



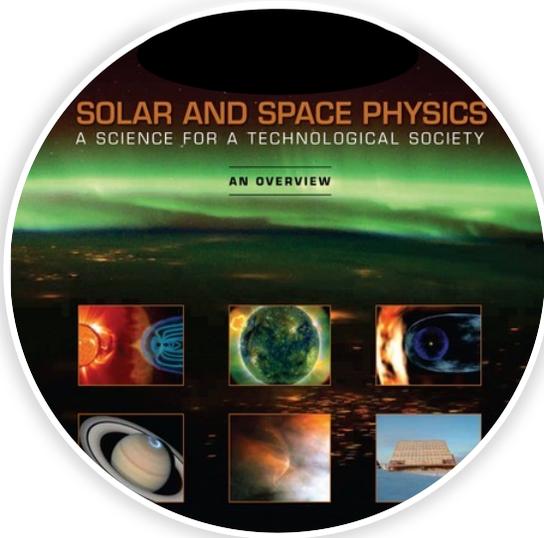
National Academies CSSP Meeting – Sep 24, 2024

Updates from NSF/GEO/AGS

Dr. Mangala Sharma (msharma@nsf.gov)

Geospace Cluster Coordinator & Program Director, Space Weather
Division of Atmospheric and Geospace Sciences
NSF Directorate for Geosciences

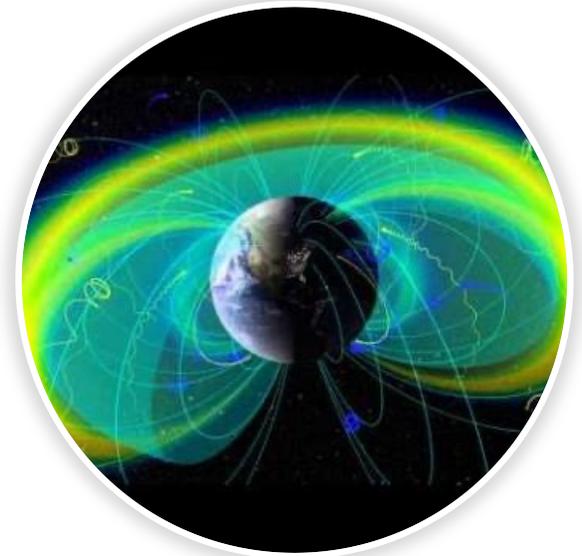
NSF values community input



NASEM Decadal Survey
for Solar and Space
Physics 2024-2033

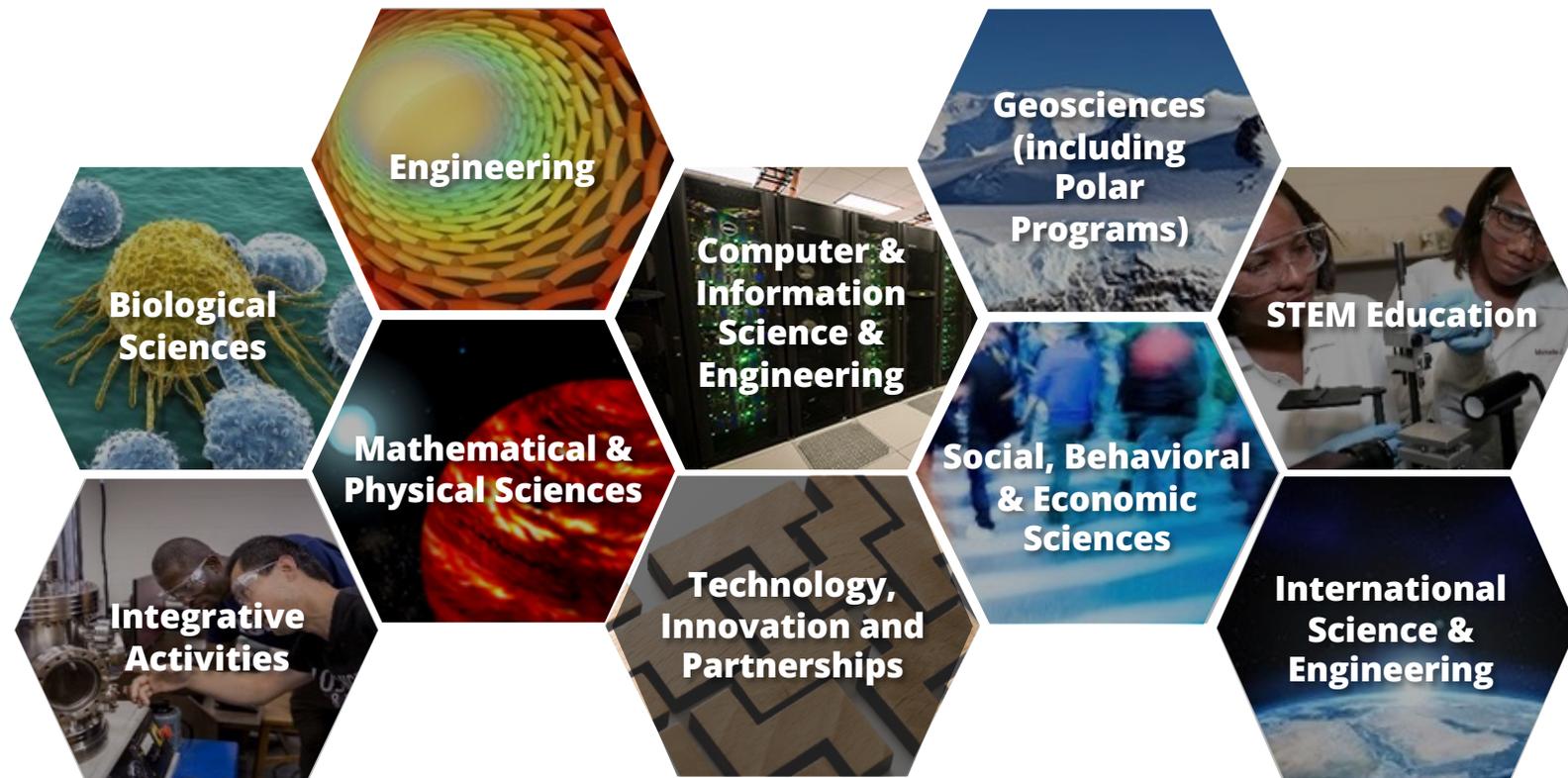


NASEM Space
Weather
Roundtable

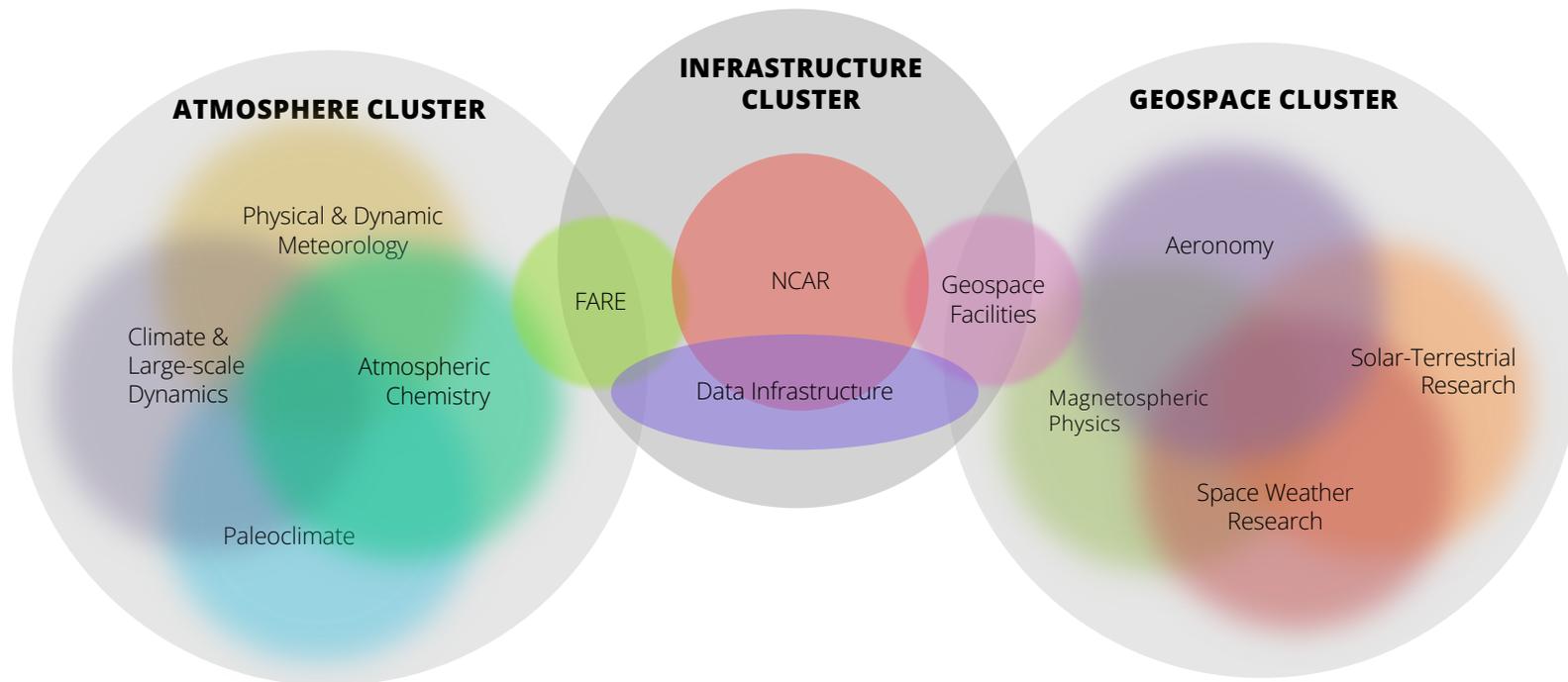


Community Meetings
(e.g., CEDAR, GEM, SHINE,
SWW,
conferences/workshops)
+
reviewers/panelists!

NSF Primary Touchpoints with Space Science



GEO/Atmospheric & Geospace Sciences



Division of Atmospheric and Geospace Sciences



Anne Johansen
Division Director

Infrastructure
Cluster

NSF NCAR, Geospace
Facilities, etc.

Geospace
Cluster

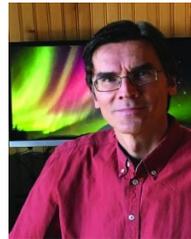
Atmosphere
Cluster



John Hannan
Deputy Division Director



Mangala Sharma
Space Weather;
Geospace Cluster
Coordinator



Andreas Keiling
(Solar-Terrestrial)



Chia-Lin Huang
Magnetospheric
Physics



Shikha Raizada
Aeronomy



Tai-Yin Huang
Data Infrastructure



Lisa Winter
Solar-Terrestrial
(80% detail to NASA HQ)

NSF Geospace Focus Areas

- **Aeronomy:** research on the mesosphere, thermosphere and ionosphere of the Earth, and the phenomena of ionization, recombination, chemical reaction, photo emission, and the transport of energy and momentum within and between these regions;
- **Geospace Facilities:** research areas that rely upon existing facilities or develop new instrumentation for geospace observations;
- **Magnetospheric Physics:** research on the magnetosphere, coupling of the magnetosphere with the solar wind, ionosphere, and atmosphere; development of ground-based observations and lab-based plasma physics;
- **Solar-Terrestrial:** development of U.S. ground-based solar observation, lab-based solar plasma physics, and instrumentation capabilities, including polarimetry techniques, and new modeling and theoretical research that connects to current or future NSF solar observatories;
- **Space Weather Research:** system-of-systems research on the physical processes in the integrated Sun-Earth system that underlie space weather and space climate, and characterizing space weather impacts on critical infrastructure and technological systems.



NSF Geospace Targeted Research

Solicitation	Target Date
NSF 22-575: Coupling, Energetics, and Dynamics of Atmospheric Regions	1st Friday in May
NSF 22-537: Geospace Environment Modeling	Sep 30
NSF 22-570: Solar, Heliospheric, and INterplanetary Environment	Oct 7

Support for CEDAR, GEM, SHINE, SW, other Workshops: ~ \$ 1 M/yr



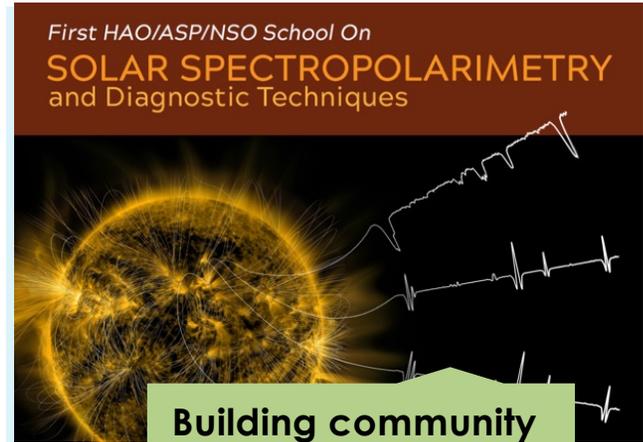
NCAR The High
HAO Altitude
Observatory

**NCAR's Solar-
Terrestrial Lab**

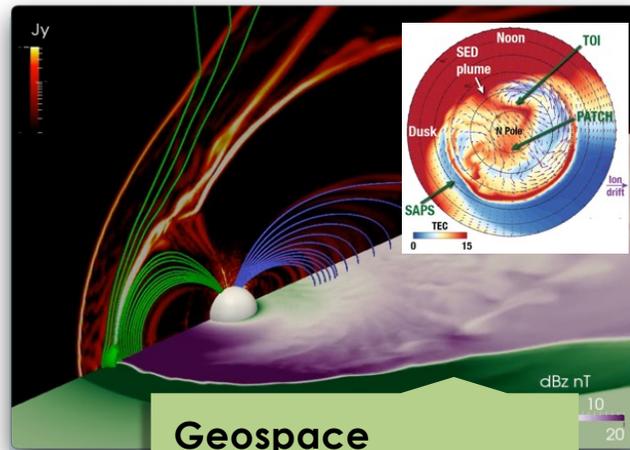
- Enabling world-class science
- Serving observations & modeling to the community
- Building innovative instrumentation



**Mauna Loa Solar
Observatory**



**Building community
capability**



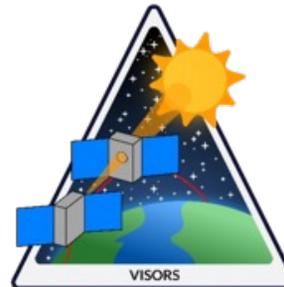
**Geospace
Modeling**



**COronal Solar
Magnetism Observatory**

Geospace Research Infrastructure

- Ground-based facilities
 - 4 new DASI awards
- Cubesats and airborne instruments
- Modeling centers, high-performance computing resources, and data repositories



Mauna Loa Solar Observatory



NCAR Supercomputing Center



Millstone Hill Observatory

NSF 23-014 DCL: Great American Solar Eclipses of 2023 and 2024

Awards and supplemental funding from GEO/AGS and MPS/AST for science and outreach around the 2023 and 2024 solar eclipses.



Several proposals funded in Geospace programs that promote:

- **Outreach Activities** (HamSCI, Univ. of Texas at Arlington, Big Bear Solar observatory)
- **New observations using existing facilities and instruments during eclipse** (Magnetometers, Millstone Hill ISR, Dynosondes, Radiometers etc)



Support for Early-Career Researchers

- **Undergraduate Students:** REU programs and GEOPATHS
- **Graduate Students:** NSF GRFP (due in Fall)
- **Postdoctoral Fellows:** AGS PRF
 - Within 2 years of PhD
 - Choose US host institution and mentor
 - ~ \$100k stipend/year for two years
 - No deadline, apply anytime!



Recent PRFs in Solar Physics: Jimmy Juno, Rachael Filwett, Ben Boe, Emily Lichko, Sarah Conley





Faculty Early Career Development 2023 Awards

- Securing the Future of Electric Field Measurements in Space Physics - **Katherine Goodrich** (WVU)
- Observational and Modeling Investigations of Pulsating Aurora Electrodynamics - **Stephen Kaeppler** (Clemson U.)
- Understanding Radiation Belt Electron Fast, Deep Injections in the Inner Magnetosphere - **Hong Zhao** (Auburn U.)
- Understanding Collisionless Magnetic Reconnection as a Fundamental Heliospheric Process - **Colby Haggerty** (U. Hawaii)
- Evolution of Stream Interaction Regions from 1 to 5.4 AU and the Implications for Geomagnetically Induced Currents - **Rachael Filwett** (Montana State U.)



NSF 23-577: Faculty Development in GeoSpace Science (FDSS)

Goal: Integrate topics in Geospace science into natural sciences or engineering or related departments at U.S. institutions

- Salary, benefits, and training for newly recruited tenure-track FDSS faculty; up to five years and \$1,500,000 total
- Proposals Submission: March 3, 2025

CLEMSON

Jens Oberheide

GT Georgia Tech.

Susan Lozier



Edmund R. Nowak

Bates

Aleksandar M. Diamond-Stanic



James Sherwood



Deng, Yue

TOTAL Funds: > \$8 million over 5 years



GEO EMpowering BRoader Academic Capacity and Education (EMBRACE) Solicitation

- Support research and educational efforts at "non-R1" institutions, including minority serving institutions, two-year colleges, primarily undergraduate institutions
- Mitigate multiple barriers faced by faculty members in geosciences and related fields at non-R1 institutions in submitting and obtaining federal funding



- **Seed proposals** - up to two years of funding to (1) initiate research and/or education programs at their own institutions; and/or (2) build or catalyze research collaborations or partnerships
- **Growth proposals** up to four years of funding to establish independent GEO-related disciplinary research programs
- Award recommendations in progress





Thank you!

NSF Funding:

[new.nsf.gov/funding](https://www.nsf.gov/funding)

NSF Staff:

[nsf.gov/staff](https://www.nsf.gov/staff)