

NASA Science Mission Extensions: Scientific Value, Policies, and Review Process

Committee

Victoria E. Hamilton

Co-Chair

VICTORIA E. HAMILTON is a section manager in the Department of Space Studies at Southwest Research Institute (SwRI) in Boulder, Colorado. Dr. Hamilton has extensive experience with laboratory spectroscopy and Mars data analysis, as an affiliate of the Mars Global Surveyor TES science team, and as a participating scientist on the Mars Odyssey and Mars Science Laboratory missions. She is a science team co-investigator and deputy instrument scientist on the OSIRIS-REx asteroid sample return mission planned for launch in 2016. She has published on laboratory mineral and meteorite spectroscopy, numerical modeling of infrared spectra, Martian surface composition, Martian atmospheric aerosol composition, & surface thermophysical properties. Dr. Hamilton has built, operated, and managed a NASA-supported spectroscopy laboratory equipped with three spectrometers for measuring visible, near infrared, and thermal infrared properties of rocks, minerals, and meteorites in reflectance and emission. She has received the NASA Group Achievement Award for the MSL Science Office Development and Operations Team in 2013. She received her Ph.D. in geology from Arizona State University. She was a member of the NRC Committee on Cost Growth in NASA Earth and Space Science Missions in 2010 as well as a member of the Mars Architecture Review Committee for the Committee for Planetary Exploration in 2006.

Harvey D. Tananbaum

Co-Chair

HARVEY D. TANANBAUM (NAS) is senior astrophysicist at the Smithsonian Astrophysical Observatory. Dr. Tananbaum is a pioneer of X-ray astronomy and was on the team that discovered stellar systems containing neutron stars and black holes and X-rays from quasars and clusters of galaxies. Dr. Tananbaum has also been deeply involved in the development of the Chandra X-ray Observatory, from its conception to its birth. He has worked at the Smithsonian Astrophysical Observatory since 1973. Dr. Tananbaum has earned the NASA Exceptional Scientific Achievement Medal, the NASA Public Service Award, and the NASA Medal for Outstanding Leadership, as well as the Bruno Rossi Prize of the High Energy Astrophysics Division of the American Astronomical Society. Dr. Tananbaum earned his Ph.D. in physics from the Massachusetts Institute of Technology. He was elected to the National Academy of Sciences in 2005, and has served on the Space Studies Board. As well, he has served on a number of Academies studies including the Committee on an Assessment of Balance in NASA's Science Programs, the Committee on the Scientific Context for Space Exploration, and the Committee on Physics of the Universe.

Alice Bowman

Member

ALICE BOWMAN is a supervisor Space Mission Operations Group at the Johns Hopkins Applied Physics Laboratory in the Space Department. She is also serving as the Mission Operations Manager for New Horizons and was the lead controller for the spacecraft during its July 2015 flyby of Pluto. She has professional experience with national defense operations, spacecraft, systems engineering, program management, engineering management, space systems, and mission operations. Bowman earned her B.S. in physics and chemistry from the University of Virginia. She has no prior experience on Academies studies.

John R. Casani

Member

JOHN R. CASANI (NAE) is a consultant who is retired from the Jet Propulsion laboratory. He has managed several major flight projects, including Voyager, Galileo, and Cassini. He is a recipient of several NASA awards, including the Distinguished Service Medal. He received the AIAA Space System Award, the von Karman Lectureship, the National Space Club Astronauts Engineer Award, the AAS Space Flight Award, and the Smithsonian National Air and Space Museum's Lifetime Achievement Award. He held senior project positions on many of the Mariner missions to Mars and Venus and in 1970 became project manager of Mariner 6 and 7. Later, Dr. Casani would project-manage NASA's Voyager mission to the outer planets, Galileo mission to Jupiter, and Cassini mission to Saturn, as well as the Jupiter Icy Moons Orbiter mission. He is a member of the NAE and an honorary member of the AIAA. Dr. Casani holds a B.S. in electrical engineering and an honorary D.Sc. from the University of Pennsylvania, Philadelphia, and an honorary degree in aerospace engineering from the University of Rome, Italy. He has previously served on the Academies NASA Technology Roadmap: Entry, Descent, and Landing Panel and the Planetary Science Decadal Survey: Giant Planet Panel.

James H. Clemmons

Member

JAMES H. CLEMMONS is the principal director of the Space Science Applications Laboratory at the Aerospace Corporation. In his 18 years at Aerospace, Dr. Clemmons has led development of over 20 scientific instruments, flown on sounding rockets and satellites, to investigate a variety of phenomena in Earth's magnetosphere as well as its ionosphere-thermosphere-mesosphere system. He is the author of numerous publications, including studies of observations conducted with the Freja satellite and other missions characterizing electric, magnetic, and plasma phenomena in the space environment. Before joining Aerospace he worked at NASA Goddard Space Flight Center, the Swedish Institute for Space Physics, and the Max-Planck-Institute for Extraterrestrial Physics on related research. He has participated in several NASA advisory groups and is the recipient of several awards by NASA and the Aerospace Corporation. Dr. Clemmons is a member of the American Geophysical Union, the American Physical Society, and the American Chemical Society. He was a Fulbright Scholar and a resident associate of the National Research Council. Dr. Clemmons received B.S. degrees in physics and chemistry from the University of Illinois, Urbana-Champaign, and an M.S. and Ph.D. in physics from the University of California, Berkeley. Dr. Clemmons previously served on the Academies Panel on Atmosphere-Ionosphere-Magnetosphere Interactions.

Neil Gehrels

Member

NEIL GEHRELS (NAS) is the chief of the Astroparticle Physics Laboratory at NASA's Goddard Space Flight Center. He is also a professor of astronomy at the University of Maryland-College Park and an adjunct professor of astronomy and astrophysics at Pennsylvania State University. He is a member of the American Academy of Arts and Sciences and National Academy of Sciences. Gehrels is the principal investigator of the NASA Swift satellite observing gamma-ray burst and supernova explosions. He is a deputy project scientist for Fermi, project scientist for WFIRST and previous project scientist for the Compton Observatory (1991-2000). He has organized nine major conferences and been an editor on the proceedings books, has over 500 articles in science journals and popular science magazines, and given many invited talks. He has been on 20 working groups and committees in various positions. Committees, societies, etc., include Chair of the Astronomy Section of the NAS, past Chair of the American Astronomical Society (AAS) High Energy Astrophysics Division, past Chair of the American Physical Society Division of Astrophysics, and past Chair of COSPAR Commission E. Numerous awards have been bestowed upon Dr. Gehrels including the COSPAR Massey award in 2012, SPIE Goddard award 2009, NAS Draper Medal in 2009, AAS Bruno Rossi Prize in 2007, Popular Science Magazine's "Best of What's New award" for Swift satellite research in 2006, and the NASA Exceptional Scientific Achievement Medal in 2005. Dr. Gehrels received his B.S. in physics, and music from the University of Arizona and his Ph.D. from the California Institute of Technology. He serves on the NRC's U.S. National Committee for the International Astronomical Union.

Fiona A. Harrison

Member

FIONA A. HARRISON (NAS) is the Benjamin M. Rosen Professor of Physics and Astronomy in the Space Radiation Laboratory and the Kent and Joyce Kresa Leadership Chair, Division of Physics and Mathematics at the California Institute of Technology, Pasadena. She is the principal investigator of NASA's Nuclear Spectroscopic Telescope Array (NuSTAR), a small explorer-class mission launched in 2012. Harrison's primary research interests are in experimental and observational high-energy astrophysics. In addition, she has an active observational program in gamma-ray, X-ray and optical observations of gamma-ray bursts, active galaxies, and neutron stars. Harrison was awarded the Robert A. Millikan Prize Fellowship in Experimental Physics in 1993 and the Presidential Early Career Award in 2000. She was named one of America's Best Leaders by U.S. News and the Kennedy School of Government in 2008, and received the NASA Outstanding Public Leadership Medal in 2013. She received her Ph.D. in physics from the University of California, Berkeley. She was elected to the National Academy of Sciences in 2014, and is a member on the Division Committee on Engineering and Physical Sciences, was a member on the Space Studies Board, and chaired the Committee on an Assessment of the Astrophysics Focused Telescope Assets (AFTA) Mission Concepts.

Michael D. King

Member

MICHAEL D. KING (NAE) is senior research scientist in the Laboratory for Atmospheric and Space Physics at the University of Colorado, Boulder. Dr. King is also the science team leader for the MODIS instrument that flies on the Aqua and Terra satellites currently in orbit. He served as senior project scientist of NASA's Earth Observing System (EOS). He joined Goddard Space Flight Center as a physical scientist and previously served as project scientist of the Earth Radiation Budget Experiment (ERBE). His research experience includes conceiving, developing, and operating multispectral scanning radiometers from a number of aircraft platforms in field experiments ranging from arctic stratus clouds to smoke from the Kuwait oil fires and biomass burning in Brazil and southern Africa. Dr. King is also interested in surface reflectance properties of natural surfaces as well as aerosol optical and microphysical properties. Earlier, he developed the Cloud Absorption Radiometer for studying the absorption properties of optically thick clouds as well as the bidirectional reflectance properties of many natural surfaces. He was formerly the principal investigator of the MODIS Airborne Simulator, an imaging spectrometer that flies onboard the NASA ER-2 aircraft—an instrument that has aided in the development of atmospheric and land remote sensing algorithms for MODIS, which is used for studies of the Earth's environment from space. Dr. King is a fellow of the American Geophysical Union, the American Meteorological Society (AMS), and the Institute of Electrical and Electronic Engineers, a recipient of the Verner E. Suomi Award of the AMS for fundamental contributions to remote sensing and radiative transfer, and a recipient of the Space Systems Award of the American Institute of Aeronautics and Astronautics for NASA's Earth Observing System. He received his M.S. and Ph.D. in atmospheric sciences from the University of Arizona. Dr. King is a member of the NRC's Committee on Earth Science and Applications from Space, and the NRC's Committee on a Framework for Analyzing the Needs for Continuity of NASA-Sustained Remote Sensing Observations of the Earth from Space, and previously served on the Board on Atmospheric Sciences and Climate and the Climate Research Committee.

Margaret G. Kivelson

Member

MARGARET G. KIVELSON (NAS) is professor of space physics, Emerita at the University of California, Los Angeles in the Department of Earth and Space Sciences as well as at the Institute of Geophysics and Planetary Physics at the University of California, Los Angeles. She is also research professor at the University of Michigan. Dr. Kivelson's scientific interests are magnetospheric plasma physics of Earth, Jupiter and Saturn, interaction of flowing plasmas with planets and moons, and ultra-low frequency waves. She is a co-investigator on the Themis and Europa missions, and a collaborator on the fluxgate magnetometer on Cassini. She is the recipient of the Alfvén Medal of the European Geophysical Union and the Fleming Medal of the American Geophysical Union. She earned her Ph.D. for physics from Radcliffe College. She was elected a member of the National Academy of Sciences in 1999, and has served on the Plasma Science Committee, the 2014 NAS Nominating Committee, the Committee on Women in the Academy, and numerous other Academies committees.

Ramon E. Lopez

Member

RAMON E. LOPEZ is a professor of physics at the University of Texas at Arlington. His research focuses on solar wind-magnetosphere coupling, magnetospheric storms and substorms, and space weather prediction. Dr. Lopez is also working in the areas of teacher education, national science education standards, and physics education research. Dr. Lopez is a fellow of the American Physical Society and the American Association for the Advancement of Science. He received his Ph.D. in space physics from Rice University. Dr. Lopez's previous NRC service includes membership on the Committee on Solar and Space Physics, Committee on a Decadal strategy for Solar and Space Physics (Heliophysics), the Committee on Strategic Guidance for NSF's Support of the Atmospheric Sciences and the Committee on Solar and Space Physics.

Amy Mainzer

Member

AMY MAINZER is a senior research scientist at the Jet Propulsion Laboratory in the astrophysics division. She has been employed as a scientist at JPL since 2003. At JPL, she serves as the principal investigator for the NEOWISE mission, which is a NASA spacecraft dedicated to observing near-Earth asteroids and comets using a thermal infrared space telescope. As the NEOWISE PI, her research focuses on characterizing the population of asteroids and comets through statistical measurements of their sizes, orbits, albedos, and rotational states. The mission began life as the Wide-field Infrared Survey Explorer (WISE), and its original purpose was to carry out an all-sky survey at four infrared wavelengths from 3 – 22 microns. After a nearly 3-year hibernation phase, the survey was restarted using its 3 and 4 micron channels and renamed NEOWISE. Dr. Mainzer served as the deputy project scientist for the WISE mission; her responsibilities included flowing down top-level science requirements to the WISE payload components, interpreting payload verification test data, and designing the in-orbit checkout procedures. In 2012 she received the NASA Exceptional Scientific Achievement medal for her work on near-Earth objects and the NASA Exceptional Achievement medal in 2011 for her work on NEOWISE. Prior to joining JPL, Dr. Mainzer worked as a systems engineer at the Lockheed Martin Advanced Technology Center in Palo Alto. She was responsible for the design, construction, testing, and in-orbit checkout of the Spitzer Space Telescope's fine guidance sensor. This instrument has been in continuous use since Spitzer's launch in 2003, including during the original Spitzer prime mission and the Warm Mission that began in 2008. Dr. Mainzer is also the principal investigator of a NASA Discovery mission proposal, the Near-Earth Object Camera. This proposal was awarded technology development funding in 2011 to mature 10 micron HgCdTe megapixel detectors. Additionally, she served on the 2010 NRC Committee to Assess Near Earth Object Hazards and Mitigation Strategies, and she is a member of the NASA Planetary Science Subcommittee. She was a member of the NASA Small Bodies Assessment Group Steering Committee from 2011 – 2013.

Alfred S. McEwen

Member

ALFRED S. MCEWEN is professor for the Lunar and Planetary Laboratory at the University of Arizona (UA). He has studied planetary surfaces for more than 25 years, including time at the U.S. Geological Survey prior to joining UA in 1996. Current research interests include volcanology, cratering, slope processes, and remote sensing of planetary surfaces. His experience with spacecraft science experiments includes service as a: member of the Voyager imaging team at Neptune; a Galileo Interdisciplinary Scientist (IDS) associated with the Solid State Imaging (SSI) team; a Cassini Imaging Science Subsystem (ISS) team member; a Mars Observer/Mars Global Surveyor Participating Scientist for Mars Orbital Camera (MOC); a member of the Clementine advisory committee and science team; a Participating Scientist on Mars Odyssey THEMIS; a principal investigator of High Resolution Imaging Science Experiment (HiRISE), Mars Reconnaissance Orbiter; a co-investigator on Lunar Reconnaissance Orbiter Camera (LROC); a principal investigator for the High resolution Stereo Color Imager (HiSCI) on the ExoMars Trace Gas Orbiter; a co-investigator on TGO/CaSSIS; and as a deputy principal investigator for the Europa Imaging System (EIS) on the still unnamed Europa mission. He was awarded NASA's distinguished public service medal in 2011 and AGU's Whipple award in 2015. He has a Ph.D. for planetary geology from Arizona State University. Prior Academies studies include the 2003 Planetary Science Decadal Survey (chair of large satellites panel, 2001-2002) and COSPAR (2008-2010).

Deborah Vane

Member

DEBORAH G. VANE is deputy program manager at the Jet Propulsion Laboratory (JPL) in the Office of Operating Earth Science Missions. She is also the project manager of the NASA CloudSat Mission. At JPL, Ms. Vane manages a portfolio of 13 Earth Science missions/experiments operating in Earth orbit with a combined annual budget of over \$70 million dollars. She oversees the JPL bi-annual Earth Science Senior Review proposal process for mission-operation extensions. She also manages the CloudSat mission that was launched and she has submitted CloudSat proposals to the senior review multiple times. Her involvement in CloudSat began as the proposal manager in 1998. She has also served as the deputy principal investigator; and she has served as project manager since the launch. She has been co-author on a number of journal articles on the application of CloudSat data to clouds and climate, atmospheric radiation and applications to hurricane intensity estimation. Ms. Vane has over 35 years of experience at JPL in a variety of technical, management, and scientific roles. Previously, she was a member of the Mars Viking Mission Lander Imaging Team and was scientific assistant to the JPL chief scientist. Ms. Vane received the NASA Individual Award for Exceptional Achievement as deputy principal investigator and project manager for the CloudSat Mission, and she has received several Group Achievement awards. She earned her B.S. in physics from the University of Colorado. Ms. Vane has not participated on any prior NRC studies.