



# Increasing Access to Cyberinfrastructure for EPSCoR and other Under-resourced Institutions

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# Presentation Outline

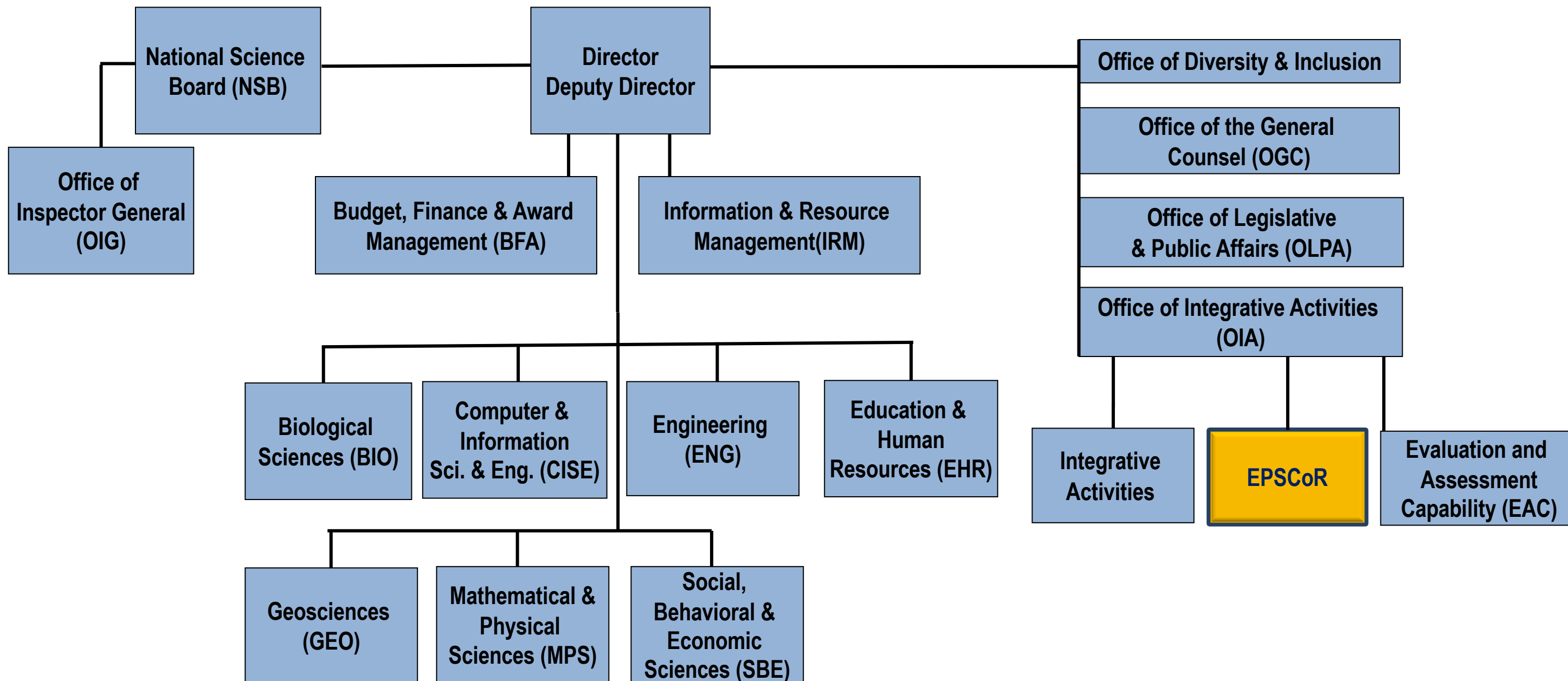
- EPSCoR Overview
- Increasing access to cyberinfrastructure for EPSCoR and under-resourced Institutions
  - Collaborative Partnerships
  - Personal Experiences
  - In-depth Immersion
- Call to Action



# EPSCoR Overview



# NSF Organization



# EPSCoR In Context

- Established by NSB Resolution in 1978
- Target: States receiving lesser amount of NSF research support funding
- Purpose: To build sustainable capacity of educational institutions in those states to compete more successfully in NSF and other research programs

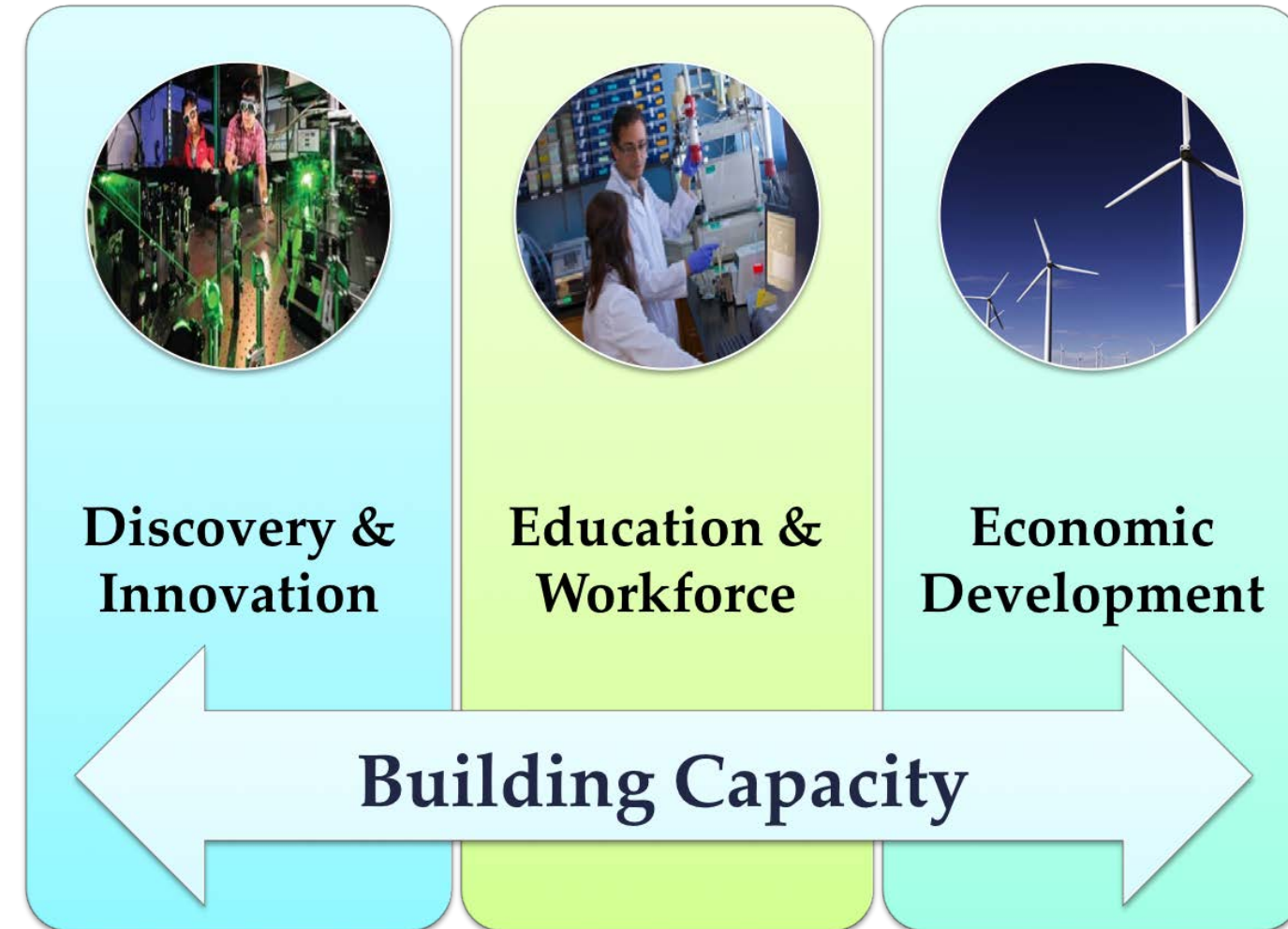


# EPSCoR Mission

*Enhances research competitiveness of targeted jurisdictions (states, territories, commonwealth) by strengthening STEM capacity and capability*

## Goals

- Catalyze research capability across and among jurisdictions
- Establish STEM professional development pathways
- Broaden participation of diverse groups and institutions in STEM
- Effect engagement in STEM at national and global levels
- Impact jurisdictional economic development



<https://www.nsf.gov/od/oia/programs/epscor/index.jsp>



# EPSCoR Investment Strategies

- **Research Infrastructure Improvement (RII)** (83% of EPSCoR budget)  
Support physical, human, and cyber infrastructure within academic institutions across each jurisdiction
- **Co-Funding w/ NSF Directorates & Offices** (16% of budget)  
Meritorious proposals reviewed in other NSF programs that also satisfy EPSCoR programmatic criteria
- **Outreach and Workshops** (1% of budget)  
Interaction among EPSCoR Community and NSF to build mutual awareness and develop areas of potential strength



# Research Infrastructure Improvement

- **Track-1** (up to \$20M over 5 years)
  - Statewide research capacity in alignment with specific priorities described in Science & Technology Plan
- **Track-2** (up to \$1.5M per year for up to 4 years)
  - Interjurisdictional collaborations (i.e., 2 or more EPSCoR jurisdictions)
  - Theme chosen by NSF EPSCoR to align with Foundation-wide priority areas
  - Additional focus on early-career faculty
- **Track-3** (piloted in FY13; up to \$750k for up to 5 years)
  - Focus on broadening participation in STEM
- **Track-4** (new in FY17; up to \$300k over 2 years)
  - Fellowships for non-tenured faculty to have extended research visits to premier private, governmental, or academic institutions in the U.S.





# Co-Funding

- **Joint support of meritorious proposals from EPSCoR Institutions**
  - Proposal submittal to specific NSF Directorate/Office
  - Merit review by the managing program based on NSF policies
  - At managing program's request, EPSCoR reviews and decides on co-funding based on alignment with priorities and availability of funds
- **Co-funding priorities**
  - New PI; Collaborative/Multidisciplinary; Synergy with NSF Priorities (for current fiscal year); Broadening Participation; Instrumentation to Increase Research Capacity; K-12 Student & Teacher Training; Integration of Research & Education



# Workshops and Outreach

- **EPSCoR Workshops**

- Support EPSCoR community-wide activities designed to:
  - Explore opportunities in emerging areas of STEM research
  - Share best practices in planning and implementation in areas of importance to EPSCoR jurisdictions
  - Current solicitation (NSF 19-588):  
[https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf19588&org=NSF](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19588&org=NSF)

- **EPSCoR Outreach**

- Supports NSF staff travel for interactions with the EPSCoR community and builds mutual awareness
- [https://www.nsf.gov/od/oia/programs/epscor/FY2017\\_Outreach\\_Procedures.pdf](https://www.nsf.gov/od/oia/programs/epscor/FY2017_Outreach_Procedures.pdf)



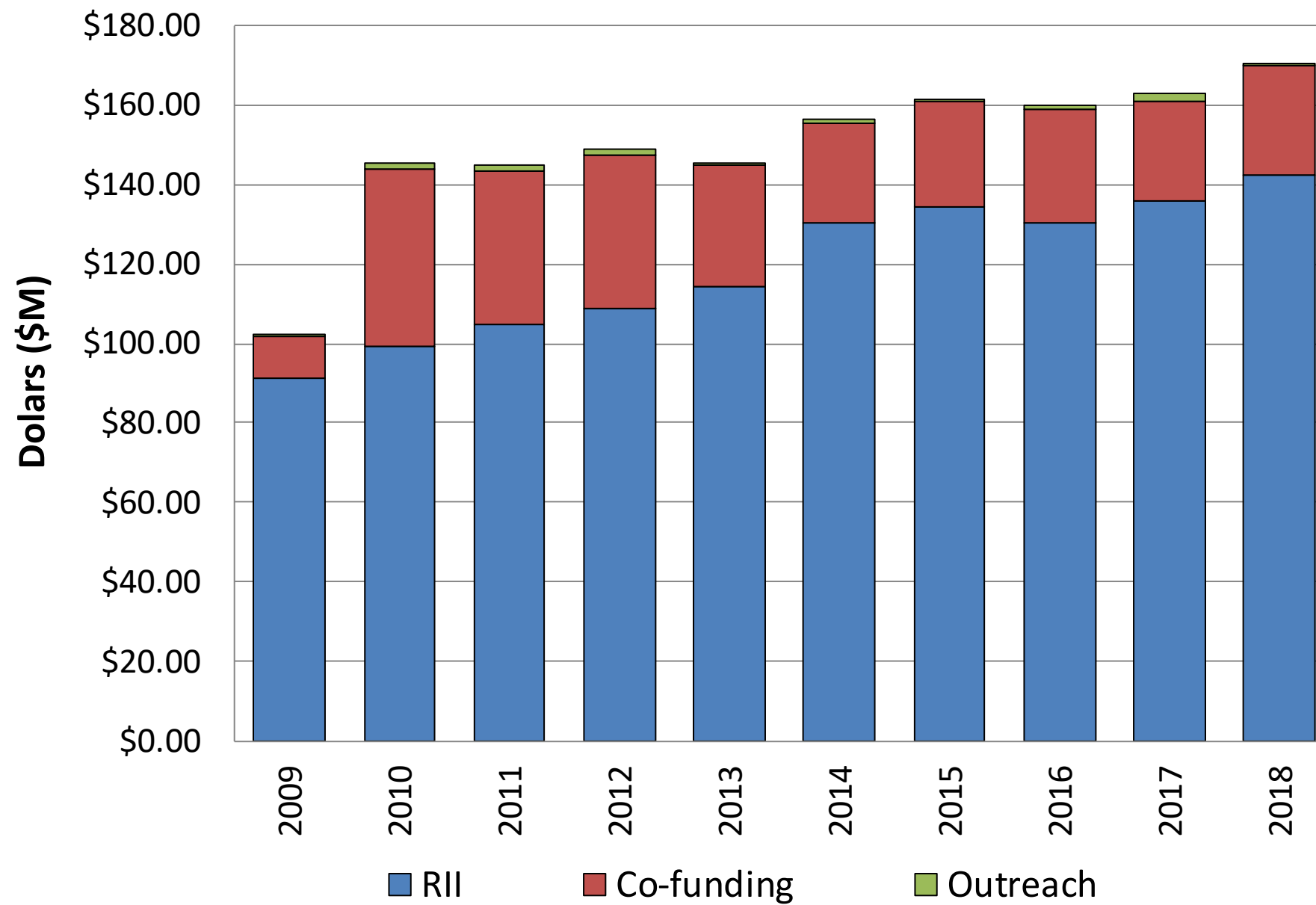
# EPSCoR Funding (\$M)

Activity	FY14	FY15	FY16	FY17	FY18
RII	132.2	137.4	130.4	135.8	142.2
Co-funding	25.3	27.6	28.5	24.9	27.6
Outreach & Workshops	1.0	0.5	1.1	2.1	0.8
Total*	158.2	165.5	160.0	162.8	170.6

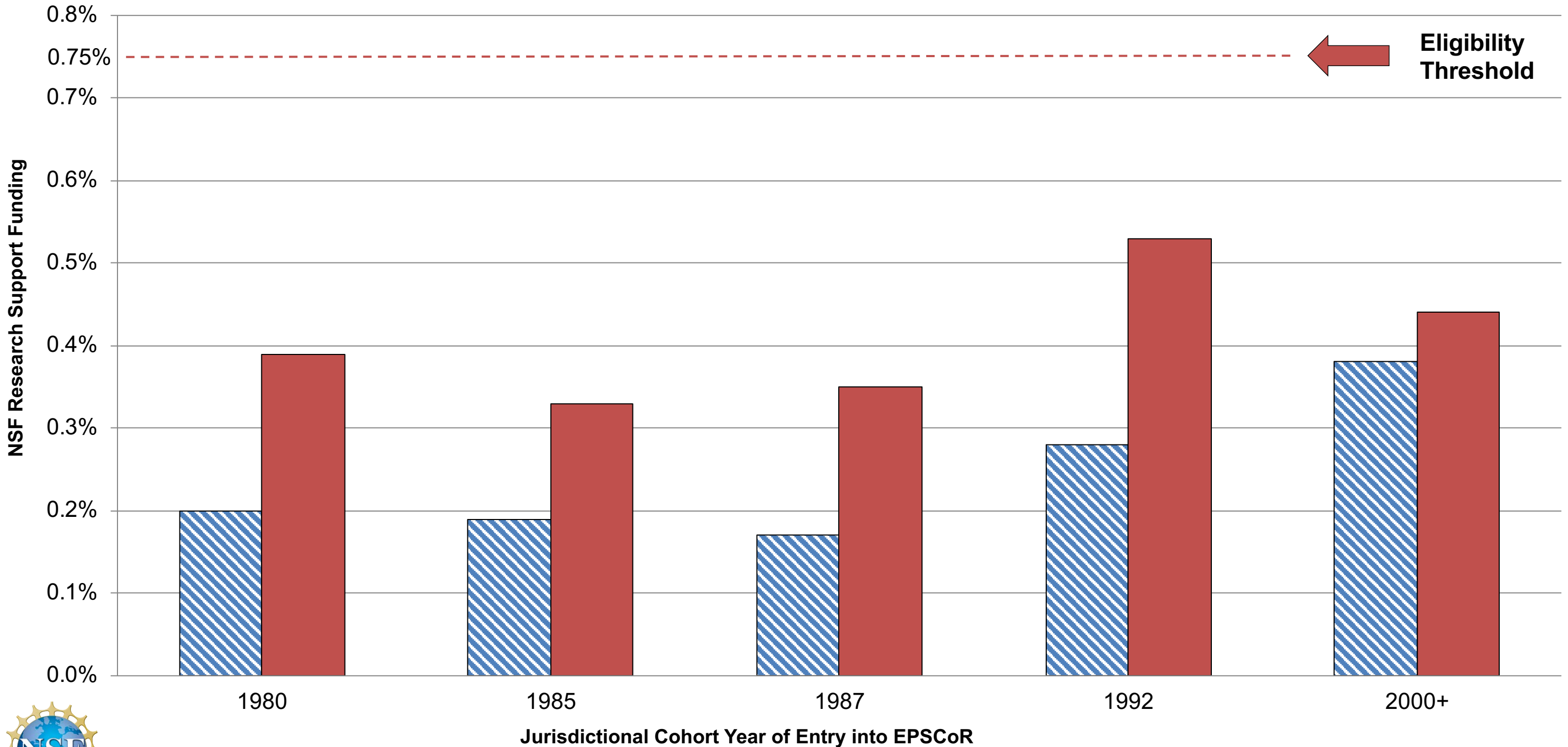
\* May not add due to rounding and includes admin fees, as reported to Congress



# EPSCoR Funding Over Time FY09 – FY18



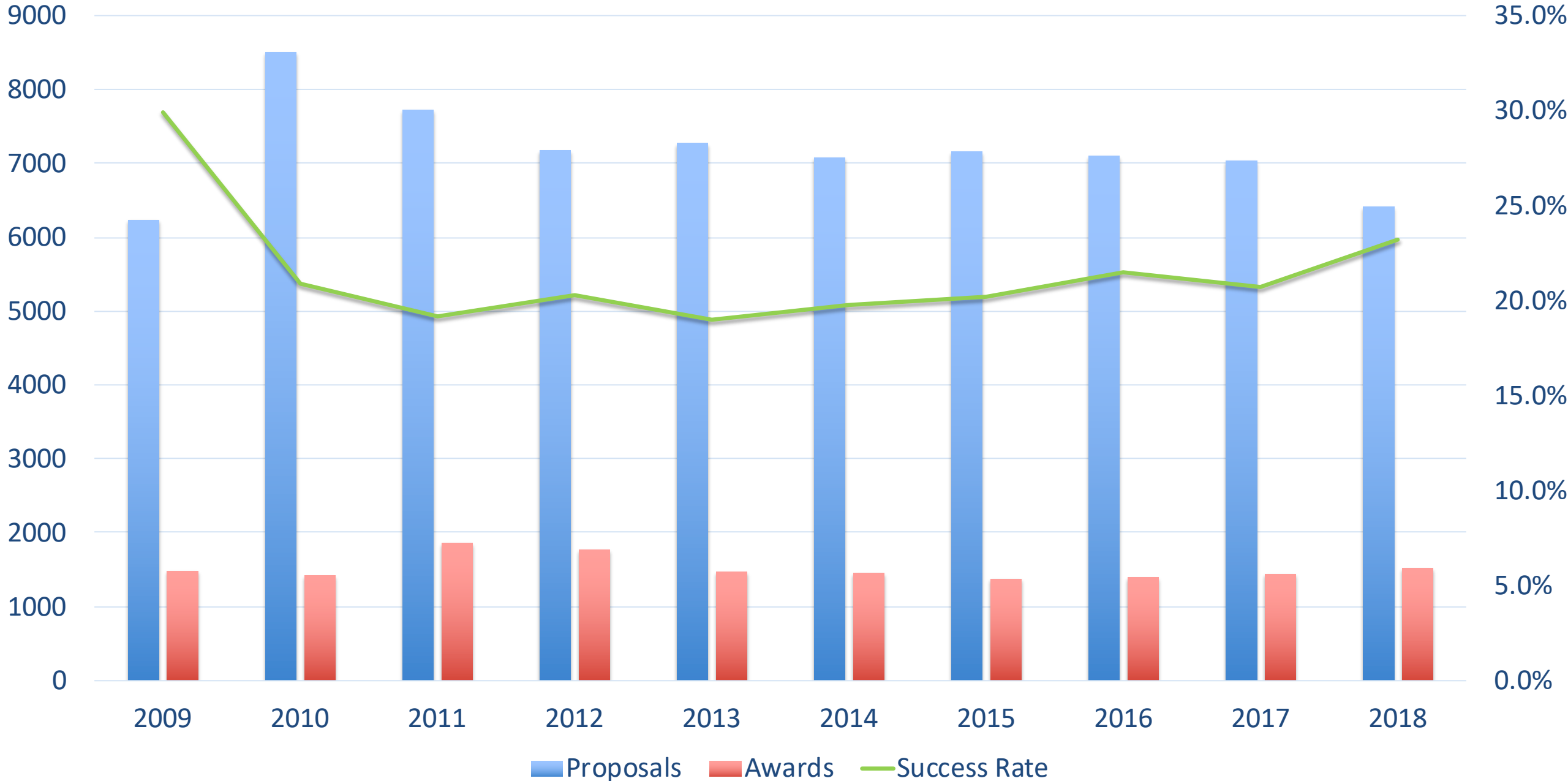
# NSF Research Support Funding



■ Initial 5 Years in EPSCoR

■ FY 2014 - FY 2018, five-year average

# EPSCoR Jurisdictions' Proposal Success Rate



# **Increasing access to Cyberinfrastructure for EPSCoR and Under-resourced Institutions**



# Focus on Collaborative Partnerships

- **Track-1:** Collaborations among regional and national EPSCoR jurisdiction-based organizations are encouraged, as are partnerships with nationally recognized centers of R&D activity, such as federal and industrial R&D laboratories, NSF-sponsored research centers, and academic institutions with nationally-recognized research capabilities.
- **Track-2:** Builds nationally and internationally competitive collaborative teams of EPSCoR investigators by providing a mechanism to coalesce investigator expertise into a critical mass for a sustained, effective research and education partnership.
- **Track-4:** Provides opportunities for non-tenured investigators to further develop their individual research potential through extended collaborative visits to the nation's premier private, governmental, or academic research centers. During these visits, the EPSCoR Research Fellows learn new techniques, develop new collaborations and advance existing partnerships.





# Center for Computation & Visualization

Scientific and technical computing expertise to advance computational research

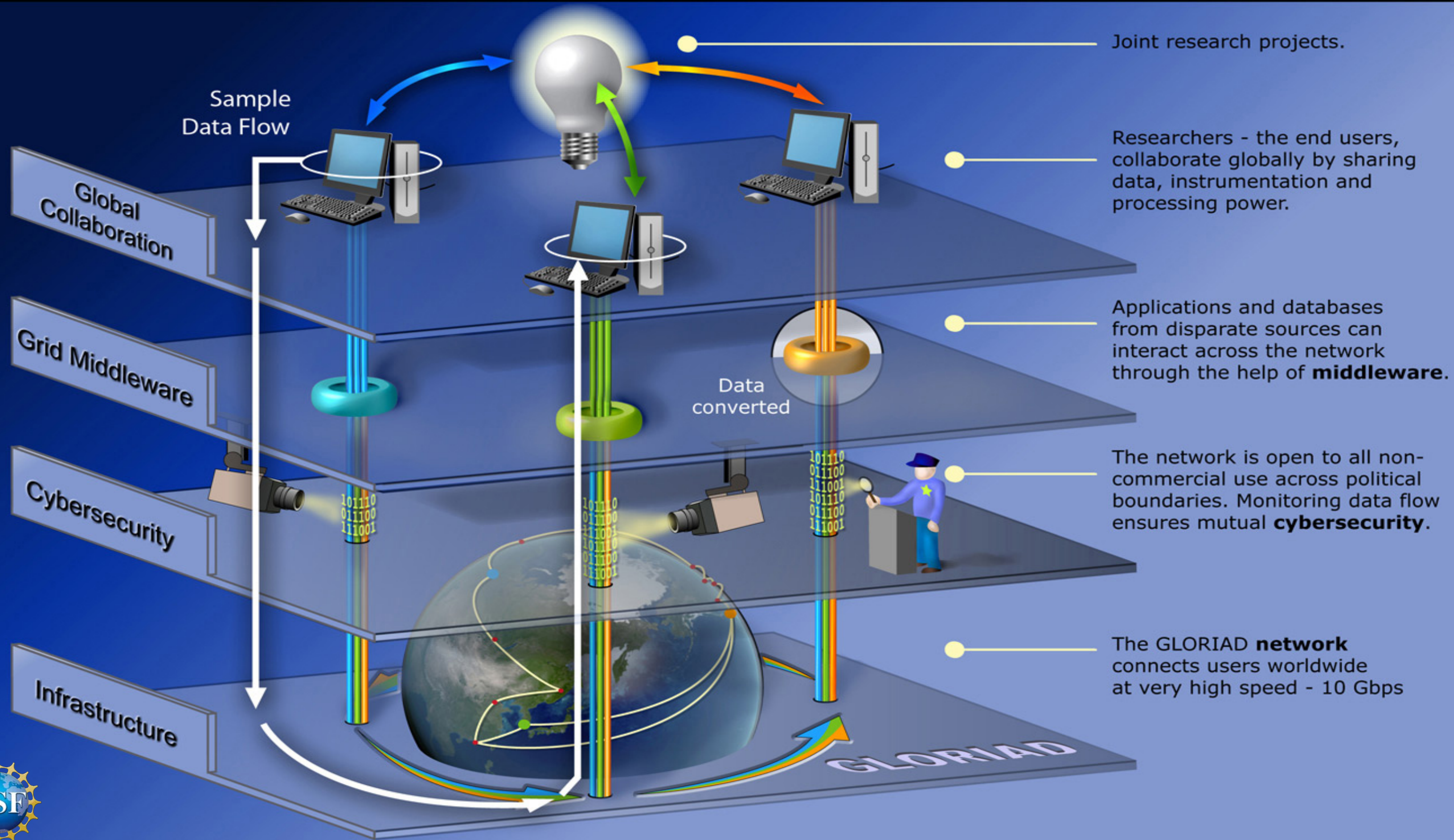
[Learn About CCV Services](#)



Alone, Rhode Island scientists and their respective institutions can't afford what they need. But together, through the EPSCoR effort to share resources, they can tap into the high performance computing and research data services of the Center for Computation and Visualization (CCV) at Brown University without having to leave their laptop. Housed at Brown's Providence campus, the CCV and its vast capabilities can be accessed by RI NSF EPSCoR researchers at any one of the nine partner institutions across the Ocean State. The high-performance computing resources equip the research community to undertake complex numerical simulations, modeling, and data analysis. Part of Brown's Computing and Information Services (CIS), the CCV fosters and manages high performance computing, highly reliable research data storage, visualization resources, physical and virtual server hosting, high-performance backup and archival services, and scientific support to empower computational research, scholarship and creativity.

**Rhode Island**





# Campus Cyberinfrastructure (CC\*)

*Campuses today face challenges across multiple levels of cyberinfrastructure.*

CC\* Invests in coordinated campus-level networking and cyberinfrastructure improvements, innovation, integration, and engineering for science applications and distributed research projects.

Awards supported in five program areas:

- Data-Driven Networking Infrastructure for the Campus and Researcher – up to \$500k over 2 years;
- Regional Connectivity for Small Institutions - up to \$800k over 2 years;
- Network Integration and Applied Innovation awards - up to \$1M over 2 years;
- Campus Computing and the Computing Continuum - up to \$400k over 2 years
- Cyber Team Research and Education CI-based Regional Facilitation - up to \$1.4M over 3 years.



# Call to Action



# Increasing Access to Cyberinfrastructure for EPSCoR and Other Under-Resourced Institutions

*Invest time to understand the needs of the Researchers, Educators, and IT staff at the institution-level.*

- Develop institutional partnerships to capitalize on resources that are already in-place and work together to acquire those that are not.
- Learn from the personal experiences of the challenges and obstacles faced by the end-source users (e.g. researchers, educators, students, IT administrative staff, ...).
- Identify opportunities for in-depth immersion to truly understand the campus' computing resources and environments and their unique needs.

*IT and computing resources are not one-size fits all.*



# U.S. Budget Priorities in Computing

*From the FY 2021 Administration Research and Development Budget Priorities Executive Memo*

## I. R&D Budget Priorities:

- American Security
- American Leadership in Industries of the Future (lotF)
- American Energy and Environmental Leadership
- American Health and Bioeconomic Innovation
- American Space Exploration and Commercialization

## II. Prioritize Crosscutting Actions:

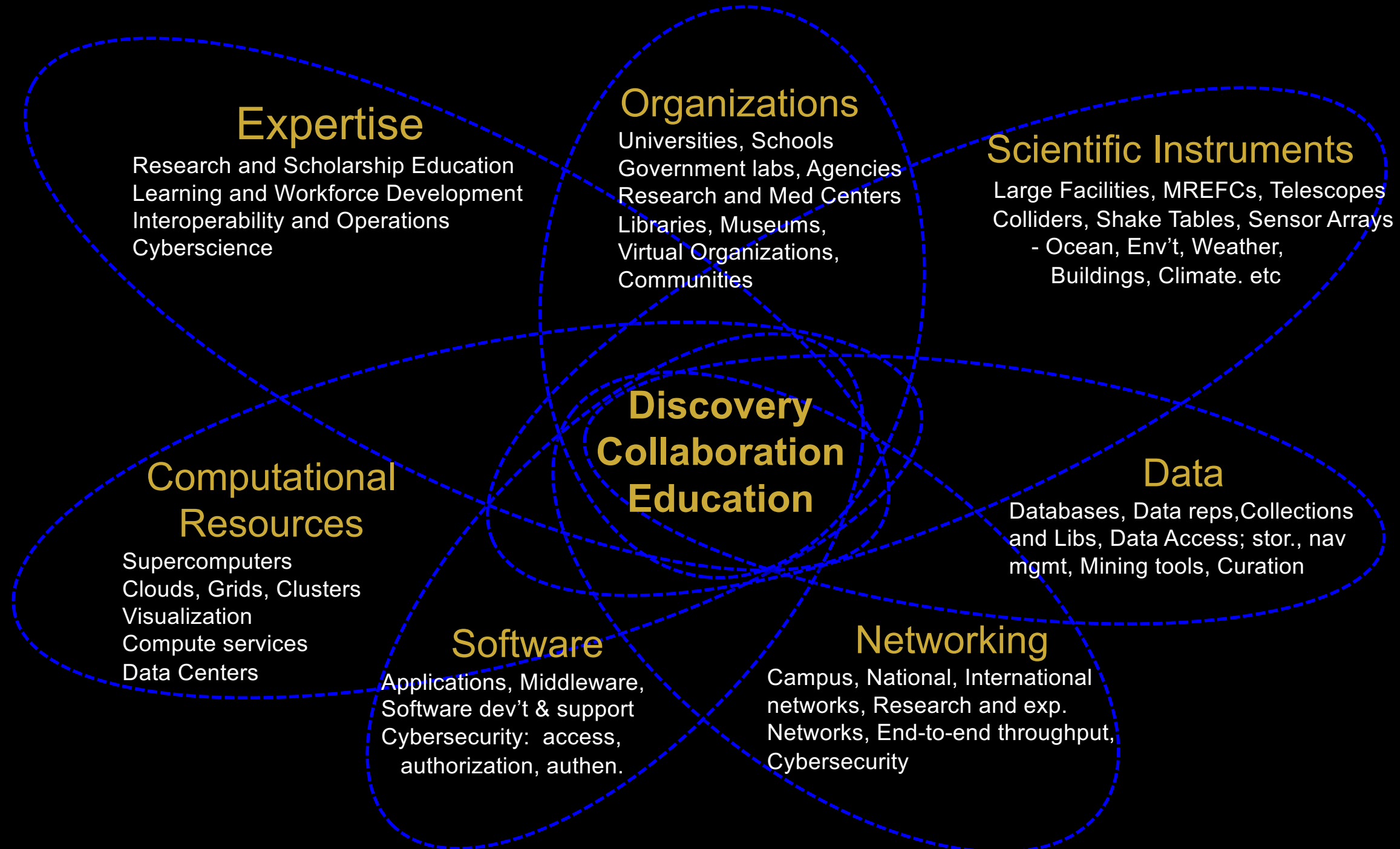
- Build and Leverage a Diverse Highly Skilled American Workforce
- Create and Support Research Environments that Reflect American Values
- Support Transformative Research of High Risk and Potentially High Reward
- Leverage the Power of Data
- Build, Strengthen, and Expand Strategic Multisector Partnerships

*“In terms of computing, departments and agencies should work together to explore new applications in and support R&D for high performance future computing paradigms, fabrication, devices, and architectures alongside sustainable and interoperable software; data maintenance and curation; and appropriate security.”*



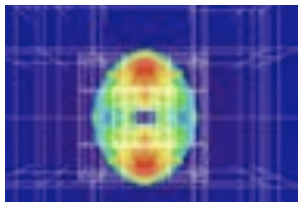


# CyberInfrastructure Ecosystem





# The Path Forward



- High-end computation, data, and visualization for transformative science
- MREFCs and collaborations including large-scale NSF collaborative facilities, international partners
- Software, tools, science applications, and VOs critical to science, integrally connected to instruments
- Campuses fundamentally linked end-to-end; grids, clouds, loosely coupled campus services, policy to support
- Comprehensive approach workforce development for 21st century science and engineering

**Thank You**



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