

Space Weather Operations and Research Infrastructure Workshop, Phase II

Committee

Christina M. Cohen

Co-Chair

CHRISTINA M. S. COHEN is a member of the professional staff at the California Institute of Technology where her work involves the design, calibration, and analysis of several energetic particle instruments. Cohen's research currently focuses on the acceleration, transport, and properties of solar energetic particles in the heliosphere and their space weather implications; and previously has included energetic particle populations in the Jovian magnetosphere and the heavy ion composition of the solar wind. Cohen analyzes combined in-situ particle measurements with remote sensing of flares, radio bursts, and coronal mass ejections. Cohen is the principal investigator on the Ultra-Low Energy Isotope Spectrometer (ULEIS) on the Advanced Composition Explorer (ACE) mission, as well as co-investigator on the High-energy Ion Telescope (HIT) on the Interstellar Mapping and Acceleration Probe (IMAP) mission, the Energetic Particle Instrument-High (EPI-Hi) on Parker Solar Probe, and the Sun Radio Interferometer Space Experiment (SunRISE; a small satellite). Cohen is also a team member of the Solar Isotope Spectrometer (SIS) on ACE, the Low Energy Telescope (LET) on the Solar Terrestrial Relations Observatory (STEREO) mission, and the Heavy Ion Counter (HIC) on the Galileo mission. Cohen is on the science advisory board for Eos and is the past president of the space physics and aeronomy section of the American Geophysical Union. Cohen earned a Ph.D. in physics from the University of Maryland, College Park.

Tuija Pulkkinen

Co-Chair

TUIJA I. PULKKINEN, NAS, is chair and professor at the University of Michigan in Ann Arbor in the Department of Climate and Space Sciences and Engineering. Pulkkinen previously served as professor, vice president, and dean of the School of Electrical Engineering at the Aalto University in Espoo, Finland. Pulkkinen's research interests comprise Sun-Earth connection physics in a wide sense: energy transfer processes from the solar wind to the magnetosphere-ionosphere system; effects of large solar disturbances in the magnetosphere and ionosphere; auroral processes and their relationship to magnetotail dynamics; storm and substorm effects in the magnetotail, in the inner magnetosphere and in the ionosphere; long-term solar variability effects in the geoefficiency of the solar wind driving; and space weather effects of solar wind driven magnetospheric dynamics. Pulkkinen is an expert in empirical modeling of the magnetospheric magnetic field and in the development of quantitative analysis methods for global MHD simulations and in multi-instrument data analysis using measurements from space- and ground-based instruments. Pulkkinen was the 2019 Birkeland Lecturer, The Norwegian Academy of Science and Letters, and a recipient in 2017 of the Julius Bartels Medal, European Geosciences Union. Pulkkinen received a Ph.D. in theoretical physics from the University of Helsinki.

Daniel N. Baker

Member

DANIEL N. BAKER, NAE, is director of the Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder (CU); Distinguished Professor of Planetary and Space Physics at CU; and the Moog-Broad Reach Endowed Chair of Space Sciences at CU. Previously, Baker was group leader for Space Plasma Physics at Los Alamos National Laboratory and division chief at NASA's Goddard Space Flight Center. Baker's research is in spacecraft instrumental design and calibration, space physics data analysis, and magnetospheric modeling. Baker has studied plasma physical and energetic particle phenomena in the magnetospheres of Jupiter and Mercury, and the plasma sheet and magnetopause boundary regions of Earth's magnetosphere. Baker is experienced in the analysis of large data sets from spacecraft at geostationary orbit, and involvement in missions to the Earth's deep magnetotail and comets, in the study of solar wind-magnetospheric energy coupling, and theoretical modeling of the possible role of heavy ions in the development of magnetotail instabilities. Baker's current interests include the use of computer systems and networks to enhance the acquisition, dissemination, and display of spacecraft data. Baker was lead investigator on several NASA space missions including Magnetospheric Multiscale (MMS) and the Radiation Belt Storm Probes (Van Allen Probes). Baker's honors include being awarded the 2018 William Bowie Medal from the American Geophysical Union for outstanding geoscience research. Baker was also the recipient of the 2019 Hannes Alfvén Medal of the European Geosciences Union. Baker received his Ph.D. in space physics from the University of Iowa.

Anthea J. Coster

Member

ANTHEA J. COSTER is a principal research scientist at MIT's Haystack Observatory in Westford, Massachusetts. Coster's research interests include physics of the ionosphere, magnetosphere, and thermosphere; space weather and geomagnetic storm time effects; coupling between the lower and upper atmosphere; GPS positioning and measurement accuracy; radio wave propagation effects; and meteor detection and analysis. Coster is a co-principal investigator on the National Science Foundation supported Millstone Hill Geospace facility award and a principal investigator/co-principal investigator on numerous projects involving the use of GPS to probe the atmosphere, including investigations of the plasmaspheric boundary layer, stratospheric warming, and the ionosphere over the Antarctic. Coster and co-workers developed the first real-time ionospheric monitoring system based on GPS. Coster has been involved with measuring atmospheric disturbances over short baselines (GPS networks smaller than 100 km) for the U.S. Federal Aviation Administration and has coordinated meteor research using the ALTAIR dual-frequency radar for NASA. Coster received a Ph.D. in space physics and astronomy from Rice University.

Mary K. Hudson

Member

MARY K. HUDSON is the Eleanor and A. Kelvin Smith Professor Emerita of Physics at Dartmouth College and a senior research associate at the National Center for Atmospheric Research. Hudson also served for eight years as chair of Physics and Astronomy at Dartmouth. Current areas of investigation include the evolution of the radiation belts; how the ionized particle outflow is known as the solar wind and the magnetic field of the Sun interact with the magnetic field of the Earth, producing electrical currents in the ionosphere; and the effects of solar cosmic rays on radio communications near the Earth's poles. Hudson is a co-investigator on NASA's Van Allen Probes Mission. Hudson was one of the principal investigators with the Center for Integrated Space Weather Modeling, where researchers studied the weather patterns that originate from a solar eruption, following the energy and mass transfer through the interplanetary medium, all the way to the Earth's ionosphere. Hudson is a fellow of the American Geophysical Union (AGU), recipient of the 2017 Fleming Medal, and recipient of the AGU Macelwane Award. Hudson has served on Heliophysics Subcommittee of the NASA Advisory Council. Hudson received a Ph.D. in physics from the University of California, Los Angeles.

Delores Knipp

Member

DELORES KNIPP is a research professor in the Smead Aerospace Engineering Science Department and a senior research associate at the National Center for Atmospheric Research High Altitude Observatory. Knipp's research focuses on weather at the space-atmosphere interaction region; she also advances scientific use of space environment observations and promotes education related to space weather. Knipp has over 30 years of research and teaching experience in meteorology, and upper atmosphere and geospace environment physics. Knipp is a retired U.S. Air Force officer, an American Meteorological Society fellow, and the director of the Education Enterprise at the University of Colorado Boulder's Space Weather Technology, Research, and Education Center (SWx TREC). Knipp earned a Ph.D. in atmospheric science at the University of California, Los Angeles.

KD Leka

Member

KD LEKA is a senior research scientist at NorthWest Research Associates' Boulder, Colorado office, and a designated foreign professor at the Institute for Space-Earth Environmental Research at Nagoya University, in Nagoya, Japan. Leka held post-doctoral fellowships at the National Oceanic and Atmospheric Administration/Space Environment Center through the National Research Council, and at the High Altitude Observatory through the National Center for Atmospheric Research/Advanced Study Program. Leka's present research interests span solar and space physics including solar active regions, spectropolarimetry and magnetic fields, and solar energetic event prediction. Leka has served as chair of the User's Committee of the National Solar Observatories and on a NASA Senior Review of Heliophysics Operating Missions. Leka earned a Ph.D. in astronomy from the University of Hawaii.

Charles D. Norton

Member

CHARLES D. NORTON is the associate chief technologist at the National Aeronautics and Space Administration Jet Propulsion Laboratory (JPL) contributing to JPL's strategic planning, investment portfolio, new technology research, and infusion into flight projects. Norton recently served as the special advisor for small spacecraft missions at NASA Headquarters. While at NASA Headquarters, Norton was responsible for advising on cross-agency strategic directions for innovative small satellite science, exploration, and technology missions—from ESPA-Class spacecraft down to CubeSats. Norton has led and performed research spanning high-performance computing, advanced information systems technology, and small satellite science and technology mission development. Norton has managed multiple CubeSat flight projects for NASA and co-led the Caltech KISS Study Program, "Small Satellites: A Revolution in Space Science." Norton is a recipient of numerous awards for new technology and innovation, including the JPL Lew Allen Award, Voyager Award, and the NASA Exceptional Service Medal. Norton received a Ph.D. in computer science from Rensselaer Polytechnic Institute.

Terrance G. Onsager

Member

TERRANCE G. ONSAGER is a physicist with the National Oceanic and Atmospheric Administration Space Weather Prediction Center. Onsager's 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. It also includes 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. Onsager has served as the director of the International Space Environment Service, co-chair of the World Meteorological Organization Inter-Programme Coordination Team on Space Weather, and as 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. Onsager 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.

Larry J. Paxton

Member

LARRY J. PAXTON is a member of the principal professional staff at the Johns Hopkins University Applied Physics Laboratory (JHU/APL) and is chief scientist for Geospace. His research interests include space science, space technology, satellite- and ground-based mission design, the implications of global climate change for the stability of nations; and innovation. Paxton is particularly interested in new instruments that characterize the geospace environment and has published over 260 papers on these subjects. Paxton is the principal investigator on seven instruments that have flown in space. Paxton is an academican member of the International Academy of Astronautics and the past president of the American Geophysical Union's Space Physics and Aeronomy section. Paxton's awards include JHU/APL Publication of the Year Awards; JHU/APL Government Purpose Invention of the Year Nominee; and Best Paper - 7th IAA Symposium on Small Satellites for Earth Observation. Other recent relevant experience includes JHU's Global Water Institute and the JHU Earth Environment Sustainability and Health Institute as well as the NASA Heliophysics Roadmap Committee; NSF Aeronomy Review Panel and NSF Aeronomy Committee of Visitors; chair of IAA Commission 4 and Small Satellite Program Committee. Paxton earned a Ph.D. in astrophysical, planetary, and atmospheric sciences from the University of Colorado Boulder.

Pete Riley

Member

PETE RILEY is vice president, chief financial officer, and senior research scientist at Predictive Science Inc. Riley is particularly interested in 3D, time-dependent MHD simulations of large-scale heliospheric processes, including solar wind streams and coronal mass ejections. Riley's expertise lies primarily in developing, testing, and running massively parallel computer codes, which are run on a range of parallel architectures, from small clusters to large supercomputers, such as NSF's Ranger and NASA's Pleiades. Riley also analyzes a variety of solar and interplanetary datasets and is a member of the STEREO, Ulysses, and ACE plasma instrument teams. Riley is also a member of the Solar Probe and Solar Orbiter magnetometer instrument teams. Riley was awarded a group achievement award for his contribution to the Advanced Composition Explorer mission and co-won the 2006 SAIC RDT&E Group performance award. Riley has published over 60 papers in the field of space physics, and particularly in the area of heliospheric physics. Riley served as chair for NSF's SHINE steering committee and has served on the NSF's Space Weather benchmarks steering committee, a follow-on to the NSF Space Weather Benchmarks Phase I study. Additionally, Riley chairs-ed the 2019 Induced Geo-Electric Fields working group and is also co-lead of the real-time forecasting validation planning group for the CCMC's IMF Bz, which in turn, is part of the IMF Bz at L1 working team, also co-lead by him. Riley has served as principal investigator for a number of projects supported by NASA, NOAA, NSF, and DoD. Riley received a Ph.D. in space physics and astronomy from Rice University.

Ronald E. Turner

Member

RONALD E. TURNER is distinguished analyst with Analytic Services (ANSER) Inc., which in 2004 became the parent institution of the Homeland Security Institute, the only Federally Funded Research and Development Center dedicated to the Department of Homeland Security. Turner is an internationally recognized expert in radiation risk management for astronauts, particularly in response to solar storms. For nine years Turner was the ANSER point of contact to the NASA Institute for Advanced Concepts, an independent institute charged with creating a vision of future space opportunities to lead NASA into the twenty-first century. Turner is currently the senior science advisor to the new, NASA Innovative Advanced Concepts Program. Turner was a participating scientist for the Mars Odyssey program. Turner is on the advisory council to the National Space Biomedical Research Institute Center for Acute Radiation Research. Turner earned a Ph.D. in physics from the Ohio State University.

Nicholeen M. Viall-Kepko

Member

NICHOLEEN M. VIALL is a research astrophysicist at NASA's Goddard Space Flight Center and serves as the mission scientist for the Polarimeter to Unify the Corona and Heliosphere (PUNCH) mission. Viall studies solar coronal heating, the formation of the solar wind, and the impact of solar wind structures on Geospace. Viall has been a highly visible member of NASA's outreach and media team with over 70 live shot television interviews that included the August 21, 2017 Eclipse and the Parker Solar Probe launch and first results. In addition, Viall has given over 100 scientific talks/presentations, 27 international talks, and 39 invited talks. Viall received the 2018 AAS/SPD Karen Harvey Prize, awarded for a significant contribution to the study of the Sun early in a person's professional career, as well as NASA's Early Career Achievement Medal in 2018, for "fundamental contributions to understanding coronal heating and the slow solar wind and for valuable service to NASA, the science community and the public." Viall earned a Ph.D. in astronomy from Boston University.

Endawoke Yizengaw

Member

ENDAWOKE YIZENGAW is a senior scientist at the Aerospace Corp. Yizengaw's research has focused on the complexities of ionospheric electrodynamics, particularly with regard to improving the modeling of the ionosphere as it applies to GPS communications. Previously, Yizengaw was a senior research scientist at Boston College. Yizengaw has received the AGU's Joanne Simpson Medal for Mid-Career Scientists. In addition to his scientific contributions, Yizengaw has played a vital role in the expansion of space science education and research in developing countries, including his native Ethiopia. He holds a Ph.D. in space physics from La Trobe University in Australia. Yizengaw has not previously served on a National Academies committee.