



# NSF's Contributions to SWAP Implementation

M. Wiltberger  
Geospace Sciences  
Section Head



# Outline

- NSF and Space Weather
  - Support for basic research
  - Budget outlook
- Support for SWORM
  - Goal 1 - Benchmarks
  - Goal 5 – Advance Understanding and Forecasting
  - Goal 6 – Increase International Cooperation
- Opportunities
  - 10 Big Ideas
  - PREEVENTs
  - FAC Program Director

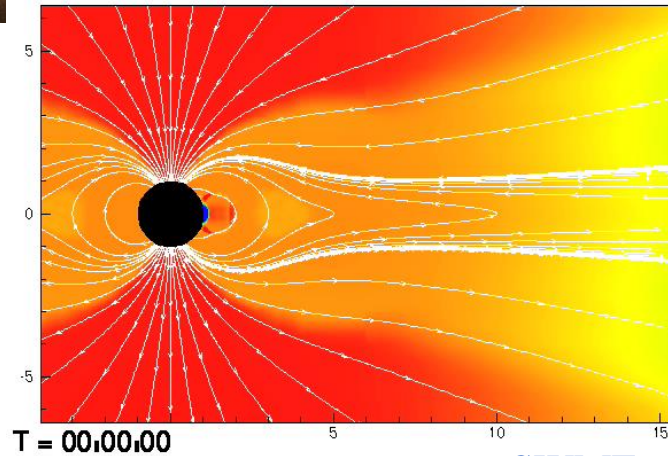


# Space Weather Research



CSEM Center for Space Environment Modeling University of Michigan

PFISR



SWMF

$$\frac{\partial \rho}{\partial t} + \nabla \cdot [\rho \vec{u}] = 0$$

$$\frac{\partial (\rho \vec{u})}{\partial t} + \nabla \cdot \left[ \rho \vec{u} \vec{u} + \left( p + \frac{B^2}{8\pi} \right) \vec{I} + \frac{1}{4\pi} \vec{B} \vec{B} \right] = 0$$

$$\frac{\partial \vec{B}}{\partial t} + \nabla \cdot [\vec{u} \vec{B} - \vec{B} \vec{u}] = 0$$

$$\frac{\partial (\rho E)}{\partial t} + \nabla \cdot \left[ \vec{u} \left( \rho E + p + \frac{B^2}{8\pi} \right) - \vec{B} (\vec{u} \cdot \vec{B}) \right] = 0$$

$$\nabla \cdot \vec{B} = 0$$

$$p = (\gamma - 1) \left[ E - \frac{1}{2} \rho u^2 - \frac{1}{2} B^2 \right]$$

Alfvén

- Support investigators using observations, modeling, and theory to advance fundamental understanding of space weather and related processes



# NSF and AGS Budgets

- We have been operating on CR since start of the fiscal year
  - Presents numerous challenges
  - Recall President's request had NSF down **10%**
  - New Omnibus spending bill has NSF up **3.9%**
    - Focuses mainly on top level numbers RRA (+5%), MREFC, HER, & AOAM
- On Feb 12, 2018 as part of the budget process the NSF's FY2019 request was submitted to Congress



	FY17 Enacted	FY19 Request	Change
NSF	\$7,504M	\$7,472M	<b>-0.4%</b>
GEO	\$825M	\$852M	<b>+3.3%</b>
AGS	\$253M	\$239M	<b>-5.6%</b>

- Prior to congressional action on budget caps NSF was down **30%**
- GEO increase to support OOI and ARF in OCE
- Google [NSF FY19 Budget](#) for more information



# Support for SWORM Implementation



## NATIONAL SPACE WEATHER ACTION PLAN

PRODUCT OF THE

National Science and Technology Council



October 2015

- **SWAP Identifies 6 Goals**
  - **Goal 1 – Establish Benchmarks for Space Weather Events**
  - **Goal 2 – Enhance Response and Recovery Capabilities**
  - **Goal 3 – Improve Protection and Mitigation Efforts**
  - **Goal 4 – Improve Assessment, Modeling, and Prediction of Impacts on Critical Infrastructure**
  - **Goal 5 – Improve Space Services through Advancing Understanding and Forecasting**
  - **Goal 6 – Increase International Cooperation**



# Space Weather Benchmarks

- Phase 1 Benchmark report is awaiting approval
  - 5 Major Space impacts are targeted
    - Induced geo-electric fields
    - Ionizing radiation
    - Ionospheric disturbances
    - Solar radio bursts
    - Upper atmospheric expansion
  - Initial estimates of 1 in 100 year storms and theoretical maxima event
- NSF and NASA are leading a Next Step Benchmarking activity for the SWORM
  - Finalizing SOW to support workshop and community report
  - Will be looking for volunteers update and revise the phase 1 benchmarks



**BENCHMARKING**



# Advance Understanding and Forecasting

- NSF led an RFI to gather community input on research priorities for space weather which closed April 6<sup>th</sup>
  - Received over 30 responses and are working with the Goal 5 team to process the input
- Contributed input to the baseline instrumentation requirements that are part of the goal 5.3.9
- Provided support the Earthscope project to expand coverage of the magnetotelluric survey





# Advance Understanding and Forecasting II

- Space weather model development can be supported by the NSF PREEVENTs program
  - Last year two multi-million dollar proposals received funding from the program
  - LOI are required part of the submission process
    - July 27, 2018 Deadline
- Coordinating with NASA/NOAA on a tri-agency O2R pilot
  - NSF will accept proposals into the Core programs in AGS and AST
    - Grants for 1-year of funding only See DCL (NSF 18-052) for details
      - Google [NSF Space Weather O2R](#)
  - Beginning discussions with NASA and NOAA for MOU to support second phase





# Increase international cooperation

- Participated in UN/USA ISWI Meeting
- Attended USA/Canada Bilateral Space Weather Meeting
- Assisting efforts associated with Space Weather as UN-COPUOS Thematic Priority 4





# NSF 10 Big Ideas



- FY19 Request includes \$282M to support the 10 Big Ideas
  - Origin of the 5% reductions in RRA activities within each directorate
- 6 Research Ideas each get \$30M for a total \$180M

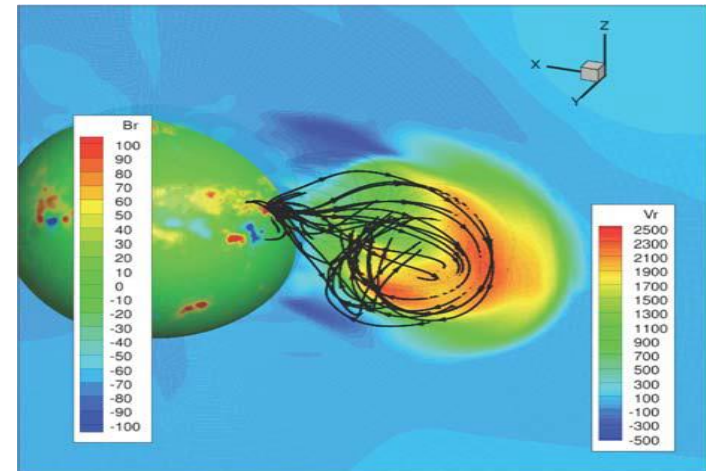
Harnessing the Data Revolution	Navigating the New Arctic	Future of Work at Human Tech Frontier
The Quantum Leap	Understanding the Rules of Life	Windows on the Universe

- Process Ideas get \$102M total
  - Midscale Research Infrastructure \$60M
  - INCLUDES \$20M
  - Growing Convergence Research \$16M
  - NSF 2026 Fund \$6M
- [https://www.nsf.gov/news/special\\_reports/big\\_ideas/](https://www.nsf.gov/news/special_reports/big_ideas/)



# PRE-EVENTS

- Expecting \$18M in FY18 for support of this program
  - Google [NSF PREEVENTS](#) for full details
- Track 1
  - Workshop Proposals accepted anytime
  - NEW collaborations only
  - Contact Iliia Roussev or Carrie Black for more details
- Track 2
  - Letters of Intent Due July 27, 2018
    - Rules on compliance are strict. Reach out if you have questions.
    - Fully submitted and signed LOIs are **REQUIRED** for submission of Full Proposals
  - Full Proposals Dues September 18, 2018
    - 2-Step review process of full proposals. Award notification dates dependent on when NSF receives FY19 funds.





# Job Opportunity – Facilities PD



A new way to sign in. Create a [login.gov account](#) to sign into USAJOBS. [Learn more](#)



[^ Back to results](#)

[Next >](#)

## Physical Scientist (Program Director)

[National Science Foundation](#)

[Overview](#)

[Locations](#)

[Duties](#)

[Requirements](#)

[Required Documents](#)

[Benefits](#)

[How to apply](#)

### Overview [? Help](#)

#### Open & closing dates

🕒 04/05/2018 to 05/16/2018

#### Pay scale & grade

AD 04

#### Appointment type

Permanent - Permanent.

#### Salary

\$133,689 to \$178,573 per year

#### Work schedule

Full-Time - Full-time.

### This job is open to [? Help](#)



#### The public

U.S. citizens, nationals or those who owe allegiance to the U.S.

[Apply](#)



Print



Share



Save

#### Announcement number

AGS-2018-0009





# Thank You – Questions?

