



# Geospace Facilities Program at NSF

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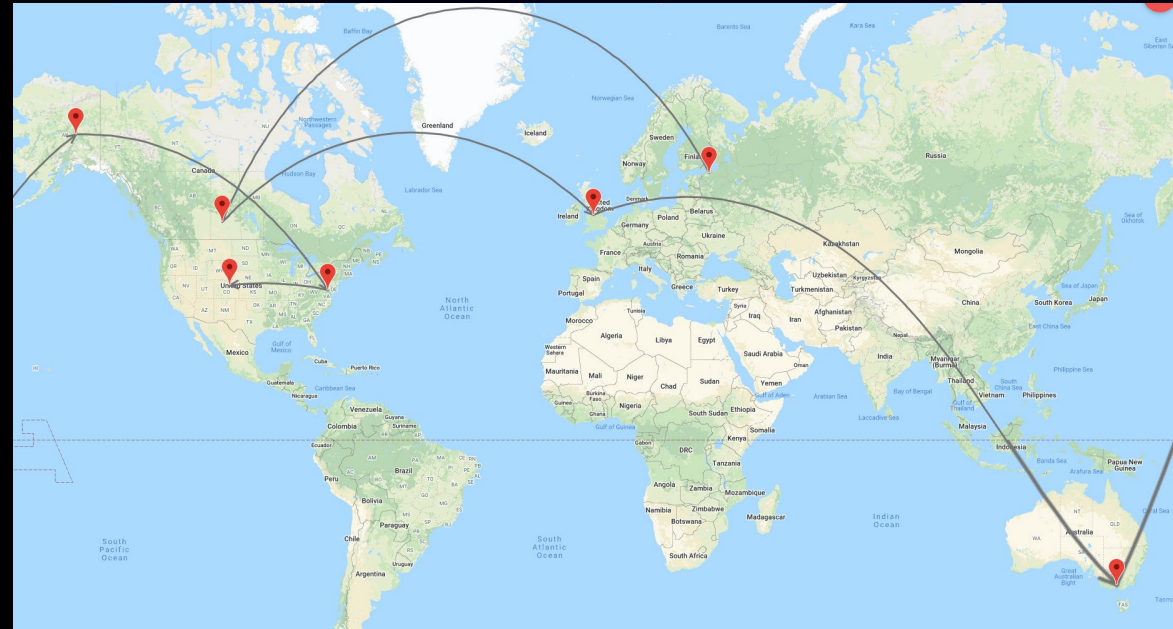


# Outline



1. Personal background
2. Radar experiments
3. Geospace Facilities program at NSF
4. Career pathways
5. Opportunities at NSF

# Personal Background

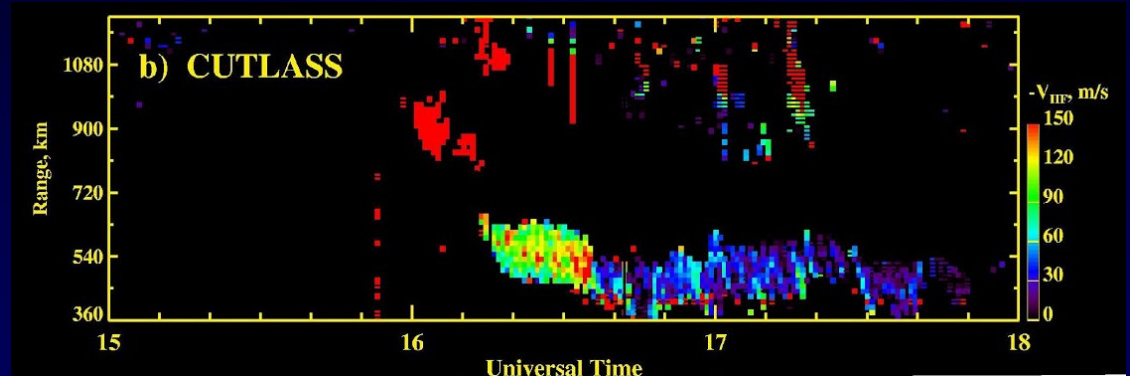


- BSc, MSc Physics  
St-Petersburg State University
- PhD Space Physics  
U. Saskatchewan, Canada
- Postdoc  
Lancaster University, UK
- Senior Lecturer  
La Trobe University, Australia
- Professor of Physics  
University of Alaska Fairbanks
- Program Director  
NSF, Aeronomy
- Senior Research Scientist  
ASTRA
- Program Director  
NSF, Geospace Facilities

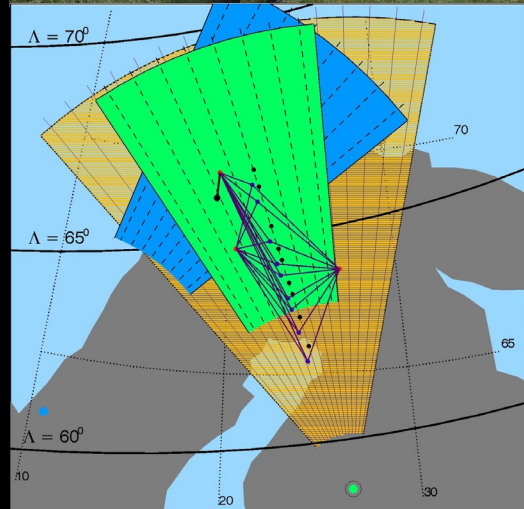
# Radar Experiments: A Personal Story

## Wallops Island HF Radar

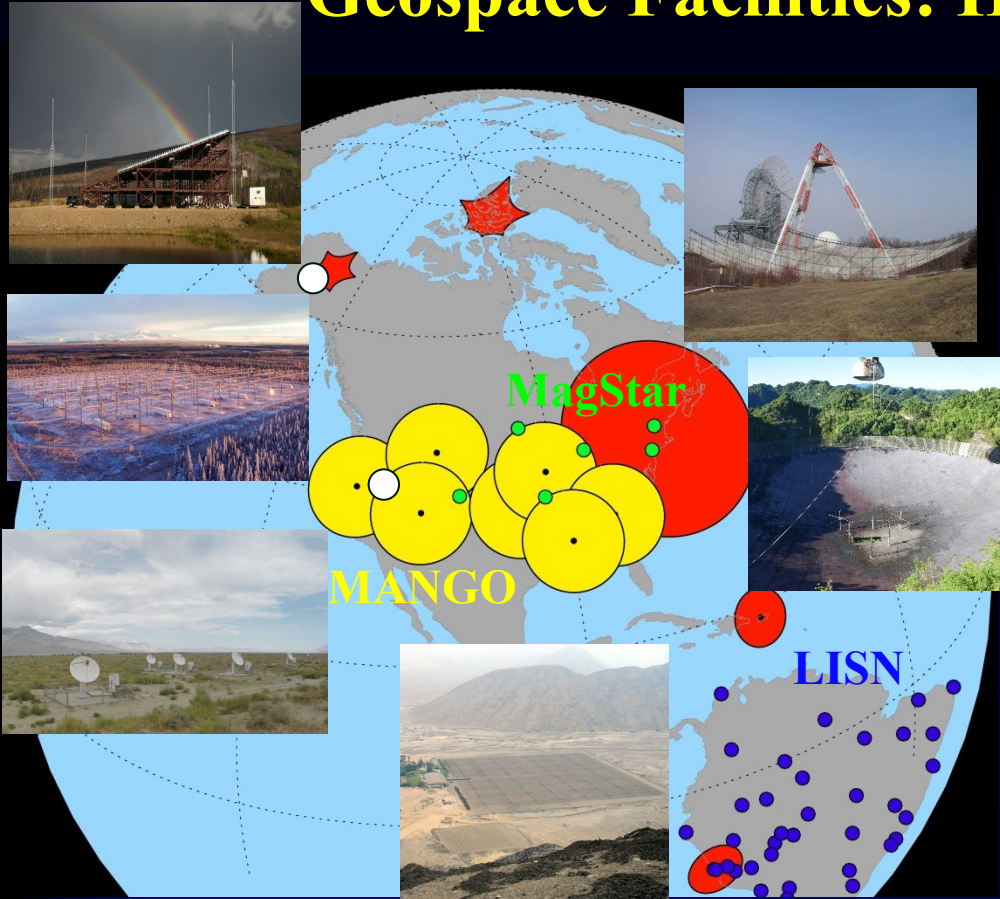
- 2003 PhD Space Physics  
Theory and radar observations of ionospheric irregularities  
“Sight unseen”
- 2004 First radar experiment



- There is no substitute for hands-on experience
- Design and run experiments
- Formulate and address science questions
- Develop and maintain strong emphasis on outcomes (publications)



# Geospace Facilities: History and Projects



## Class 1 Incoherent Scatter Radars (ISRs)

- Resolute Bay 2009
- Poker Flat 2007
- Arecibo 1963 1969
- Jicamarca 1961 1979
- Millstone Hill 1958 1974

## Class 2 DASI Track 2

- MagStar 2020
- MANGO 2019
- LISN 2020

## Class 2

- AMPERE 2008
- CCMC 1999
- HAARP 2021
- EOVS 2021

# Geospace Facilities: Update



## Arecibo Observatory

Nov 2020: 2<sup>nd</sup> cable failure  
Dec 2020: Platform collapse

Damage:

- ISR: 35% reflector panels
- HF: 4/6 dipoles
- Lidar and optics: Minimal

Cleanup underway

Nature paper on ionospheric effects of lightning and flares



## Subauroral Geophysical Observatory

New 5-year award

Class 2 geospace facility

Apr 2021 – Mar 2025

PI: Robert McCoy

200 hours of baseline

HF operations per year



## Jicamarca Radio Observatory

High-power operations

restarted in Sept 2020

Repaired AMISR-14

Experiments in support of

COSMIC2, ICON, GOLD

Significant results on high altitude (>1500 km)

equatorial echoes



## Expanded Owens Valley Solar Array

New 3-year award

Class 2 geospace facility

Sept 2021 – August 2023

PI: Dale Gary

Spectral imaging of solar activity

3D measurements of solar magnetic fields

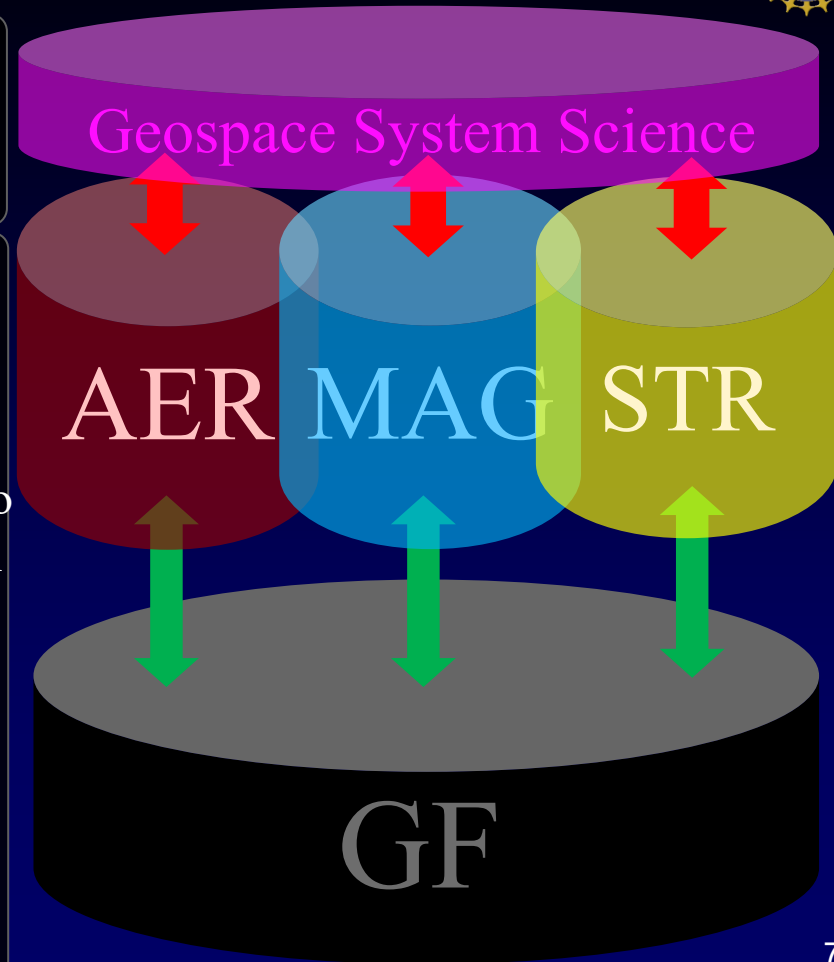


# Geospace Facilities: Foundation



GF serves as a foundation for all Geospace Section core programs

The Aeronomy Program supports research from the mesosphere to the outer reaches of the thermosphere and all regions of the Earth's ionosphere. The Aeronomy Program seeks to understand phenomena of ionization, recombination, chemical reaction, photo emission, and the transport of energy, and momentum within and between these regions. The program also supports research into the coupling of this global system to the stratosphere below and magnetosphere above and the plasma physics of phenomena manifested in the coupled ionosphere-magnetosphere system, including the effects of high-power radio wave modification.



# Geospace Section



**AGS Division Director  
Candace Major**



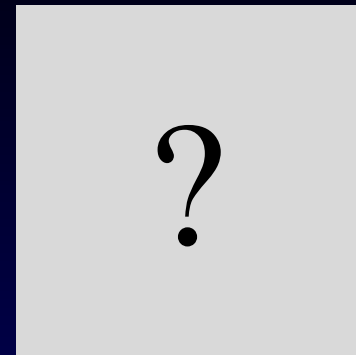
**Acting Section Head  
Magnetospheric Physics  
Lisa Winter**



**Aeronomy  
Alan Liu**



**Solar Terrestrial Research  
Ilya Roussev**



**Geospace Program Director**



**Geospace Facilities  
Roman Makarevich**



**Expert  
John Meriwether**



**Space Weather  
Mangala Sharma**





# Career Pathways

## Academia

### Pros:

- Academic freedom
- Student feedback
- Good benefits

### Cons:

- Only faculty jobs secure
- Student feedback
- Proposal writing

## Industry

### Pros:

- Good pay
- Different perspective

### Cons:

- No student feedback
- Proposal writing

## Government

### Pros:

- Making a difference
- Job security

### Cons:

- No student feedback

# NSF Proposals and Review



## NSF Grant Proposal Guide (PAPPG)

### Review Criteria

- Intellectual Merit
- Broader Impacts
- Relevance to a solicitation
- Additional solicitation specific criteria

### NSF Conflicts of Interest

Noncompliant proposals can be returned without review



# NSF Opportunities: Graduate Research Fellowships



- Three years of financial support
- \$34,000 Stipend per year
- \$12,000 Cost allowance to institution
- Professional Development Opportunities
- Career-Life Balance Initiative (family leave)
- **Fellowship:** Awarded to individual
- **Flexible:** Choice of project, advisor & graduate program
- **Portable:** Can be used at any accredited US institution
- MS, PhD, both degrees
- U.S. citizens and permanent residents
- Early-career: undergrad & grad students
- Pursuing research-based MS or PhD
- Science and engineering
- Enrolled in accredited institution in US by Fall
- The deadline for GEO-related proposals is October 22, 2021

# NSF Opportunities: Atmospheric and Geospace Science

## Postdoctoral Research Fellowships (AGS-PRF)



- Stipend \$65,000 year 1 and \$67,000 year 2
- \$29,000 per year for benefits, travel, equipment

### Eligibility

- US citizens and green card holders
- Grad student or PhD for less than 2 years or with less than 18 months of employment
- Must start Postdoc within 6 months of award
  
- Geospace track: can take fellowship to any institution, except for NCAR
- No annual deadline

# NSF Opportunities: Acting as a Reviewer or Panelist

- NSF relies on the community to review proposals
- Panels or adhocs
- POs cannot make funding recommendations without reviews from you
- 3 reviews per proposal
- Reviews inform PO
- POs look at portfolio for balance, timeliness/urgency and other factors and recommend to the Division Director
- Volunteer to become a reviewer

# NSF Opportunities: Acting as a Reviewer or Panelist

- How to write a useful review
  - Reviews identify major and minor strengths and weaknesses
  - Summary
  - Intellectual Merit
  - Broader Impacts
  - Recommendation
- Give your opinion in the summary
- Statements on how important a particular area is to the community at large are helpful
- Suggestions for improvement of the proposal document or science idea



# Summary

- Student support is a priority at NSF
- Your advisor is your bestie in science
- Facilities provide excellent opportunities for hands-on experience
- Do not let this experience go to waste
  - Experiment
  - Focus on outcomes