2022 Space Weather Workshop (virtual meeting)

THEME: Collaboration: Advancing the Space Weather Enterprise

Times in EDT

Monday Evening, April 25 (Session for Students)

6:00 – 8:00 pm  Space Weather: Student Welcome and Citizen Science Discussion  
Sophie Graf (Organizer, UT, Arlington); co-chair Elizabeth Vandegrif (UT, Arlington)

6:00  Space Weather Workshop Student Welcome  
Sophie Graf, UT Arlington

6:05  Introduction to the Space Weather Workshop and Overview for Students  
Bill Murtagh, NOAA/SWPC

6:20 – 6:35  Q&A

6:35  Introduction to the Space Weather Student Career Development Resource  
Sophie Graf, UT, Arlington

6:50 – 7:00  Q&A

7:00  Heliophysics Citizen Science and Innovation in the Past, Present, and Future  
Liz MacDonald, NASA Goddard Space Flight Center

7:20  HamSCI: Collaborating with Radio Amateurs to Better Understand Space Weather 
Nathaniel Frissell, University of Scranton

7:40 – 8:00  Q&A

Tuesday, April 26

10:00  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: Bill Murtagh, NOAA/SWPC  
Jinni Meehan, NOAA/NWS Headquarters

10:05  **Space Weather and Critical Infrastructure Resilience: Senior Officials Exercise**  
Caitlin Durkovich, Resilience and Response, National Security Council (NSC), White House

10:15  **Update from the Office of Science and Technology Policy (OSTP)**  
Ezinne Uzo-Okoro, Executive Office of the President (EOP) /Office of Science and Technology Policy (OSTP)

10:25  **Implementation of U.S. Space Weather Policy**  
Mary Erickson, Space Weather Operations, Research and Mitigation Subcommittee (SWORM)/National Weather Service

10:35  **UK Space Weather Strategy and US - UK Workshop**  
Mark Prouse, Department for Business, Energy & Industrial Strategy, UK

10:45 - 10:50  Break

10:50 – 11:19  **Implementing the “Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow” Act - Part I**  
Co-Chairs: Jinni Meehan, NOAA/NWS  
Bill Murtagh, NOAA/NWS/SWPC

10:50  **NOAA National Weather Service (NWS)**  
Clinton Wallace, NOAA/NWS/SWPC

10:58  **Implementing the PROSWIFT ACT**  
Lt Col Justin Erwin, DOD/USAF

11:06  **Space Weather Advisory Group (SWAG)**  
Tammy Dickinson, Science Matters Consulting

11:14 – 11:19  Break

11:19 – 12:15  **Implementing the “Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow” Act – Part II**  
Co-Chairs: Jinni Meehan, NOAA/NWS  
Bill Murtagh, NOAA/NWS/SWPC

11:19  **NOAA National Environmental Satellite, Data, and Information Service (NESDIS)**  
Elsayed Talaat, NOAA/NESDIS/Office of Projects, Planning and Analysis (OPPA)

11:27  **NASA**  
Jamie Favors, NASA Headquarters, Heliophysics Division

11:35  **NSF**  
Mangala Sharma, NSF Geospace Section

11:43  **American Commercial Space Weather Association (ACSWA)**  
Kent Tobiska, Space Environment Technologies

11:51 – 12:15  **Community Discussion with Morning Session Speakers**

12:15 – 1:00  **Lunch and National Academies of Sciences Space Weather Roundtable Discussion (12:20-12:55)**  
Co-Chairs: Bill Murtagh, NOAA SWPC
1:00 – 2:30  
**Space Traffic Coordination and Space Situational Awareness**  
Co-Chairs: Janet Green, Space Hazards Applications  
Mike Bonadonna, NOAA NESDIS

1:00  
**Session Introduction** – Janet Green

1:05  
**Still Muddling Through Space Traffic Management**  
Brian Weeden, Secure World Foundation

1:15  
**Office of Space Commerce – New Operational SSA System**  
Brian Bates, NOAA Office of Space Commerce

1:25  
**Space Domain Awareness Environmental Toolkit for Defense: Software Transition Approach**  
Sage Andorka, United States Space Force (USSF)

1:35  
**LEO Space Environment Impacts on Satellite Orbits**  
Eric Sutton, Univ. of Colorado, Technology, Research and Education Center (TREC)

1:45  
**Space Weather Environment during SpaceX Starlink Satellite Loss in February 2022**  
Tzu-Wei Fang, NOAA SWPC

1:55  
**Space Weather Tools for Investigating Satellite Anomalies: Current Status and Future Needs**  
Alex Boyd, Aerospace Corporation

2:05  
Q&A

2:30 – 3:00  
Break

3:00 – 4:30  
**Space Weather Support for Human Exploration**  
Co-Chairs: Azita Valinia, NASA Engineering & Safety Center (NESC)  
Terry Onsager, NOAA SWPC

3:00  
**Session Introduction** – Azita Valinia

3:05  
**Space Weather and Crew Health Implementations**  
John Allen, NASA Headquarters, Human Exploration and Operations

3:15  
**Space Radiation and Analysis Group**  
Janet Barzilla, NASA Johnson Space Center (JSC)

3:25  
**NASA Moon to Mars (M2M) Activities**  
Yaireska Collado-Vega, NASA Goddard Space Flight Center

3:35  
**Radiation Monitoring and Shielding Capability Gaps**  
Joe Minow, NASA Engineering & Safety Center

3:45  
**Forecasting Solar Particle Events in Support of Human Space Exploration**  
Hazel Bain, University of Colorado Cooperative Institute for Research in Environmental Sciences (CIRES)/NOAA SWPC

3:55  
**Solar Cycle Prediction Capabilities for Timing of Mars Missions**  
Ron Turner, Analytical Services, Inc. (ANSER)
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: Eric Adamson/NOAA SWPC
Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT)

- Predicting Solar Proton Events of Solar Cycles 22-24
  Aatiya Ali, Georgia State University
- Simplified CME Monitoring and Characterization by Summarizing Time Series of Coronagraph Images
  Manuel Flores-Soriano, University of Alcalá, Space Weather Group
- Coronal Hole Observer and Regional Tracker for Long-term Examination
  Chris Lowder, Southwest Research Institute
- Improving Operational Solar EUV Irradiance Modeling Using Physics-Based Differential Emission Measure Techniques
  Courtney Peck, CIRES/University of Colorado, NOAA NCEI
- Mapping the Sun with the Italian Radio Telescopes
  Simona Righini, Istituto Nazionale di Astrofisica
- What Machine Learning Algorithms Teach Us about Which Explanatory Variables Matter Most in Predicting Bz within Coronal Mass Ejections
  Pete Riley, Predictive Science Inc.
- Concept for Real-Time Solar Flare Predictions
  Juliana Vievering, Johns Hopkins University Applied Physics Laboratory

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Wednesday, April 27

10:00 – 11:30 Space Weather: Meeting the Needs of the Energy Sector
Co-Chairs: Josh Rigler, US Geological Survey (USGS)
           Jenn Gannon, Computational Physics, Inc.

10:00 Session Introduction – Josh Rigler, USGS
10:05 Lessons learned from Historical Geomagnetic Storms
       Jeff Love, USGS
10:15 Xcel Energy MagSTAR Magnetometer Project
       Matt Twardy, Xcel Energy
10:25 Understanding the interconnections of the Sun-to-Power Grid System: Convergence and the NSF Workshop on simulating Space Weather Extremes
       Ryan McGranaghan, Orion Space Solutions
10:35 Modelling and Validation of Geomagnetically Induced Currents and The Impact on the Swedish Power Grid
       Lisa Rosenqvist, Swedish Defence Research Agency, FOI, Sweden
10:45 Use of NERC-collected Geomagnetically Induced Currents (GIC)-related data
       Mark Olson, North American Electric Reliability Corporation (NERC)
10:55 Geomagnetically Induced Currents (GIC) Model Validation
       Bob Arritt, Electric Power Research Institute (EPRI)

11:05 – 11:30 Q&A
11:30 – 1:00 Lunch and following events:
• Student Lunch: Student Government and Private Sector Career Path Panel
(11:40-12:50)
Chair: Sophie Graf, UT, Arlington; co-chair Elizabeth Vandegrif (UT, Arlington)
Panelists:
  Janet Green, Space Hazards Applications
  Jinni Meehan, NOAA/NWS Headquarters
  Alex Boyd, Aerospace Corporation
  Mangala Sharma, NSF Geospace Section

• 16th 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: Brent Gordon, NOAA SWPC
    Robyn Fiori, Natural Resources Canada (NRCan)

1:00
Session Introduction – Brent Gordon, NOAA SWPC

1:05
Communication, Navigation, and Irradiation – ICAO Space Weather Services for Aviation
Rob Steenburgh, SWPC

1:15
Space Weather Considerations for Airlines
Stephanie Klipfel, Manager Meteorology and A4A Meteorology Committee Chair Delta Air Lines

1:25
UK User Feedback on Space Weather Products
Krista Hammond, UK Met Office (UKMO)

1:35
Operational Monitoring of Cosmic Radiation for Civil Aviation with the SiGLE-RT Model
Philippe Yaya, Paris Observatory

1:45
Progress Towards Resolving Maximum Usable Frequency (MUF)
Loredana Perrone, INGV (Italy)

1:55
Space Weather and Aviation Testbed Experiment and Exercise
Michele Cash, NOAA 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: Tim Fuller-Rowell, CU CIRES/NOAA SWPC
    Holly Gilbert, NCAR High Altitude Observatory (HAO)

3:00
Session Introduction – Tim Fuller-Rowell, CU CIRES/NOAA SWPC

3:02
Observing and Modeling the Ionosphere: Supporting Communications and Navigation
Sean Elvidge, University of Birmingham, UK

3:12
Supporting Space Weather with the Geospace Dynamics Constellation
Katherine Garcia-Sage, NASA Goddard Space Flight Center

3:22
Forecasting Equatorial Ionospheric Stability Using a Regional Model and WAM-IPE
David Hysell, Cornell University

3:32
Q&A
3:45 - 4:30  **Space Weather Workforce Development**  
Co-Chairs: Mangala Sharma, NSF Geospace Section  
Frank Centinello, NOAA Corps, SWPC

3:45  **Session Introduction** – Mangala Sharma, NSF Geospace Section

3:47 – 3:52  **Commercial Sector Space Weather Job Opportunities and Qualifications**  
Laura Stiles, Blue Origin

3:52 – 3:57  **My Future Career: How do I get there and what's next?**  
M. Chantale Damas, Queensborough Community College

3:57 – 4:02  **Ways That Space Weather Can Open Doors and How to Make Sure Those Doors Don’t Hit You in the Back**  
Joe Mazur, Aerospace Corp

4:02 – 4:07  **Millersville University Space Weather Certificate Program**  
Richard Clark, Millersville University

4:07 – 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**

**Space Weather Policy and General Space Weather Contributions**  
Chair: Delores Knipp, CU Smead Aerospace Engineering Sciences

Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT)

- **Detection of High-Latitude Ionospheric Plasma Conditions Leading to GPS Scintillations Using a Novel Poker Flat Incoherent Scatter Radar Mode**  
  Jacob Willis, United States Military Academy

- **Innovative Global Ionospheric Total Electron Content (TEC) Map Reconstruction and Forecasting Using Machine Learning**  
  Shasha Zou, University of Michigan

- **PlanetiQ GNSS RO Measurements of the Ionosphere**  
  Rob Kursinski, PlanetiQ

- **Applications of FORMOSAT-7/COSMIC-2 to Space Weather at CWB/SWOO**  
  I-Tse Lee, Center Weather Bureau

- **Performance of a Locally Adapted NeQuick-2 Model During 2014 Solar Maximum over the Brazilian Equatorial Region**  
  Osanyin Taiwo, National Institute for Space Research

- **A Machine-Learning Oriented Remote and In-Situ Dataset for Forecasting SEP Occurrence and Properties**  
  Kimberly Moreland, University of San Antonio/Southwest Research Institute

- **A New Interactive 3-Dimensional Data Viewer for the Enlil Solar Wind Model**  
  Christopher Pankratz, University of Colorado, Boulder

- **Osses and Other Numerical Studies in Support Of The Space Weather Next (SW Next) Program**  
  Dimitrios Vassiliadis, NOAA/NESDIS

**Thursday, April 28**

10:00 – 12:00  **Space Weather Research to Operations to Research (R2O2R) Applications**  
Co-Chairs: Barbara Giles, NASA Goddard Space Flight Center
10:00  **Session Introduction** – Barbara Giles, NASA Goddard Space Flight Center

10:05  **Space-Weather CubeSat Array for 24/7 Prompt Global Coverage Experiment (SWAP-E)**
Henry Voss, NearSpace Launch, Inc.

10:14  **Operationalizing Data-driven Prediction Tools for Post-eruption Solar Energetic Particles**
Sumanth Rotti - Petrus Martens, Georgia State University

10:23  **Forecasting Solar Energetic Particle Events at the Cis-Lunar Environment using the Combined AWSoM-iPATH Model**
Gang Li, University of Alabama Huntsville

10:32  **Predicting the Bookend Solar Flares**
KD Leka, Northwest Research Associates (NWRA)

10:41  **Commercial R2O Testbed**
Alec Engel, NextGen Federal Systems

10:50  **Forecasting Solar Flares Using the Time Evolution of Active Regions and Machine Learning Techniques**
Talwinder Singh, University of Alabama, Huntsville

10:59  **Transitioning from Deterministic to Probabilistic Space Weather Forecast using Ensembles of Neural Networks**
Andrés Munoz-Jaramillo, Southwest Research Institute (SwRI)

11:08  **Forecasting Solar Energetic Particle Radiation Using Data-Driven and Physics-Based Simulations**
Lulu Zhao, University of Michigan

11:17  **Miniaturized Nightglow Interferometer for Monitoring Emissions from a CubeSat**
Wilbert Skinner, Michigan Aerospace Corporation

11:26  **Kamodo Space Weather Models**
Michael Contreras, Ensemble Government Services, LLC

11:35  **Space Weather Forecasting Toolset to Support Operations**
Robert Arslanbekov, CFD Research Corporation

11:44  **Session Wrap-up and Inspiration for Future R2O2R**
Janet Green, Space Hazards Applications

11:53  **Q&A**

12:00 - 1:00  **Lunch and Heliophysics Decadal Survey Plans-Interactive Discussion (12:10-12:50)**

Co-Chairs: Howard Singer, NOAA SWPC
Frank Centinello, NOAA Corps/SWPC

*Art Charo, National Academy of Sciences*
Jared Leisner, NASA, Heliophysics Division
Elsayed Talaat, NOAA/NESDIS/Office of Projects, Planning and Analysis (OPPA)
Carrie Black, NSF, Division of Astronomical Sciences and
**Lisa Winter, NSF Atmospheric and Geospace Sciences Division**
1:00 - 2:30  
**Space Weather: New and Future Observations to Advance Understanding and Forecasting**  
Co-Chairs: Irfan Azeem, NOAA NESDIS  
            Simon Machin, UK Met Office

1:00  
**Session Introduction** – Irfan Azeem, NOAA NESDIS

1:05  
**Strategies for Filling Critical Observational Gaps for Improved Space Weather Monitoring, Mitigation, and Predictive Capabilities**  
Drew Turner, Johns Hopkins University Applied Physics Laboratory (JHUAPL)

1:15  
**NOAA’s Space Weather Follow On Program: Ensuring Continuity of Data for Geomagnetic Storm Forecasts**  
Doug Biesecker, NOAA NESDIS

1:25  
**Neutron Monitors and Space Weather—Back to the Future**  
James Ryan, University of New Hampshire (UNH)

1:35  
**Solar X-rays: Early Flare Signatures and How to Measure Them**  
Lindsay Glesener, University of Minnesota

1:45  
**Requirements for a Future Ground-based Solar Monitoring Network. Implications for ngGONG**  
Valentin Pillet, National Solar Observatory

1:55  
**Access Diverse Space Weather Data with SWx TREC’s Space Weather Data Portal**  
Jenny Knuth, Univ. of Colorado, Technology, Research and Education Center (TREC)

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** – Dan Welling, University of Texas, Arlington, Physics Department

3:05  
**CCMC: Preparing Models to Enter the R2O Pipeline**  
Leila M. Mays, NASA Community Coordinated Modeling Center (CCMC)

3:15  
**Advancing Space Weather Predictions with Data Driven Methods -- Stories from SOLSTICE**  
Yang Chen, University of Michigan

3:25  
**PAGER: Probabilistic Sun to Earth Modeling Utilizing Data Assimilation and Machine Learning**  
Yuri Shprits, University of Potsdam

3:35  
**Space Weather Science and Forecasting at University of Texas at Arlington**  
Elizabeth Vandegrif, University of Texas Arlington

3:45  
**OSPREI: A Coupled Approach to Modeling CME-Driven Space Weather with Automatically-Generated User-Friendly Outputs**  
Christina Kay, Catholic University of America

3:55  
**Aurora: Prediction, Imaging and Services**
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: Mary Hudson, Dartmouth College

Lightning Talk Presenters (3 min each, from 5:00-5:30 EDT; poster viewing from 5:30-6:30 EDT)

- Fine Structure of Geoeffective Solar Wind Transients Complicating Space Weather Predictions
  Matti Ala-Lahti, Department of Climate and Space Sciences and Engineering, University of Michigan

- Geomagnetically Induced Current Measurements and Space Weather Prediction in Austria
  Dennis Albert, Institute of Electrical Power Systems, Graz University of Technology

- Association between the Spatial Characteristics of Relativistic Electron Precipitation Observed at LEO and its Magnetospheric Drivers
  Luisa Capannolo, Boston University

- Effects of Upstream Small Scale Structure on Predictive Performance of the Space Weather Modeling Framework
  Sophie Graf, University of Texas at Arlington

- MAGICIAN Project: Machine Learning, Data Collection, Education and Outreach for Space Science Research
  Dogacan Ozturk, University of Alaska Fairbanks

- An ML Approach to Forecasting Space Weather Impacts on Critical Infrastructure from Ground-Based Arrays
  Adam Schultz, Oregon State University

- Multiscale Atmosphere Geospace Environment Model
  Michael Wiltberger, NCAR/HAO

- Atmospheric Ionizing Radiation Environment (AIRE) Institute
  Eric Benton, Oklahoma State University, Department of Physics