



U.S. National
Science Foundation



NSF GEO

Updates on geospace activities

Shikha Raizada | *Program Officer*

Acknowledgements for workshop organization:

PI and co-PI: Hanne Mauriello and Liying Qian

Logistics: Tracy and her team

CSSC Chair: Lynn Harvey and members

Agenda

NSF GEO update on geospace

Funding highlights

Funding opportunities



Leadership and staff



Joydip Kundu
Directorate Head



Anne Johansen
Deputy
Directorate
Head



Subhashree Mishra
Section Head –
Overseeing atmospheric
and geospace program
officers

Geospace
Program
Officers



Andreas
Keiling



Lina
Patino



Mangala
Sharma



Shikha
Raizada





Workshop highlights

NSF-supported aeronomy workshops



Hanne Mauriello & Liying Qian



Phil Erickson



Nathaniel Frissell & Gareth Perry



Fabiano Rodrigues



ISEA-17
participants
Courtesy: Fabiano
Rodrigues (UTD)





Program highlight

NSF Faculty Development in geoSpace Sciences (FDSS)



Sarah A Conley
Bates College, Univ. of Iowa



Dong Lin
Clemson Univ.



Bharat Kunduri
Geogia Tech



Zhonghua Xu
UTA



Mei-Yun Li
UMass, Lowell



Riddhi Bandyopadhyay
Univ of Delaware

Quick facts

- Initiated in 2004
- Since then, 23 faculty positions have been added
- > \$ 20 M have been added through this program
- Promotes early careers professional growth
- Latest awardees shown here



Research Infrastructure Highlight

Award: AGS 2019234 – MRI: Development of a Tristatic Network for Ground-based Aeronomic Observatories to Operate in Synergy with the EISCAT-3D Facility

PIs: Mark Conde (UAF), D.L. Hampton, and A.J. Ridley



View Inside one of the containers



Instrument Container

Courtesy: PI and his team

Quick facts

Successfully depolyed instrument containers in Europe.

>All-sky cameras, GNSS, SDIs, FPIs, magnetometers

Map the local scale thermospheric responses to space weather forcing.

>Enable new observations with EISCAT 3D.

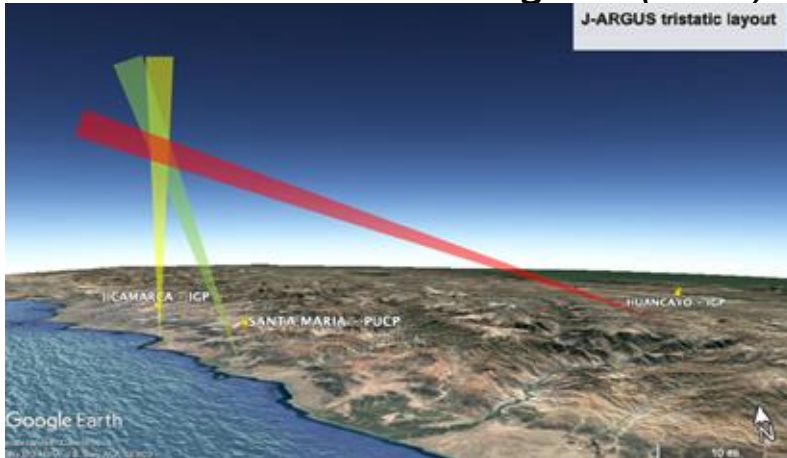




Research Infrastructure Highlight

AGS – 2215567: MRI-Development of a frequency agile multistatic radio system for geospace imaging

PI: Fabiano Rodrigues (UTD)



Photos shared by the
PI: F. Rodrigues



Figure. View of the antennas installed at Huancayo (May 2026).

Quick facts

- ❖ Collaborators: Dave Hysell, J. Chau, Danny Scipion, Marco Milla, Kenneth Obenberger
- ❖ Enhances Jicamarca scientific capabilities by providing Tristatic observations (Jicamarca Augmented Radar for Geospace and Upper Atmosphere studies).

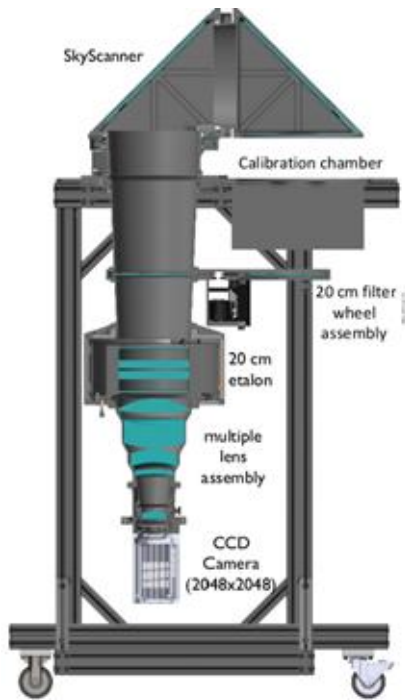




Research Infrastructure Highlight

AGS-2215857: MRI-Acquisition of a state-of-the-art Fabry-Perot interferometer to measure upper atmosphere winds and temperatures for He, OH, and O nightglow and auroral emissions

PI: *John Meriwether and Andrew Gerrad (NJIT)*



Schematics of FPI



Anticipated construction in July 2026 of an observatory to house the instruments at Jenny Jump State Park (**Courtesy: John Meriwether**)



Photo shared by the PI: J. Meriwether

Quick facts

- Acquired a high-resolution FPI to measure winds, temperature in mesosphere (839.9 nm), thermosphere (630 nm) and Exosphere (1083 nm).
- Testing yielded satisfactory results.





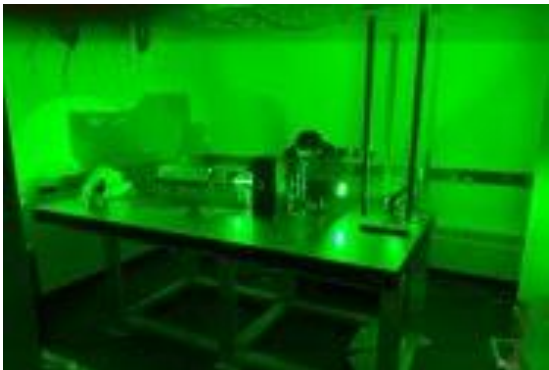
Research Infrastructure Highlight

Award: AGS 2408815 — MRI Track 1: Development of a Geospace and Middle Atmosphere Lidar

PIs: Vishnu Kumar, Rich Collins, and M. Roddewig (UAF)



Lidar Lab at UAF, co-PI R. Collins



Rayleigh Lidar at PFRR, UAF, courtesy: Vishnu Kumar



Quick facts

Upgraded Rayleigh-Mie-Raman lidar at Poker Flat Rocket Range and installed another lidar at HAARP.

>Collect data on atmospheric temperature, density, aerosol backscatter coefficients, and water vapor

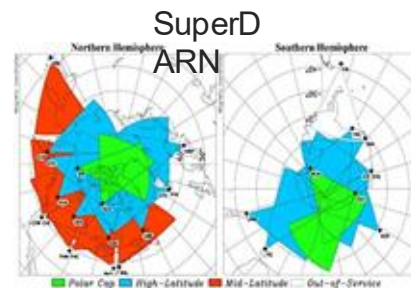
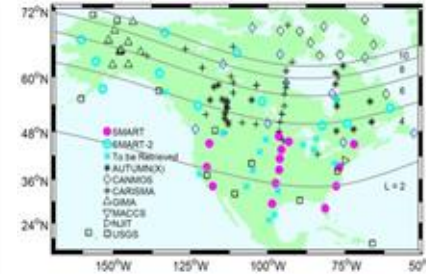
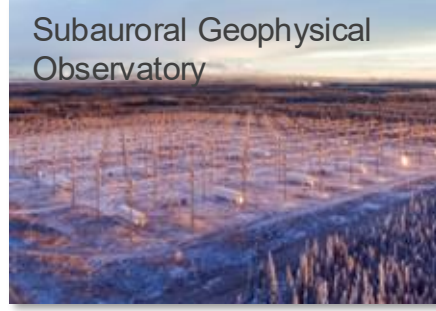
>Build partnership with laser industry

>Support early career





Research Infrastructure - Geospace Facilities



- New PO for GF: Lina Patino
- Both Jicamarca and Millstone Hill (MH) have finished several upgrades.
- Meteor radar and GNSS receivers near MH captured Cape Cod Bay meteor on 30 May 2026. Analysis is in progress.





Research Infrastructure - DASI

❖ **Deployment and Operations of the Ham Radio Science Citizen Investigation (HamSCI) Personal Space Weather Station Network**

- ❖ *Nathaniel Frissell (University of Scranton), Travis Atkison (University of Alabama Tuscaloosa), Hyomin Kim (New Jersey Institute of Technology), Christian Zorman (Case Western Reserve University)*

❖ **Distributed Meteor Radar and Optical Network in South America**

- ❖ *Alan Liu (Embry-Riddle Aeronautical University), Jonathan Makela (University of Illinois at Urbana-Champaign), Asti Bhatt (SRI)*

❖ **Student-Led Development of an Advanced yet Low-cost Multi-Constellation, Triple Frequency Ionospheric Scintillation and Electron Content Monitor**

- ❖ *Fabiano Rodrigues (University of Texas at Dallas)*

❖ **AUtonomous Remote geospace Observation and Research Array (AURORA)**

- ❖ *Zhonghua Xu (Virginia Polytechnic Institute and State University), Michelle Salzano (Space Science Institute)*

Quick facts

- Two DASI solicitations
 - 2019
 - 2024
- Added Research infrastructure
- NSF contributed approximately \$15 M till now through this effort.





Science highlight

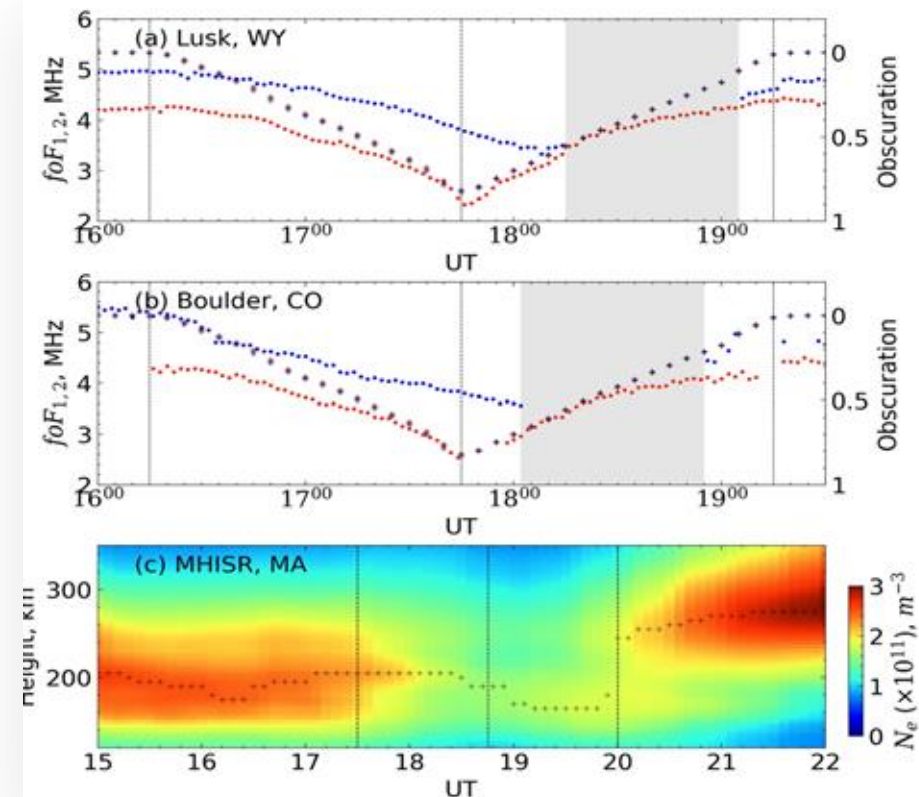
AGS-2412294: Collaborative Research: Ionospheric Density Response to American Solar Eclipses

PIs: S. Chakrabarty (ERAU), Mrak Sebastjan (John Hopkins Univ), and Naomi Maruyama (Univ. of Colorado, Boulder)

Chakrabarty, S., Qian, L., Mrak, S., Mabie, J., Goncharenko, L., McInerney, J. M., & Bullett, T. (2025). **Formation of the ionospheric G- condition following the 2017 Great American Eclipse.** *Earth and Space Science*, 12, e2024EA004007.
<https://doi.org/10.1029/2024EA004007>

Quick Facts

- F2-layer density depletion lags eclipse obscuration by ~20 minutes due to slower O⁺ recombination and diffusion-dominated transport, enabling a transient period in which $NmF1 > NmF2$ for more than 50 minutes.
- Compared NASA-GOLD observations with different models to understand the role of conjugate photoelectrons.



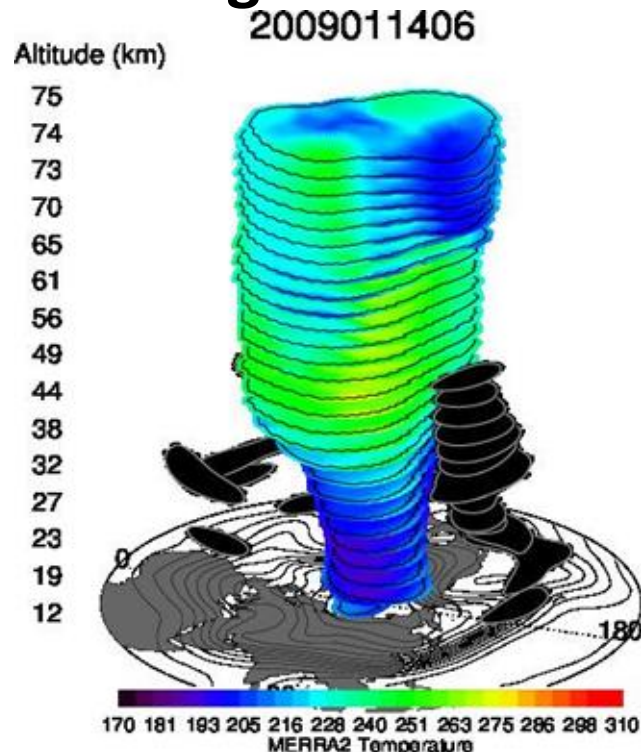


Science highlight

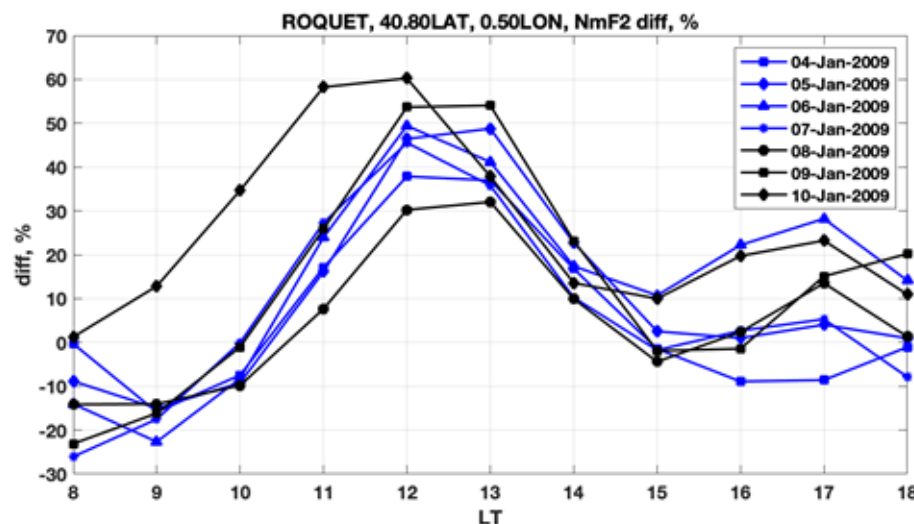
AGS 2411430: 4-dimensional impacts of strong polar cortices on the thermosphere-ionosphere system

PI: Greer (LASP), Co-I Harvey (LASP), Co-I Navarro (CU), Co-I Goncharenko (MIT-Haystack)

Strong Polar Vortex



Electron Density Anomaly



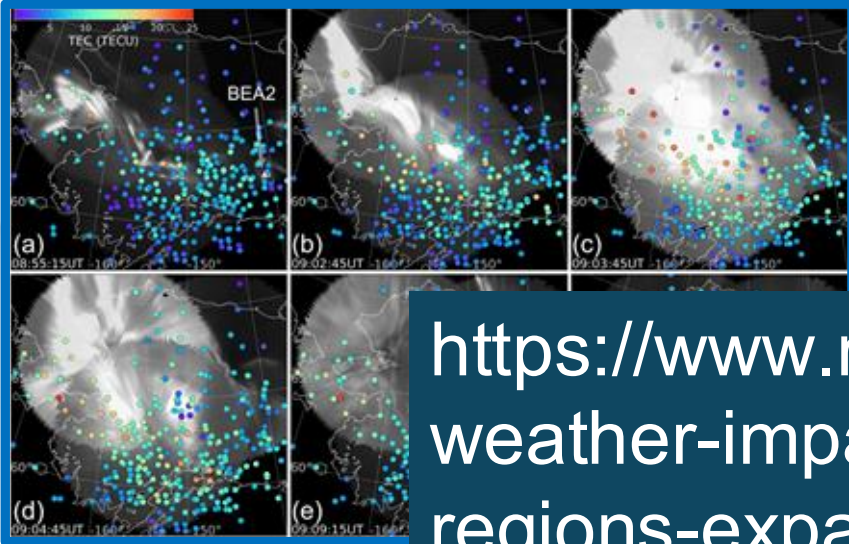
Quick Facts

- ❖ Midlatitude NmF2 increases by up to 60%, with strong longitudinal differences.
- ❖ This work helps us to understand the operational environment of the VLEO region.



Science Highlight: AGS - 2527835 CEDAR: Mid-Latitude GPS Position Errors During Geomagnetic Storms

PI: Yukitoshi Nishimura



High-Latitude GPS Position Error During Substorms:

Liao, W., Nishimura, Y., Younas, W., Li, W., Groves, K. M., Donovan, E. F., & Angelopoulos, V. (2026). High-latitude GPS position error during substorms. *Space Weather*, 24, e2025SW004858. <https://doi.org/10.1029/2025SW004858>

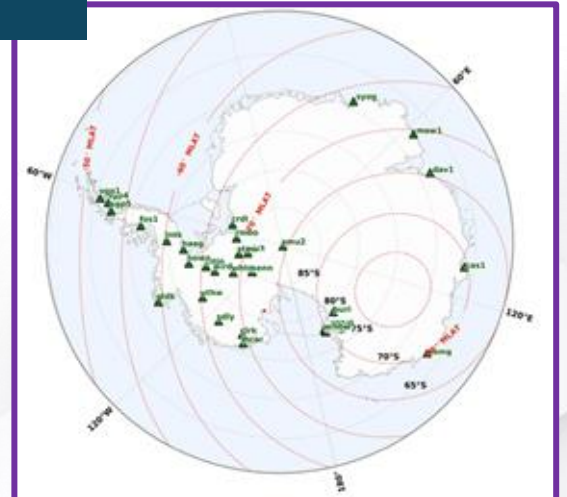
<https://www.nsf.gov/geo/updates/space-weather-impacts-gps-extend-polar-regions-expanding>

m during

Characterizing the Role of Storm-Time High-Latitude Ionospheric Structures in GPS Position Accuracy in Antarctica: May 2024 Storm

Younas, W., Nishimura, Y., Liao, W., Semeter, J. L., Mrak, S., Morton, Y. J., et al. (2026). Characterizing the role of storm-time high-latitude ionospheric structures in GPS position accuracy in Antarctica: May 2024 storm. *Space Weather*, 24, e2026SW004946. <https://doi.org/10.1029/2026SW004946>

- **TOIs resulted in GPS position errors ~ 28 m in Antarctica**



Artificial Intelligence Related Award



Aurora and airglow captured from the International Space Station with a Nikkor color camera.

•**Collaborative Research: CAIG: Unveiling Hidden Dynamics of the Auroral Ionosphere Using AI-based Sensor Fusion**

•*PIs: Josh Semeter (BU) and Pau Closas (North-Eastern University)*

- ❖ Combines optical and GNSS data with ML techniques.
- ❖ Applications of AI to MI coupling.
- ❖ Student training opportunities.

President's FY2027 Budget Request

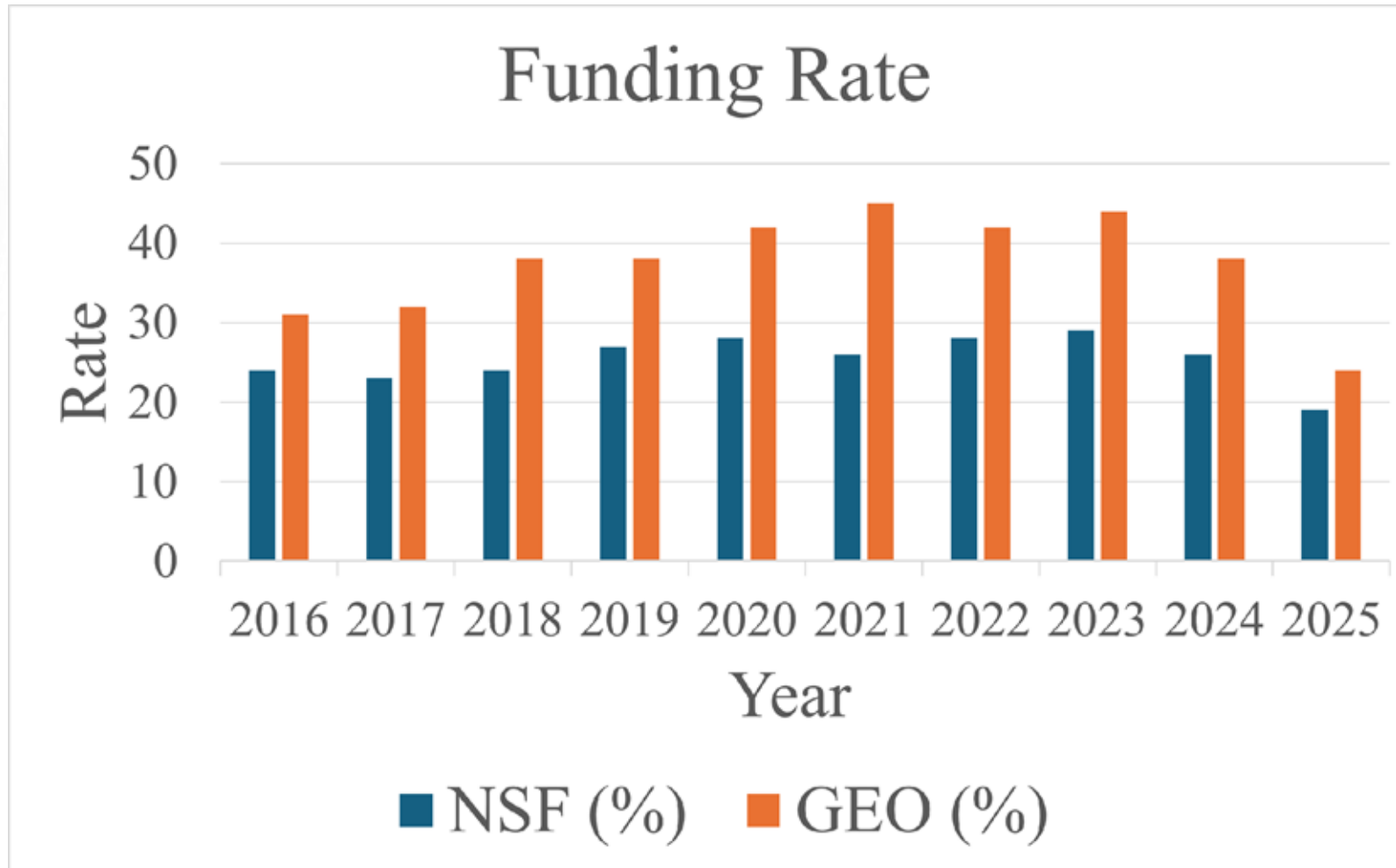


Agency	2026 Enacted (\$B)	2027 Request (\$B)	Change (\$B)	Change (%)
NSF	8.8	4.0	-4.8	-54.7



(Dollars in Millions)					
	FY 2025	FY 2026 (TBD)	FY 2027 Request	Change over	
	Current Plan			FY 2025 Current Plan Amount	Percent
Total	\$1,020.61		\$426.32	-\$594.29	-58.2%
Research	505.46		175.07	-330.39	-65.4%
Education	22.53		3.68	-18.85	-83.7%
Infrastructure	492.62		247.57	-245.05	-49.7%

Past NSF – GEO Funding Scenario



Current Administration Priorities

NSF GEO Priorities

- ❖ AI
- ❖ Innovative Research
 - ❖ Critical Minerals
 - ❖ Energy and water
- ❖ National Security Strategies
 - ❖ Prediction of natural hazards
 - ❖ Wildfires, earthquakes, and windstorms
 - ❖ Impacts on infrastructure (space weather), development of new technologies to mitigate their impacts

NSF Priorities

- AI (Data centers, applications to industry)
- Translational Research
- Quantum Information Science



Funding Opportunities relevant to Geospace

Geospace Core Program

View Guidelines:
PD 7789

**Accepts
Proposals
throughout the
year**

CEDAR Solicitation

View Guidelines:
NSF 25-510

**Target Date:
March 3, 2027**

SHINE Solicitation

View Guidelines:
NSF 22-570

**Target Date:
Oct. 7, 2026**



NSF-Wide Funding Opportunities

- **Ecosystem for Leading Innovation in Plasma Science and Engineering (ECLIPSE)**
 - **Deadline Date: Aug. 11, 2026**
- **Mid-Career Advancement (MCA)**
 - **Window: Feb 1 – Mar 1, 2027**
- **Faculty Early Career Development Program (CAREER)**
 - **Deadline Date: July 22, 2026**



NSF Wide Funding Opportunities

- **Cyberinfrastructure for Sustained Scientific Innovation (CSSI): NSF 22-632**

- **Deadline**

- **Evolving in cyber**

- **Integrated Services (I)**

- **Deadline**

- **Supports operations-level national-scale cyberinfrastructure systems and services**

Morris Cohen from Georgia Tech successfully leveraged NSF TTP-P program (TI – 2553000) to translate the research from Aeronomy grant 2139916, titled: “D-region Ionosphere Inferred Maps of Electron density”, partnering with a private company “Vaisala Inc”.

to Practice (NSF TTP)

Deadline: Nov 17, 2026

[View guidelines](#)

[NSF 25-540](#)

THE MEASURE OF INTELLIGENCE IS THE ABILITY TO CHANGE.

Quote by Albert Einstein

**THANK
YOU**

