Research and Education Programs in NSF Office of Advanced Cyberinfrastructure

Office of Advanced Cyberinfrastructure Division (OAC)
Computer and Information Science & Engineering (CISE)
National Science Foundation

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ATIP workshop, SC 2018
Join NSF/OAC: Multiple Program Officer openings

* IPA Appointment
CISE/OAC – Transforming the Frontiers of Science & Society

Computing
- Advanced resources and services at all scales – MRI (clusters); Innovative HPC; Leadership Class; XSEDE coordination and user services; Research

Data
- Data Building Blocks (DIBBS) Program

Software
- Software Infrastructure for Sustained Innovation (SI2)

Networking & Cybersecurity
- Campus Cyberinfrastructure (CC*), International Research Network Connections (IRNC), Cybersecurity Innovation for CI (CICI)

Learning & Workforce Devel
- Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining), CAREER, CRII, OAC Core

Emerging Opportunities
- Cyberinfrastructure for Emerging Science and Engineering Research (CESER), Public Access
The NSF Big Ideas

RESEARCH IDEAS

Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future

Windows on the Universe: Multi-messenger Astrophysics

Quantum Leap: Leading the Next Quantum Revolution

Navigating the New Arctic

Understanding the Rules of Life: Predicting Phenotype

PROCESS IDEAS

Mid-scale Research Infrastructure

NSF 2026

Growing Convergence Research at NSF

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

"... bold questions that will drive NSF's long-term research agenda -- questions that will ensure future generations continue to reap the benefits of fundamental S&E research."

Big Ideas => Big Cyberinfrastructure Challenges & Opportunities
Learning and Workforce Development

Communities of Concern

**CI Contributors**
Cyber Scientists
to develop new capabilities

**CI Professionals**
Professional Staff
to deploy & support new capabilities

**CI Users**
Area Scientists
to exploit new capabilities

OAC

Cognizant PO:
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LWD: Learning and Workforce Development

Student Research Training
- REU SITES
- NRT

Faculty Research
- CRII
- CAREER
- Expeditions

Training/Workforce Development
- CyberTraining NSF 19-524
- Deadline Feb 6, 2019
- Revised

OAC-Core Research Program
- New Solicitation NSF 18-567
- Deadline Nov 15, 2018
**OAC Core Research Program**

**SOLICITATION NSF 18-567**

- **Translational research** (spanning design to practice) in all aspects of advanced cyberinfrastructure (CI) to transform science and engineering research:
  - Other characteristics: multi-disciplinary, extreme-scale, driven by science and engineering research, end-to-end, or deployable as robust research CI
- **Research Areas**
  - **Architecture and middleware for extreme-scale systems:**
    Design, benchmarking, and analysis; storage, networks, and input/output (I/O)
    Resource management, monitoring, fault tolerance, and cybersecurity
  - **Scalable Algorithms and Applications:**
    Numerical and high-performance scientific computing methods; Data, software and visualization; and Modeling and simulation
  - **Advanced Cyberinfrastructure Ecosystem:**
    Programming languages, libraries, and environments; Tools; Sociotechnical aspects
- **Research Communities:** Multiple disciplinary areas supported spanning Computer as well as Computational and Data-driven Science and Engineering

- Part of CISE’s coordinated core program solicitations
- Only Small proposals in FY’19
- Funding amount $7.5M
- Max $500K/award;
- Due Nov 15, 2018
- PI’s strongly encouraged to send 1-page project summary for further guidance.
- Webinar: Aug 7, 2 pm EDT
CyberTraining – NSF 19-524

Training-based Workforce Development for Advanced Cyberinfrastructure

• Goals for research workforce preparation
  1. Broad adoption of CI tools/methods, or
  2. Curriculum/Instructional Materials Development and Integration

• Three project classes:
  • Pilot: Exploratory activities, $300K, 2 yrs
  • Implementation: Broadly accessible to community
    • Small: $500K, 4 yrs
    • Medium: foster a community, $1M, 4 yrs
  • Large-scale Project Conceptualization:
    • Planning grants for potential future institute-like CyberTraining projects, $500k, 2 yrs

• No separate tracks, still 3 communities of concerns
  • CI Professionals, CI Contributors, and CI Users

• Participation:
  • ENG, GEO, SBE, MPS (AST, DMR, Phy), EHR/DGE, CISE/CCF
  • OAC - lead;

• Excellent community response
  • 40% additional submissions in 2nd round!
  • About 25 awards made in FY16 and FY17

• Next Deadline:
  • Feb 6, 2019
  • Watch OAC newsletter for Webinar details
Other OAC LWD Research Programs:

**Focus:** Translational Research in Advanced Cyberinfrastructure

- **Faculty Research – CI Contributors**
  - **CAREER** - NSF 17-537: Most prestigious award supporting junior faculty as a teacher-scholar; min $400K/5yrs; July’19
    - Number of submissions doubled in FY16 and tripled in FY’17
    - 30 active awardees
    - Now open to non-tenure track faculty
  - **CRII** - NSF 17-552: Faculty or research scientists in their first 3 years; $175K/2yrs; Aug’19

- **Student Research Training - CI Contributors/Users**
  - **REU site** - NSF 13-542: Research participation by undergraduate students; $360K/3yrs; Aug’17
  - **INTERN DCL** (NSF 17-091)
    - Non-academic internship for grad students; $50K/student
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