to collect surface and water column data down to 3000m. Prior to joining Shell, Dr. Perry was a research scientist with NOAA's Integrated Ocean Observing System (IOOS), specifically the Gulf of Mexico Coastal Ocean Observing System, and the Geochemical and Environmental Research Group at Texas A&M University. While there, she worked on many diverse projects including the implementation of a regional glider network, ocean science education and outreach campaigns, incorporating geospatial techniques with remote sensing and ocean observing to study Gulf environmental hazards, such as hypoxia, and the effects of physical ocean processes on marine mammal distributions. Dr. Perry has over 10 years of national and international experience in oceanographic project management, research, and fieldwork in the areas of ocean observing technology, physical oceanography,, ocean policy analysis, and marine mammal observational studies. She earned her PhD in Oceanography from Texas A&M University in 2013.

Daniel L. Rudnick

Member

Dr. Daniel Rudnick is currently a professor and director of the Climate Ocean Atmosphere Program and formerly the deputy director of Education at Scripps Institution of Oceanography. Dr. Rudnick is an observational oceanographer whose research focuses on processes in the upper ocean. His particular interests include fronts and eddies, air-sea interaction, the stirring and mixing of physical and biological tracers, the effect of oceanic structure on acoustic propagation, boundary currents, and coastal circulation. He is interested in observational instrumentation, having been involved in the use and/or development of moorings, towed and underway profilers, autonomous underwater gliders, and profiling floats. Dr. Rudnick has sailed on more than 25 oceanographic cruises, more than half as chief scientist. He has authored more than 80 peer-reviewed publications. He was a member of the Ocean Studies Board of the National Academies of Sciences, Engineering, and Medicine and has served on various panels and committees for the National Science Foundation, National Oceanographic and Atmospheric Administration, and the Office of Naval Research. Dr. Rudnick is Chair of the Executive Steering Committee of the Southern California Coastal Ocean Observing System (SCCOOS), a component of the Integrated Ocean Observing System (IOOS), and is a member of the OceanGliders international steering team and the U.S. Interagency Ocean Observation Committee Glider Task Team. He earned his Ph.D. in oceanography from the Scripps Institution of Oceanography in 1987.

Neha Sharma

Member

Neha Sharma is currently the Vice President of Operations at Horizon Marine, Inc. She has been with the company since 2007, serving as Physical Oceanographer and EddyWatch Analyst (2007-2010), Physical Oceanographer and Team Leader (2010), EddyWatch Operations Manager (2010-2012), EddyWatch Program Manager (2012-2015), and EddyWatch and SurveyWatch Program Manager (2015), with the primary responsibility of conducting research and compilation/analysis of oceanographic data for the purpose of providing real-time ocean current monitoring and forecasting for the offshore oil and gas industry in the Gulf of Mexico, offshore Trinidad, Brazil, India, East Africa, West Africa, Australia, and other regions impacted by strong ocean currents. Ms. Sharma holds a B.E. in Electronics and Telecommunications Engineering from Maharashtra Institute of Technology WEC, Pune University (2005) and an MS in Physical Oceanography and Remote Sensing from Louisiana State University (2007). Among her interests are public speaking, computer programming, marketing, and business strategy.

Robert H. Weisberg

Member

Dr. Robert Weisberg is a distinguished university professor at the University of South Florida (USF). As an experimental physical oceanographer, he conducts ocean circulation and ocean-atmosphere interaction studies in the tropics, on continental shelves, and in estuaries. His current research emphasizes the West Florida Continental Shelf (WFS) and the interactions occurring between the shelf and the deep ocean and between the shelf and the estuaries. He maintains a coordinated program of real-time in situ observations, analyses, and numerical circulation models aimed at describing and understanding the processes that determine WFS water properties. Dr. Weisberg is on the Board of Directors for the Southeast Coastal Ocean Observing Regional Association (SECOORA) and is a fellow of the Southeastern Universities Research Association (SURA) engaged in the Coastal and Environmental Research Program (CERP). He served on the Committee on New Orleans Regional Hurricane Protection Projects of the National Research Council from 2005 to 2009, and he led the Naval Research Lab (Stennis, Mississippi) Battlespace Environments site review in 2009. He received the Phi Kappa Phi Honor Society and USF Chapter Scholar of the Year Award in 2011, the National Oceanographic Partnership Program Excellence in Partnering Award in 2008, the President's Award for Excellence in 2003, the Professorial Excellence Award in 1998 from USF, and the American Geophysical Union Editor's citation for excellence in refereeing for Geophysical Research Letters in 1995. Dr. Weisberg is a member of the Oceanography Society, the American Geophysical Union, the American Meteorological Society, and Sigma Xi. He obtained his master's degree and Ph.D. in physical oceanography in 1972 and 1975, respectively, from the University of Rhode Island.

Dana R. Yoerger

Member

Dr. Dana Yoerger is a senior scientist at the Woods Hole Oceanographic Institution and a researcher in robotics and unmanned vehicles. He supervises the research and academic program of graduate students studying oceanographic engineering through the Massachusetts Institute of Technology / Woods Hole Oceanographic Institute Joint Program in the areas of control, robotics, and design. Dr. Yoerger has been a key contributor to the remotely operated vehicle JASON; the Autonomous Benthic Explorer known as ABE; and most recently, the autonomous underwater vehicle, SENTRY and the hybrid remotely operated vehicle NEREUS, which reached the bottom of the Marianas Trench in 2009. Dr. Yoerger has gone to sea on more than 80 oceanographic expeditions exploring the Mid-Ocean Ridge, mapping underwater seamounts and volcanoes, surveying ancient and modern shipwrecks, studying the environmental effects of the Deepwater Horizon oil spill, and the recent effort that located the Voyage Data Recorder from the merchant vessel El Faro. His current research focuses on robots for exploring the midwater regions of the world's oceans. Dr. Yoerger has served on several National Academies of Sciences, Engineering, and Medicine committees, including the Committee on Undersea Vehicles and National Needs, the Committee on Evolution of the National Oceanographic Research Fleet, and the Committee on Distributed Remote Sensing for Naval Undersea Warfare. He has a Ph.D. in mechanical engineering from the Massachusetts Institute of Technology.

Randolph Watts

Member

Dr. Randolph Watts is a professor of oceanography at the Graduate School of Oceanography of the University of Rhode Island. He holds a Ph.D. in physics from Cornell University (1973) and a B.A. in physics from the University of California, Riverside. From 1972 to 1974, he was a postdoc in the Department of Geology and Geophysics of Yale University, working with Dr. Tom Rossby. In 1974, he joined the faculty of the Graduate School of Oceanography of the University of Rhode Island as an assistant professor. Dr. Watts was granted tenure in 1980 and promoted to full professor in 1988. Dr. Watts's research has focused on understanding mesoscale dynamics of major ocean currents using moored instrumentation. For many years, his field programs were concentrated on the Gulf Stream in the region downstream of Cape Hatteras in order to develop observational and analytical methodology to understand the dynamics and energetics of that current system. More recent field experiments have been conducted in the Kuroshio Extension east of Japan, Gulf of Mexico, Japan/East Sea, the Agulhas Current off South Africa, and the Antarctic Circumpolar Current. These programs included observations made by inverted echo sounders, pressure gauges, current meters, and hydrography. Dr. Watts has been actively involved with the development of the inverted echo sounder since it was first used to make scientific measurements in the mid-1970s. During the 1980s, he oversaw modifications to the inverted echo sounders to incorporate additional sensors for measuring pressure, temperature, and ambient noise. At present, Dr. Watts is overseeing the latest improvements to the Model 6.2C inverted echo sounder which permits current measurements and data telemetry. This instrumentation is now being used by more than 20 research groups at major oceanographic institutions in Asia, Europe, South America, and the United States.

Kelly Oskvig

Staff Officer

Kelly Oskvig is a Program Officer for the Gulf Research Program. She supports various aspects of the program's grant funding processes and she leads the program's offshore systems safety initiative. Prior to joining the Gulf Research Program, she provided operations and engineering development support to the Integrated Ocean Drilling Program. She also worked in the Gulf of Mexico monitoring metocean conditions and developing environmental design criteria for offshore infrastructure. Additionally, Ms. Oskvig has experience performing geotechnical investigations in the Gulf of Mexico to determine soil strength profiles for pile capacity and feasibility studies. Ms. Oskvig earned her M.S. in physical oceanography at Texas A&M University, and her B.S. in Civil Engineering at the University of Texas.