

Decadal Survey for Solar and Space Physics (Heliophysics) 2024-2033: Panel on Space Weather Science and Applications

Committee

Christina M. Cohen

Co-Chair

CHRISTINA W. COHEN is a member of the professional staff at the California Institute of Technology. Cohen's research currently focuses on the acceleration, transport, and properties of solar energetic particles in the heliosphere and their space weather implications. Cohen is past president of the Space Physics and Aeronomy Section of the American Geophysical Union. Cohen led a team that produced the report for NASA, "Next Steps in Determining Space Weather Benchmarks for Ionizing Radiation Hazards." Cohen was co-chair of the organizing committee for the National Academies "Space Weather Operations and Research Infrastructure Workshop, Phase II." Cohen received a Ph.D. in physics from the University of Maryland, College Park.

Thomas P. O'Brien

Co-Chair

Thomas Paul O'Brien, III is a research scientist in the Space Sciences Department at The Aerospace Corporation. O'Brien's research experience includes magnetospheric physics, with special emphasis on radiation belts and empirical analysis of in situ particle data. O'Brien is a past chair of the COSPAR Panel on Radiation Belt Environment Modeling (PRBEM) and editor of the journal Space Weather. O'Brien is a member of the NASA Space Weather Council, a community-based, interdisciplinary forum that provides advice to the NASA's Heliophysics Advisory Committee (HPAC), which in turn provides advice to NASA's Heliophysics Division. O'Brien received a Ph.D. in geophysics and space physics from the University of California Los Angeles.

Hazel M. Bain

Member

HAZEL M. BAIN is the CIRES science lead at the National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center and a research scientist in the University of Colorado Boulder's Cooperative Institute for Research in Environmental Sciences (CIRES). Bain's current research focuses on space weather and, in particular, solar radiation storms, which can pose a radiation hazard for astronauts in space, and passengers and crew on polar flight routes, as well as causing satellite malfunctions and problems for high frequency communication technologies. Bain previously worked at the Space Sciences Laboratory at the University of California, Berkeley, and did research on solar flares as a member of the NASA RHESSI (Reuven Ramaty High Energy Spectroscopic Imager) spacecraft team. Bain was also part of a team that designed and built a solar gamma-ray telescope, which flew on a high-altitude balloon around Antarctica. Bain received a Ph.D. in physics and astronomy from the University of Glasgow.

Thomas E. Berger

Member

THOMAS E. BERGER is the founder and executive director of the Space Weather Technology, Research, and Education Center at the University of Colorado Boulder. Berger's research interests include the observation and analysis of solar magnetic structures, from the smallest observable magnetic elements to the plasma instabilities in large-scale prominences, and application of machine learning to space weather prediction and data assimilation problems. Prior to joining the University of Colorado, Berger was the director of the NOAA/NWS Space Weather Prediction Center, a project scientist at the NSF Daniel K. Inouye Solar Telescope at the National Solar Observatory, and a senior research scientist at Lockheed Martin's Solar and Astrophysics Laboratory. Berger served as the Working Group Four lead at the White House Office of Science and Technology Policy's Space Weather Operations, Research, and Mitigation task force; was the founding chair of the American Astronomical Society's Solar Physics Division's Public Policy Committee and Nomination Task Force. Berger has served on numerous NASA and NSF committees and panels, and is a member of the American Geophysical Union's Space Physics and Aeronomy Division Nominations Task Force. Berger received a Ph.D. in applied physics and astrophysics from Stanford University.

Yaireska M. Collado-Vega

Member

YAIRESKA COLLADO-VEGA is the director of the Moon to Mars Space Weather Analysis Office at NASA Goddard Spaceflight Center, which supports NASA's Space Radiation Analysis Group (SRAG) with human space exploration activities by providing novel capabilities to characterize the space radiation environment and also provides real-time analysis of the space environment and their probable impacts for NASA missions. Collado-Vega's research focuses on the solar wind interaction with the Earth's magnetic environment, solar energetic particle events, and space weather real time analysis. Collado-Vega also works on the validation of solar and magnetospheric models and the current developments on machine learning capabilities to improve space weather analysis and forecasting. Collado-Vega is the former lead of the experimental Space Weather Forecasting Team at the Community Coordinated Modeling Center, and conducts education and public outreach for NASA and the Heliophysics Science Division. Collado-Vega received a Ph.D. in space physics from The Catholic University of America.

Heather Elliott

Member

HEATHER ELLIOTT is a staff scientist and acting lead for the heliospheric group at the Southwest Research Institute. Elliott's research interests include the analysis of large-scale structure in the solar wind, space weather impact on geophysical indices and the Global Positioning System. Elliott is also an adjunct professor at the University of Texas at San Antonio and serves as a member of the Living With a Star Program Analysis Group at NASA. Elliott received a Ph.D. in space plasma physics from the University of Alabama Huntsville.

Noe Lugaz

Member

NOE LUGAZ is a research professor in the Space Science Center and Department of Physics, Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire. Lugaz's research focuses on the investigation of coronal mass ejections (CMEs), particularly series of CMEs, their propagation, and their consequences on Earth's magnetosphere and radiation belts, and for the acceleration of particles. Lugaz's work encompasses solar, interplanetary, and magnetospheric/radiation belt physics, through the analysis of remote-sensing observations and in-situ measurements, and numerical simulations. Lugaz is the lead of the Interstellar Mapping and Acceleration Probe (IMAP) student collaboration, a 3U CubeSat mission to Earth's cusps. Lugaz currently serves as the editor-in-chief of Space Weather and the chair of the NSF's Solar Heliospheric and Interplanetary Environment (SHINE) steering committee. Lugaz received a Ph.D. in space physics from the University of Michigan.

Juha-Pekka Luntama

Member

JUHA-PEKKA LUNTAMA is head of Space Weather Office at the European Space Agency (ESA). ESA is a key U.S. partner in the development of space weather observational assets. Luntama's research focuses on high resolution ionospheric imaging by tomography. Luntama provides addition insight into the international context for the space weather enterprise.

Steven K. Morley

Member

STEVEN K. MORLEY is a scientist in the Space Science and Applications division of the Los Alamos National Laboratory (LANL). Morley was also a postdoctoral researcher at LANL, a postdoctoral fellow at the University of Newcastle, a research associate at the Rutherford Appleton Laboratory, and a postdoctoral researcher at the British Antarctic Survey. Morley's research interests include electron radiation belt climatology and dynamics, geomagnetic substorm occurrence and space weather impacts, inner magnetosphere dynamics and wave-particle interaction, and geomagnetically-induced currents. Morley received a Ph.D. in physics from the University of Southampton.

Emma L. Spanswick

Member

EMMA L. SPANSWICK is an assistant professor in the Department of Physics and Astronomy and Tier 2 Canada Research Chair in Geospace Dynamics and Space Plasma Physics at the University of Calgary. Spanswick develops ground- and satellite-based instruments to improve understanding of Earth's near-space environment and space weather. Spanswick's research interests include energization, transport, and loss of the >30keV electron population in the near-Earth space environment; magnetosphere-ionosphere coupling mechanisms; techniques for remote sensing magnetospheric dynamics; and impacts of particle precipitation on the ionosphere and technological systems. Spanswick earned a Ph.D. in physics from the University of Calgary.

Drew L. Turner

Member

DREW L. TURNER is a senior research staff at the Johns Hopkins University Applied Physics Laboratory. Research interests include energetic charged particles in the Earth's magnetosphere; the coupling of energy from the Sun and space environments ranging from the Van Allen radiation belts to the boundaries of the magnetosphere and solar wind; and space-based measurements needed to improve space weather forecasting, nowcasting, and hindcasting. Turner is a 2018 James B. Macelwane Medal Winner from the American Geophysical Union. Turner received a Ph.D. in aerospace engineering from the University of Colorado Boulder.

Kathryn Whitman

Member

KATHRYN WHITMAN is a research scientist in the Space Radiation Analysis Group (SRAG) at the University of Houston/NASA Johnson Space Center. The SRAG is responsible for ensuring that the radiation exposure received by astronauts remains below established safety limits. Whitman's work includes space weather, solar energetic particles, and galactic cosmic rays and their impacts on the space radiation environment. A primary focus is the development of a validation process to assess SEP forecast models selected for use in space radiation operations during NASA's Exploration Class missions. Whitman received a Ph.D. in physics from the University of Hawaii at Manoa.

Michael J. Wiltberger

Member

MICHAEL WILTBERGER is the deputy director of the High Altitude Observatory (HAO) at the National Center for Atmospheric Research. Wiltberger was the section head of the Geospace Section in the Atmospheric and Geospace Science Division at NSF. Wiltberger's research interests include the modeling of the magnetosphere and its interaction with the solar wind and coupled thermosphere-ionosphere system. Wiltberger's work also entails the inclusion of ionospheric outflow and the application of advanced statistical analysis in global models and ground-breaking results proving the connection between localized reconnection and, so-called, Bursty Bulk Flows in high-resolution simulations of the magnetotail. Wiltberger also served in many community functions, including as chair of the Geospace Environment Modeling (GEM) Steering Committee, and as vice-chair of the American Meteorological Society Science and Technology Committee on Space Weather. Wiltberger received a Ph.D. in space plasma physics from the University of Maryland, College Park.