



June 19 - 24
Austin, TX

Welcome to CEDAR 2022

- We are committed to providing a safe, open and inclusive workshop environment for everybody. Be kind, respectful, and present in all your interactions.
- All participants are expected to follow the Code of Conduct <https://cedarscience.org/code-of-conduct>
- You can report any concern using one of the listed options in the Code of Conduct or contact Michelle McCambridge (mmccamb@ucar.edu).

Enjoy the meeting



UCAR
COMMUNITY
PROGRAMS



CEDAR Information



Agenda

<https://cedarscience.org/2022-cedar-workshop-agenda>



Sli.do can be used in the plenary session

<https://app.sli.do/event/5qywCGUVQ6K8tRUBB85Q9X>



Slack

<https://cedarscience.slack.com/ssb/redirect>

[Use the helpdesk on slack, get information about CEDAR](#)

Shape the Future CEDAR Student Day



We need your feedback to improve student day!

CEDAR supports DYNAMIC

- CEDAR community letter in support of the DYNAMIC mission was sent to NASA on June 14, 2022
- The letter was signed by 120 colleagues from 52 institutions, 18 states, and 10 countries
- Many thanks for your enthusiastic support of DYNAMIC!

CEDAR supports GDC

- CEDAR community has prepared a letter of endorsement of the GDC mission
- By June 19, the letter is signed by 90 colleagues
- Please read and consider signing:
https://docs.google.com/document/d/1khh1kVnITd6f-Ffg_2dBXPqrS-sgJ8R2/edit?



Building DEI Landscape in CEDAR



- Building a safe space: Code of conduct
- Continuing a dialogue: DEI happy hour and workshop
- Supporting those impacted by war and violence
- Anti-racism literacy
- Imposter feelings and stereotype threat
- Microaggression training
- More transparency: Double-blind proposal and review process
- Student and early-career opportunities
- Supporting women and minorities

Sunday 15:45 - 16:05	Active allyship in STEM
Sunday 19:00 - 20:00	Student DEI happy hour
Monday 08:55 - 09:15	Equal Opportunity? The legal inequality of public education & its relationship to the STEM fields
Thursday 13:30 - 15:30	Continuing to evolve: DEI (Diversity, Equity, and Inclusion) in CEDAR



If interested in joining the CEDAR DEI Task Force please contact: Lindsay Goodwin (lindsaygoodw@gmail.com), Mack Jones (mcarthur.jones@nrl.navy.mil), or Julio Urbina (jvu1@psu.edu) to discuss getting involved!



Equitable Letters for Space Physics

Resources for writing better recommendation and nomination letters with the space physics community

<https://equitableletterssp.github.io/ELSP/>

Our Mission

Encouraging merit-based recommendations and nominations in the space physics community by providing resources and reviews.

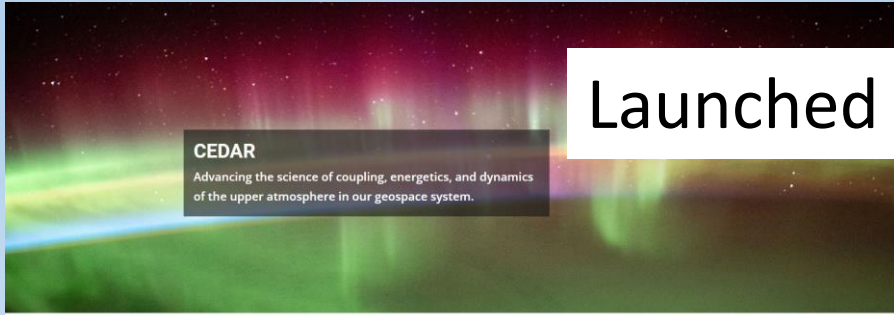
Our People

- Dr. Angeline G. Burrell, Ionospheric Researcher (Exec. Dir.)
- Dr. John Coxon, Northumbria University, Magnetospheric Researcher
- Dr. Alexa Halford, NASA Goddard Space Flight Center, Magnetospheric Researcher
- Dr. McArthur Jones Jr., Upper Atmospheric Researcher
- Dr. Kate Zawdie, Ionospheric Researcher

Please upload/send your letter for review as a text, .docx, or .pdf file to equitable.space.letters@gmail.com. Though we aim for a fast turn-around, nominal review times are 1 month.

If you are interested in being a reviewer, please contact us at equitable.space.letters@gmail.com.

New CEDAR website - cedarscience.org



Launched in February 2022



Who We Are

The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) is a Program funded by the National Science Foundation's Atmospheric and Geospace Sciences Division with a mission to understand the fundamental properties of the space-atmosphere interaction region; identify important processes that define the local and global behavior; the evolution, and influence of these processes on the Earth's environment and human activities.

We need pictures of your science

CEDAR Annual Workshop

The annual CEDAR workshop, which started as a grassroots initiative in 1986, provides the community an opportunity to self-organize and exchange ideas. With CEDAR's emphasis on fostering new ideas, providing a safe space for all participants, and a strong educational component, CEDAR has become the intellectual engine of aeronomy.

The workshop includes community-organized breakout workshops as well as grand challenge workshops, poster sessions with a student poster competition, a student day, and a student symposium.

Resource page is under development & needs community input



An integral part of CEDAR is the training and education of students as well as providing experience in research.

CEDAR Students

Students are a vital part of CEDAR. Two student representatives are on the CEDAR scientific steering committee providing the student perspective and ensuring that student's ideas are heard and acted upon. During the yearly CEDAR workshop CEDAR students organize a student workshop day for and with students. The CEDAR students lead social and networking events at the CEDAR workshop to build a community. Approximately a third of the CEDAR workshop participants are students. Students can apply for travel and housing support to attend the CEDAR workshop, which is supported by NSF. To support students with dependent care responsibility and allow them to fully participate in the CEDAR workshop CEDAR offers dependent care grants.



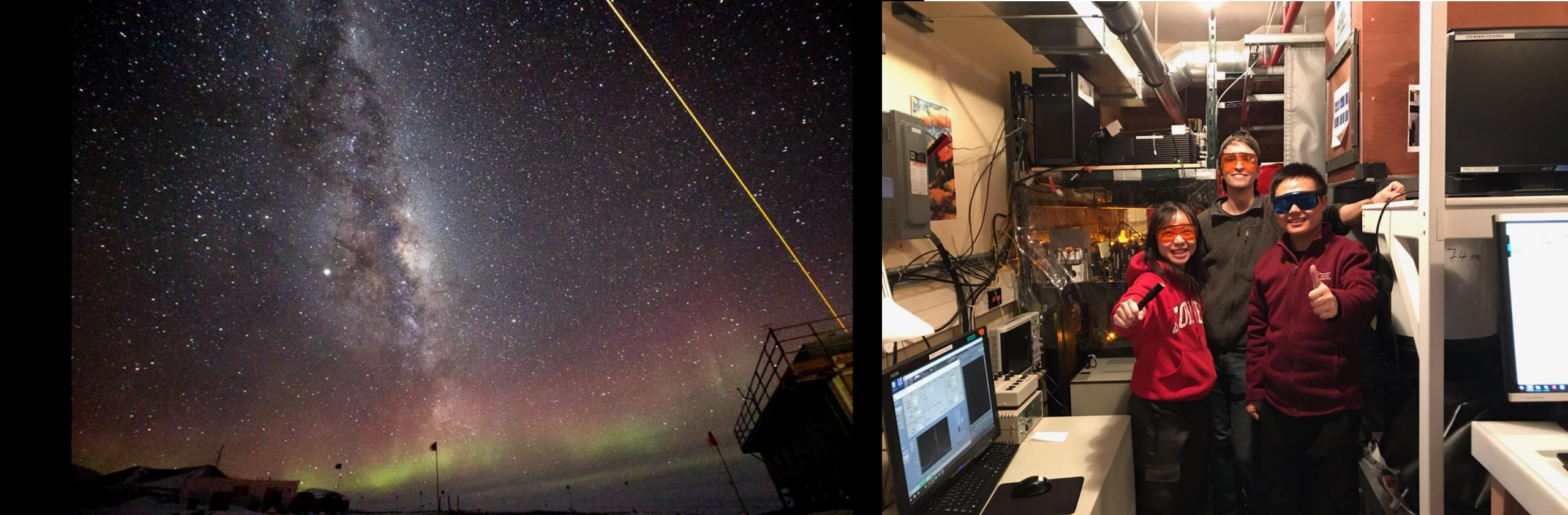
Resources

(This page is under development.)

Position announcements

Human Wanted

for hazardous journey, small wages, bitter cold, long months of complete darkness, constant challenges. ~~Safe return doubtful~~, honor and recognition in event of success



9-12 months of deployment to McMurdo, Antarctica as **winter-over**

Job duties: Watching Skies, Running Lasers, Collecting the Best Data

Contacting Professor Xinzhao Chu, CU-Boulder, xinzhao.chu@Colorado.edu

NSF CEDAR Project

A Whole-Atmospheric Perspective on Connections between Intra-Seasonal Variations in the Troposphere and Thermosphere

P.I., F. Gasperini (OSS)
Co-I., A. Maute (NCAR/HAO)

Looking for one undergraduate or graduate student for two 2-month experiences at OSS/NCAR during the Summer/Fall 2022 & 2023

PROJECT OBJECTIVES

- a. *Provide observational evidence of correlative connections between intra-seasonal variability in the troposphere, mesosphere, and thermosphere.*
- b. *Characterize and quantify the intra-seasonal variability in the thermosphere due to global-scale waves excited in the tropical troposphere.*
- c. *Identify potential connections with the MJO, QBO, and ENSO.*



VIRGINIA TECH.

PhD Fellowships in Geospace Data Analytics at Virginia Tech

The Department of Electrical and Computer Engineering at Virginia Tech has funding available for students to enroll in its PhD program and conduct research in the emerging area of geospace data analytics. Successful applicants will work with faculty in the Center for Space Science and Engineering Research (Space@VT) to conduct fundamental research on space weather specification and forecasting using globally distributed ground- and space-based datasets and numerical simulations. Outstanding candidates with advanced computer programming skills and academic backgrounds in physics or engineering are encouraged to respond. An advertisement with complete application details has been distributed via CEDAR email. **Interested students can contact or look for Dr. Mike Ruohoniemi (mikeruo@vt.edu) to discuss the positions informally at this workshop, from Tuesday onwards.**



Post-Doctoral Position

U.S. Naval Research Laboratory



NRL Space Science Division, Washington, DC is looking for a motivated, post-doctoral research associate with an interest in the development and test of space-flight hardware, especially for CubeSat applications

Multiple opportunities in the NRL SSD:

- UV remote sensor development, test and analysis of the ionosphere/thermosphere
- GPS RO sensor development and test
- Miniaturized in situ IT sensor test & development
- Orbital debris detector test & development
- Thermospheric winds research with the NASA ICON MIGHTI team

Positions available through National Research Council (NRC) Research Associateship Program

- Application deadline 1 August (every 3 months)
- Must be US Citizen or US Permanent Resident
- For more info:

<http://sites.nationalacademies.org/pga/rap>

See Bruce Fritz in person at the Wednesday CEDAR Poster Session (ITIT-12) for more details, or email bruce.fritz@nrl.navy.mil

Equal Employment Opportunity:

The United States government does not discriminate in employment on the basis of race, color, religion, sex (including pregnancy and gender identity), national origin, political affiliation, sexual orientation, marital status, disability, genetic information, age, membership in an employee organization, retaliation, parental status, military status or other non-merit factor.

PARTICIPATING AGENCIES - NRL

- Participating Agencies
- NRL
- Opportunities List
- Opportunity
- Search Opportunities
- Search Opportunities
- RAP Home
- Apply Now

Opportunity at Naval Research Laboratory (NRL)

<https://nrc58.nas.edu/RAPLab10/Opportunity/Opportunity.aspx?LabCode=64&ROPCD=641589&RONum=B7887>

Climate of Earth's Upper Atmosphere

Location

Naval Research Laboratory, DC, Space Science

RO#	Location
64.15.89.B7887	Washington, DC 203755321

Advisers

name	email	phone
Emmert, John T	john.emmert@nrl.navy.mil	202.767.0467
McArthur "Mack" Jones Jr.	mcarthur.jones@nrl.navy.mil	202-767-6317

Description

The climate of the upper atmosphere (above ~50 km) is studied using a wide variety of contemporary and historical measurements of temperature, composition, and winds. We are interested in the systematic response of the thermosphere and mesosphere to (1) long- and short-term variations in radiative forcing (solar and terrestrial) and in solar wind and magnetospheric energy inputs, (2) anthropogenic composition changes, and (3) the climate and meteorology of the lower atmosphere. This research involves thorough statistical analysis of large and diverse data sets, characterization of significant geophysical variations and mutual biases among the data sets, development of comprehensive empirical models with appropriate physical constraints, assimilation of the data into the models, validation of the models, and comparison with first-principles physics models. A key aspect of the program is the continued development of NRLMSIS, the most comprehensive empirical model of atmospheric temperature and composition and HWM, the only global empirical model of atmospheric winds. These models are used extensively by the scientific and engineering communities in diverse applications such as atmospheric remote sensing, prediction of atmospheric drag on satellites, atmospheric gravity wave research, and ionospheric modeling.

Keywords:

Upper atmosphere; Climate; Thermosphere; Mesosphere; Empirical models; Data analysis; Data assimilation; Space weather;

Eligibility

Citizenship: Open to U.S. citizens and permanent residents

Level: Open to Postdoctoral applicants

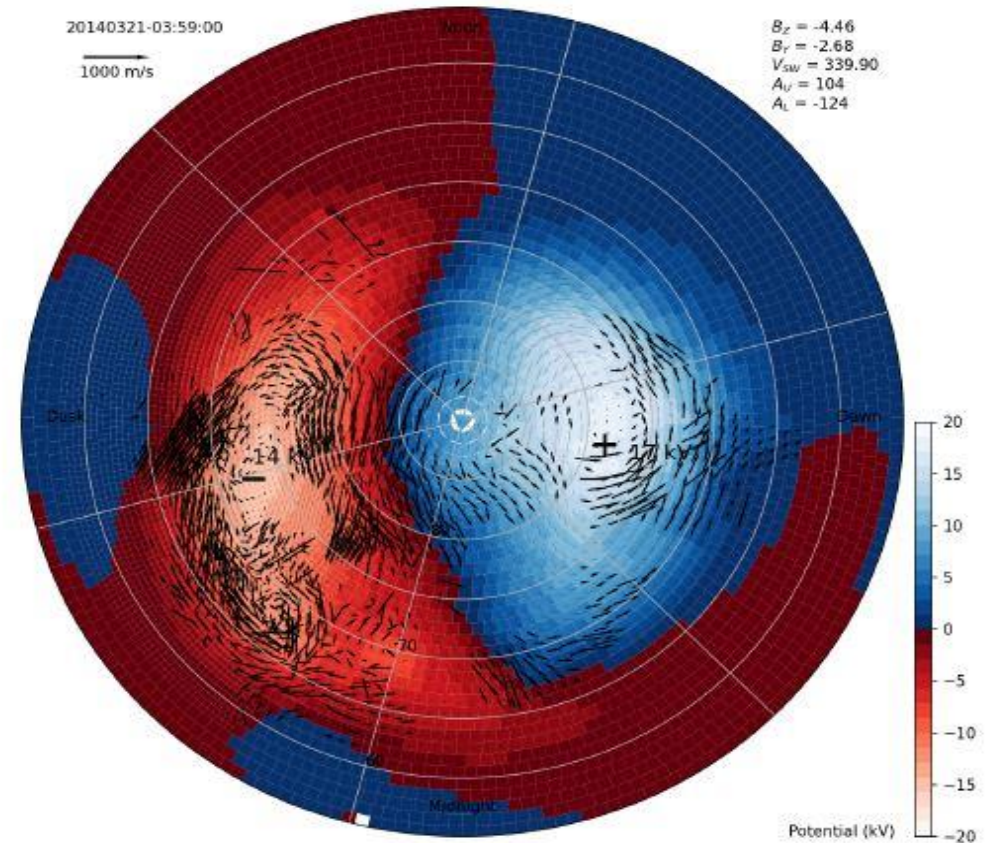
Stipend

Base Stipend	Travel Allotment	Supplementation
\$87,198.00	\$3,000.00	

SuperDARN PostDoc at Penn State

Postdoc position in the Department of Meteorology and Atmospheric Science at The Pennsylvania State University. The department operates the SuperDARN radar on Kodiak Island, Alaska, King Salmon, Alaska, McMurdo Station, Antarctica, and South Pole Station, Antarctica. We seek an energetic individual to carry out research using observations from the network. In addition the successful candidate will take part in ongoing hardware and software developments for the radar systems, would be expected to assist with the day-to-day operation of the radars including development of new modes of operation, and assist users of SuperDARN data. The position requires Ph. D. in physics or electrical engineering or related field, a background in data analysis, and will require travel to the radar sites including those in Antarctica. Preference will be given to applicants with experimental experience in radio or radar systems, and background in magnetospheric physics or ionospheric/thermospheric physics.

- Contact Bill Bristow (wab5217@psu.edu)



CENTER FOR

GEOSPACE STORMS

Transforming the understanding and predictability of space weather

We are hiring

- Postdoc positions @ JHU/APL (modeling & data analytics)
- Postdoc @ UCLA (Ionosphere/plasmasphere modeling, Prof. Roger Varney)
- Graduate students @
 - VT (Profs. Mike Ruohoniemi & Lenny Smith)
 - Rice U (Prof. Toffoletto)

Contact: slava.merkin@jhuapl.edu

— INNOVATE

— EMPOWER

— DISCOVER

JOHNS HOPKINS APPLIED PHYSICS LABORATORY / NATIONAL CENTER FOR ATMOSPHERIC RESEARCH / RICE UNIVERSITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES / SYNTEK TECHNOLOGIES / UNIVERSITY OF NEW HAMPSHIRE / VIRGINIA TECH



Post Doctoral Fellow - Space Plasmas
Data Analyti...

careers.jhuapl.edu



Post Doctoral Fellow - Space Plasmas
Theory and S...

careers.jhuapl.edu

Job Advert:

Ionosphere-Magnetosphere Coupling



- **Atmospheric & Space Technology Research Associates LLC (formerly 'ASTRA', now 'Orion Space Solutions')**
Location: Boulder, Colorado area
- **Ionosphere-Magnetosphere Coupling**
 - Use models and data to study the ionosphere, its coupling to the magnetosphere and solar wind, and its effects on space systems.
 - Possible projects: ionospheric electrodynamics, coupling to the magnetosphere and solar wind, SAPS, GICs, polar holes, ionospheric scintillation, thermospheric modelling for satellite drag prediction, data assimilation, machine learning / artificial intelligence technologies, etc.

Qualifications: PhD in Ionospheric Physics, Magnetospheric Physics, Atmospheric or Space Sciences, Aerospace Engineering, or related technical field

- Experience: 3+ years beyond PhD

At the CEDAR Meeting, please reach out to: John Noto: john.noto@orionspace.com
Federico Gasperini: federico.gasperini@orionspace.com
Ryan McGranaghan: ryan.mcgranaghan@orionspace.com

Federal Position at NOAA Space Weather Prediction Center

(application period begins July/August 2022)

Space Weather Prediction Testbed Lead

A government Physical Scientist position (GS-13/GS-14) at the NOAA Space Weather Prediction Center in Boulder, CO is expected to be posted this summer. This position will be responsible for shepherding predictive SWx capabilities across the gap between research and operations toward advancing the nations SWx forecasting skill. With a Research-to-Operations (R2O) focus, this scientist will facilitate improvements to the models, observations, and capabilities supporting space weather forecasting through the new Space Weather Prediction Testbed. This is a “permanent” position, meaning it comes with civil service tenure after a one-year probation period. Job application and details will be posted on USAJobs.

For more information or questions about the position, please talk to Tzu-Wei Fang during the CEDAR workshop. To get updates regarding the timeline for the posting of this position, please contact Michele Cash michele.cash@noaa.gov

Ionospheric Positions in CIRES CU Boulder at NOAA Space Weather Prediction Center

1. Space Weather / Ionosphere-Thermosphere Research Scientist

To advance SWPC's ability to predict the dynamics and response of the ionosphere and atmosphere to space weather as it pertains to impacts on communication, navigation, and satellite drag applications.

<https://jobs.colorado.edu/jobs/JobDetail/?jobId=39319>

2. Space Weather / Ionosphere Data Scientist

To evaluate the influence of commercial radio occultation data on the quality of SWPC ionospheric models, products, and services.

<https://jobs.colorado.edu/jobs/JobDetail/?jobId=39768>

For more information or questions, please talk to Tzu-Wei Fang during the CEDAR workshop or contact

Tim Fuller-Rowell tim.fuller-rowell@noaa.gov

Hazel Bain hazel.bain@noaa.gov

Today's program

Time CDT	Agenda	Presenter / Convener	Room
8:00 - 9:30	Plenary (in-person & streamed)	Chair: Asti Bhatt	Onyx Ballroom
8:00 - 8:15	Early Career Highlight I: 3-D Ionosphere Imaging and SED Reconstruction With a New TEC-Based Ionospheric Data Assimilation System (TIDAS)	Ercha Aa (MIT, Haystack)	Onyx Ballroom
8:15 - 9:00	Grand Challenge Tutorial "Interhemispheric asymmetries"	Yue Deng (UTA), Qingyu Zhu (NCAR), Astrid Maute (NCAR)	Onyx Ballroom
9:00 - 9:20	Science Highlight II: Insights from the NSF FIREBIRD II CubeSats into Energetic Electron Precipitation	Katharine Duderstadt (U. New Hampshire)	Onyx Ballroom
9:20 - 9:35	Grand Challenge report "Poynting Flux"	Alex Chartier (JHU/APL)	Onyx Ballroom
9:30 - 10:00	Break		
10:00 - 12:00	Grand Challenge-A: Interhemispheric asymmetries (IHA) in the I-T system: generated by high latitude forcing	Yue Deng (U. Texas, Arlington)	Onyx Ballroom
	Recent progress of lidar science and technology CEDAR workshop	Titus Yuan (Utah State University)	Topaz 2
	Advances in Vertical and Lateral Coupling Studies of Middle and Upper Atmospheres during Sudden Stratosphere Warmings	Eswaraiah Sunkara (Pusan National University, Korea)	Topaz 3
12:00 - 13:30	Lunch on our own/ poster judge lunch (Travertine room)		
12:00 - 12:45	Townhall: Decadal Survey and the Future of CEDAR Instrumentation. Working list of Decadal white papers on ground-based observations ^{cf}	Led by Josh Semeter & Larisa Goncharenko	Onyx Ballroom



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13:30 - 15:30	Grand Challenge-B: Interhemispheric asymmetries (IHA) in the IT system: generated by lower atmosphere	Astrid Maute (HAO/NCAR)	Onyx Ballroom
	New Results in Subauroral Science	Bharat Kunduri (Virginia Tech)	Topaz 2
	Snakes on a Spaceship: The Code Awakens	Russell Stoneback (Stoneris)	Topaz 1
	High-Latitude Space-Atmosphere Coupling and Wave Dynamics	Xinzhao Chu (U. Colorado, Boulder)	Topaz 3
15:30 -16:00	Break		
15:30 - 18:30	Poster Session		Topaz Lobby

Today's workshops

GC: Interhemispheric asymmetries (IHA) in the I-T system: generated by the high-latitude forcing

Onyx Ballroom, 10 am CDT, Wed, 06/22/2022

10:02~10:12 Gang Lu: Interhemispheric Asymmetries in the IT System: A multifaceted process

10:12~10:22 Marc Hairston: Preliminary results of penetration electric field asymmetry on the duskside during the 2015 St Patrick's Day storm

10:22~10:32 Sheng Tian (by Sneha Yadav): Simultaneous observation of auroral streamers in conjugate hemispheres and the associated in-situ observations

10:32~10:42 Aaron Ridley: The Magnetospheric Auroral Asymmetry eXplorer

10:42~10:52 Naomi Maruyama: Impact of the hemispheric asymmetry of Superthermal Electrons on the coupled Magnetosphere-Ionosphere-Thermosphere (M-I-T) system

10:52~11:02 Qingyu Zhu: Interhemispheric asymmetries in the ionospheric response during the 2013 St Patrick's Day geomagnetic storm

11:02~11:12 Yu Hong: Inter-hemispheric Asymmetry of Ion Convection and its Impacts on the Ionosphere-Thermosphere System During the 08-10 October 2012 Geomagnetic Storm

11:12~11:22 Delores Knipp Inter-hemispheric asymmetries in Poynting flux: A perspective from different space-based platforms (Virtual)

11:22~11:32 Yongliang Zhang: Sources for Hemispheric Asymmetry in Storm-time O/N₂ Depletion (Virtual)

11:32~12:00 All attendees: Discussion

(Virtual option)

Through the livestream used for the plenary session

Recent progress of lidar science and technology CEDAR workshop

Welcome (10:00-10:02) **10 am CDT, Wed, 06/22/2022**

Joe She: Lidar detection sensitivity and (T,V) measurement uncertainties (10:02-10:15)

Rich Collins: Development of Nd:YAG-based resonance iron lidar system (10:15-10:28)

Jintai Li: A case study of secondary gravity wave using lidar and reanalysis data (10:28-10:41)

Jens Lautenbach: Optical lantern technique and its applications to lidar (10:41-10:54)

Xinzhao Chu: Surprising Results of Sensible Heat and Meteoric Na Fluxes in the MLT Measured by Lidar at McMurdo, Antarctica (10:54-11:07)

Yang Fan: Bias correction for atmospheric instability (11:07-11:20)

Biff Williams: KHI and other instabilities observed in Poker Flat sodium wind-temperature lidar data and PMC imaging (11:20-11:33)

Neal Criddle: Automatic wave package detection and analysis (11:33-11:46)

Titus Yuan: MIGHTI lidar study on turbopause tide (11:46-11:59)

Closing remarks: (11:59-12:00)

Advances in Vertical and Lateral Coupling Studies of Middle and Upper Atmospheres during Sudden Stratosphere Warmings

10:00-12:00 Topaz 3

10:00 McArthur Jones Jr

10:15 Larisa Goncharenko

10:30 Zishun Qiao

10:45 Jack Wang

11:00 Ruth Lieberman

11:15 Saswati Das

11:30 Jens Oberheide "IT response to SSW as observed by GOLD and COSMIC-2"

11:45 Quan Gan

Onyx ballroom

12:00 - 12:45

Townhall: **Decadal Survey and the Future of CEDAR Instrumentation.** [Working list of Decadal white papers on ground-based observations](#)

Interhemispheric Asymmetries (IHA) in the I-T system: generated by the lower atmosphere

13:30-15:30 Onyx Ballroom

- 13:30-13:45 Xian Lu (Clemson U.) - modeling
- 13:45-14:00: Koki Chau (IAP, Germany) - meteor radars
- 14:00-14:15 Koushik Neelakantan (Clemson) tropical stratopause precursor of SSW
- 14:15 - 14:30 Rich Collins (UA Fairbanks) GW forcing and "Eddy Diffusion" in WACCM variations for SSW and non-SSW
- 14:30-14:45 Larisa Goncharenko (MIT) - SSW in NH & SH
- 14:45 - 15:00 Xing Meng (JPL) - North-South asymmetry in the ionosphere due to Earthquake
- 15:00-15:15 Joanne Wu (UC Berkeley) - Correlation study of the variation in the topside ionosphere and F-region along the magnetic field line
- 15:15-15:30 Discussion

New Results in Subauroral Science

13:30-15:30 Topaz 2

First half (13:30 to 14:30): Talks

1. Intro to the session (**Phil Erickson**)
2. Subauroral polarization streams (SAPS): Intrinsic response of geospace during storm time (**Wenbin Wang**)
3. Bistatic SAPS convection measurements (**Simon Shepherd**)
4. High Latitude Ionospheric Electrodynamics During STEVE and non-STEVE Substorm Events (**Tomoko Matsuo**)
5. Preliminary results on the penetration electric field in both hemispheres for the 17 March 2015 storm (**Marc Hairston**)
6. Traveling Ionospheric Disturbances in the vicinity of storm-enhanced density at midlatitudes (**Shun-Rong Zhang**)
7. On turbulence and vorticity induced by rapid ion drifts (**Josh Semeter**)
8. TBD (**Megan Gillies**)

Second Half (14:30 to 15:30): Discussion, questions, and future directions

Snakes on a Spaceship: The Code Awakens

13:30-15:30 Topaz 1

Introduction Russell Stoneback (Stoneris)

Spectral methods for space physics: A tutorial using Dedalus Enrique Rojas (Cornell)

A path towards easier data access with the HAPI interface Jon Vandegriff (JHUAPL)

The pysat Ecosystem Russell Stoneback (Stoneris)

Kamodo: Lowering the Utilization Barrier for Heliophysics Model Outputs Rebecca Ringuette (ADNET Systems Inc.)

The Python in Heliophysics Community (PyHC) and Contributions towards Open-Source Software Julie Barnum (LASP)

High-Latitude Space-Atmosphere Coupling and Wave Dynamics

13:30-15:30 Topaz 3

Wednesday (June 22) @ Topaz 3

<https://cuboulder.zoom.us/j/91008874788>

13:30 - 13:43 **Shun-Rong Zhang** - TID across polar cap

13:43 - 13:56 **Nick Pedatella** - Impact of Strong and Weak Stratospheric Polar Vortices on the MLT

13:56 - 14:09 **Arunima Prakash** - PMC inter-annual variations at McMurdo vs. solar cycle and polar vortex breakup

14:09 - 14:22 **Xinzhao Chu** - Surprising results of sensible heat and meteoric Na fluxes in the MLT at McMurdo and possible connection to secondary gravity waves

14:22 - 14:35 **Sharon Vadas** - Heat fluxes of gravity waves with non-zero vertical wavelengths, and connection to secondary gravity waves excited by local body forces from momentum deposition: comparison of fully compressible and Boussinesq solutions

14:35 - 14:48 **Komal Kumari** - Observational Study of Thermospheric Disturbances over Central Alaska during the 2013 Sudden "Stratospheric" Warming

14:48 - 15:01 **Haonan Wu** - A nested grid modeling of gravity wave propagation excited by Tonga eruption

15:01 - 15:11 **Ian Geraghty** - Gravity Wave Properties from the Stratosphere to the Lower Thermosphere: Results from 10 Years of Lidar Observations at McMurdo Station, Antarctica

15:11 - 15:21 **Jackson Jandreau** - Gravity Wave Dynamics over McMurdo, Antarctica as observed in 10 years of Lidar Data: Variability in Energy and Spectrum