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  Space Weather Support for Human Exploration
            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
### 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.

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<tr>
<th>Time</th>
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<td>10:00</td>
<td><strong>Session Introduction</strong></td>
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<td>10:05</td>
<td><strong>NESDIS Powergrid Economic Impact Study</strong></td>
<td>Lou Nadeau, Eastern Research Group, Inc.</td>
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<td>10:15</td>
<td><strong>Geomagnetic Disturbances – British Columbia Hydro Experience</strong></td>
<td>Jorge Hollman, Powertech Labs</td>
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<td>10:35</td>
<td><strong>NOAA-USGS Geoelectric Field Model</strong></td>
<td>Chris Balch, NOAA/NWS/SWPC</td>
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<td>10:45</td>
<td><strong>Ensemble Modeling to Predict Space Weather Impacts on the North American Power Grid</strong></td>
<td>Steven Morley, Los Alamos National Laboratory</td>
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<td>10:55</td>
<td><strong>Texas A&amp;M Support for Texas Grid</strong></td>
<td>Komal Shetye, Texas A&amp;M University, Engineering</td>
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<td>11:05</td>
<td><strong>Q&amp;A</strong></td>
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#### 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


#### Space Weather: Meeting the Needs for Global Aviation Services

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

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<td><strong>Session Introduction</strong></td>
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<td>1:05</td>
<td><strong>Provision of ICAO Space Weather Information</strong></td>
<td>Pat Murphy, FAA Aviation Weather Division</td>
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<td>1:15</td>
<td><strong>UN International Civil Aviation Organization (ICAO) Space Weather Services</strong></td>
<td>Kirsti Kauristi, Finnish Meteorological Institute</td>
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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 Observing and Modeling the Ionosphere: Supporting Communications and Navigation
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
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.
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<td>11:17</td>
<td><strong>Extending and Improving the Wang-Sheeley-Arge Solar Wind Model</strong></td>
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<td>Heather Elliott, Southwest Research Institute</td>
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<td>11:25</td>
<td><strong>Updates to Global Remotely-Sensed Heliospheric Modeling Using In-situ Spacecraft Measurements</strong></td>
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<td>Bernard Jackson, University of California, San Diego</td>
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<td>11:33</td>
<td><strong>Q&amp;A</strong></td>
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<td>12:00</td>
<td>Lunch, also <strong>Heliophysics Decadal Survey Plans-Interactive Discussion (12:10-12:50)</strong></td>
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<td>Co-Chairs: Antti Pulkkinen, NASA Goddard Space Flight Center, Heliophysics Science Division</td>
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<td>Presenters: Jim Spann, NASA Headquarters, Heliophysics Division</td>
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<td>Jared Leisner, NASA Headquarters, Heliophysics Division</td>
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<td>1:00</td>
<td><strong>Space Weather: New and Future Observations To Advance Understanding and Forecasting</strong></td>
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<td>Co-Chairs: Joanne Ostroy, NOAA/NESDIS</td>
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<td>Terry Onsager, NOAA/NWS/SWPC</td>
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<td>1:05</td>
<td><strong>Radiation Belts: What We've Learned from Van Allen Probes and Future Prospects</strong></td>
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<td>Dan Baker, University of Colorado, Laboratory for Atmospheric and Space Physics</td>
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<td>1:15</td>
<td><strong>Solar Orbiter</strong></td>
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<td>Teresa Nieves-Chinchilla, NASA Goddard Space Flight Center</td>
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<td>1:25</td>
<td><strong>Space Weather Applications of the Spire Nanosatellite Constellation</strong></td>
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<td>Matthew Angling, Spire</td>
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<td><strong>Radio Occultation Measurements from GeoOptics CICERO Constellation</strong></td>
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<td>Conrad Lautenbacher, GeoOptics</td>
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<td><strong>Solar Cruiser</strong></td>
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<td>Leslie McNutt, NASA Marshall Space Flight Center</td>
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<td><strong>CubeSat Mission to Study Solar Particles - Pathfinder for Interplanetary Space Weather Constellation Mission</strong></td>
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<td>Mihir Desai, Southwest Research Institute</td>
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<td>2:30-3:00</td>
<td><strong>Break</strong></td>
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<td>3:00-4:30</td>
<td><strong>Advances in Space Weather Modeling and Services</strong></td>
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<td>Co-Chairs: Dan Welling, University of Texas, Arlington, Physics Department</td>
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<td>Howard Singer, NOAA/NWS/SWPC</td>
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<td><strong>Solar Storms and Terrestrial Impacts Center (SOLSTICE): Where Machine Learning Meets Space Weather Modeling</strong></td>
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<td>Tamás Gombosi, University of Michigan, Climate and Space Sciences and Engineering</td>
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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