Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining)

NSF 22-574

Submission Deadline: May 16, 2022
(also see PAPPG, NSF 22-1)


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Solicitation Goals

- **CyberTraining program** seeks to *prepare, nurture and grow* scientific *research* workforce.

- **Three Goals:**
  1. ensure *broad adoption* of CI tools, methods, and resources, *Or*
  2. *integrate skills* into educational *curriculum/instructional materials* in
     - advanced cyberinfrastructure (CI) +
     - computational and data science and engineering (CDS&E)
     - spanning undergraduate and graduate courses.
  3. **build communities** of research CI professional staff and establish career paths for those staff

- **Innovative, scalable training, education, and curricular** programs, and **building communities to support effective use of research CI**
  - Targeting *one or more* of the solicitation goals
  - Addressing emerging needs and unresolved bottlenecks
  - From students (undergrad and grad), to instructors and faculty, to research CI professionals
Additional Goals

• **Broadening CI access and adoption to**
  - Enable increasing use of advanced cyberinfrastructures by varied *institutions* and *scientific communities* with lower levels of CI-adoption, and
  - Harness the capabilities of larger segments of diverse *underrepresented* groups

• **Short Term Goals**
  – catalyze research with training and educational activities, or
  – curriculum/instructional materials that are integrated into courses, serving as templates, or
  – stronger communities of CI professionals

• **Long Term Goal**
  – A research ecosystem enabling *Computational and Data-driven Science for All Scientists and Engineers*
NSF-wide Participation

- **CISE/OAC** - Office of Advanced Cyberinfrastructure – lead
  - Alan Sussman, Juan (Jenny) Li, Ashok Srinivasan
- **CISE/CCF/CNS/IIS** – all divisions in CISE
  - Almadena Chtchelkanova, CCF
  - Deep Mehdi, CNS
  - Wei Ding, IIS
- **EHR/DGE** - Division of Graduate Education
  - Victor Piotrowski, Li Yang, DGE
- **ENG** - Directorate for Engineering
  - Reha Uzsoy, CMMI
  - Ronald Joslin, Shahab Shojai-Zadeh, CBET
- **GEO** - Directorate for Geosciences
  - Eva Zanzerkia, EAR
  - Allen Pope, OPP
- **MPS** - Directorate for Mathematical & Physical Sciences
  - Nigel A. Sharp, AST
  - Daryl W. Hess, DMR
  - Bogdan Mihaila, PHY
  - Richard Dawes, CHE
- **SBE** – Directorate for Social Behavioral and Economic Sciences
  - Joe Whitmeyer, SES

**Intent:** stimulate cooperation between OAC and one or more other domains
- Consult OAC + other Cognizant Program Officers
  - At least one month in advance of the submission deadline
Scientific Communities

• **CI Contributors:**
  • community of computational and data scientists and engineers who **develop new CI capabilities**

• **CI Users:**
  • community of domain scientists and engineers who **exploit advanced CI capabilities**

• **CI Professionals:**
  • community of research CI and professional staff who **support effective use of research CI**
Key solicitation provisions

• 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
  • *CI Professionals (CIP)*:
    • up to two FTEs per institution and four FTEs total, 5 years

• Must address one or more of the 3 communities of concerns
  • CI Professionals, CI Contributors, and CI Users

• PI Limit
  • PI/co-PI for max 1 Pilot or Implementation proposal
  • *CIP* projects not in this limit for PIs, but an institution is limited to 1 *CIP* proposal
CI Professionals (CIP) Projects

• Key goals and features of the new project class for CI Professionals
  – **Embed** CI Professionals into the research enterprise at one or more institutions
    • Project teams can be based on geography, scientific/engineering discipline, etc.
  – **Promote** professional development, **establish** career paths, **incentivize** coordination, **address** sustainability
  – **Establish**, foster and nurture a community
  – **Incentivize/support** the development of necessary academic structures and career paths within and across institutions, and within and across disciplines
Solicitation-specific Review Criteria

1. **Challenges** for Research Workforce Development;
2. **Solicitation Goal(s)** Targeted
   (a) Broadening Adoption of Advanced CI; or
   (b) Integration of CI Skills into Curriculum/Instructional Materials; or
   (c) Building a community of CI Professionals;
3. **Scalability** and **Sustainability**;
4. **Recruitment** and **Evaluation**;
5. “**Collective Impact**” Strategy:
   Coordination network and Backbone organization
   (or an alternative strategy);
6. **Fostering Community**;
7. **Integration** with the Computational Science Support Network (**CSSN**)
Programmatic Areas of Interest: OAC Focus

• Concerned about all the three communities of CI Professionals, CI Contributors, and CI Users
  – both current and future generations.

• CI Professionals
  – technical/research CI professional skills for future CI Professionals
  – skill refinement and career development of current CI Professionals
  – incorporating CI professionals into the research enterprise

• CI Contributors: training/cross-training of computational and data scientists and engineers in topics such as
  – scalable modeling and simulation, and
  – advanced domain topics, including domain-specific CI tools

• CI Users: larger goal of preparing research workforce that is well-versed in basic CI and has CDS&E literacy
  – undergraduate students and graduate students across all disciplines

• Proposals with overlapping concerns with other OAC programs
  – e.g., BD Hubs; CC*; CSSI; and CICI
Programmatic Areas of Interest: Across all Directorates and Many NSF Divisions

• Common theme is research and education-related projects in the science/engineering domain;
• And more effective use of CI to catalyze research advances and address fundamental knowledge gaps
• See the solicitation for descriptions of each directorate/division priorities and interests
FAQ

Q1. Is consultation with a Cognizant Program Officer required?

– No. But it is strongly encouraged that you consult with us (with OAC leading this solicitation) and any other Cognizant Program Officer at least a month in advance of the solicitation deadline, and note this in a *Single Copy Document*. 
FAQ

Q2. Can my project primarily train/re-train for jobs in the IT industry?

- No, all proposals, including cybersecurity proposals, must be relevant to
  - Scientific Research Workforce Development, and
  - Advanced Cyberinfrastructure
- Cybersecurity proposals must be relevant to the scientific research workflow
- This relevance will vary from undergrads, to grads, to CI professionals, and across disciplines.
FAQ

Q3. Must you already have a Small-size Implementation award before seeking a Medium-size Implementation award?
   – No
Thank you!

Questions: alasussm@nsf.gov, jjli@nsf.gov, asriniva@nsf.gov

These slides, an audio recording, and a script of this webinar will be available at http://www.nsf.gov/events/

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Please ask your questions via the Zoom Q&A box