Chesapeake Bay Program Modeling in 2025 and Beyond: A Proactive Visioning Workshop

Participant Biographies and Contact Information

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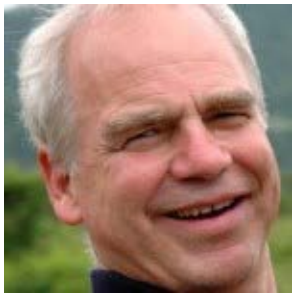
Workshop Steering Committee



William P. (Bill) Ball is Director of the Chesapeake Research Consortium (CRC) and holds this position through the Johns Hopkins University, where he continues to teach and conduct research as a Research Professor in the Department of Health and Environmental Engineering. Prior to this year, Bill was a Full Professor at JHU, where he has been since 1992. His first academic position was at Duke University and, prior to his doctoral study, he worked as a professional environmental engineer for six years. Bill has a BS in civil engineering from the University of Virginia and MS and PhD degrees in Environmental Engineering and Science from Stanford University. He has spent the last 30 years investigating and modeling physical-chemical processes that affect water quality and treatment, with applications to both natural aquatic systems and engineered processes. He is currently Director of a multi-university project under NSF's Water, Sustainability and Climate program that focuses on linking changing agricultural practices with water quality impacts to Chesapeake Bay. Through his current position, Bill is excited to be helping to foster collaborative research and to facilitate the application of science to management through his involvement and cooperation with the many federal, state, academic, citizen-science and other non-governmental organizations involved in the Chesapeake Bay Program partnership. **Contact Information:** ballw@chesapeake.org; (410) 798-1283

Peter Claggett is a Research Geographer with the U.S. Geological Survey's Eastern Geographic Science Center and has worked at the Chesapeake Bay Program Office since 2002. Peter leads the Land Data Team at the CBPO which conducts research on l and change characterization, analysis, and modeling in the Chesapeake Bay Watershed. Peter led the development of the Chesapeake Bay Land Change Model and urban land use data for use in the Phase 5.x watershed models. Currently, Peter is exploring alternative methods for simulating urban growth, initiating a study on the impact of impervious surface patterns on water quality, and pursuing the concept of crediting land-use planning as a "Best Management Practice" in the context of the Bay TMDL from both modeling and policy perspectives. **Contact Information:** pclagget@chesapeakebay.net**;** (410) 267-5771

Lee Currey is the Director of the Water and Science Administration at the Maryland Department of the Environment. He oversees both the States Clean Water Act and Safe Drinking Water Act Programs as well as serving as lead staff on the Governor's Chesapeake Bay Cabinet supporting Chairman Grumbles. Lee's administration is currently leading priority efforts to advance Chesapeake Bay Restoration, to provide a water quality certification for Conowingo Dam Relicensing, revise the next round of NPDES stormwater permits and test for lead in drinking water in schools, to name a few. Over Lee's 17 years with the Department he has served in various roles ranging from engineer to director. Prior to MDE Lee worked as an engineer in the private sector. Lee has a Bachelors and Masters degree in Civil Engineering with a focus on Water Resources and is a registered professional engineer**. Contact Information:** lee.currey@maryland.gov

Lora Harris is an estuarine ecologist at UMCES-Chesapeake Biological Laboratory who applies field and modeling approaches to address questions regarding nutrient dynamics, primary production and ecosystem structure and function in a range of estuarine ecosystems. She is especially interested in how climate and management actions interact to affect water quality characteristics in estuaries and lagoons. Some of her most recent work involves collaboration with engineers to understand the restoration trajectories of hypoxic estuaries, and the contribution of wastewater to estuarine receiving waters. She also frequently works to combine individual-based modeling approaches with systems level mechanistic models, for example in seagrass or oyster reef ecosystems. Dr. Harris works closely with state and regional agencies in both a research and advisory capacity. She is committed to efforts that increase diversity in the geosciences as a founding principal investigator of Centro Tortuga, an institutional collaboration based in Puerto Rico that is focused on exposing first year undergraduates to the marine sciences. She is also a principal investigator in the "Active Societal Participation in REsearch" (ASPIRE) effort to increase diversity at the leadership level through place- and community-based research. Dr. Harris takes just as much satisfaction in talking about water quality to a Board of County Commissioners as she does in giving a talk at a scientific conference. She received her B.S. from Smith College and her Ph.D. from the University of Rhode Island. Dr. Harris moved to her faculty position in Maryland following a postdoctoral position at the Marine Biological Laboratory in Woods Hole. **Expertise/Interests:** Ecosystem modeling, individual-based modeling SAV, wetlands, and oyster reefs. **Contact Information:** harris@umces.edu

Raleigh Hood began his research career as a biological oceanographer when he was an undergraduate at the University of Washington, studying harmful algae blooms in Puget Sound, Washington State. He has since conducted research in coastal and open ocean environments all over the world, including the Atlantic, Pacific and Indian Oceans and both the east and west coasts of North America. Presently his research is focused primarily on using models to simulate and predict biogeochemical and ecological variability in marine environments. Dr. Hood's current work in Chesapeake Bay includes modeling and observational studies aimed at understanding marsh / estuary interactions, organic matter transport, primary production, oxygen and denitrification variability, gelatinous zooplankton variability and impacts on the marine food web, and ecological forecasting. **Contact Information:** rhood@umces.edu

Thomas Ihde is a fisheries ecologist at MSU-PEARL with research interests that focus on ecosystem based fisheries management (EBFM) of the Chesapeake. Specifically, Tom has developed a range of ecosystem modeling tools (applying mainly the Atlantis modeling approach and Ecopath with Ecosim) that integrate the best available information available for the Chesapeake environment, to predict the effects of the major stressors and changes in this system on our harvested populations like oysters, striped bass, and blue crab. The effects of factors that Tom has focused on to date include: nutrient management, submerged aquatic vegetation and marsh habitat loss, oysters habitat restoration, and invasive blue catfish. Tom holds a PhD in marine fisheries stock assessment and a Masters in Marine Science from the Virginia Institute of Marine Science (College of William & Mary), and completed his post-doctoral work in recreational fisheries while with UMCES-Chesapeake Biological Lab. **Contact Information:** Thomas.Ihde@morgan.edu

Lewis Linker is the Chesapeake Bay Program Modeling Coordinator, and works with colleagues throughout the Chesapeake Bay Program to develop linked models of the airshed, watershed, estuary, and living resources of the Chesapeake. The linked models of the Chesapeake have provided the basis for the nutrient and sediment reductions in the historic 2010 Chesapeake TMDL. The nutrient and sediment allocations Chesapeake TMDL will reduce Chesapeake nutrient and sediment loads by about a half and one third, respectively, from the high point of nutrient and sediment loading in the mid-1980's. Lew received his Masters from the Johns Hopkins Whiting School of Engineering. His professional interest is in the expansion and refinement of current watershed, airshed, and estuarine models of the Chesapeake, and in expanding the capabilities and analysis of linked water quality and living resource models generally. Lew has authored more than 110 reports, book chapters, papers, and invited presentations. He and his team have received sixteen major awards including two EPA Gold Medals and four Bronze Medals, two major EPA awards for scientific achievement, two Smithsonian Awards in information technology excellence, and the Horner Award from the American Society of Civil Engineers. Lew and his wife Julie live in Annapolis, Maryland and have two boys and four grandchildren.
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Gary Shenk is a watershed modeler with the USGS at the EPA's Chesapeake Bay Program Office in Annapolis Maryland. In this position he focuses on the development of environmental models and the application of models and monitoring analysis to management questions. His work in Chesapeake modeling and monitoring informed a number of technical aspect of the Chesapeake Bay TMDL. As a participant in many of the ongoing CBP technical groups, Gary has the opportunity to forge collaborations with federal, state, academic, and other non-governmental organizations.
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Christopher R. Sherwood is a research oceanographer at the U.S. Geological Survey, Woods Hole Coastal and Marine Science Center in Woods Hole, Massachusetts. His research interests include wave- and current-driven sediment transport on beaches, estuaries, and the inner shelf; coastal and marine geomorphology; transport of nutrients and contaminants; and cohesive sediment dynamics. He approaches these topics with both fie ld observations and numerical modeling. Chris has developed innovative field methods and contributed to well-regarded community models for coastal ocean physics and biogeochemistry, and he is now using unmanned aerial systems (drones) and multiview stereo photogrammetry (structure from motion) to document coastal landscape change. Prior to joining the USGS in 1999, Chris worked for three years at the Commonwealth Scientific and Industrial Research Organization, Marine Division, in Hobart Tasmania, and for 10 years at the Pacific Northwest National Lab in Richland and Sequim, WA. He received a PhD (1995) and MS (1982) in Geological Oceanography from the University of Washington, and a BA (1976) in Economics and Environmental Studies at Bowdoin College. **Contact Information:** csherwood@usgs.gov

Lisa A. Wainger is a research professor of environmental economics at the University of Maryland Center for Environmental Science. She has over 25 years of experience in integrating ecological and economic analysis tools to evaluate costs, benefits and risks of environmental policies, with an emphasis on cost-effective restoration of wetlands, rivers, and estuaries. Current research includes developing consistent and practical frameworks for ecosystem service valuation by federal agencies and innovative approaches to promoting public-private partnerships with local governments. As Past Chair of the Scientific and Technical Advisory Committee (STAC) to the US EPA Chesapeake Bay Program, she collaborates with a wide network of scientists to provide scientific review and direct future research into effective natural resource management. She is a frequent economics advisor to government agencies (including the White House Council on Environmental Quality, National Academies of Science) and non-governmental organizations. **Contact Information:** Lisa Wainger, University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, 1 Williams Street, Solomons, MD 20688; 410-326-7401; wainger@umces.edu

STAC Staff

Rachel Dixon joined STAC staff in November 2014 after graduating from the University of Delaware with a M.S. in Marine Studies, where she researched estuarine fish behavior in response to hypoxia. Prior to UD she received her B.S. in Marine Biology from UNC Wilmington. Rachel grew up all along the East coast, from Connecticut to Georgia. Currently, she also teaches part-time in the biology department at Washington College, and plans to one day pursue a PhD in marine science. **Contact Information:** Rachel Dixon, STAC Coordinator, Chesapeake Research Consortium, 645 Contees Wharf Road, Edgewater, MD 21037; Work: 410-798-1283; Cell: 910-386-8666; dixonr@chesapeake.org

Elaine Hinrichs has supported STAC as a staff member since the fall of 2016. She graduated from Oberlin College in spring 2016 with a B.A. in Environmental Studies. Elaine grew up in Ames, Iowa then State College, Pennsylvania, and now enjoys living by the Chesapeake Bay in Annapolis, Maryland. She plans to eventually pursue a graduate degree in ecology or environmental education. **Contact Information:** Elaine Hinrichs, STAC Staff, Chesapeake Research Consortium, 645 Contees Wharf Road, Edgewater, MD 21037; Work: 410-798-1283; Cell: 814-880-0752; hinrichse@chesapeake.org

Workshop Participants

Richard B. Alexander is a senior Research Hydrologist with the U.S. Geological Survey (USGS), Integrated Modeling and Prediction Division (IMPD). His research career with USGS spans more than 35 years, with an emphasis on the development and use of water-quality modeling techniques to investigate pollutant sources and contaminant transport processes in watersheds. His research includes assessments of the influences of human activities and natural processes on the supply and transport of water, nutrients, and organic carbon in terrestrial and aquatic ecosystems. He's made important contributions to understanding the effects of in-stream processes on seasonal and annual nitrogen transport in large watersheds. He is a co-developer of the USGS SPARROW water-quality model that has been widely used

by researchers and water managers. His current activities include developing an open-source version of SPARROW in R, with decision-support and interactive mapping capabilities as well as methods for Bayesian simulation with SPARROW. He has served as a coordinator and instructor for USGS technical courses on statistical methods and modeling and previously as the Associate Editor for water-quality modeling for the *Journal of the American Water Resources Association*. His prior service on STAC panels includes the 2017 mid-period review of the Phase 6 watershed model. He holds a Ph.D. in Forest Resources from the Pennsylvania State University. **Contact Information:** Richard B. Alexander, U.S. Geological Survey, 413 National Center, Reston, Virginia 20192; Phone: 703-303-6128; Fax: 703-648-6693; ralex@usgs.gov

Larry Band: I am an eco-hydrologist with research spanning the continuum of natural through urban watersheds. A goal is to develop and incorporate principles learned in unmanaged ecosystems as part of urban ecosystem restoration. I have a major interest in the role of forests and tree canopy on flooding and drought, the provision of high-quality freshwater, coupled water, carbon and nitrogen cycling, and vulnerability to climate and land use change. My current urban environmental research has an emphasis on the design, analysis and simulation of green infrastructure on urban ecosystems and human well-being, and the development of computational tools to facilitate collaborative and participatory research, management and design for watershed restoration. **Contact Information:** Larry Band, Ernest H. Ern Professor of Environmental Science and Professor of Civil and Environmental Engineering, Clark Hall, Rm 207291, McCormick Rd, Charlottesville, Virginia 22904; Phone: 454 924 7241; lband@virginia.edu

Jesse Bash is a Research Physical Scientist in the U.S. Environmental Protection Agency's National Exposure Research Laboratory, Computational Exposure Division. His research is focused on developing and expanding the capabilities of current air-quality and biogeochemical models to better represent the nitrogen cycle, mercury cycle, and atmospheric mercury chemistry, and the coupling of ecosystem and air-quality models. **Contact Information:** Bash.Jesse@epa.gov

Rich Batiuk is the Associate Director for Science, Analysis, and Implementation at the United States Environmental Protection Agency's Chesapeake Bay Program Office located in Annapolis, Maryland. In his 32 years with EPA and the Chesapeake Bay Program partnership, he has led the integration of science into multi-partner policy-making and collaborative decision-making. Rich is now focused on directing the partnership resources towards helping local partners understand their part in the Bay and watershed restoration efforts and getting the job done, restoring water quality to local waterways and the Bay. He received his B.S. in Environmental Science from the University of New Hampshire in 1984 and his M.S. in Environmental Toxicology from American University in Washington D.C. in 1985. Rich is participating in this STAC workshop to ensure, before he retires after 34 years of working with the Chesapeake Bay Program Partnership and with some absolutely crazy modelers, that there is a clear path forward for ensuring model simulations will continue to inform Bay and watershed restoration decision making for decades to come! **Contact Information:** Rich Batiuk**,** Associate Director for Science, Analysis and Implementation, Chesapeake Bay Program Office, U.S. Environmental Protection Agency, 410 Severn Avenue, Annapolis, Maryland 21403; 410-267-5731 (Work); 443-223-7823 (Mobile); batiuk.richard@epa.gov; http://www.chesapeakebay.net/

Mark Bennett is the Director of the U.S. Geological Survey's Virginia Water Science Center and Co-Chair of the Chesapeake Bay Program's Science, Technical Assessment, and Reporting (STAR) Team. **Contact Information:** mrbennet@usgs.gov

John Karl (JK) Bohlke is a Research Hydrologist with the U.S. Geological Survey's National Research Program. His areas of expertise include nonpoint-source pollution, land use change, groundwater quality, contamination and pollution, water quality, surface water quality, the water cycle, waste treatment and disposal, hydrology, field methods, isotopic analysis, laboratory methods, and mathematical simulation. **Contact Information:** jkbohlke@usgs.gov

Kathy Boomer: My academic research experience focused on how human impacts affect hydrologic processes at multiple spatial scales. As a doctoral student in the biogeochemistry program at Cornell University, I explored linkages between wetland plant communities and ground water dynamics. My research led me to find that supply of terminal electron acceptors, mainly in the form of excess nitrate and sulfate, can have strong effects on phosphorus availability, depending on background water chemistry. After completing my field research, I joined the Spatial Ecology and Landscape Modeling laboratory at the Smithsonian Environmental Research Center. Here, I developed extensive experience with a wide range of watershed models including HSPF, SWAT, GWLF, and SPARROW, among others. In addition, I developed spatial models to map wetland processes using high resolution LiDAR data. Our results have generated strong traction with county level planners, but the model also provides an exciting opportunity to explore variation in ecosystem processes at the watershed scale. Most recently, as the watershed scientist for The Nature Conservancy's Chesapeake Bay restoration program, I have had great opportunities to combine my experiences in field research and modeling and to help guide discussions linking science and management. We are applying adaptive management principles, in part as a basis to identify science relevant to defining policy targets and information gaps that limit our ability to manage resources effectively. Applications include identifying environmental flow thresholds for protection of freshwater species, exploring reservoir sediment management options, and developing effective bmp targeting approaches to improve water quality. Since 2007, I have served as member and now Chair of the Queenstown Planning Commission in Queen Anne's County. This experience has allowed me to develop a practical understanding of the challenges that local- and county- governments must accommodate to reach regional goals like restoring the Chesapeake Bay. Engaging with local leaders has been invaluable to our efforts within The Nature Conservancy as we attempt to link stakeholder concerns with federal, state, and local policies. **Contact Information:** kboomer@tnc.org

Walter Boynton is a professor at the Chesapeake Biological Laboratory (CBL), University of Maryland Center for Environmental Science and has been a faculty member at CBL since 1975. Boynton's research expertise is estuarine ecology, particularly issues related to eutrophication and ecosystem restoration. He has published over 100 scientific papers and many more technical reports related to water quality, habitat and restoration issues. All of this research involves coastal and estuarine eutrophication and restoration of these ecosystems. Boynton serves on boards of the Patuxent Riverkeeper, Maryland-DC Chapter of The Nature Conservancy, and the Alliance for the Chesapeake Bay. He has served on several EPA Science Advisory Board panels reviewing the hypoxic zone in the Gulf of Mexico, Florida nutrient criteria, an EPA workgroup developing national water quality standards for estuarine systems and, more recently, worked with the Department of Justice on Gulf of Mexico oil spill issues. He served on Maryland Governor O'Malley's transition team for environmental issues and is currently a member of the science advisory panel for the Chesapeake Bay Trust Fund. He and Dr. Michael Kemp were awarded the Odum Award for Lifetime Achievement from the Coastal and Estuarine Research Federation and he was also elected president of this scientific society. In 2016 here was awarded the Mathias Medal from MD and VA Sea Grant and the Chesapeake Research Consortium and during 2017 the Ruth Patrick Award from ASLO More locally, he served as the vice-chair of the Calvert County Zoning Appeals Board for more than a decade and in this position has been involved in many Maryland Critical Area decisions.

He taught a graduate ecology course and seminar that ties together the ecosystems of Maryland from the western mountains to the coastal ocean. **Contact Information:** boynton@umces.edu

Damian C. Brady is an assistant professor of marine science at the University of Maine's Ira C. Darling Marine Center in Walpole, ME. Dr. Brady has studied estuaries all over the world for over 15 years. He is especially interested in how to link water quality with ecosystems. Because we rely on the coast for tourism, fisheries, aquaculture, pollution processing, and energy (offshore wind and tidal power generation), Dr. Brady has focused on creating tools and models that can explore hypothetical uses of the coast to help communities better reflect their values in how they use their environment. Dr. Brady is the lead of the Ecological Carrying Capacity of Maine Estuaries Research Theme of NSF's Sustainable Ecological Aquaculture Network and the assistant director of Maine Sea Grant for Research. Dr. Brady lives in Hallowell, ME with his wife and three daughters.
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Carl F. Cerco, Research Hydrologist (retired), Environmental Laboratory, US Army Engineer Research and Development Center, Vicksburg, MS**. Duties:** Dr. Cerco recently retired from a position as principal investigator and team leader in the Water Quality and Contaminant Modeling Branch, Environmental Laboratory, US Army Engineer Research and Development Center. Dr. Cerco is a specialist, with over forty years' experience, in pollutant fate and transport. He is the developer and curator of the CE-QUAL-ICM eutrophication model and has applied it in multiple locations in the US and overseas. CE-QUAL-ICM was the first practical, three-dimensional, eutrophication model to be coupled to a multi-dimensional hydrodynamic model and applied for multi-year time scales. Since its development, the model kinetics have been widely disseminated and reproduced. CE-QUAL-ICM was employed in development of the 2010 Chesapeake Bay TMDL, and is in present use in the 2017 reassessment of the TMDL. Recently, Dr. Cerco's attentions have turned to unconventional pollutants such as eDNA. Based on laboratory data, he developed mathematical descriptions of eDNA reactivity and decay and installed the formulations in CE-QUAL-ICM. This version of CE-QUAL-ICM was subsequently applied in a study of Asian Carp eDNA in the Chicago Waterways System. Another novel application of CE-QUAL-ICM was to the carbonate system in the Potomac River Estuary. The application simulated the biological impacts on pH in that system. The Potomac River formulations form the basis for a simulation of the carbonate cycle near Brandon Roads Lock and Dam, where use of carbon dioxide to prevent passage of exotic Asian Carp in under consideration.
Biographical Sketch: Dr. Cerco earned a Bachelor of Science (with honors) in Mechanical Engineering from Newark College of Engineering in 1972. He subsequently earned Master of Science in Environmental Engineering from University of North Carolina 1974, Master of Science in Civil Engineering from Massachusetts Institute of Technology 1977, and Doctor of Philosophy in Marine Science from the College of William and Mary 1982. Dr. Cerco was on the faculty of Virginia Institute of Marine Science, College of William and Mary, for ten years. He started with the US Army Engineer Waterways Experiment Station in 1987. He is a Registered Professional Engineer in the state of Mississippi and a member of the Coastal and Estuarine Research Federation.
Contact Information: carlcerco@outlook.com; 769-230-5543; PO Box 1316, Clinton, MS 39060

Dinorah Dalmasy is the Manager of Maryland Department of the Environment's Integrated Water Planning Program. **Contact Information:** dinorah.dalmasy@maryland.gov

James Davis-Martin is the Manager of Virginia Department of Environmental Quality's Chesapeake Bay Program. **Contact Information:** james.davis-martin@deq.virginia.gov

Kim de Mutsert: I am an assistant professor in the Department of Environmental Science and Policy at George Mason University, and the Associate Director of Research at the Potomac Environmental Research and Education Center. I hold a PhD in Oceanography and Coastal Sciences from Louisiana State University, and an MS in Biology from the University of Amsterdam. My area of expertise is coastal and estuarine fish ecology with a focus on ecosystem-based fisheries management. I study the combined effects of environmental impacts and fishing on nekton abundance and biomass, community structure, foodweb dynamics, and fisheries landings. In my research, I make use of end-to-end model simulations and large existing datasets, in combination with field collections and lab studies. The main component of my research is ecosystem-based fisheries modeling using Ecopath with Ecosim and Ecospace. My current research program consists of ecosystem modeling projects in the Gulf of Mexico and Louisiana estuaries, and field-oriented fish ecology projects in Potomac River tributaries in Virginia. I apply a combination of empirical research and modeling to evaluate effects of environmental stressors such as hypoxia on fish and fisheries, to evaluate effects of restoration efforts such as large river diversions on estuarine fishes, to evaluate the role of forage fish in fisheries ecosystems, to trace contaminants through the foodweb, and to evaluate effects of eutrophication and habitat changes on fish abundance, biomass, and community structure. **Contact Information:** Kim de Mutsert, Assistant Professor, Department of Environmental Science & Policy, George Mason University, 4400 University Dr. MSN 5F2, Fairfax, VA 22030; Phone: 703-993-4480; Fax: 703-993-1066; kdemutse@gmu.edu; demutsertlab.com

Scott A. Drzyzga is a professor in the Department of Geography-Earth Science and Center for Land Use & Sustainability at Shippensburg University. **Contact Information:** sadrzy@ship.edu

Christopher J. Duffy is an Emeritus Professor in the Civil and Environmental Engineering Department of Penn State University in the area of Water Resources Engineering. He has held faculty appointments with Utah State University (1981-89), Visiting Professor appointments at Los Alamos National lab (1998-99), Cornell University (1987-88), Ecole Polytechnic Lausanne (2006-07), Senior Fellow with the Smithsonian Institution in residence at the Smithsonian Environmental Research Center (2007), Benjamin Meaker Visiting Professor University Bristol, UK (20014-2016) and visiting scientist University of Bonn, DE (2015). Recently Duffy and his team focused on developing the spatially-distributed, physics-based computational model PIHM (The Penn State Integrated Hydrologic Model) for multi-scale, multi-process water resources applications (http://www.pihm.psu.edu/), and an on-line national data service for access to geospatial watershed data (www.hydroterre.psu.edu) anywhere in the continental US. He has recent and current funded projects with NSF INSPIRE program, NSF EarthCube, EPA, DOE, USDA and the NSF Critical Zone Observatory and NSF Coupled Human and Natural Systems programs. He also is currently co-PI on the DARPA World Modeling project that aims to develop AI/Machine Learning technology that will enable analysts to rapidly build environmental models to analyze questions relevant to national and global food, energy and water security. The effort will build technologies that automate the integration of hydrologic, biophysical, agro-economic and ecosystem models and data into workflows that automate the selection, calibration and execution of models and data for food and water security problems arising anywhere in the world. **Contact Information:** cxd11@psu.edu

Zach Easton: The primary focus of my work is to improve our understanding of hydrologic and terrestrial processes that control the biogeochemical cycles and fluxes with the ultimate goal of developing policies and management practices that protect water, soil, and other natural resources. Water is typically my central focus because it is arguably the most critical and at-risk resource to humans and entire ecosystems. My research addresses both native and managed systems, considers processes at plot- to large river basin-scales, and is relatively evenly divided among field study/monitoring, modeling, and application of results to real world problems. Three broad and somewhat overlapping research themes around which I focus are: 1. Impact of land use and climate (change) on water quality and quality, 2. Impact of watershed management practices on water quality, and 3. Bridging basic research and modeling to management and application. **Contact Information:** Zach Easton, Virginia Tech, Seitz Hall, Blacksburg, VA 24060; 540-231-0689; zeaston@vt.edu

Andrew J. Elmore works broadly across issues relevant to global environmental change, with a particular focus on landscape ecology, biogeochemical cycling in watersheds, and the management of land and water. He applies an array of tools to these problems, including remote sensing data analysis and Geographical Information Science (GIS). In the Chesapeake Bay watershed, Dr. Elmore has advanced remote sensing techniques used to map impervious surfaces and buried streams. He has also worked to understand how climate change has influenced nitrogen availability in forests, with consequences for managing nitrogen loads in forested watersheds. Dr. Elmore received a BSc in Applied Physics from Purdue University and an MSc and PhD in Geoscience from Brown University. He is now Associate Professor at the University of Maryland Center for Environmental Science Appalachian Laboratory. **Contact Information:** Andrew Elmore, UMCES Appalachian Laboratory**,** 301 Braddock Rd**,** Frostburg, MD 21502**;** aelmore@umces.edu

Marjorie Friedrichs is an associate professor at the Virginia Institute of Marine Science of the College of William & Mary. She received a BA in Physics from Middlebury College, a MS in Physical Oceanography from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program, and a Ph.D. in Oceanography from Old Dominion University. Her interdisciplinary research interests focus on how physical processes affect biogeochemical properties in estuarine and coastal systems. She uses coupled hydrodynamic-biogeochemical models together with analyses of in-situ and satellite data to better understand how and why carbon and nitrogen cycling varies among diverse marine environments. Much of her current research investigates how human impacts, such as changes in global climate, atmospheric deposition, urbanization and land use affect carbon, biogeochemical and ecosystem dynamics in these systems. Friedrichs' current modeling projects involve forecasting hypoxia in the Chesapeake Bay (www.vims.edu/hypoxia) and inorganic carbon cycling (acidification). Another focus of her research involves the assessment of the relative skill of multiple models currently being used by the scientific community and techniques for optimally combining data and models including data assimilation and parameter optimization.
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Ciaran Harman is an assistant professor in the Department of Geography and Environmental Engineering and the Department of Earth and Planetary Sciences at John Hopkins University. Harman's research aims to understand flow and transport across hydrologic scales, and their link to the co-evolution of landscape structure, using a combination of theory, experiments, modeling, field work, and data analysis. **Contact Information:** charman1@jhu.edu

Courtney Harris is a professor at the Virginia Institute of Marine Science of the College of William & Mary. Harris' research interests include 3-D modeling to improve understanding of sediment transport in continental shelves and estuarine environments. **Contact Information:** ckharris@vims.edu

Kyle Hinson is a master's student in the Department of Biological Sciences at the Virginia Institute of Marine Science of the College of William & Mary. Prior to starting his studies at VIMS, Kyle staffed the Chesapeake Bay Program's Science, Technical Assessment, and Reporting (STAR) Team, the Modeling Workgroup, the Integrated and Trends Analysis Team, and the Climate Resiliency Workgroup. He is a graduate of the University of North Carolina-Chapel Hill. **Contact Information:** kehinson@vims.edu

Eric Hutton is the lead software engineer at the Community Surface Dynamics Modeling System where he has worked since its inception in 2007. The focus of his current work is developing new tools and standards that will help modelers more easily create new models and to make these models coupleable with existing software. Eric, himself, has been developing and coupling earth-system models for over 20 years so is all too familiar with the difficulties and obstacles faced by earth-system modelers. Also of interest to him is in trying to bring best (or just good-enough) software engineering practices to the scientific programming community. **Contact Information:** eric.hutton@colorado.edu

Ken Hyer is the Associate Coordinator for USGS Chesapeake Bay studies, with nearly 20 years of experience in applied watershed hydrology, chemistry, and ecosystem studies. He helps to coordinate the integrated USGS science efforts across the Chesapeake Bay watershed to generate management-relevant science in support of Chesapeake Bay Program Partnership needs. He holds a PhD in Environmental Science from the University of Virginia. He's authored numerous journal articles and technical reports on water-quality fate and transport.
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Claire Jantz holds a PhD in Geography from the University of Maryland and is currently a Professor in the Geography-Earth Science Department and the Director of the Center for Land Use and Sustainability at Shippensburg University (https://centerforlanduse.org/). She has extensive expertise in land use and land cover change analysis and modeling, and interdisciplinary research. Since 2003, she has been publishing research on land use and land cover change in the Chesapeake Bay Watershed, and in 2010 led a team to publish the first instance of a Chesapeake Bay-wide urban land change forecast. Under a grant from the William Penn Foundation, this expertise was transferred to the Delaware River Basin, where a basin-wide framework to model stakeholder-driven future scenarios of urban land change was recently completed. **Contact Information:** cajant@ship.edu

Peter Kleinman is the Research Leader of the USDA Agricultural Research Service's Pasture Systems and Watershed Management Research Unit in State College, PA. He is a soil scientist who conducts research on conservation and nutrient management practices to improve water quality. His specialty is in the study and management of phosphorus, an element he has pursued from the rainforests of Borneo to the pastoral landscapes of the Chesapeake Bay watershed. He is an advisor to science, action and policy organizations world-wide. His work emphasizes the development of novel tools for phosphorus management, such as new filtration technologies to

remove phosphorus from manures and runoff waters. His research underpins the Phosphorus Index and other decision support tools, including the Fertilizer Forecaster. He has spearheaded comprehensive research efforts to develop and evaluate novel manure application technologies for use by livestock farmers, from liquid manure injectors to dry manure applicators. He is a leader of USDA's Long Term Agroecosystem Research Network (LTAR) and Dairy Agroecosystem Working Group (DAWG). He is a Fellow of the American Society of Agronomy, Soil Science Society of America and Soil and Water Conservation Society. **Contact Information:** Peter Kleinman, USDA-ARS, Pasture Systems and Watershed Management Research Unit, University Park, PA, USA; Peter.Kleinman@ars.usda.gov

Iara Lacher is a landscape ecologist at the Smithsonian Conservation Biology Institute (SCBI) in Front Royal, Virginia, USA. She is interested in applied research that addresses impacts of global environmental change on biodiversity conservation. Her work at SCBI combines scenario planning and spatially explicit land use models to illustrate how different land use futures may impact biodiversity and ecosystem services. This interdisciplinary research involves collaborating with scientists and regional stakeholders to identify ecologically relevant drivers of change and to develop scenarios representative of regional policies and preferences. Dr. Lacher earned a PhD in Ecology from the University of California at Davis, where her dissertation evaluated the climatic responses of species and the use of species distribution models to predict extinction risk. Research in this avenue is ongoing, with work focused on their use in reserve prioritization and the influence of local adaptation on model assumptions. Related research endeavors include assessing the conservation value of protected area networks and exploring the use of landscape based metrics in predicting species invasions. **Contact Information:** LacherI@si.edu

Andrew Miller is a professor of Geography and Environmental Systems at University of Maryland, Baltimore County and Vice Chair of the Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC). **Research Interests:** I am interested in the interaction between watershed form, hydrologic response, and fluvial morphology with particular focus on interactions between flood processes and channel and valley-floor boundary conditions. In recent years this work has focused primarily on small urban watersheds which experience extreme floods relative to watershed size with much greater frequency than is observed in other landscapes. I am also interested in the geomorphic transformation of the landscape associated with urban development, which we can now quantify at much finer resolution than was possible in the past; and with the implications of landscape transformation for hydrologic processes, flowpaths and residence times, including but not limited to floods. Ongoing research in collaboration with colleagues at the UMBC Center for Urban Environmental Research and Education includes work on the connection between patterns of urban development and impacts on the water cycle, work on the impacts of stream restoration on watershed hydrologic response and sediment yield, and work on the relative effectiveness of stormwater management on storm response in urban watersheds. A recent project that funded work by M.S. student Mitchell Donovan investigated the rate of remobilization of "legacy" sediment from Maryland Piedmont floodplains and assessment of the relative importance of historic mill dam deposits in supplying sediment to Piedmont streams. I am also involved in a team monitoring and assessment of the geomorphic impacts of dam removal and the fate and transport of sediment stored behind dams, particularly with the anticipated removal of the 40-foot-high Bloede Dam on the Patapsco River just 10 minutes from our campus. **Contact Information:** miller@umbc.edu

Dave Montali is a Co-Chair of the Chesapeake Bay Program Modeling Workgroup. **Contact Information:** dave.montali@tetratech.com

Julia M. Moriarty is a Mendenhall Postdoctoral Scholar and Research Oceanographer at the U. S. Geological Survey's Woods Hole Science Center. She received a B.A in Physics and a B.S. in Geophysical Science from the University of Chicago, IL, as well as an M.S. and Ph.D. in Marine Science from the Virginia Institute of Marine Science, VA. Dr. Moriarty's research goals are to improve understanding and quantification of the transport and fate of sediment, nutrients, and contaminants in coastal and marine systems. Past research has focused on developing and implementing numerical models that account for hydrodynamics, sediment transport and/or biogeochemistry. These coupled models have been used to analyze the role of various processes on particulate transport and water quality in dynamic coastal systems including estuaries, shelves and wetlands. Chesapeake Bay – focused research has included using the Regional Ocean Modeling System (ROMS) to evaluate the roles of sediment transport and biogeochemical processes on oxygen and nitrogen dynamics in the estuary. Her current research focuses on exchanges of sediments and organic matter between wetlands and estuaries. **Contact Information:** jmoriarty@usgs.gov

Greg Noe has been a Research Ecologist with the U.S. Geological Survey's Water Mission Area in Reston, VA since 2002, where he leads the Wetland Ecosystem Ecology & Biogeochemistry Laboratory (WEEBL). Dr. Noe's research centers on wetland ecosystem ecology, focusing on the interactive influences of geomorphology, hydrology, climate, and biology on nitrogen and phosphorus biogeochemistry and sediment transport in fluvial ecosystems, as well as plant community ecology and restoration ecology. His dissertation research identified the complex controls on annual plant germination in the salt marshes of southern California. This was followed by post-doctoral research on phosphorus biogeochemistry and enrichment effects in the Florida Everglades. When joining the USGS, he started a research program on nutrient cycling, transport, and retention in wetlands associated with flowing waters. This work includes quantifying nutrient retention by riverine floodplains from site to watershed scales with study sites located in Maryland, Virginia, Pennsylvania, West Virginia, New York, New Jersey, North Carolina, and Louisiana; the effect of sea level rise and salinification on tidal freshwater forested wetland ecosystem resilience in Virginia, Maryland, South Carolina, and Georgia; phosphorus and sediment transport research in the Florida Everglades; and studies of nutrient dynamics and trapping in created mitigation bank wetlands located in Virginia, stream restoration projects in North Carolina, and floodplain reconnection to the river in Maryland. **Current Focus Areas:** 1) Measuring and modeling the effects of floodplains on sediment and nutrient transport in watersheds; 2) Sea level rise and watershed impacts to the resilience and water quality functions of tidal freshwater wetlands; and 3) Quantifying the water quality benefits of wetland restoration and creation and how to optimize their design. **Contact Information:** gnoe@usgs.gov

Elizabeth North is an associate professor at UMCES Horn Point Laboratory with expertise in 1) fisheries oceanography with emphasis on finfish and shellfish in estuaries, 2) circulation and particle trajectory modeling, and 3) physical-biological interactions and ecology in plankton.
Contact Information: enorth@umces.edu

George Onyullo is a water quality modeler and leads the development Total Maximum Daily Loads (TMDLs) and general water quality planning efforts at the District of Columbia's Department of Energy and Environment in Washington, DC. He has extensive experience in water regulations and policy, project management, trans-boundary pollution management, wastewater treatment,

wastewater treatment facilities compliance inspection and technology selection. He currently serves a member of several Chesapeake Bay TMDLs Workgroups (Modeling, Land Use and TCW) and Teams (ITAT and WQGIT. He is also a GIS professional. His interests include taking Bay TMDLs modeling to local-scale resolution. **Contact Information:** george.onyullo@dc.gov

James E. Pizzuto is a professor in the Department of Geological Sciences at the University of Delaware**. Interests and Expertise:** Fluvial geomorphology and sediment transport (most recently watershed scale suspended sediment routing that accounts for sediment storage in alluvial deposits). **Contact Information:** James E. Pizzuto, Professor, Department of Geological Sciences, University of Delaware, Newark, DE 19716; pizzuto@udel.edu; 302-831-2710 (o)

Mindy Ramsey joined the WVDEP Division of Water and Waste Management as the TMDL Program Manager in February 2017. This workshop is an opportunity to shadow retired manager, Dave Montali, and become more familiar with her future responsibilities related to the Chesapeake Bay TMDL. Prior to coming to the agency, Ms. Ramsey directed the Charleston office of Tetra Tech, Inc. where she managed projects to support the WVDEP TMDL development for WV streams, as well as to support the WVDHHR drinking water program. Previously, Ms. Ramsey worked directly for the WVDHHR drinking water program after spending several years conducting impact studies required by NEPA while working for Michael Baker Jr., Inc. Ms. Ramsey obtained a Masters in Biological Sciences from Marshall University where she completed a thesis studying effects of mountain-top mining/valley fill practices on streamside salamander communities. With the support of her 14-year-old daughter, Mindy recently remarried. Her name will change to Mindy Neil at some point soon. **Contact Information:** mindy.s.ramsey@wv.gov; 304-926-0499 x. 1063

Kenneth Rose's research centers on using mathematical and computer simulation modeling to predict and better understand fish population and food web dynamics in estuaries, lakes, reservoirs, and oceans. Dr. Rose is presently the France-Merrick Chair in Sustained Ecosystem Restoration at Horn Point Laboratory. Prior to that, he was as a Professor in the Department of Oceanography and Coastal Sciences, and Associate Dean in the College of the Coast and Environment, at Louisiana State University. He started his career as a consultant in Washington, D.C. and then as a research staff member at Oak Ridge National Laboratory. Dr. Rose has served on multiple editorial boards, and was recently awarded the Award of Excellence (for lifetime achievement) from the American Fisheries Society. He has been a member of multiple steering and advisory committees providing scientific guidance and oversight, including several National Academy of Sciences' committees, the US GLOBEC program, and the US Army Corps of Engineers. Dr. Rose has been involved with a wide range of ecosystem restoration programs, some of which have been contentious that often involve fish; these highlight the sometimes tricky arena for scientists where science meets policy and decision-making. He received his BS degree in biology and mathematics from the University at Albany, and his graduate degrees in fisheries from the University of Washington. **Contact Information:** Kenneth Rose, France-Merrick Professor in Sustainable Ecosystem Restoration, University of Maryland Center for Environmental Science, Horn Point Laboratory, PO Box 775, Cambridge, MD 21613; (225) 773-5625 (cell); krose@umces.edu

Amirreza Sharifi works at the District of Columbia Department of Energy and Environment (DOEE). **Contact Information:** amirreza.sharifi@dc.gov

Jian Shen is a research professor at the Virginia Institute of Marine Science of the College of William & Mary. Shen's research interests include estuarine circulation; transport timescale; numerical model simulations of hydrodynamics and water quality in estuaries and coastal sea; storm surge and inundation predictions; inverse modeling of estuarine water quality; numerical modeling of watershed processes. **Contact Information:** shen@vims.edu

Katherine Skalak is a Research Hydrologist with the U.S. Geological Survey's National Research Program. She studies landscape dynamics and fluvial geomorphology, focused on understanding and predicting changes in the patterns and functions of landforms in response to human impacts and restoration efforts. In particular, dynamics of fine sediment and particle associated nutrients and contaminants on varying temporal and spatial scales, and management effects on fluvial systems. Dr. Skalak received her undergraduate degree in environmental science from St. Joseph's University. She received her master's degree in Geology from University of Delaware in 2004. A National Science Foundation GK-12 fellow, she completed her Ph.D. in Geological Sciences from the University of Delaware in 2009. She started as a post-doctoral researcher at U.S. Geological Survey in 2009 and became a Research Hydrologist in 2011. **Contact Information:** kskalak@usgs.gov

Sean Smith is an Assistant Professor in the School of Earth and Climate Sciences with a joint appointment to the Senator George J. Mitchell Center for Sustainability Solutions at the University of Maine. His research seeks to understand the processes that shape the Earth's landscape, with special attention given to hillslope and stream alterations resulting from human activities. This pursuit focuses his work on watershed geomorphology and hydrology, including the stability of landforms and the flux of water, sediment, and nutrients in the contemporary landscape. A primary goal of his research is to advance the ability to predict and mitigate environmental impacts across varied spatial and time scales. **Contact Information:** sean.m.smith@maine.edu

Andrew Sommerlot is a non-point source analyst with the University of Maryland Center for Environmental Science (UMCES) at the Chesapeake Bay Program Office.
Contact Information: asommerlot@chesapeakebay.net

Kenneth Staver is Associate Research Scientist and Acting Director of the University of Maryland Wye Research and Education Center. Dr. Staver's primary research interest is the development of agricultural production systems that maximize nutrient and energy use efficiency and minimize environmental degradation at the field and system level. His academic training is in systems ecology (B.A.; Cornell), marine science (M.S.; U. MD) and engineering (Ph.D.; U.MD). He has worked at the Wye Research and Education Center since 1984 focusing initially on nutrient transport patterns in Coastal Plain watersheds and the development of practices that reduce nutrient losses from cropland at the field level. More recently his research focus has shifted to development of multi-discipline approaches to regional environmental problems. His current research activities include: 1) assessment of nutrient flow patterns in grain/poultry production systems at field, watershed and regional scales; 2) assessment of changes in subsurface nitrogen storage and transport in Coastal Plain watersheds where nutrient control strategies have been implemented; 3) assessment of the effect of phosphorus management strategies on phosphorus losses in field drainage; 4) development of land placement options for sediment dredged from Chesapeake Bay shipping lanes; and 5) assessment of the nutrient uptake and retention, and biofuel potential of native warm season grasses. **Contact Information:** kstaver@umd.edu

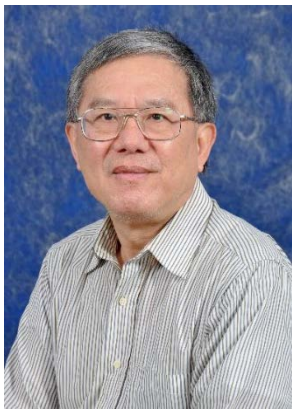
Theodore (Ted) Tesler is a Professional Geologist with the Pennsylvania Department of Environmental Protection. Mr. Tesler holds a BS Geology degree from Lafayette College and has over 18 years of

experience in completing environmental investigation and remediation/compliance projects in support of brownfield restoration and groundwater fate and transport modeling. In July 2011, Mr. Tesler joined the PADEP Chesapeake Bay Office and is currently engaged with Pennsylvania's Chesapeake Bay Phase 3 WIP restoration efforts. In this capacity Mr. Tesler is responsible for collecting and reporting Pennsylvania's BMP data, assisting state regulatory programs with data collection and reporting and currently serves as Chair of the Bay Program's Watershed Technical Workgroup. In addition to his work with the DEP, Ted currently serves as President of the State Registration Board for Professional Engineers, Land Surveyors and Geologists which oversees licensing within these professions. Ted lives in Harrisburg and enjoys all varieties of cycling, cards, billiards, and playing piano.
Contact Information: thtesler@pa.gov

Jeremy Testa is an assistant professor at the UMCES Chesapeake Biological Laboratory and a systems ecologist who has worked for over a decade to understand the biogeochemistry on estuaries like Chesapeake Bay. Jeremy's particular interests include understanding the linkages between carbon, oxygen, and nutrient cycling and how these linkages interact with ecosystem metabolism, hypoxia, and nutrient inputs. He has approached these topics using a combination of empirical measurements, retrospective data analysis, and numerical modeling. With respect to the latter, Jeremy brings expertise in the application of numerical models of Chesapeake Bay systems and the linkages between estuarine models to watershed models. **Contact Information:** Jeremy Testa, Chesapeake Biological Laboratory, P.O. Box 38, Solomons MD 20688; jtesta@umces.edu; 410-326-7266

Richard Tian is a research scientist with the University of Maryland Center for Environmental Science (UMCES) at the Chesapeake Bay Program Office and specializes in marine ecosystem and water quality modeling. **Contact Information:** rtian@chesapeakebay.net

Tamie Veith is an Agricultural Engineer with the USDA Agricultural Research Service's Pasture Systems and Watershed Management Research Unit in State College, PA. Dr. Veith explores the impacts of agricultural management practice selection and location on local and regional water quality. She uses simulation models such as the Soil and Water Assessment Tool (SWAT) and the Integrated Farming Systems Model (IFSM) to spatially extend the application of detailed field- and farm-scale processes across watersheds and landscapes. This enables study of the long-term spatial and temporal impacts of land management on nutrient cycling and transport. She uses this information to assess environmental impacts of predicted climate change and create practical methods of targeting cost-effective practices into high risk areas. Recently she has been working intensively with colleagues from multiple disciplines to better understand interactions among agricultural management, aquatic water quality, landscape diversity, atmospheric deposition, climate change, and ecosystem service provisioning within the Chesapeake Bay Watershed ecosystem. **Contact Information:** tamie.veith@ars.usda.gov; 814-863-0888



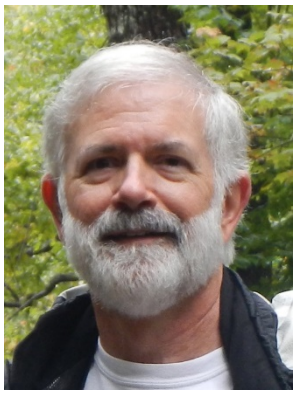
Harry Ven-Chieh Wang started working on Chesapeake Bay hydrodynamic and water quality modeling project as a physical scientist with Dr. Billy Johnson and Dr. Carl Cerco of US Army Corps of Engineers around 1995. In 1998, Dr. Wang moved to Virginia Institute of Marine Science and became a faculty there in the Department of Physical Sciences. Recently, Dr. Joseph Zhang and Dr. Wang have developed the VIMS 3rd generation HEM3D (Hydrodynamic Eutrophication Model 3D) with unstructured grid, cross-scale hydrodynamic model SCHISM and ICM water quality model, and was applied in the Chesapeake Bay and the adjacent continental shelf. The SCHISM is a community developed open source code accessible from http://ccrm.vims.edu/w/index.php/About_SCHISM and the publications http://ccrm.vims.edu/schismweb/schism_pubs.html. **Contact Information:** Harry Ven-Chieh Wang, Virginia Institute of Marine Science, Department of Physical Sciences, College of William and Mary, Gloucester Point, VA 23062; (804)-684-7215; hvwang@vims.edu

Appointments:
1998 - present, Professor, Department of Physical Sciences, Virginia Institute of Marine Science
1992 - 1998, Research Physical Scientist, US Army Corps of Engineers, WES
1985 - 1992, Water Resource Engineer, Maryland Department of the Environment
1983 - 1985, Research Associate, Chesapeake Bay Institute/The Johns Hopkins University

Professional Preparation:
B.S. Atmospheric Sciences, National Taiwan University, 1975
Ph.D. Geophysical Fluid Dynamics, The Johns Hopkins University, 1983

John C. Warner is a civil engineer and modeler at the U.S. Geological Survey in Woods Hole, MA. His research program focuses primarily hydrodynamic and sediment transport numerical modeling, numerical turbulence closures, estuarine transport, oceanographic data collection, numerical methods, and time series analysis. John has been a proponent of open-source software for many years. He played a central role in the development of the USGS Community Coastal Sediment-Transport Model and more recently has led the development of the USGS Coupled-Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System. COAWST is a fully coupled ocean (Regional Ocean Model, ROMS), atmosphere (Weather Research Forecasting Model, WRF), wave (Simulating WAves Nearshore, SWAN; and Wave Watch 3) and sediment transport model (USGS Community Sediment Transport Model). The modeling system is integrated by the Model Coupling Toolkit to exchange data fields between ROMS, WRF, SWAN, and WW3. The overarching goal of this effort is to better identify the significant processes affecting our coastlines and how those processes create coastal change. John's past projects include efforts to predict the impacts of storms on circulation and sediment transport in Massachusetts Bay using simulation models; numerical studies of tidal asymmetry and residual circulation over sandbanks and their implication on sediment transport; numerical simulations of the Hudson River estuary and skill assessments of estuarine models; and simulations of Hurricanes and their impacts along Fire Island, NY. **Contact Information:** John C. Warner, Coastal and Marine Geology Program, U.S. Geological Survey, 384 Woods Hole Road, Woods Hole, MA 02543; jcwarner@usgs.gov; 508-457-2237; http://woodshole.er.usgs.gov/staffpages/jwarner/

Affiliations:
2009-present, Adjunct Associate Professor, North Carolina State University
2007-present, Adjunct Faculty, University of South Carolina
2006-present, Guest Investigator Woods Hole Oceanographic Institution
2018-present, Adjunct Faculty University of Florida



Don Weller is a Senior Scientist and Quantitative Ecologist at the Smithsonian Environmental Research Center (SERC). He earned a B.A. in Biology from Wabash College and a Ph.D. in Ecology from the University of Tennessee. Don has expertise in ecological modeling and landscape ecology and over 30 years of post-graduate research experience. Don leads a research program that applies spatial analysis and mathematical, statistical, and computer models to ecological problems. His work considers the linkages among ecosystems and the role of human activities in complex landscapes, and his findings have contributed to understanding and solving environmental problems arising from human impacts. His research has focused on the linkages of watersheds to wetland condition, to stream chemistry and biology, and to estuarine health. He recently added work on carbon storage in coastal wetlands. As a scientist, Don has developed statistical and simulation models for water discharge and stream water quality. As a former STAC member, he led two workshops on CBP modeling and participated in many other related workshops.
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Claire Welty is the Director of the Center for Urban Environmental Research and Education and a Professor of Engineering at University of Maryland, Baltimore County. **Contact Information:** weltyc@umbc.edu

Joseph Zhang is a Research Associate Professor at the Virginia Institute of Marine Science of the College of William & Mary. **Expertise/Interests:** My main expertise and passion is to develop cutting edge numerical models for fully coupled creek-river-lake-estuary-shelf-ocean systems in order to simulate cross-scale processes in these systems in a holistic fashion. In addition, I also have a strong interest in the fundamental research in numerical algorithms (finite element and finite volume methods) and their implementations on modern high performance computers. The latest community model I developed, SCHISM, which combines accuracy, efficiency, stability, and flexibility via the use of flexible 3D gridding systems and a semi-implicit scheme, has been widely utilized by government agencies, academia and industry, and has been proved ideal for cross-scale applications commonly found in estuaries, bays, coastal oceans and marginal seas (cf. publications on schism.wiki). A unique feature of SCHISM is that it allows users to apply high resolution in targeted areas in combination with realistic, non-smoothed bathymetry. In addition, I'm also a developer of DOE's cutting-edging global earth-system modeling system MPAS-Ocean; my effort focuses on the long-term prediction of global ocean circulation and carbon cycling in the earth system. **Contact Information:** yjzhang@vims.edu