Agenda as of April 19, 2021

2021 Space Weather Workshop Agenda
Held Virtually

Times in EDT

Monday Evening, April 19

6:00 - 8:00 pm **Space Weather: Student/Professional Virtual Networking Session**

Co-Chairs: Rhiannon Fleming, Millersville University
Sara Housseal, US Air Force Space Weather Operations Center

Participating Professionals:
Janet Green, Space Hazards Applications
Alexa Halford, NASA Goddard Space Flight Center
Rachel Hock, USAF, Air Force Research Laboratory
Dan Welling, University of Texas, Arlington

Participating Graduate Students:
Samantha Carlson, Catholic University of America
Samantha Howard, Maj, USAF Air Force Institute of Technology
Agnit Mukhopadhyay, University of Michigan
Lengying Khoo, University of Colorado, Boulder

Tuesday, April 20

10:00 am **Opening Remarks and Welcome**
Bill Murtagh, National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Space Weather Prediction Center (SWPC)

10:05 – 10:50 **Space Weather Policy**
Co-Chairs: Tammy Dickinson, Science Matters Consulting
Bill Murtagh, NOAA/SWPC

10:05 **Update from the Executive Office of the President**
Caitlin Durkovich, National Security Council

10:15 **Implementation of U.S. Space Weather Policy**
Louis Uccellini, NOAA National Weather Service

10:25 **UK Space Weather Strategy**
Mark Prouse, Department for Business, Energy & Industrial Strategy, UK

10:35 **Q&A**

10:45 **Break**

10:50 – 12:15 **Space Weather Programs**
Co-Chairs: Tammy Dickinson, Science Matters Consulting
Bill Murtagh, NOAA/NWS/SWPC

10:50 **Session Introduction**

10:55 **Space Weather Prediction Center (SWPC)**
Clinton Wallace, NOAA/NWS/SWPC

11:05 **National Environmental Satellite, Data, and Information Service (NESDIS)**
Elsayed Talaat, NOAA NESDIS

11:15 **National Aeronautics and Space Administration (NASA)**
Jamie Favors, NASA Headquarters, Heliophysics Division

11:25 **National Science Foundation (NSF)**
Mangala Sharma, NSF Geospace Section

11:35 **US Air Force (USAF)**
Omar Nava, Lt Col, Headquarters USAF/A3W

11:45 **American Commercial Space Weather Association (ACSWA)**
Jennifer Gannon, Computational Physics, Inc.

11:55 **Q&A**

12:15 – 1:00 **Lunch**

1:00 – 2:30 **Space Weather and Space Situational Awareness**
Co-Chairs: Jinni Meehan, NOAA, National Weather Service Headquarters
Janet Green, Space Hazards Applications

1:00 **Session Introduction**

1:05 **Space Traffic Management**
Moriba Jah, University of Texas, Austin, Aerospace Engineering and Engineering Mechanics

1:15 **Office of Space Commerce**
Mark Mulholland, NOAA Office of Space Commerce

1:25 **Low Earth Orbit (LEO) Space Environment**
Jeff Thayer, University of Colorado, Aerospace Engineering Sciences

1:35 **Maxar Anomaly Analysis**
Casey Keys, Maxar

1:45 **Iridium's Space Operations Experience Through the Decades**

Walt Everetts, Iridium

1:55 **GEO Spacecraft Anomaly Attribution Using GOES-16 / 17 Data**
Dave Pitchford, SES

2:05 **Q&A**

2:30 – 3:00 **Break**

3:00 – 4:30 **<u>Space Weather Support for Human Exploration</u>**
Co-Chairs: Bob Rutledge, Aerospace Corporation
Bill Murtagh, NOAA/NWS/SWPC

3:00 **Session Introduction**

3:05 **NASA Plans for Human Exploration**
John Allen, NASA Headquarters, Human Exploration and Operations

3:15 **NESC Study: Safe Human Expeditions Beyond Low Earth Orbit**
Azita Valinia, NASA Engineering & Safety Center (NESC)

3:25 **NASA Space Radiation Analysis Group**
Katie Whitman, NASA Johnson Space Center, Space Radiation Analysis Group

3:35 **Radiation Modeling**
Hazel Bain, University of Colorado, Cooperative Institute for Research in Environmental Sciences (CIRES)/SWPC

3:45 **European Space Agency (ESA) Support for Human Spaceflight**
Alexi Glover, ESA Space Safety Programme Office

3:55 **Gateway-Space Weather Observations**
Bill Paterson, NASA Goddard Space Flight Center

4:05 – 4:30 **Q&A**

4:30 – 5:00 **Break**

5:00 – 6:30 **Lightning Talks (5:00-5:30) and Poster Session (5:30-6:30):**
Solar and Interplanetary Research and Applications
Chair: Leila Mays, NASA Community Coordinated Modeling Center (CCMC)
Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT):

- **Predicting the Occurrence of Solar Energetic Particles With Machine Learning Techniques**
  Eleni Lavasa, Department of Physics, National and Kapodistrian University of Athens
- **Space Weather Monitoring in 3D with PUNCH and QuickPUNCH: Mission Status**
  Craig DeForest, Southwest Research Institute
- **SMOS Mission: from Earth Explorer Satellite to Space Weather Asset**
  Manuel Flores-Soriano, Universidad de Alcalá
- **The Solaris Solar Polar MIDEX Mission: Improving our Understanding for Space Weather**
  Don Hassler, Southwest Research Institute
- **Solar Wind Simulations along the Parker Solar Probe Trajectory**
  Dinesha Vasanta Hegde, The University of Alabama in Huntsville
- **Advantages of Multiple Line-of-Sight Measurements of Faraday Rotation through a Coronal Mass Ejection**
  Jason Kooi, U.S. Naval Research Laboratory

Wednesday, April 21

10:00 – 11:30 **Space Weather: Meeting the Needs of the Energy Sector**

Co-Chairs: Antti Pulkkinen, NASA Goddard Space Flight Center, Heliophysics Science Division
Jenn Gannon, Computational Physics, Inc.

10:00 **Session Introduction**

10:05 **NESDIS Powergrid Economic Impact Study**
Lou Nadeau, Eastern Research Group, Inc.

10:15 **Geomagnetic Disturbances – British Columbia Hydro Experience**
Jorge Hollman, Powertech Labs

10:25 **Ground Electromagnetic Induction and the Geoelectric Field: Update from the United States Geological Survey (USGS)**
Anna Kelbert, USGS Geomagnetism Program

10:35 **NOAA-USGS Geoelectric Field Model**
Chris Balch, NOAA/NWS/SWPC

10:45 **Ensemble Modeling to Predict Space Weather Impacts on the North American Power Grid**
Steven Morley, Los Alamos National Laboratory

10:55 **Texas A&M Support for Texas Grid**
Komal Shetye, Texas A&M University, Engineering

11:05 – 11:30 **Q&A**

11:30 – 1:00 **Lunch Events:**

Student Lunch with a Professional (11:40-12:50)
Co-Chairs: Rhiannon Fleming, Millersville University
Carina Alden, NASA Goddard Space Flight Center
Participating Professionals:
Hazel Bain, CIRES CU Boulder / NOAA SWPC
Michele Cash, NOAA/SWPC

15th Annual NOAA - American Commercial Space Weather Association (ACSWA) Summit Meeting – by invitation (11:40-12:50)

1:00 – 2:30 **Space Weather: Meeting the Needs for Global Aviation Services**

Co-Chairs: Rachel Hock, USAF, Air Force Research Laboratory
Frank Centinello, LT, NOAA/NWS/SWPC

1:00 **Session Introduction**

1:05 **Provision of ICAO Space Weather Information**
Pat Murphy, FAA Aviation Weather Division

1:15 **UN International Civil Aviation Organization (ICAO) Space Weather Services**
Kirsti Kauristi, Finnish Meteorological Institute

1:25 **Space Weather Services in Support of Aviation**
Robyn Fiori, Natural Resources Canada (NRCAN)

1:35 **Space Weather and the Allied Pilots Association**
Rondeau Flynn, Allied Pilots Association

1:45 **Space Weather and Airlines for America**
Nathan Polderman, Airlines for America (A4A)

1:55 **Whole Atmosphere Model - Ionosphere Plasmasphere Electrodynamics (WAM-IPE)**
Tzu-Wei Fang, CIRES/SWPC

2:05 – 2:30 **Q&A**

2:30 – 3:00 **Break**

3:00 – 4:30 **<u>Observing and Modeling the Ionosphere: Supporting Communications and Navigation</u>**
Co-Chairs: Tzu-Wei Fang, University of Colorado, CIRES/SWPC
Omar Nava, Lt Col, Headquarters USAF/A3W

3:00 **Session Introduction**

3:05 **Space Weather Effects on Communications Systems**
Mark MacAlester, Department of Homeland Security, Cybersecurity and Infrastructure Security Agency

3:15 **The Ionosphere's Impact on Global Navigation Satellite System (GNSS)**
Jade Morton, University of Colorado, Aerospace Engineering Sciences

3:25 **Defense Advanced Research Projects Agency (DARPA) Space Environment Portfolio**
David Lewis, Lt Col, DARPA, USAF

3:35 **Space Weather Research and Operations at the German Aerospace Center (DLR) Institute for Solar-Terrestrial Physics**
Jens Berdermann, DLR, Institute for Solar-Terrestrial Physics

3:45 **ASTRA Ionospheric Observations and Modeling Ionospheric Conditions**
Geoff Crowley, Atmospheric & Space Technology Research Associates (ASTRA)

3:55 **Data Assimilation for Ionospheric and Thermospheric Prediction of Dynamics**
Seebany Datta-Barua, Illinois Institute of Technology, Mechanical and Aerospace Engineering

4:05 – 4:30 **Q&A**

4:30 – 5:00 **Break**

5:00 – 6:30 **Lightning Talks (5:00-5:30) and Poster Session (5:30-6:30):**
Ionosphere and Thermosphere Research and Applications and General Space Weather
Chair: Tim Fuller-Rowell, CIRES/SWPC
Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT):

Taking Ionospheric Measurements to the Oceans
Irfan Azeem, ASTRA LLC

Interactive Tool To Visualize Space Weather Scenarios
Valerie Bernstein, University of Colorado Boulder

Estimation of ROTI Thresholds for Ionospheric Scintillation Over the African Sector

Pierre Cilliers, South African National Space Agency

Ionospheric Long-Term Trends and Its Relevance to Space Weather
Ana Georgina Elias, Laboratorio de Ionosfera, Atmosfera Neutra y Magnetosfera

Resolving High-Latitude Ionospheric Plasma Density Structures With Novel Geospace Sensor Techniques
Lindsay Goodwin, New Jersey Institute of Technology; University Corporation for Atmospheric Research

SWx TREC's Space Weather Data Portal: A Tool for Accessing Diverse Space Weather Data
Jenny Knuth, SWx TREC, CU Boulder, LASP

An Operative Space Weather Service in Argentina
Vanina Lanabere, Universidad de Buenos Aires

Pushing the Frontiers of Geoelectric Hazard Modeling
Greg Lucas, Laboratory for Atmospheric and Space Physics

Thursday, April 22

10:00 – 12:00 **Space Weather Research to Operations to Research (R2O2R) Applications**
Co-Chairs: Barbara Giles, NASA Heliophysics Science Division, Goddard Space Flight Center
Jim Spann, NASA Headquarters, Heliophysics Division

10:00 **Session Introduction**

10:05 **Automated Radiation Measurements for Aerospace Safety - Dual Monitor (ARMAS-DM)**
Kent Tobiska, Space Environment Technologies

10:13 **Advanced Techniques to Specify Irregularities with Ground- and Space-based Sensors**
Keith Groves, Boston College

10:21 **A CubeSat Based System for Topside Ionospheric Sounding**
Ivan Galkin, Lowell Digisonde International

10:29 **A Tool for Defining Solar Particle Access to the Magnetosphere (SPAM) for Satellite Anomaly Attribution**
Janet Green, Space Hazards Applications

10:37 **Towards a Robust Hindcast and Forecast Framework for On-Orbit Satellite Anomaly Detection**
Adam Kellerman, University of California Los Angeles

10:45 **Enhancing Geomagnetically Induced Current Understanding and Prediction over Continental United States**
Chigomezyo Ngwira, Atmospheric & Space Technology Research Associates (ASTRA)

10:53 **Advanced Prediction of Upper Atmospheric Neutral Density Using Measurements from Solar Wind Sentinels**
Daniel Weimer, Virginia Polytechnic Institute & State University

11:01 **Improving the EUVS Spectral Model Through Physics-Based Differential Emission Techniques**
Courtney Peck, University of Colorado

11:09 **Interactive Tool for Modeling Multiple Solar Eruptions**
Tibor Török, Predictive Science Inc.

11:17 **Extending and Improving the Wang-Sheeley-Arge Solar Wind Model**
Heather Elliott, Southwest Research Institute

11:25 **Updates to Global Remotely-Sensed Heliospheric Modeling Using In-situ Spacecraft Measurements**
Bernard Jackson, University of California, San Diego

11:33 **Q&A**

12:00 - 1:00 **Lunch, also**
Heliophysics Decadal Survey Plans-Interactive Discussion (12:10-12:50)
Co-Chairs: Antti Pulkkinen, NASA Goddard Space Flight Center, Heliophysics Science Division
Jenn Gannon, Computational Physics, Inc.
Presenters: Jim Spann, NASA Headquarters, Heliophysics Division
Jared Leisner, NASA Headquarters, Heliophysics Division

1:00 - 2:30 **Space Weather: New and Future Observations To Advance Understanding and Forecasting**
Co-Chairs: Joanne Ostroy, NOAA/NESDIS
Terry Onsager, NOAA/NWS/SWPC

1:00 **Session Introduction**

1:05 **Radiation Belts: What We've Learned from Van Allen Probes and Future Prospects**
Dan Baker, University of Colorado, Laboratory for Atmospheric and Space Physics

1:15 **Solar Orbiter**
Teresa Nieves-Chinchilla, NASA Goddard Space Flight Center

1:25 **Space Weather Applications of the Spire Nanosatellite Constellation**
Matthew Angling, Spire

1:35 **Radio Occultation Measurements from GeoOptics CICERO Constellation**
Conrad Lautenbacher, GeoOptics

1:45 **Solar Cruiser**
Leslie McNutt, NASA Marshall Space Flight Center

1:55 **CubeSat Mission to Study Solar Particles - Pathfinder for Interplanetary Space Weather Constellation Mission**
Mihir Desai, Southwest Research Institute

2:05 **Q&A**

2:30 – 3:00 **Break**

3:00 – 4:30 **Advances in Space Weather Modeling and Services**
Co-Chairs: Dan Welling, University of Texas, Arlington, Physics Department
Howard Singer**,** NOAA/NWS/SWPC

3:00 **Session Introduction**

3:05 **Solar Storms and Terrestrial Impacts Center (SOLSTICE): Where Machine Learning Meets Space Weather Modeling**
Tamas Gombosi, University of Michigan, Climate and Space Sciences and Engineering

3:15 **Building Multiscale Atmosphere-Geospace Environment (MAGE): Toward a New Community Model for Understanding and Predicting Space Weather**
Slava Merkin, Johns Hopkins University Applied Physics Laboratory

3:25 **Harnessing Big Data to Improve Understanding and Predictions of Geomagnetically Induced Currents (GIC)**
Hyunju Connor, University of Alaska, Physics Department

3:35 **International Space Weather Action Teams (ISWAT)**
Masha Kuznetsova, NASA Goddard Space Flight Center, Community Coordinated Modeling Center

3:45 **Ground-Based Solar Astronomy Support to Space Weather R&D: DKIST and the Path Forward**
Valentin M. Pillet, National Solar Observatory (NSO)

3:55 **Machine Learning in Space Weather**
Enrico Camporeale, University of Colorado, CIRES/SWPC

4:05 **Q&A**

4:20 **Workshop 'Penultimate' Remarks**
Howard Singer, NOAA/NWS/SWPC

4:30 – 5:00 **Break**

5:00 – 6:30 **Lightning Talks (5:00-5:30) and Poster Session (5:30-6:30):**
Geospace/Magnetosphere and Aviation Radiation Research and Applications
Chair: Michael Wiltberger, National Center for Atmospheric Research, High Altitude Observatory (NCAR HAO)
Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT):

A Machine Learning Based Specification and Forecast Model of the Inner Magnetospheric Radiation Environment
Jacob Bortnik, UCLA

Geomagnetically Induced Currents and Space Weather Prediction in Austria
Dennis Albert, Institute of Electrical Power System, Graz University of Technology

GIC Monitoring in the Mexican 400kV Power Grid
Ramón Caraballo, Universidad Nacional Autónoma de México, Laboratorio Nacional de Clima Espacial

Substorm Dynamics in MHD: Statistical Validation Tests and Paths for Improvement
John Haiducek, US Naval Research Laboratory