Cyberinfrastructure Research, Learning and Workforce Development (LWD) Programs

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

Alan Sussman
Questions: alasussm@nsf.gov
MUG Workshop, August 2021
Foster a cyberinfrastructure ecosystem to transform science and engineering research... through Research CI and CI research
LWD: 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
Learning and Workforce Development

Student Research Training
- REU SITES – NSF 19-582

Training/Workforce Development
- CyberTraining - NSF 19-524

Faculty Early Career Research
- CRII – NSF 21-591
- CAREER – NSF 20-525

Research/Development Programs
- OAC Core Research – part of CISE
  Core Research – NSF 20-591
  OAC is only division with deadline for Smalls
- Cyberinfrastructure for Sustained Scientific Innovation (CSSI) – NSF 20-592
OAC Core Goals

– Advanced Cyberinfrastructure (CI) research to impact the future capabilities of research CI
  • New knowledge in design, development, and utilization of robust research CI

– Research career paths of cyber scientists/engineers
  • Computer as well as Computational and Data-driven Science and Engineering with advanced CI research thrusts

– Next deadline in November/December 2021
Characteristics of OAC-Core

• Translational research
  • Design, development, deployment, experimentation, and application of advanced research CI
  • Spanning design to practice
• Other characteristics (optional):
  • Multi-disciplinary,
  • Extreme-scale,
  • Driven by science and engineering research,
  • End-to-end solution, or
  • Deployable as robust research CI
Research Areas

• **Architecture & middleware for extreme-scale systems:**
  • Design, benchmarking, and analysis; storage, networks, and 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
Cyberinfrastructure for Sustained Scientific Innovation (CSSI)


- Supports the development and deployment of robust, reliable and sustainable data and software cyberinfrastructure
- Brings innovative capabilities towards sustained scientific innovation and discovery
- Provides opportunity to advance common approaches to sustain and innovate research cyberinfrastructures.
- Follows accepted data management and software development practices

Guiding Principles

<table>
<thead>
<tr>
<th>Project Motivation and Impact</th>
<th>Science-driven</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Innovation</td>
</tr>
<tr>
<td>Cyberinfrastructure Plans</td>
<td>Close collaborations among stakeholders</td>
</tr>
<tr>
<td></td>
<td>Building on existing, recognized capabilities</td>
</tr>
<tr>
<td>Measurable Outcomes</td>
<td>Project plans, and system and process architecture.</td>
</tr>
</tbody>
</table>

Next Deadline: November 2021

Submit your questions to: CSSIQueries@nsf.gov
Faculty Early Career Development Program (CAREER - NSF 20-525)

- Prestigious award supporting junior faculty as a teacher-scholar
  - Outstanding research, education and the integration of education and research
    - Presidential Early Career Awards ...(PECASE – 4 from OAC last time – out of 20 best from NSF each year)
- Number of OAC submissions steady, with broad variety of topics
- >30 active OAC awardees; Deadlines: July 26, 2021, next should be in July 2022
- Open to non-tenure track faculty; Sr. personnel allowed
- Min $400K/5 years, typically ~$500K in CISE
Faculty Early Career Development Program (CAREER – contd)

- OAC encourages proposals that are either of
  - primary interest to OAC, or
  - secondary interest to OAC (add OAC in Cover Page)
- CAREER program page
  - http://www.nsf.gov/career
- CISE CAREER Proposal Writing Workshops
  - April 8, 2019, Alexandria: http://cisecareerworkshop.web.unc.edu
  - April 6, 2020, virtual, http://cisecareerworkshop.web.unc.edu
  - April 5-6, 2021, virtual, https://cisecareerworkshop.web.unc.edu
CISE Research Initiation Initiative 
(CRII - NSF 21-591)

• Independent research for faculty or research scientists in their first three years
  • May not have any federal grant as PI; 2 chances;
  • New: Chair letter (w/template) certifies lack of essential resources
  • Tenure-track or research science or education position

• OAC research focus:
  • Advanced CI research: Translational, Use-inspired, multidisciplinary, End-to-end
  • Computational and data-intensive scientists in addition to computer scientists

• Award <$175K/ 2 yrs;
• Deadline: Sept. 20, 2021
Goals of CISE Research Initiation Initiative (CRII - contd.)

• Start a research program and career
  – The PI need not have significant prior research results or maturity
  – Start a path toward research independence
  – Develop collaborations within or across research disciplines
  – Undertake exploratory investigations
  – Acquire and test preliminary data

• Broaden community of researchers
  – Reach underserved sub-communities, under-represented groups, non-traditional institutions
CyberTraining – Training-based Workforce Development for Advanced Cyberinfrastructure (NSF 19-524)

• Twin 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

• 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
  • Send 1-page project summary

• Excellent community response
  • ~10-12 awards per year last several years

• Previous Deadline:
  • Jan. 20, 2021
  • Next one in Jan. 2022
Other LWD Opportunities within OAC

- **INTERN DCL (NSF 21-013)**
  - Supplements for Non-academic Graduate Student Research ~$50K/student
- **EAGERs (<$300K), Workshops (<$50K), RCNs**
  - Seed Exploration of Research, Training and Education, Broadening Participation
  - Students, Post-Docs, Faculty, CI Professionals
- **Student Travel Grants**
- **Discuss with me and other OAC Program Officers**
- **To subscribe to OAC Mailing List:**
  Send an email to: OAC-ANNOUNCE-subscribe-request@listserv.nsf.gov
Cyberinfrastructure Research, Learning and Workforce Development (LWD) Programs

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

Alan Sussman
Questions: alasussm@nsf.gov
MUG Workshop, August 2021