Update and Key Issues at NSF-Geospace

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AGS Division Director

Space Weather Research

PFISR

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

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

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

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

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

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

Alfvén

SWMF

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

Quick Facts about FY17

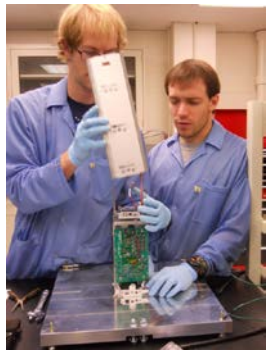
- Overall spending in section was $47.5M up 5% from FY16
  - Support for interdisciplinary projects
  - Funds from division used to pay down mortgage rates

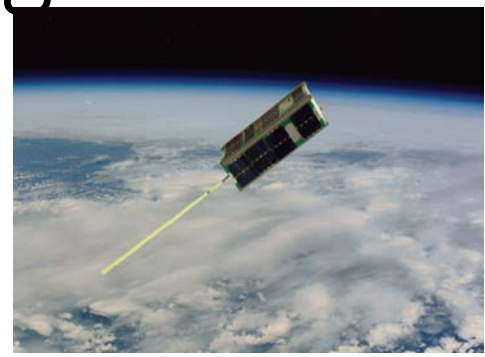
AER	MAG	STR	SWR	FAC
10.6M	8.1M	7.8M	7.0M	13.6M

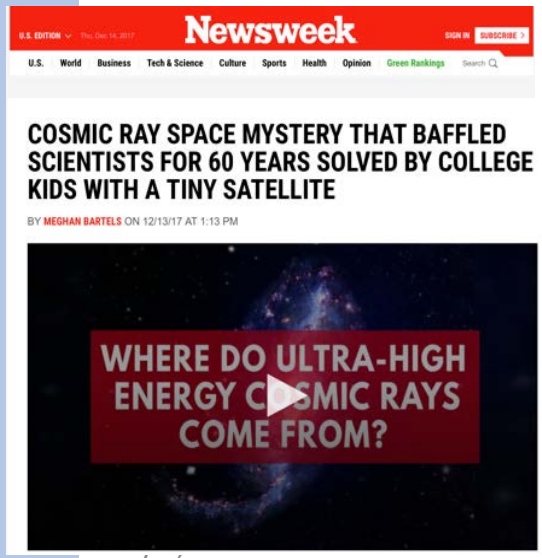
- Additional facts about AER, MAG, STR grants in 2017
  - 178 Actions resulting in 55 new awards
  - 25 CGIs and 30 standard grants
  - 52% average mortgage rate for the section

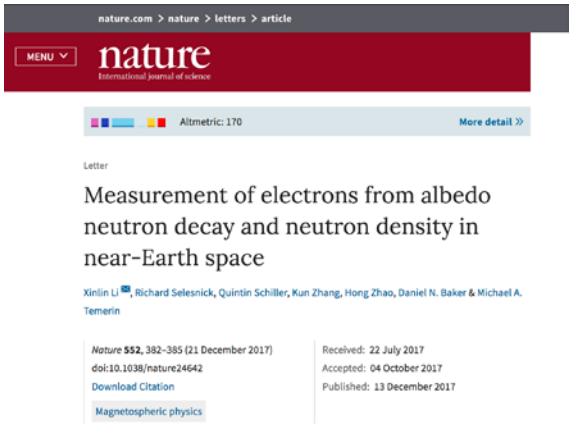
NSF/GEO CubeSat Program

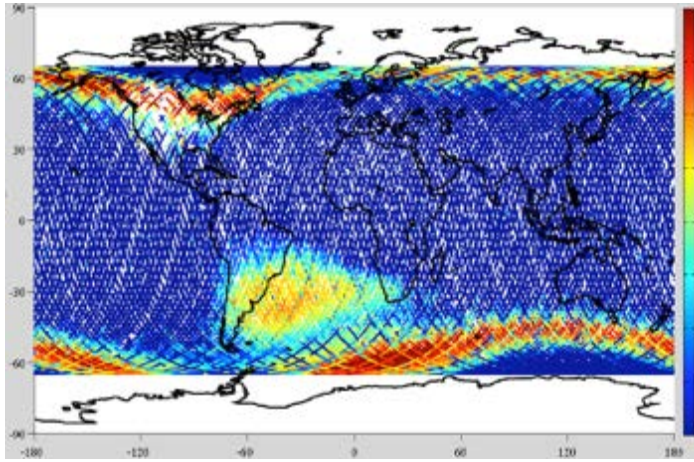
- 14 Missions and 20 CubeSats
  - Advance space weather research
  - Create educational opportunities
- Colorado Student Space Weather Explorer
  - Measurements of electrons & protons produced a clear picture of the global distribution energetic particles in the near Earth environment
  - Over 19 peer reviewed publications



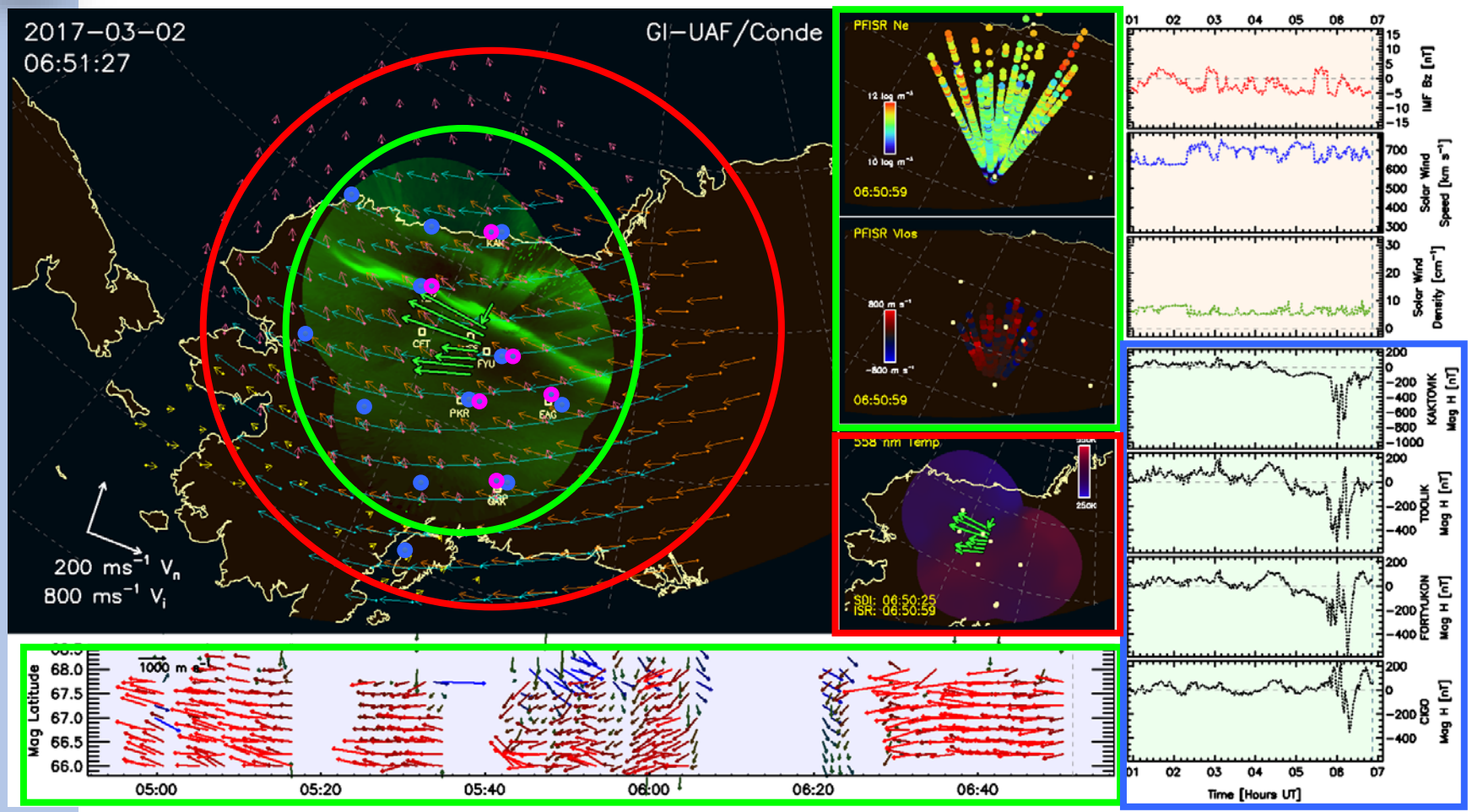








A Mesosphere-Ionosphere-Thermosphere Laboratory for ion-neutral interactions in the auroral zone



Poker Flat Incoherent Scatter Radar (PKR) and optics (PKR, TLK, KAK, FYU, EAG)

Scanning Doppler Imager Network (KAK, TLK, PKR, EAG)

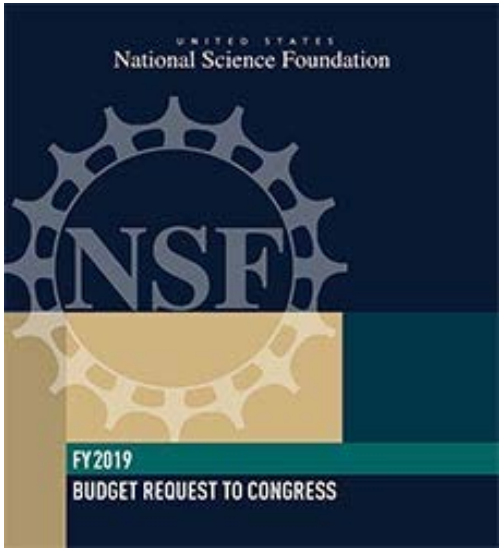
Magnetometer arrays (GIMA, USGS, THEMIS)

SuperDARN network (Kodiak, Adak)

GPS Scintillation Receivers (ASTRA, SAGA, Morton, MACAWS*)

* Deployed 2018-2019

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	**-0.4%**
GEO	$825M	$852M	**+3.3%**
AGS	$253M	$239M	**-5.6%**

  - Prior to congressional action on budget caps NSF was down **30%**
  - GEO increase to support OOI and ARF in OCE
  - Detailed information at https://www.nsf.gov/about/budget/fy2019

Arecibo Observatory

- NSF has selected a UCF – UMET – YEI consortium to operate AO for the next 5 years
  - The award will start on April 1
  - Anticipate reduced funding over the life of this effort, to a total of $2M per year by the end of the five-year project period (and pending availability of funds)
  - The FY19 president's request is aligned with this plan
- The CR passed on Feb 9 (Public Law 115-119) included $14.3M in disaster relief funding for repairs to AO
  - Repairing the 430MHz line feed is included in the spending plan for these funds

Sondrestrom Research Facility

- Geospace Portfolio Review made 3 recommendations related to SRF
  - 7.2 – End ISR observations
  - 7.3 – Support ancillary observations from site
  - 7.4 – Investigate joining EISCAT

ISR and LIDAR at SRF

- Section is moving forward with these recommendations
  - Community input obtained in response to DCL
  - Support for ISR operations will continue through 3/31
  - Conducting an environmental and engineering assessment of site via CPS
  - Obtained information from EISCAT on levels of involvement

Support for SWORM

- Goal 1 – Space Weather Benchmarks
  - Initial estimates of 1 in 100 year and theoretical maxima event
  - NSF and NASA are leading a Next Step Benchmarking activity
    - Finalizing SOW to support workshop and community report
- Goal 5 – Advance Understanding and Forecasting
  - RFI to gather community input on research priorities for space weather is open until April 6th
    - Go to federalregister.gov and search space weather
- Goal 6 – International Cooperation
  - Participated in UN/USA ISWI Meeting
  - Attending US/CAN Bilateral SWx Cooperation Mtg
  - Space Weather as UN- COPUOS Thematic Priority 4

Revision of CEDAR, GEM, & SHINE

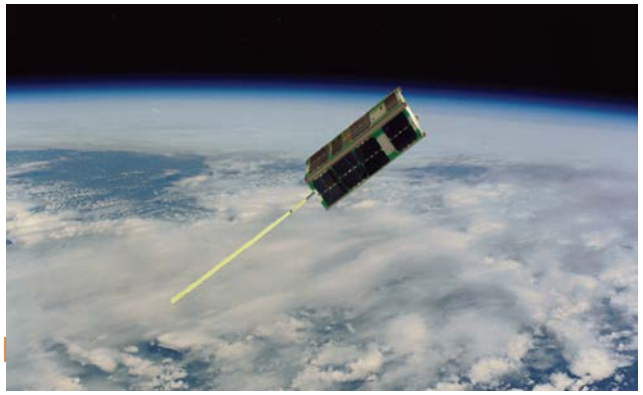
- Previously we had announced our intention to make CEDAR, GEM, and SHINE to programs with no deadlines
  - Changes requested by NSF Policy office caused additional delay

Due dates, we don't need no stinking due dates

- New solicitations for CEDAR and GEM released on Feb 28 and are now accepting proposals
  - Google NSF CEDAR or NSF GEM for details
  - PI's encouraged to contact PO before submission
- Not planning to release SHINE during FY18
  - Funding for STR program remains the same
  - RREF workshop next week is part of community input for next SHINE solicitation

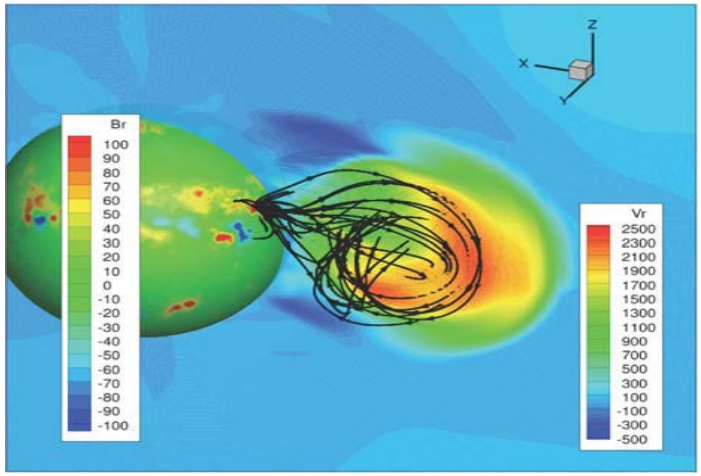
Cubesat Plans

- Geospace Portfolio Review recommended continuing CubeSat program and engaging with rest of NSF to expand program



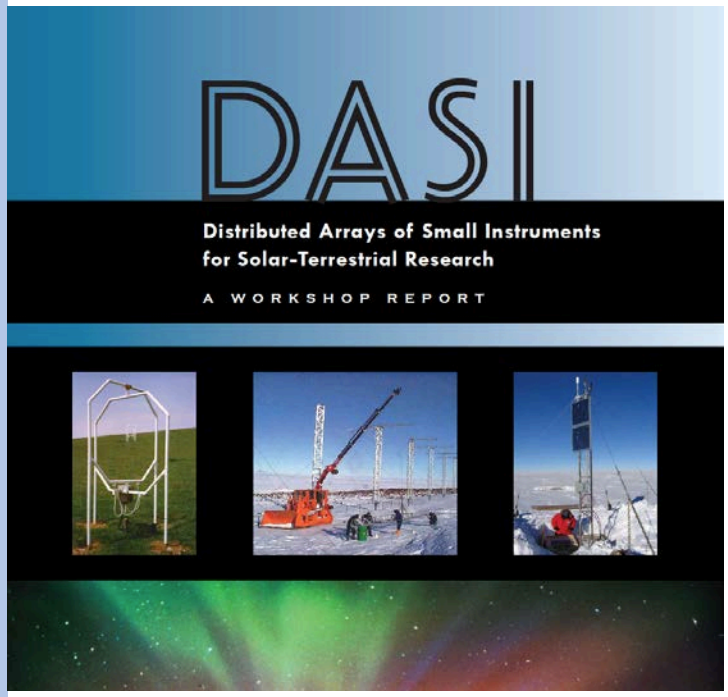
- Cubesat solicitation was released on March 19
  - Google NSF CubeSat
  - Support for 1-2 missions at total cost $1.2M each
  - Submissions are due June 12th
- CubeSat-Enabled Science and Engineering meeting has generated significant interest in collaborations with CISE/CNS and ENG/ECCS
  - Focused novel science applications of CubeSats and CubeSat constellations

PREEVENTS



- 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 Ilia 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.

Distributed Array of Small Instruments



- Section is beginning to consider how to implement the DASI recommendations in the geospace portfolio review
- Listening sessions at summer CEDAR, GEM, SHINE are also expected

Other collaborations

- Working with NASA on several initiatives
  - Developing NSCI-Space Weather pilot program (includes several divisions at NSF)
  - Support for coordination of ground, ICON and GOLD related research
  - Coordinating efforts on the DRIVE Science Centers
- 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
- Establishing an MOU with AFRL to support SuperDARN enhancements

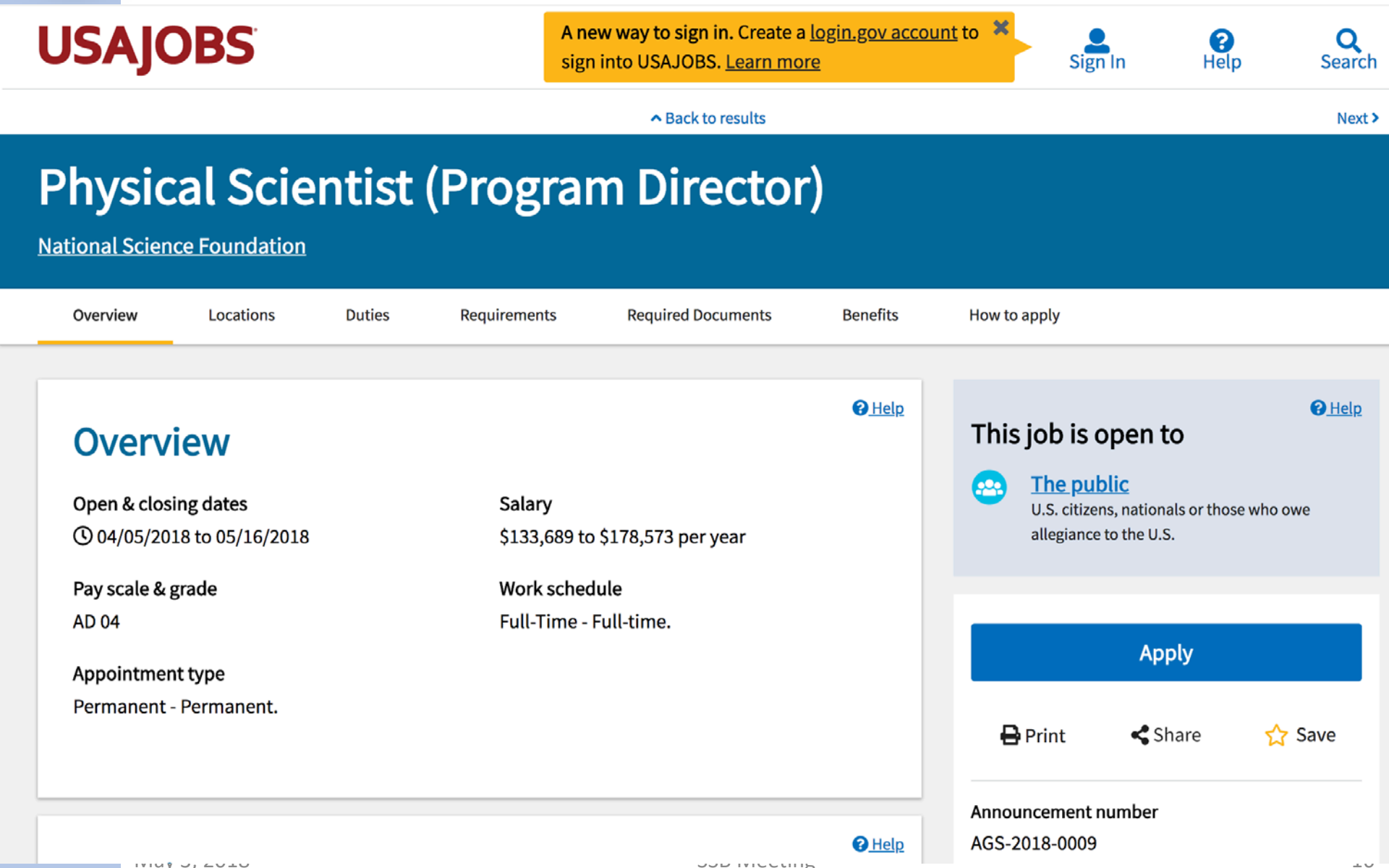
NSF 10 Big Ideas

- 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/

Job Opportunity – Facilities PD



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Pay scale & grade
AD 04

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Appointment type
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Questions?

- Happy to provide answers ☺