

Assessment of the National Weather Service's Modernization Program

Committee

John A. Armstrong

Chair

Dr. Armstrong, who retired from IBM after a 30-year career with the world's largest manufacturer of computers, is internationally recognized as an expert in nonlinear optics, the statistical properties of laser light, picosecond pulse measurements and the multiphoton laser spectroscopy of atoms. He previously chaired the Committee on Partnerships in Weather and Climate Services, which produced the 2003 NRC Report, *Fair Weather: Effective Partnership in Weather and Climate Services*. Dr. Armstrong holds an A.B. in physics from Harvard College (1956) and the PhD (1961) from Harvard University for research in nuclear magnetic resonance at high pressures. He joined IBM in 1963 as a research staff member. In 1976 he became Director of Physical Sciences for the company and was responsible for a major part of IBM research in physics, chemistry and materials science. In 1980 he was appointed to the IBM Corporate Technical Committee. In 1983 he was named Vice President of logic and memory, in the Research Division. In 1986 he became director of research and the following year was elected IBM Vice President and Director of research. In 1989 he was elected a member of the Corporate Management Board and named Vice president of Science and Technology. Dr. Armstrong is a Fellow of the Optical Society of America, the American Physical Society, the American Association for the Advancement of Science, the American Academy of Arts and Sciences and the Institute of Electrical and Electronic Engineers. He is a member of the National Academy of Engineering and a foreign member of the Royal Swedish Academy of Engineering Sciences. In 1989 he was awarded the George E. Pake Prize of the American Physical Society.

James D. Doyle

Member

James D. Doyle earned his B.S. degree in Atmospheric Science and Mathematics from the University of Wisconsin at Milwaukee in 1983 and M.S. and Ph.D. from the Pennsylvania State University in 1986 and 1991, respectively, in Meteorology with an emphasis on mesoscale dynamics and numerical weather prediction. He joined the Mesoscale Modeling Section of the Naval Research Laboratory's Marine Meteorology Division in 1992 and has served as the head of the group since 1998. Since joining NRL, he has conducted research on atmospheric processes over complex terrain, coastal air-sea interaction, and the development of high-resolution numerical weather prediction models. He is one of the primary developers of the Navy's Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS), which is used to support operational Navy and DoD interests globally as well as basic research at NRL and numerous other universities and laboratories. Currently, he is leading efforts for improving the physical understanding and prediction of mesoscale phenomena using both deterministic and probabilistic approaches. He is a past Chairman of the American Meteorological Society Committee on Mesoscale Processes and has served as an editor for the Monthly Weather Review and subject matter editor for the Bulletin of the American Meteorological Society. He is a recipient of the 2008 Top Navy Scientists and Engineers of the Year Award and is a Fellow of the American Meteorological Society. He has over 90 peer-reviewed publications.

Pamela Emch

Member

Pam Emch is a Senior Staff Engineer/Scientist with Northrop Grumman Aerospace Systems in Redondo Beach, California. For over 16 years she has worked in Northrop's Civil Space business area on weather, climate, and environmental remote sensing and information technology activities supporting NOAA, NASA, DoD, and international customers. From 2005-2007 she was System Engineering, Integration, and Test Lead on Northrop's GOES-R PDRR Program. Before working on GOES-R, Dr. Emch spent eight years on Northrop's NPOESS Program effort, the last two years of which she served as Northrop's system engineering and science interface to the NPOESS government program office in Silver Spring, Maryland. Prior to that Dr. Emch managed development of end-to-end physics/instrument/satellite remote sensing simulations, archives for environmental multimedia data, and led environmental data-collection and application activities for hyperspectral airborne instruments. Dr. Emch holds an M.S. degree in Aerospace Engineering from USC and a Ph.D. degree in Civil and Environmental Engineering from UCLA, specializing in water resources with a minor in atmospheric sciences. She is the Chair of the AMS Board on Enterprise Economic Development, and a member of the Executive Committee of the AMS Commission on the Weather and Climate Enterprise.

William B. Gail

Member

William B. Gail is a Director in the Startup Business Group at Microsoft with responsibility for enabling breakthroughs in consumer software, having held similar positions within the Public Sector and Virtual Earth organizations. He is also co-founder and Chief Technology Officer of Global Weather Corporation, a private-label provider of precision weather forecast information. He was previously Vice President of the mapping products division at Vexcel Corporation (where he initiated Vexcel's 2006 acquisition by Microsoft) and Director of Earth science programs at Ball Aerospace (responsible for developing spaceborne instruments/missions for Earth science and meteorology). Dr. Gail received his undergraduate degree in Physics and his PhD in Electrical Engineering from Stanford University, where his research focused on plasma physics in the Earth's magnetosphere. During this period, he spent a year as cosmic ray field scientist at South Pole Station.

Dr. Gail is a lifetime Associate of the US National Academy of Science's research council, having participated on a number of council committees including the "Decadal Survey for Earth Science and Applications from Space" chartered with recommending a 10-year mission plan for NASA and NOAA. He serves on a variety of corporate and organizational boards including Peak Weather Resources Inc., Women in Aerospace, Imaging Notes magazine, the NOAA Advisory Committee on Commercial Remote Sensing (acting), and the NASA Applied Sciences Program Advisory Group. He has published extensively on both technical and policy issues, and serves as Associate Editor for the SPIE Journal of Applied Remote Sensing and Director of Industry Relations for the IEEE Geoscience and Remote Sensing Society. Dr. Gail received recent awards from GITA for best conference speaker and AGU for excellence in scientific journal review.

David J. Gochis

Member

David Gochis is currently a Scientist-II at the National Center for Atmospheric Research in Boulder, Colorado. Dr. Gochis is based in NCAR's Research Applications Laboratory, a group that looks for research and engineering solutions to problems relevant to society. As a hydrometeorologist, he serves as a liaison between hydrologists, who traditionally have strong engineering backgrounds, and atmospheric scientists, who are typically oriented toward scientific research. His research focuses on coupled hydrological and meteorological forecasting problems. Dr. Gochis earned a Master's Degree in Bioresources Engineering from Oregon State University, with an emphasis on water resources and the agricultural applications of meteorology and atmospheric sciences. Afterward, he worked briefly for an engineering firm, designing irrigation systems and assessing water resources. He earned his Ph.D. in hydrology and water resources from the University of Arizona. From Arizona, he headed to NCAR to work as a postdoctoral researcher, and later became part of the organization's permanent scientific staff. Dr. Gochis also serves as co-chair of the International CLIVAR panel on Variability of American Monsoon Systems.

Eve Gruntfest

Member

Dr. Gruntfest is currently Professor Emeritus of Geography and Environmental Studies at the University of Colorado at Colorado Springs. She has published widely and is an internationally recognized expert in the specialty areas of warning system development and flash flooding. She recently completed a year sabbatical, during which she worked at National Center for Atmospheric Research (NCAR) workshops for physical and social scientists dedicated to culture change within meteorology to actively incorporate social impacts into weather forecasting. The effort is called WAS*IS (Weather and Society Integrated Studies). As of November 2006 there are 85 WAS*ISers. She has spoken to many professional organizations in the United States, including the Association of State Floodplain Managers, the National Weather Service, the Hydrologic Engineering Center of the U.S. Army Corps of Engineers, COMET at NCAR, and the Forecast Systems Laboratory of the National Oceanic and Atmospheric Administration. She has participated in numerous workshops, sharing lessons from research on warning systems and flash flooding. Dr. Gruntfest received her B.A. in Geography from Clark University and her M.A. and Ph.D. in Geography from the University of Colorado, Boulder.

Holly Hartmann

Member

Holly Hartmann is Director of the Arid Lands Information Center at the University of Arizona, where she is a co-investigator at the Climate Assessment for the Southwest (CLIMAS) and led the scenario development team at the Science and Technology Center for the Sustainability of Semi-Arid Hydrology and Riparian Areas (SAHRA). Dr. Hartmann's research has focused on making climate and water research more usable, based on engagement with stakeholders, development of decision support resources and tools, and transition of decision support into sustainable operations. Current projects address climate and hydrologic forecasts, climate change scenario planning and risk management, water policy in the US West, and collaborative software development. She is a member of the American Meteorological Society's (AMS) Committee on Climate Services, the AMS Board of Economic Enterprise Development, the Board of the International Environmental Modeling and Software Society, the Editorial Board of the journal Environmental Modeling and Software, and the Executive Committee of Carpe Diem West. She also serves on the Climate Working Group of the NOAA Science Advisory Board. Holly received her MS degree in water resources management from the University of Michigan and her PhD in hydrology and water resources from the University of Arizona.

Kevin A. Kloesel

Member

Kevin Kloesel is Associate Dean for Public Service and Outreach in the College of Atmospheric and Geographic Sciences at the University of Oklahoma. He is directly responsible for outreach programs and tours for the over 40,000 people that visit the National Weather Center facility in Norman annually. In addition, he is an Associate Professor in the OU School of Meteorology with teaching and research interests ranging from synoptic meteorology to societal impacts and decision making in weather-impacted situations. He led the team that won the Innovations in American Government Award from Harvard University and the Ford Foundation for their work with the emergency management community in Oklahoma. Currently, he works directly with thousands of K-12 students and teachers, as well as hundreds of emergency management agencies in finding appropriate applications for weather data in local education and decision making. He also serves as Interim Director for the largest state climate office in the country, the Oklahoma Climatological Survey, and served as Director of the Florida Climate Center in Tallahassee, FL. He has a B.S. in Engineering Science from the University of Texas at Austin and a M.S. and Ph.D., 1990, Meteorology, from The Pennsylvania State University.

John W. Madden

Member

Mr. Madden was appointed in January 2007 as the Director of the Division of Homeland Security and Emergency Management for the State of Alaska. This followed a year as the Deputy Director for Homeland Security within the division. His mission is to protect lives and property from all hazards including terrorism as well as to provide response and comprehensive recovery from all disasters.

His state service follows a distinguished career in seven federal agencies. Most recently, he served with the Transportation Security Administration as Assistant Federal Security Director for Operations. He coordinated security policies, procedures, plans, and exercises with federal, state, and local agencies throughout Alaska.

Mr. Madden served in the U.S. Army for three years including twenty months in Vietnam performing aviation direct support. After his military service, he joined the U.S. civil service with the Department of the Navy. He worked in program and project management with the Naval Weapons Engineering Support Activity, Naval Electronic Systems Command, and the Joint Cruise Missile Project Office. After earning his degree in political science, he joined the Department of Energy working on fossil fuels programs and research and development into alternative fuels.

In 1982, he elected to move to Alaska with the National Weather Service. He supported their operations throughout Alaska and traveled extensively to maintain the remote weather observation sites. He next worked for the Alaskan Region of the Federal Aviation Administration as the Executive Staff to the Regional Administrator. He also ensured continuity of operations for all FAA operations under all hazards. He supported FEMA in several exercises and served in several Disaster Field Offices, most notably to Puerto Rico and Florida in response to Hurricane Georges.

Gordon A. McBean

Member

Dr. McBean is a Canadian atmospheric scientist and Professor at the University of Western Ontario, and Chair for Policy in the Institute for Catastrophic Loss Reduction. Previously Gordon was the Assistant Deputy Minister, Meteorological Service of Canada (MSC); Professor and Head, Department of Oceanography, University of British Columbia; Professor and Chairman, Atmospheric Science Programme, University of British Columbia, and; Senior Scientist, Canadian Climate Centre, MSC. Dr. McBean's early career spanned a wide variety of interests, including boundary layer research, hydrometeorology and environmental impact research, and weather forecasting. Dr. McBean has received many distinguished awards including the Order of Canada, the MSC Patterson Medal and CMOS President's Prize and has been elected a Fellow of the Royal Society of Canada, the Canadian Meteorological and Oceanographic Society and the American Meteorological Society. Dr. McBean has Chaired and been a Member of enumerable national and international scientific committees, including the NAS Committee on Partnerships in Weather and Climate Services and Chair of the International Scientific Committee for the World Climate Research Programme. He is now chair of the ICSU-ISSC-UNISDR Science Committee for Integrated Research on Disaster Risk program and President of START International. He has published extensively. Dr. McBean received his Ph.D. in Physics and Oceanography from the University of British Columbia.

David J. McLaughlin

Member

David J. McLaughlin is Professor of Electrical and Computer Engineering at the University of Massachusetts-Amherst and Director of the NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA). CASA is a partnership among academic, industry, and government researchers from 20 different organizations pursuing the fundamental knowledge, enabling technologies, and system-level prototypes behind a new dense radar network technology that has the potential to revolutionize how we detect, track, forecast, warn, and respond to hazardous weather events. Dr. McLaughlin received his BS and PhD degrees from the University of Massachusetts, Amherst, in 1984 and 1989, respectively. He spent the period from 1989 through 1999 on the engineering faculty at Northeastern University and joined the UMass Electrical and Computer Engineering faculty in January of 2000 where he was the first recipient of the UMass College of Engineering Armstrong Professional Development Professorship and he served as Director of the Microwave Remote Sensing Laboratory (MIRSL). His research and teaching interests include radar design, systems engineering, and policy-mediated dense radar networks. He is a Distinguished Lecturer for the American Institute of Aeronautics and Astronautics (AIAA) and was named a Distinguished Faculty member by the UMass Amherst Alumni Association. He has held research fellowships at the US Naval Research Laboratory and the USAF Rome Laboratory and recently completed a sabbatical as an Engineering Fellow at Raytheon Integrated Defense Systems.

Adrian Raftery

Member

Adrian E. Raftery is Blumstein-Jordan Professor of Statistics and Sociology, at the University of Washington in Seattle. He was born in Ireland, and obtained a B.A. in Mathematics (1976) and an M.Sc. in Statistics and Operations Research (1977) at Trinity College Dublin. He obtained a Doctorate in Mathematical Statistics in 1980 from the Universite Pierre et Marie Curie in Paris, France under the supervision of Paul Deheuvels. He was a lecturer in statistics at Trinity College Dublin from 1980 to 1986, and then an associate (1986-1990) and full (1990-present) Professor of Statistics and Sociology at the University of Washington. He was the founding Director of the Center for Statistics and Social Sciences (1999-2009). Raftery has published over 100 refereed articles in statistical, sociological and other journals. His research focuses on Bayesian model selection and Bayesian model averaging, model-based clustering, inference for deterministic simulation models, and the development of new statistical methods for sociology, demography, and the environmental and health sciences. He is a member of the United States National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, a Fellow of the American Statistical Association, a Fellow of the Institute of Mathematical Statistics and an elected Member of the Sociological Research Association. He has won the Population Association of America's Clifford C. Clogg Award, the American Sociological Association's Paul F. Lazarsfeld Award for Distinguished Contribution to Knowledge, and the Jerome Sacks Award for Outstanding Cross-Disciplinary Research from the National Institute of Statistical Sciences. He is also a former Coordinating and Applications Editor of the Journal of the American Statistical Association and a former Editor of Sociological Methodology. He was identified as the world's most cited researcher in mathematics for the decade 1995-2005 by Thomson-ISI.

James Rasmussen, (Retired)

Member

James Rasmussen spent three years as a weather Officer in the USAF following his graduation from St. Olaf College in 1958. Assigned to the Air Force Institute of Technology he graduated with a BS in Meteorology from the University of Utah (1959) and served as a weather Officer at the 8th Air Force Forecast Center at Westover AFB from 1959-1961. Upon discharge he entered graduate school at Colorado State University, Department of Atmospheric Science, earning his PhD in 1968 with research interests in hydrometeorology, tropical meteorology and climate studies. He remained at CSU as a faculty member until 1972 when he joined NOAA's Global Atmospheric Research Program (GARP) Atlantic Tropical Experiment (GATE) Project Office as the Science Coordinator for the US contribution to this international field project involving some 13 Countries. GATE was centered on mounting an observational program designed to provide insight into the scale interactions of tropical oceanic and atmospheric phenomena. He was awarded the Department of Commerce Gold Medal for his work on GATE. In 1976 he moved to the World Meteorological Organization (WMO) in Geneva, Switzerland, to participate in the International Joint Planning Staff for GARP and to undertake the task as Manager of the International Operations Center for the First GARP Global Experiment, an effort involving virtually every country in the world. This year-long observational program designed to obtain a global data set for numerical weather prediction research proved to be a uniquely successful demonstration of international cooperation toward the attainment of an important global objective. He returned to NOAA in 1981 as Director of the NOAA/NWS Climate Analysis Center at the National Meteorological Center. He was elected President of the WMO Commission for Climatology serving for 8 years in this capacity. In 1982 he took the position of Director of the Office of Meteorology in the NWS. This office oversaw the NWS service programs and was responsible for planning and coordination with, and between, the six Regional Offices. In 1989 he returned to WMO as the Director of the World Weather Watch (WWW) Department which was responsible for organizing and coordinating all Member States to implement WMO's Basic Systems comprised of the Global Observing System, the Global Telecommunications System, and the Global Data Processing System and WMO's associated service programs. In 1994 he was appointed Director of NOAA's Environmental Research Laboratories (ERL). After retiring from NOAA in 1999 he has been a consultant internationally on topics including the Global Climate Observing System, the continued development of the World Weather Watch, and the organization and management of meteorological and climate services. He has served in various capacities in the American Meteorology Society (Counselor, Commissioner, and Fellow). He was awarded the CSU William E. Morgan Alumni Achievement Award.

Paul L. Smith, Jr.

Member

Dr. Paul Smith is Interim Director of the Institute of Atmospheric Sciences (IAS) at the South Dakota School of Mines and Technology. He started as a research engineer in the IAS, working his way up the ladder as chief engineer to engineering group head and senior scientist, to become the Director of the Institute in 1981. He served in that position until 1996, at which time he retired from full-time duties and was designated Professor Emeritus. Dr. Smith also was named the Facility Manager for the National Science Foundation supported T-28 Research Aircraft Facility, which was housed at the Institute of Atmospheric Sciences, and served in that position from 1985 to 2005. He then retired but was called back to duty as Interim Director for the South Dakota 2011 fiscal year. He has taught radar meteorology, physical meteorology, and microwave engineering. Dr. Smith's major research interests are in Radar Meteorology, Cloud Physics, and Weather Modification. He chaired the NRC Committee on Weather Radar Technology Beyond NEXRAD, the Committee to Assess NEXRAD Flash Flood Forecasting Capabilities at Sulphur Mountain, California and the Committee on the Evaluation of the Multi-function Phased Array Radar Planning Process. Paul Smith has received the Award for Meritorious Civilian Service, USAF Air Weather Service (1975); the Editor's Award, Journal of Applied Meteorology, American Meteorological Society (1992); the Thunderbird Award, Weather Modification Association (1995), and was named a National Associate by the National Research Council (2004). He was selected as the American Meteorological Society's Remote Sensing Lecturer for 2006. Dr. Smith has more than 70 refereed publications in engineering and scientific journals or books and presented more than 100 papers at professional society meetings.

John Toohey-Morales

Member

John Toohey-Morales is chief meteorologist at WTVJ-TV NBC-6 in Miami FL. He is also founder and president of ClimaData Corporation, a commercial weather firm providing specialized forecasts for government, industry and media. John—a Fellow of the American Meteorological Society—served as AMS Commissioner on Professional Affairs from 2004 to 2010, overseeing the Society’s certification programs as well as its continuing education efforts and the private and public sector meteorologist boards. He currently serves on the NOAA Science Advisory Board’s Environmental Information Services Working Group, and will begin serving on the AMS Fellows’ Committee in January 2011.

During his 26-year professional career, Toohey-Morales has worked in the public sector (as a forecaster for the National Weather Service) and in the private sector (as a Certified Consulting Meteorologist and a broadcast meteorologist). He has also been exposed to the academic sector as an adjunct professor of meteorology. John attained his B.S. in atmospheric sciences from Cornell University in 1984. World Meteorological Organization (WMO)-sponsored training at the National Hurricane Center and the University of Miami in 1988 garnered him several credits of masters-level meteorology courses. He attained his AMS Certified Consulting Meteorologist (CCM) designation in 1997. John is one of only a handful of AMS members with both the CCM and Certified Broadcast Meteorologist (CBM) accreditations.

Toohey-Morales is Past-President of the National Council of Industrial Meteorologists (NCIM), as well as a member of the National Weather Association (NWA) and the International Association of Broadcast Meteorologists. In 2005, he served as private-sector envoy to the U.S. Delegation at the 57th WMO Executive Council meeting in Geneva, Switzerland. John won the AMS Award for Outstanding Contribution to Applied Meteorology in 2007, the AMS Award for Broadcast Meteorology in 2004, and the NWA Broadcaster of the Year Award in 2003.