Future Water Resource Needs for the Nation: Water Science and Research at the U.S. Geological Survey

Committee

George M. Hornberger

Chair

George M. Hornberger (NAE), Chair, is Distinguished University Professor at Vanderbilt University, where he is the Director of the Vanderbilt Institute for Energy and the Environment. He has a shared appointment as the Craig E. Philip Professor of Engineering and as Professor of Earth and Environmental Sciences. He previously was a professor at the University of Virginia where he held the Ernest H. Ern Chair of Environmental Sciences. He has been a visiting scholar at the Australian National University, Lancaster University, Stanford University, the U.S. Geological Survey (USGS), the University of Colorado, and the University of California, Berkeley. His research is aimed at understanding complex water-energy-climate interrelationships. Dr. Hornberger is a fellow of the American Geophysical Union (AGU), the Geological Society of America, and the Association for Women in Science. He has served on numerous boards and committees of the National Academies of Sciences, Engineering, and Medicine including as chair of the Commission on Geosciences, Environment, and Resources (1996-2000); chair of the Board on Earth Sciences and Resources (2003-2009); and chair of the Water Science and Technology Board (2013-2017). Dr. Hornberger was elected as a member of the National Academy of Engineering in 1996. He holds a B.S. degree in civil engineering and a M.S. degree in hydrology from Drexel University and a Ph.D. degree in hydrology from Stanford University.

Kenneth R. Bradbury

Member

Kenneth R. Bradbury is Wisconsin state geologist and the director of the Wisconsin Geological and Natural History Survey, University of Wisconsin - Extension. Previously, Dr. Bradbury held various roles within the Survey, including research hydrogeologist and professor, Water and Environment program leader, and assistant director for science. He also holds an Affiliate Faculty appointment at the University of Wisconsin-Madison's Department of Geoscience. Dr. Bradbury's recent research has focused on developing regional groundwater flow models for groundwater and surface-water management. Additional research interests include investigating the movement of viruses in groundwater systems, characterizing and simulating fractured aquifers, determining groundwater flow paths near water-supply wells, wellhead protection, groundwater recharge, and the regional hydrogeology of Wisconsin. Dr. Bradbury holds a B.A. degree in geology from Ohio Wesleyan University, an M.A. degree in geology from Indiana University, and a Ph.D. degree in hydrogeology from the University of Wisconsin - Madison.

Yu-Ping Chin

Member

Dr. Yu-Ping Chin is professor of civil and environmental engineering at the University of Delaware. Prior to coming to Delaware he was professor of Earth Sciences at the Ohio State University for the past 26 years. He has also been a visiting research scientist at the Swiss Federal Institute of Aquatic Science and Technology (EAWAG) in Switzerland and in the Chemistry Department at the University of Otago in New Zealand. Dr. Chin conducts research on the fate of synthetic organic chemicals in aquatic systems in both natural and the built environment. He is predominantly interested in the transformation of these compounds mediated by dissolved organic matter (DOM) in the presence of sunlight and under anaerobic conditions. He has also conducted research on DOM mediated biogeochemical processes in both the Arctic and Antarctic. Dr. Chin served two terms as a member of the NASEM Water Science and Technology Board. He has also been a member on past NASEM committees including Review of the WATERS Network Science Plan and Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites. Dr. Chin received his A.B. in Geology from Columbia University in 1981 and his Ph.D. in Civil and Environmental Engineering (Aquatic Chemistry) from the University of Michigan in 1988. He received further postdoctoral training at the Ralph M. Parsons Lab at the Massachusetts Institute of Technology from 1988 to 1991.

Ellen Gilinsky

Member

Ellen Gilinsky is president of Ellen Gilinsky, LLC. Prior to this, she was an associate deputy assistant administrator and senior policy adviser in the Office of Water at the U.S. Environmental Protection Agency (EPA). In this position, she addressed policy and technical issues related to all EPA water programs with an emphasis on science, water quality, and state programs including nutrient pollution, floodplain management, and harmful algal blooms. Prior to that appointment, she was the director of the Water Division at the Virginia Department of Environmental Quality (DEQ) and also served at DEQ as the manager of the Office of Wetlands and Water Protection. She is a past president of the Association of Clean Water Administrators, held a gubernatorial appointment to the state advisory board of the Virginia Water Resources Research Center, and served as an adjunct faculty member at Virginia Commonwealth University in the departments of biology and environmental studies. Dr. Gilinsky has twelve years of experience as an environmental consultant on water issues. She holds a B.A. degree in biology from the University of Pennsylvania and a Ph.D. degree in zoology from the University of North Carolina at Chapel Hill.

Peter Gleick

Member

Peter H. Gleick (NAS) is president emeritus and chief scientist of the Pacific Institute. Dr. Gleick is a world-renowned expert, innovator, and communicator on water and climate issues. In 1987, he co-founded the Pacific Institute, which he led as president until mid-2016 when he became chief scientist. Dr. Gleick was the first to successfully link general circulation models with regional hydrologic models to characterize regional impacts of climate change on water. His subsequent work has focused on the challenges of providing basic human needs for water across the globe and understanding the interactions of global freshwater resources with respect to human environmental impacts, economic development, and international security. Also, he pioneered and advanced the concepts of the “soft path for water” and “peak water.” Dr. Gleick received a MacArthur fellowship and is a member of the National Academy of Sciences. Dr. Gleick holds a B.S. degree in engineering and applied science from Yale University and M.S. and Ph.D. degrees in energy and resources from the University of California, Berkeley.

Robert E. Mace

Member

Robert E. Mace is associate director and chief water policy officer at The Meadows Center for Water and the Environment and professor of practice in the department of Geography at Texas Tech University. Prior to his current position, he was a deputy executive administrator at the Texas Water Development Board (TWDB). There, he managed the Water Science and Conservation Program that studies the rivers and aquifers of the state, promoted the conservation of the state's water, and pursued innovative technologies such as desalination, rainwater collection, and water reuse. Previously he was the Division Director for Groundwater Resources at the TWDB. Dr. Mace also worked for nine years at the Bureau of Economic Geology at The University of Texas at Austin as a hydrologist and research scientist. During that time he undertook research on groundwater modeling and hydrogeologic characterization of aquifers. Dr. Mace's expertise includes hydrogeology, water conservation, geostatistics, policy and science, and stakeholder processes and communication. He has over 25 years of experience working with water in Texas. He holds a B.S. degree in geophysics and a M.S. degree in hydrology from the New Mexico Institute of Mining and Technology and a Ph.D. degree in hydrogeology from The University of Texas at Austin.

Anne W. Nolin

Member

Anne W. Nolin is professor of Geography in the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University (OSU). Prior to her appointment at OSU, Dr. Nolin was a research scientist at the National Snow and Ice Data Center, which is part of the Cooperative Institute for Research in Environmental Sciences at the University of Colorado, Boulder. Her research focuses on mountain hydroclimatology, water scarcity, radiative transfer modeling, glaciers, and meltwater, mountains as social-ecological systems, and remote sensing. She is a member of NASA's Multi-angle Imaging SpectroRadiometer (MISR) Science Team and the NASA SnowEx Science Definition Team. She served as vice chair of the Water Resources and Global Hydrologic Cycle panel for the 2007 Earth Science and Applications from Space Decadal Survey and subsequently on the National Academy of Sciences Space Studies Board—Committee on Earth Sciences. She currently serves on the NASA Earth Science Advisory Committee. Dr. Nolin was elected and served three years as the chair of the Cryosphere Focus Group of the American Geophysical Union (AGU). She holds a B.A. degree in anthropology and a M.S. degree in soils, water, and engineering from the University of Arizona, and a Ph.D. degree in geography also from the University of California – Santa Barbara.

Roger K. Patterson

Member

Roger K. Patterson is assistant general manager for the Metropolitan Water District of Southern California overseeing Metropolitan's strategic water initiatives for the Colorado River and Sacramento-San Joaquin Bay Delta. Mr. Patterson was the director of the Nebraska Department of Natural Resources from 1999 to 2005. He was responsible for water administration, water planning, flood-plain delineation, dam safety, and the state databank. He represented Nebraska on interstate compacts, decrees, and basin associations and led the state team in the settlement of U.S. Supreme Court cases on the North Platte and Republican rivers. Prior to his work in Nebraska, Mr. Patterson served 25 years with the U.S. Bureau of Reclamation. During his Reclamation tenure, he served as regional director in both the mid-Pacific region based in Sacramento and the Great Plains region headquartered in Billings, Montana. He is a registered professional engineer in Nebraska and Colorado. He has participated in several National Academies studies in the past including the Committee on the Assessment of Water Resources Research. He holds B.S. and M.S. degrees in engineering from the University of Nebraska.

Ying F. Reinfelder

Member

Ying Fan Reinfelder is professor in the Department of Earth and Planetary Sciences at Rutgers University. Her research interests include the global water cycle and its role in regulating global environmental change through time, in particular water-plant relations below ground, and the coevolution of land plants and the terrestrial environment. She was on the board of directors for the Consortium of Universities for Advancement of Hydrologic Sciences (CUAHSI). She is currently leading two community projects: NSF-EarthCube DigitalCrust to develop a 3D geologic framework for simulating large-scale fluid motion in the Earth’s crust, and NSF-INSPIRE collaboration between CUAHSI and National Center for Atmospheric Research (NCAR) to improve hydrology in Earth System Models. She holds a B.S. degree in engineering from Beijing Institute of Civil Engineering, an M.S. degree in geography from the University of Utah, and a Ph.D. degree in civil and environmental engineering from Utah State University.

Jennifer Tank

Member

Jennifer L. Tank is Director of the Notre Dame Environmental Change Initiative and the Ludmilla F., Stephen J., and Robert T. Galla Professor of Biological Sciences at the University of Notre Dame. Dr. Tank's research focuses on the influence of human activities on ecosystem function in streams and rivers. Currently, much of Dr. Tank's research takes place in the agricultural Midwest where she and her team focus on innovative techniques to improve sustainable agriculture by working with farmers to minimize negative effects on freshwater and livelihoods downstream. Dr. Tank currently leads the Indiana Watershed Initiative funded through the U.S. Department of Agriculture (USDA) Resource Conservation Partnership Program, which includes partnerships with The Nature Conservancy, local Soil and Water Conservation Districts, county surveyors, and the USDA Natural Resource Conservation Service. Her goal is to improve the health and nutrient removal efficiency of streams and rivers draining cropland in the agricultural Midwest through implementation of watershed-scale conservation using real-time nutrient sensing, cover crops, and novel drainage management. She was a 2013 Leopold Leadership Fellow. Dr. Tank holds a B.S. in Zoology from Michigan State University and M.S. and Ph.D. degrees in Ecology from Virginia Tech.

Howard S. Wheater

Member

Howard S. Wheater is Canada Excellence Research Chair in Water Security, Director of the Global Institute for Water Security at the University of Saskatchewan, and Distinguished Research Fellow and Emeritus Professor of Hydrology at Imperial College London. A leading expert in hydrological science and modelling, he has published more than 200 refereed articles and 6 books. He is a Fellow of the Royal Academy of Engineering and the American Geophysical Union and winner of the Prince Sultan bin Abdulaziz International Prize for Water. He has initiated and led national and international research programmes in the UK and Canada, and has advised states, provinces and national governments on flood, water resource and water quality issues. He represented Hungary and Argentina at the International Court of Justice, and recently sat on an International Court of Arbitration concerning the Indus Waters Treaty. He was, until 2014, vice-chair of the World Climate Research Programme's Global Energy and Water Cycle Exchange (GEWEX) project and leads UNESCO's GWADI arid zone water program. In Canada, he leads the Changing Cold Regions Network, focused on the analysis and prediction of hydrological change in western Canada, and the Global Water Futures Program, focused on managing water futures in Canada and other cold regions where global warming is changing landscapes, ecosystems, and the water environment. His role as Chair of the Council of Canadian Academies Expert Panel on Sustainable Management of Water in the Agricultural Landscapes of Canada saw release of a report in February 2013 entitled Water and Agriculture in Canada: Towards Sustainable Management of Water Resources. He holds B.A. and M.A. degrees in engineering science from the University of Cambridge and a Ph.D. degree in civil engineering/hydrology from the University of Bristol.