Overview of NSF Cyberinfrastructure and Perspectives

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Pre-RDA E-Infrastructures Workshops
September 22, 2015
NSF: Advancing Fundamental Science & Engineering (S&E) Research & Education

- $7.3 billion FY 2015 appropriation
- 94% funds research, education and related activities
- 48,100 proposals
- 11,000 awards funded
- 1,826 NSF-funded institutions
- 320,900 NSF-supported researchers
- All S&E disciplines funded
- Funds research into STEM education
- 214 Nobel Prize winners

Other than the FY 2015 appropriation, numbers shown are based on FY 2014 activities.
NSF embraces an expansive view of cyberinfrastructure motivated by research priorities and the scientific process.
NSF cyberinfrastructure investments led by the Division of Advanced Cyberinfrastructure (ACI)

**ACI Mission:** To support advanced cyberinfrastructure to accelerate discovery and innovation across all disciplines

**Division Director:** Irene Qualters  
**Deputy Division Director** (Acting): Amy Friedlander  
**Science Advisor for Cross-cutting CI:** Bill Miller

### High Performance Computing
Bob Chadduck  
Rudi Eigenmann  
Ed Walker

### Data
Bob Chadduck  
Amy Walton

### Networking/Cybersecurity
Anita Nikolich  
Kevin Thompson

### Software
Dan Katz  
Rajiv Ramnath

### Learning/Workforce Development
Sushil Prasad

National Strategic Computing Initiative (NSCI)

Lead Agencies: DOD, DOE, NSF

Executive Order, July 29 2015

Create a coordinated Federal strategy in High Performance Computing research, development, and deployment to maximize the benefits of HPC for economic competitiveness and scientific discovery.

Strategic Objectives

1. Accelerate delivery of a capable exascale computing system to deliver approximately 100X performance of current 10PF systems.

2. Increase coherence between technology base used for modeling and simulation and that used for data analytic computing.

3. Establish, over the next 15 years, a viable path forward for future HPC systems in the post Moore’s Law ...

4. Increase capacity and capability of an enduring national HPC ecosystem. Use a holistic approach ... networking, workflow, downward scaling, foundational algorithms and software, workforce development.

5. Develop enduring public-private partnerships
Researcher-Centric Challenge

*Revolution in the scientific workflow: many interfaces to shared cyber resources*

- Research Infrastructures
- Collaboration Networks
- High Performance Computing Resources
- Cloud and Grid Services
- Shared Data/Software Gateway Resources

LHC Atlas image courtesy of CERN
Global Collaboration Challenge

- Compatibility?
- Access, Identity?
- Capacity?
- ....