Assessment of the National Science Foundation's 2015 Geospace Portfolio Review

Committee

Timothy S. Bastian

Chair

TIMOTHY S. BASTIAN is assistant director and head of the Science Support and Research department at the National Radio Astronomy Observatory, where he has been an astronomer since 1990. He is also an adjunct faculty member in the Astronomy Department at the University of Virginia. Dr. Bastian’s research interests include solar and stellar radiophysics; planetary/exoplanetary radio emission; radio propagation phenomena as probes of the solar wind; radio interferometry; and the physics of flares and coronal mass ejections. He is currently the principal investigator of the Solar Radio Burst Spectrometer Project and principle investigator on the ALMA Development Study to implement solar observing modes with ALMA. He serves as chair of the AAS Publications Board, and is a member of the NASA LWS Steering Committee Dr. Bastian previously served as scientific editor of the Astrophysical Journal. He earned his Ph.D. in astrophysics from University of Colorado. Dr. Bastian served on the NRC Panel on Solar and Heliospheric Physics for the Decadal Strategy for Solar and Space Physics (Heliophysics), and he is currently a member of the SSB Committee on Solar and Space Physics.

Susan K. Avery

Vice Chair

SUSAN K. AVERY is the former president and director of the Woods Hole Oceanographic Institution. Her research interests include studies of atmospheric circulation and precipitation, climate variability and water resources, and the development of new radar techniques and instruments for remote sensing. She has received the Outstanding Publication Award of the National Center for Atmospheric Research (1990), the National Science Foundation Faculty Award for Women (1991), and the Margaret Willard Award of the University Women's Club, at the University of Colorado at Boulder (1995). She was a fellow of the American Meteorological Society (1994), a fellow of the American Association for the Advancement of Science (2011), and is a member of the American Geophysical Union. She is chair of the Board of Trustees for the University Corporation for Atmospheric Research (UCAR) and served as president of the American Meteorological Society (2004). She received her Ph.D. in Atmospheric Science from the University of Illinois at Urbana-Champaign in 1978. Dr. Avery has previously served on the Academies' Committee on a Survey of the Active Scientific Use of the Radio Spectrum, the Committee on the Review of the National Science Foundation's Division on Atmospheric and Geospace Sciences (AGS) Draft Science Goals and Objectives, the 2007 Earth Science and Applications from Space Survey Steering Committee, and the Committee on Strategic Guidance for NSF's Support of the Atmospheric Sciences. She currently serves on the Committee to Advise the U.S. Global Change Research Program.

Marcel Agueros

Member

MARCEL AGÜEROS is an assistant professor of astronomy at Columbia University in New York, New York. Dr. Agüeros has been a professor at Columbia since 2010, where he also directs the Bridge to the Ph.D. in the Natural Sciences Program, which is increasing the number of underrepresented minorities moving into STEM graduate programs. His research uses new datasets and technologies to address classic questions in stellar astrophysics. Dr. Agüeros's current focus is on combining time-domain photometric surveys, spectroscopic campaigns, and X-ray observations to place observational constraints on the evolution of low-mass stars, and in particular to explore the relationship between a star's age, its angular-momentum content, and its magnetic activity. Previously, Dr. Agüeros was a National Science Foundation (NSF) Astronomy & Astrophysics post-doctoral fellow in the Columbia Astrophysics Laboratory. In 2008, the National Society of Black Physicists awarded him a Certificate of Excellence "in recognition of distinguished personal initiative on diversity in astronomy." Dr. Agüeros received the NSF Faculty Early Career Development (CAREER) award in 2013. He earned his Ph.D. in astronomy from the University of Washington in 2006.

Peter M. Banks

Member

PETER M. BANKS (NAE) assists the development of early stage technology companies and is currently a member of the Board of Directors of Visual Communications, Inc. and Liberty Plugins, Inc. Dr. Banks provides expertise and advice for challenges facing young companies relative to their development plans, personnel, technologies, intellectual properties, financial needs, and fundraising. He is also active in the Academies, having served on the Reports Review Committee and as a Senior Advisor to the President of the National Academy of Sciences. Previously, Dr. Banks was a Partner in Red Planet Capital of Palo Alto, CA. This venture capital investment firm was funded by NASA and provided the agency and employees with access to emergent high technology developments of Silicon Valley and other technology-rich areas. During this period, Dr. Banks was a trustee and chair of the Board of Trustees of Universities Space Research Organization, located in Greenbelt, MD. Prior to the above activities and over two decades, Dr. Banks was a director of two public companies (Tecumseh Products and X-Rite Corporation) and partner of XR Ventures, Inc., of Grand Rapids, MI. In the 1990s, Dr. Banks was dean of engineering and professor in the Atmospheres, Oceans and Space Science Department at the University of Michigan, then CEO of the Environmental Research Institute of Michigan, Ann Arbor. Dr. Banks' scientific expertise lies in the areas of space science, Earth remote sensing, climate change science, ionospheric physics, computer systems, and environmental science. He is a member of the National Academy of Engineering and an affiliate of the National Academy of Sciences. He has received the Appleton Prize of the Royal Society (London), is a fellow of the American Geophysical Union, is a recipient of the AGU's Nicolet Award, and is a recipient of the Distinguished Public Service Award from NASA (for activities relating to the definition of scientific needs of the International Space Station). He has published over 200 articles in scientific literature. Dr. Banks received M.S.E.E. and Ph.D. (physics) degrees from Stanford and Pennsylvania State University respectively. His university experience includes faculty appointments at the University of California (San Diego), Utah State University, Stanford University, and the University of Michigan. He has served on many Academies activities, including the Committee on Assessment of NASA Laboratory Capabilities, the Report Review Committee, and the Committee on Space-Based Additive Manufacturing of Space Hardware.

George Gloeckler

Member

GEORGE GLOECKLER (NAS) is a distinguished university professor, emeritus, of the University of Maryland and research professor in the Climate and Space Sciences and Engineering Department at the University of Michigan. Dr. Gloeckler's research focuses on space plasma physics, particularly the properties of the local interstellar medium, such as its magnetic field, density and composition of its gas, and its interaction with the solar system. He is known for developing a new experimental measurement technique allowing observations of interstellar pickup ions and for pioneering discoveries and the invention of instruments carried on satellites and deep space probes, including the two Voyagers, Ulysses, and Cassini. Elected to the NAS in 1997, Dr. Gloeckler is also a fellow of the American Geophysical Union (AGU) and the American Physical Society and the recipient of the COSPAR Space Science Award. He earned his Ph.D. in physics from the University of Chicago. Dr. Gloeckler's most recent NRC service was as a member of the Panel on Solar and Heliospheric Physics for the Decadal Strategy for Solar and Space Physics (Heliophysics). He currently serves on the SSB Committee on Solar and Space Physics.

J. T. Hoeksema

Member

J. TODD HOEKSEMA is a senior research scientist in the W.W. Hansen Experimental Physics Laboratory at Stanford University. His primary scientific interests include the physics of the Sun and the interplanetary medium, the large-scale solar and coronal magnetic fields, solar velocity fields and rotation, helioseismology, solar-terrestrial relations, and education and public outreach. His professional experience includes research administration, system and scientific programming, and the design, construction, and operation of instruments to measure solar magnetic and velocity fields from both ground and space. He is co-investigator and magnetic team lead for the Helioseismic and Magnetic Imager (HMI) on NASA's Solar Dynamics Observatory and was instrument scientist for the Michelson Doppler Imager on the Solar and Heliospheric Observatory. He directs the Wilcox Solar Observatory at Stanford, with which he has been associated for more than three 11-year sunspot cycles. Dr. Hoeksema has chaired the Solar Physics Division of the American Astronomical Society (AAS) and the Solar Observatory Council of the Association of Universities for Research in Astronomy (AURA). He is currently the Secretary of the Solar and Heliophysics (SH) subsection of the Space Physics and Aeronomy (SPA) Section of the American Geophysical Union (AGU). He has served on the Heliophysics subcommittee of the NASA Advisory Council Science Committee. In 2004, NASA recognized Dr. Hoeksema's leadership in developing the roadmap for "Heliophysics" by awarding him NASA's Distinguished Public Service Medal. Dr. Hoeksema earned his B.A. from Calvin College and Ph.D. from Stanford University in applied physics. Dr. Hoeksema was a member of the Committee on Survey of Surveys: Lessons Learned from the Decadal Survey Process, the steering committee for the Decadal Strategy for Solar and Space Physics (Heliophysics), and the Astro2010 Panel on Optical and Infrared Astronomy from the Ground. He currently serves as co-chair of the Committee on Solar and Space Physics (CSSP).

Justin Kasper

Member

JUSTIN KASPER is an associate professor in the Atmospheric, Oceanic and Space Sciences Department in the University of Michigan's College of Engineering. Prior to his recent appointment at the University of Michigan, Dr. Kasper was an astrophysicist in the Solar and Stellar X-Ray Group in the High Energy Astrophysics Division of the Harvard-Smithsonian Center for Astrophysics and a Lecturer in the Department of Astronomy at Harvard University. Dr. Kasper has worked on the development, construction, and analysis of instrumentation for the in-situ and remote measurement of particles and fields, including space-based plasma probes and particle telescopes such as the Faraday Cups on Wind, and ground-based radio telescopes including the Murchison Widefield Array (MWA). His major results concern heating, instabilities, and helium in the solar corona and solar wind, and the impact of space weather on society. He is currently the principal investigator (PI), SWEAP Investigation, Solar Probe Plus; Instrument Lead, Faraday Cup, Deep Space Climate Observatory; co-investigator, FIELDS, Solar Probe Plus; Instrument Lead, Solar Wind Experiment Faraday Cup, Wind spacecraft; Project Scientist and Co-Investigator, Cosmic Ray Telescope for the Effects of Radiation, LRO; and PI of NASA and NSF grants to conduct investigations into the fundamental physics of solar corona and solar wind including heating, instabilities, composition, shocks, magnetic reconnection, radio emission. Dr. Kasper received his Ph.D. in physics from MIT. He was a member of the U.S. organizing and instrumentation committees for the 2007 International Heliophysical Year and the project scientist for the Cosmic Ray Telescope for the Effects of Radiation (CRaTER), on the Lunar Reconnaissance Orbiter. Dr. Kasper served on the steering committee on a Decadal Strategy for Solar and Space Physics and was the Committee's liaison to, and member of, the decadal survey's Panel on Solar and Heliospheric Physics. He currently serves on the SSB Committee on Solar and Space Physics.

Kristina A. Lynch

Member

KRISTINA A. LYNCH is a professor of physics in the Department of Physics and Astronomy at Dartmouth College. At Dartmouth, Dr. Lynch has led the design, manufacturing, testing, and launch of a number of NASA auroral sounding rocket payloads. Her research interests include instruments that measure ionospheric plasma particles and fields, the plasma physics of the lower thermal ionosphere, laboratory plasma physics used to develop space instrumentation, and developing and analyzing space mission architectures for low-resource ionospheric multipoint missions. Previously, Dr. Lynch was on the research faculty of the University of New Hampshire, in the Department of Physics and the Institute for Earth Oceans and Space. She is a recipient of an NSF Career Award. She earned her Ph.D. in physics from the University of New Hampshire. She has served on several NRC activities, including the Panel on Atmosphere-Ionosphere-Magnetospher Interactions for the Decadal Strategy for Solar and Space Physics (Heliophysics), the Committee on Heliophysics Performance Assessment, the Committee on Solar and Space Physics, and the Committee on Plasma 2010: An Assessment of and Outlook for Plasma and Fusion Science.

Terrance G. Onsager

Member

TERRANCE G. ONSAGER is a physicist with the NOAA Space Weather Prediction Center. His research includes solar wind-magnetosphere coupling, modeling the signatures of magnetic reconnection at Earth's magnetopause and in the magnetotail, and the dynamics of the electron radiation belts. His recent efforts include coordinating the capabilities and priorities of international space weather organizations to improve global space weather services and working to bridge the gap between research and operations. Currently he is the director-elect of the International Space Environment Service. He serves as co-chair of the World Meteorological Organization Inter-Programme Coordination Team on Space Weather, and he is a member of the Space Weather Expert Team for the UN Committee on the Peaceful Use of Outer Space Working Group on the Long-Term Sustainability of Outer Space. He received a Ph.D. in physics from the University of Washington with a focus on shock waves in collisionless plasma, using Earth's bow shock as a natural laboratory. Dr. Onsager has previously served as a member of the NRC Committee on the Assessment of the Role of Solar and Space Physics in NASA's Space Exploration Initiative and a member of the Panel on Education and Society, and he is currently a member of the SSB Committee on Solar and Space Physics.

Aaron Ridley

Member

AARON RIDLEY is a professor in the Department of Atmospheric, Oceanic, and Space Sciences at the University of Michigan. He previously served as a research scientist at the Southwest Research Institute. His research interests include modeling of the near-Earth space environment, ground-based instrumentation, and small satellites. Dr. Ridley currently has active programs for ground-based magnetometers in Antarctica and Fabry-Perot Interferometers in North America. He was recently awarded grants to launch three CubeSats, including CADRE and two CubeSats for the European QB50 mission, each of which will measure the state of the upper atmosphere. Dr. Ridley has received the NASA Group Achievement Award, the University of Michigan's College of Engineering Outstanding Research Scientist Award, and the National Center for Atmospheric Research High Altitude Observatory's Newkirk Fellowship. He earned a Ph.D. in atmospheric and space science from the University of Michigan. He currently serves on the SSB Committee on Solar and Space Physics.

Nathan A. Schwadron

Member

NATHAN A. SCHWADRON is a professor at the University of New Hampshire's (UNH) Institute for the Study of Earth, Oceans, and Space and in UNH Department of Physics in the Space Science Center. He also serves as the PI for the Cosmic Ray Telescope for the Effects of Radiation (CRaTER) on the LRO mission and the PI for the Dose Spectra from Energetic particles and Neutrons (DoSEN) instrument. He serves as the science operations lead for the Interstellar Boundary Explorer Mission, and the science operations lead on Solar Probe Plus (SPP) Integrated Science Investigation of the Sun. Dr. Schwadron is the PI for NASA/NSF/LWS Strategic Capability Earth-Moon-Mars Radiation Environment Module (EMMREM) and is the co-lead of the NSF/FESD Sun-2-Ice project that studies particle acceleration and radiation interactions from the Sun through the Earth system. Dr. Schwadron is the NASA/NSF/LWS strategic capability lead of the recently selected Chromosphere-Solar-Wind and Energetic Particle Acceleration (C-SWEPA) Model. Dr. Schwadron's previous experience includes positions as an associate professor of astronomy at Boston University; senior research scientist, principal scientist, and staff scientist at the Southwest Research Institute; assistant research scientist at the University of Michigan; senior research scientist at the International Space Science Institute in Bern, Switzerland; and postdoctoral scholar at the University of Michigan's Atmospheric, Oceanic and Space Science Department. Dr. Schwadron's research interests include heliospheric phenomena related to the solar wind, the heliospheric magnetic field, pickup ions, cometary X-rays, energetic particles, cosmic rays, energetic neutral atoms, space weather and radiation hazards and effects. He received a B.A. with honors in physics from Oberlin College and a Ph.D. in physics from the University of Michigan. Dr. Schwadron served as a member of the NRC Panel on Solar and Heliospheric Physics for Committee for a Decadal Strategy for Solar and Space Physics (Heliophysics) and the Committee on Priorities for Space Science Enabled by Nuclear Power and Propulsion: A Vision for Beyond 2015. He currently serves on the SSB Committee on Solar and Space Physics.

Maria Spasojevic

Member

MARIA SPASOJEVIC is a senior research scientist at Stanford University. Her primary expertise is in data analysis, and her research focuses on the global-scale dynamics of the plasma populations in the Earth's inner magnetosphere (plasmasphere, ring current, and radiation belts), the generation of plasma waves, and the interaction these waves with ions and electrons over a wide range of energy. Previously, she has worked as a Research Engineer at the Space, Telecommunications and Radioscience Laboratory at Stanford and as a Consulting Physicist at the Space Physics Laboratory at Lockheed Martin's Advanced Technology Center. She has published dozens of articles in the Journal of Geophysical Research. Dr. Spasojevic earned her Ph.D. in electrical engineering from Stanford University.