

Lessons-Learned in the Implementation of NASA's Earth Venture Class

Committee

Christian D. Kummerow

Co-Chair

CHRISTIAN D. KUMMEROW is a professor of atmospheric science at Colorado State University where he also serves as director of the Cooperative Institute for Research in the Atmosphere (CIRA). His research interests include remote sensing, and the global water cycle and its uncertainties, including how uncertainties relate to physical aspects of the atmosphere and thus the fundamental processes underlying precipitation and the water cycle. Prior to joining Colorado State University, he worked at the Goddard Space Flight Center serving as the project scientist for the Tropical Rainfall Measuring Mission (TRMM) and as a study scientist for the Global Precipitation Mission (GPM). Kummerow is currently on the Advanced Microwave Scanning Radiometer Science Team as well as the team lead for GPM's passive microwave algorithm team. He was awarded the NASA Goddard Exceptional Achievement Award and Maryland's Distinguished Young Scientist Award. In addition to being the CIRA director, he has been a chair and member of the GEWEX Data and Assessments Panel, and the NASA Earth Science Subcommittee. He received his Ph.D. in atmospheric physics from the University of Minnesota, Minneapolis. He served on the Decadal Survey for Earth Science and Applications from Space: Panel on Global Hydrological Cycles and Water Resources.

Mahta Moghaddam

Co-Chair

MAHTA MOGHADDAM, NAE, is the Ming Hsieh Chair and Professor of Electrical and Computer Engineering at the University of Southern California (USC) in the Viterbi School of Engineering. She is also the director of New Research Initiatives. She is the 2020 President of the IEEE Antennas and Propagation Society and the co-director of the USC Center for Sustainability Solutions. Moghaddam's research interests are in variety of topics related to applied electromagnetics, including the development of advanced radar systems for environmental sensing and subsurface characterization, software-defined radar, mixed-mode high resolution medical imaging techniques, and autonomous sensor webs for remote sensing data collection and validation. Each of these areas requires the development of state of the art sensors as well as novel signal processing and physical models to characterize the sensors and their interaction with their intended environments. She has led numerous multidisciplinary projects in these areas and has been a member of the science teams of several NASA missions. She is a Fellow of IEEE. Moghaddam received her B.S. from the University of Kansas, Lawrence and her M.S. and Ph.D. from the University of Illinois, Urbana-Champaign, in electrical and computer engineering.

Mark R. Abbott

Member

MARK R. ABBOTT is the director and president of Woods Hole Oceanographic Institution through December 2020. Previously, he was dean of the College of Earth, Ocean, and Atmospheric Sciences (CEOAS) at Oregon State University. Abbott has advised the Office of Naval Research and the National Science Foundation on issues regarding advanced computer technology and oceanography. He was a member of MEDEA, which advised the federal government on issues of national security and climate change. In 2006, Abbott was appointed by the President to a six-year term on the National Science Board, which oversees the National Science Foundation (NSF) and provides scientific advice to the White House and to Congress. Abbott was the recipient of the Jim Gray eScience Award, presented by Microsoft Research to a nationally recognized researcher who has made outstanding contributions to data-intensive computing. He is a member of the Board of Trustees for the Consortium for Ocean Leadership as well as the Board of Trustees for NEON, Inc., which is constructing the National Ecological Observatory Network for the NSF, and served as president of The Oceanography Society. He also served on the Board of Trustees for the University Corporation for Atmospheric Research. Abbott holds a B.S. in the conservation of natural resources from the University of California, Berkeley, and a Ph.D. in ecology from the University of California, Davis. Abbott's extensive participation on committees of the National Academies includes service on the Committee on Earth Science and Applications from Space, as its chair in the late 1990s, and as a member and co-chair from 2010-2014. He is a member of the National Academies Ocean Studies Board.

Otis B. Brown, Jr.

Member

OTIS B. BROWN is a research professor in the Department of Marine, Earth and Atmospheric Sciences, at North Carolina State University (NCSU). He is also the director of the North Carolina Institute for Climate Studies. At NCSU, Brown has led the formation and development of the North Carolina Institute for Climate Studies (NCICS), a co-located effort with NOAA's National Centers for Environmental Information (NCEI) in Asheville, NC. NCICS is the host for the Cooperative Institute for Climate and Satellites-NC (CICS-NC), which he founded in 2009. NCICS/CICS-NC provides research to operations, stewardship, access, system engineering, and system prototyping support to NCEI. Previously, Brown was on the faculty of the University of Miami (UM) as a professor in the Division of Meteorology and Physical Oceanography, and dean of the Rosenstiel School of Marine and Atmospheric Science. While at UM, Brown was a member of the NASA EOS MODIS Science Team and was responsible for the algorithms and processing system for the global sea surface temperature product as well as validation methodologies and support for the TERRA/MODIS and AQUA/MODIS instruments. His specialties include radiative transfer in the ocean-atmosphere system for visible light; particulate scattering in sea water; satellite infrared observations of sea surface temperature; kinematical studies of warm-core rings; transient processes in western boundary currents; tropical eco-system function in the Caribbean and Arabian Seas; innovative approaches to developing diversity and K-12 education; and inter-disciplinary studies of climate change and severe weather impacts. His interests also include strategies to address the science/policy interface and public outreach. He is the recipient of multiple NASA Group Achievement Awards, and a fellow of the American Meteorological Society and the AAAS. He earned his Ph.D. in physics from the University of Miami. He is a current member of the National Academies Committee on Earth Science and Applications from Space.

Ivona Cetinic

Member

IVONA CETINIC is an oceanographer at Universities Space Research Association in the Ocean Ecology Laboratory at NASA Goddard Space Flight Center. Her research focuses on developing new ways of resolving ocean biogeochemistry and phytoplankton diversity from satellite and other remote observations. At the University of Southern California, she conceived of and participated in field campaigns focused on developing innovative ocean observing technology, several for which she served as chief scientist. These campaigns include the groundbreaking Tara Oceans circumnavigation of the globe, as well as others that utilized unique fusions of cutting edge technology such as hyperspectral radiometry, light polarimeters, and airborne lidar, allowing for more detailed information about concentration and composition of particles in the ocean (as well as the atmosphere). Cetinic has served as the project scientist for EXPORTS (EXport Processes in the Ocean from RemoTe Sensing), a large scale NASA-led field campaign, and as the PACE (Plankton, Aerosol, Cloud, ocean Ecosystem) project science lead for Ocean Biogeochemistry, a NASA mission scheduled for launch in 2022. In the last ten years, she has been a member of multiple international science teams and committees and has served as the co-chair of the Ocean Optics Conference, the premier biannual gathering of the ocean color remote sensing community. She earned her Ph.D. in biological oceanography at the University of Southern California. She is a current member of the National Academies Committee on Earth Science and Applications from Space.

Carlos E. Del Castillo

Member

CARLOS E. DEL CASTILLO is chief of the Ocean Ecology Laboratory at NASA Goddard Space Flight Center. He is also an associate research professor at the Johns Hopkins University Department of Earth and Planetary Sciences. He was previously a member of the senior professional staff and section supervisor with the Space Department of the Johns Hopkins University, Applied Physics Laboratory. He studies biogeochemical and physical processes in the oceans through a combination of remote sensing and field and laboratory experiments. Del Castillo has chaired NASA and NSF workshops; and served on several inter-agency working groups, NASA Senior Reviews for Continuation of Missions, and NASA's Carbon Cycle and Ecosystem Management and Operations Working Group. He has also chaired the Science Definition Team for a new NASA satellite mission, PACE, and was elected chair for the Ocean Optics XXI Conference in Glasgow, Scotland. Del Castillo has several well-cited publications and has co-edited a book on the application of remote sensing techniques. He is a frequent reviewer for technical journals and served as an associate editor for the Journal of Geophysical Research. Del Castillo received the William Sackett Prize for Innovation and Excellence in Research from the University of South Florida, the NASA Presidential Early Career Award for Scientists and Engineers, the Emerald Honors Trailblazer Award, and other awards. He has a Ph.D. in oceanography from the University of South Florida.

Helen A. Fricker

Member

HELEN A. FRICKER is professor of geophysics at the Scripps Institution of Oceanography in the Institute of Geophysics and Planetary Physics. Her research focuses on ice sheets in Antarctica and Greenland and their role in the climate system. She uses a combination of satellite radar and laser altimetry and other remote-sensing data to understand ice sheet processes. Some specific processes Fricker investigates include subglacial hydrology by monitoring the activity of subglacial lakes under the ice streams, ice flexure from tidal activity in the grounding zone, basal melting and freezing under the ice shelves, and the propagation and evolution of active ice shelf rifts, which eventually lead to iceberg calving. She joined Scripps as a postgraduate researcher. She is a member of the American Geophysical Union (AGU) and was chair of AGU's Cryospheric Sciences Focus Group. She received the Royal Tasmania Society Doctoral Award. She received the NASA Group Achievement Award for her role in the Ice, Cloud, and Land Elevation Satellite (ICESat) Mission Development Team, was elected a member of the ICESat Science Team, and is on the ICESat-II steering committee. Fricker received her B.Sc., with first-class honors, in mathematics and physics from University College London and her Ph.D. in glaciology from the University of Tasmania. She served as a member of the steering committee of the Committee on the Decadal Survey for Earth Science and Applications from Space.

Dennis L. Hartmann

Member

DENNIS L. HARTMANN, NAS, is a professor of atmospheric sciences at the University of Washington (UW) in Seattle. He also served as department chair and interim dean of the College of the Environment at UW. Hartmann's research interests include the dynamics of the atmosphere, atmosphere-ocean interaction, and climate change. His primary areas of expertise are atmospheric dynamics, radiation and remote sensing, and mathematical and statistical techniques for data analysis. He is a Fellow of the American Meteorological Society, the American Geophysical Union, and the American Association for the Advancement of Science. He was awarded the NASA Distinguished Public Service Medal and the Carl Gustav Rossby Research Medal of the American Meteorological Society. He served as a coordinating lead author for the Fifth Assessment of The Physical Science Basis of Climate Change for the Intergovernmental Panel on Climate Change (IPCC) 2014. Hartmann received his Ph.D. in geophysical fluid dynamics from Princeton University. He was a member of the steering committee of the Committee on the Decadal Survey for Earth Science and Applications from Space.

George J. Komar

Member

GEORGE J. KOMAR is Senior Executive Service, retired at National Aeronautics and Space Administration. He also served as a U.S. Air Force officer. He has over forty-five years' experience in engineering, program, project, and operational management. He served as the associate director in the Earth Science Division and program manager for the Earth Science Technology Office at NASA. Komar has also served as the deputy associate administrator for technology for the NASA Science Mission Directorate, facilitating the development and optimization of advanced technologies for NASA. He has received the NASA Medal for Exceptional Achievement, as well as the NASA Exceptional Leadership Medal. He is a graduate of the Program Managers Course with the Defense Systems Management University, Fort Belvoir, Virginia, and the Federal Executive Institute, Charlottesville, Virginia. Komar has an M.B.A. in management and finance from the Hardin-Simmons University, as well as a B.S. in aeronautics and astronautics engineering from New York University. He has served on the National Academies Committee on Future Use of NASA Airborne Platforms to Advance Earth Science.

Kathleen O'Neill Green

Member

KATHLEEN (KASS) O. GREEN is president, Kass Green and Associates. Her experience spans over thirty years of managing and supervising geographic information system (GIS) and remote sensing professionals, as well as leadership in GIS and remote sensing research and policy. Her research includes innovations in automated change detection and machine learning for object-oriented image classification. Green is the past chair of NASA's Earth Science Applications Committee, co-founded and chaired the Department of the Interior's Landsat Advisory Group and has served on a variety of Federal Advisory Committees for NASA, NOAA and DOI. She has taught numerous workshops for the American Society of Photogrammetry and Remote Sensing (ASPRS) and federal agencies; is a fellow and an honorary member in ASPRS; and a past president of both MAPPS and ASPRS. Her recent publications include the text Imagery and GIS, Best Practices for Extracting Information from Imagery (Green et al, 2018), and the third edition of Assessing the Accuracy of Remotely Sensed Data, Principles and Practices with Russell Congalton (Congalton and Green, 2019).

Michael J. Prather

Member

MICHAEL J. PRATHER is a professor of Earth System Science at the University of California, Irvine. His research focuses on the simulation of the physical, chemical, and biological processes that determine atmospheric composition; the development of detailed numerical models of photochemistry and atmospheric radiation; and overall testing of global chemical transport models that describe ozone and other trace gases. Previously, Prather was a research fellow at Harvard University and then a scientist at the Goddard Institute for Space Studies, where he managing NASA HQ programs on the upper atmosphere and aviation impacts. He is a Fellow of the AGU, AAAS, and a member of the Norwegian Academy of Science and Letters. He has served as editor-in-chief of Geophysical Research Letters; and has participated in key United Nations' environmental efforts, including the International Ozone Assessments and Climate Assessments. He received a B.A. in mathematics from Yale University, a B.A. in physics from the University of Oxford, and a Ph.D. in astronomy and astrophysics from Yale University.

John R. Scherrer

Member

JOHN R. SCHERRER is a program officer at Johns Hopkins University Applied Physics Laboratory. He joined JHU/APL after a long career at the Southwest Research Institute. He currently serves as the mission project manager of IMAP, a Solar Terrestrial Probes mission for which APL is the implementing institution. Prior to IMAP, Scherrer served as mission project manager of CYGNSS, NASA's first Earth Venture Mission, and IBEX, a NASA Small Explorer mission. CYGNSS and IBEX are both currently in extended mission and were delivered on time and under budget. Scherrer also served as deputy payload manager of New Horizons (NH); and instrument manager of MMS-HPCA (Magnetospheric Multiscale-Hot Plasma Composition Analyzer); New Horizons Ralph and Alice; and Rosetta Alice. He also currently serves on the AWE (Atmospheric Waves Experiment (AWE) Standing Review Board. He has over 36 years of experience in the design, development, management, and delivery of complex instruments for scientific missions, spacecraft and payload management, and mission management. He received a B.S. in mechanical engineering from Texas A&M University and an M.B.A. from the University of Texas at San Antonio.

Byron D. Tapley

Member

BYRON D. TAPLEY, NAE, is a research professor in aerospace engineering at the University of Texas, Austin. He previously held the Clare Cockrell Williams Centennial Chair in Engineering and was director of the Center for Space Research. His research interests include orbit mechanics, precision orbit determination, nonlinear parameter estimation, satellite data analysis, and the uses of methods from these areas to study the Earth and planetary system. Currently, he is the mission principal investigator for the Gravity Research and Climate Experiment (GRACE) Mission, which is the first NASA Earth System Pathfinder Mission. A recent focus of his research has been directed to applying the GRACE measurements to determine accurate models for the Earth's gravity field and using these measurements for studies of climate-driven mass exchange between the Earth's dynamic system components. He is a fellow member of AIAA, AGU, and the American Association for the Advancement of Science. The NASA Medal for Exceptional Scientific Achievement, the NASA Exceptional Public Service Medal, the AAS Brouwer Award, the AIAA Mechanics and Control of Flight Award, and the AGU Charles A. Whitten Medal are among the awards he has received. He has been a principal investigator for nine NASA and international missions. He earned his Ph.D. in engineering mechanics, his M.S. in engineering mechanics, and his B.S. in mechanical engineering from the University of Texas in Austin. He was a member of the steering committee of the Committee on the Decadal Survey for Earth Science and Applications from Space.

Christopher S. Velden

Member

CHRISTOPHER S. VELDEN is a research scientist at the University of Wisconsin where he heads a group that develops satellite products, mainly for tropical cyclone applications. He served as a member of the U.S. Weather Research Project Science Steering Committee, the GOES Science Team, and the Geostationary Microwave Sounder Working Group. Velden served as chair of the American Meteorology Society (AMS) Committee on Satellite Meteorology and has also been a member of the AMS Tropical Committee. He has been honored by AMS with four awards and has published numerous papers. He has an M.S. in meteorology from the University of Wisconsin, Madison.

Duane E. Waliser

Member

DUANE E. WALISER is chief scientist of the Earth Science and Technology Directorate at the Jet Propulsion Laboratory (JPL). He provides science guidance and scrutiny to mission concept, development, and implementation across the breadth of JPL's Earth Science program. Waliser is also a visiting associate at the Geological and Planetary Sciences of the California Institute of Technology, as well as an adjunct professor for the Atmospheric and Oceanic Sciences Department at the University of California. Waliser's primary research interests lie in weather-climate prediction and predictability, with emphasis on the Tropics, Earth system processes, and the Earth's water cycle. His recent research focuses on utilizing new and emerging satellite data sets to study weather and climate, as well as advanced model simulation and forecast capabilities, particularly for long-range weather and short-term climate applications. Previously, he served as the principal scientist for the Water and Carbon Cycle Group at JPL. He was also an adjunct associate professor at the Institute for Terrestrial and Planetary Atmospheres, part of the School of Marine and Atmospheric Sciences at the State University of New York, Stony Brook. Waliser has earned multiple honors and awards, including the NASA Group Achievement Award, the JPL People Leadership Award, the JPL Magellan Award, and a fellowship from the American Meteorological Society. He holds a Ph.D. in physical oceanography from the University of California, San Diego. He is a current member of the National Academies Committee on Earth Science and Applications from Space and the Board on Atmospheric Sciences and Climate.