

Training-based Workforce
Development for Advanced
Cyberinfrastructure (CyberTraining)
NSF 18-516
(replaced NSF 17-507)

Submission Deadline: Feb 14, 2018

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505342

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Overarching Goals

- **Overarching Goal:**
 - *prepare, nurture and grow* scientific **research** workforce
 - ensure **broad adoption** of CI tools, methods, and resources
 - *integrate skills* into educational **curriculum/instructional material fabric** in
 - advanced cyberinfrastructure (CI) +
 - computational and data science and engineering (CDS&E)
 - spanning undergraduate and graduate courses.
- ***Innovative, scalable training and education*** programs addressing
 - Emerging needs and Unresolved bottlenecks
 - Multidisciplinary communities
 - Undergrads, grad students, instructors, faculty, research CI professionals

Solicitation Goals

- **Broadening CI access and adoption to**
 - Enable increasing use of advanced cyberinfrastructures by varied *institutions* and *scientific communities* with **lower-level of CI-adoption**, and
 - Harness the capabilities of larger segments of diverse **underrepresented** groups
- **Short Term Goal**
 - Out-of-class as well as in-class training and educational activities
- **Long Term Goal**
 - An educational ecosystem enabling *Computational and Data Science for All Scientists and Engineers*

Collective Impact

- Engage all relevant **stakeholders**
 - by forging alliances and forming backbones for collective impact to address unresolved bottlenecks
- Each project shall have
 - a **board of expert advisors** or a network of collaborators
 - Help refine the **curriculum/instructional material**, and
 - inform relevant **professional associations**
- Articulate well-designed programs
 - with significant impacts that can serve as **templates** and provide **adoptable** curriculum/instructional material

NSF-wide Participation

- CISE/OAC - Office of Advanced Cyberinfrastructure – **lead**
 - Sushil K Prasad
 - CISE/CCF Computing and Communication Foundation
 - Almadena Chtchelkanova
 - CISE/BD Hubs and Spokes
 - Fen Zhao
 - EHR/DGE - Division of Graduate Education
 - Victor Piotrowski
 - ENG - Directorates of Engineering
 - Joanne Culbertson, ENG/CMMI
 - Ronald Joslin, ENG/CBET
 - Anthony Kuh, ENG/EECS
 - GEO - Directorate for Geosciences
 - Eva Zanzerkia
 - MPS - Directorate for Mathematical & Physical Sciences
 - Bogdan Mihaila
- Intent: **stimulate co-funding** between OAC and one or more domains

Other Revision Highlights

- PI/co-PI eligibility criteria have been revised
 - at least one PI/co-PI with expertise relevant to the targeted research discipline
 - at least one PI/co-PI with expertise relevant to OAC.
- Definitions of the submission tracks streamlined
- List of additional solicitation specific review criteria is updated

Scientific Communities and Submission Tracks

- **CI Contributors (CIC):** community of computational and data scientists and engineers who **develop new CI capabilities**
 - CIC track for the development of **contributor-level CI and advanced domain skills**
- **CI Users (CIU):** community of domain scientists and engineers who effectively **exploit advanced CI capabilities**
 - CIU track is for **user-level core literacy** in advanced CI & computational and data science and engineering skills
- **CI Professionals (CIP):** community of research CI and professional staff who **support effective use of research CI**
 - CIP track is for the development of **technical and research CI professional skills** of future CI professionals
 - skills refinement and career development of current CI professionals.

Short Term Impacts

Innovative, scalable training/educational activities while challenging PI's for

1. preparing a better scientific workforce for advanced CI;
2. broadening adoption and accessibility of shared computing and data resources by various **disciplines, institutions**, and groups;
3. developing or updating **curriculum/instructional material to feed** into undergraduate and graduate courses;
4. creating alliances and backbones for ***collective impact***;
5. providing on-demand, personalized accessibility;
6. exploring innovative ways of **drawing students into computational disciplines** (X+Computing and Computing+X);
7. leveraging and contributing to NSF cyberinfrastructure and research projects (such as XSEDE, NanoHub, LIGO, and NHERI).

Long Term Impacts

- Training/Education a **vehicle** for achieving long term goals while meeting short term objectives
- ***Long term sustainability and scalability:*** The programs will
 - Lead to an *educational cyberinfrastructure ecosystem* enabling “**Computational and Data Science for All scientists and engineers**”
 - Re-envisioning the advanced CI ecosystem as **integral element** of scientific research enterprise
 - Establish deeper engagement with and impact on various **disciplines**, institutions, and groups
 - Result in an ubiquitous and scalable **educational cloud infrastructure**

Solicitation-specific Review Criteria

1. Challenges addressed in training, education, and workforce development
2. New modes of discovery and use of advanced CI resources, tools, and services in fundamental research enabled
3. Advances in integrating skills in CI and CDS&E into institutional and disciplinary curriculum/instructional material
4. Steps to broaden access and community adoption
5. Stakeholders engaged and partnerships forged for collective impact
6. Scalability and sustainability of key aspects
7. Plans for recruitment and assessment
8. Plans for management and collaboration

FY 18: Award Framework

- Award Budget
 - \$300K-\$500K per award and 1-3 years in duration
 - 7-11 awards
 - Minimum \$3.5M + co-funding
- Tracks:
 - CI Professionals (CIP), CI Contributors (CIC), CI Users (CIU)
- Consult OAC + other Cognizant Program Officers
 - At least one month in advance of the submission deadline
 - [Mention consultation in the Project Summary](#)
- Interested in serving in review panels?

Example Projects

- CI-professionals:
 - Training and certification of CI Professionals in cybersecurity technology and management for advanced CI-enabled research;
 - working with natural science researchers for advanced visualization, or for supporting scientific gateways;
- CI Contributors track:
 - Training geoscience students to develop scalable software
 - Training the next generation of researchers on the NHERI DesignSafe Cyberinfrastructure with holistic computational models for future, adaptive buildings;
- CI Users track:
 - Instructor training for computational science literacy across STEM disciplines in minimum core topics
 - Software and data literacy for natural science students

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.
- CIU:
 - technical/research CI professional skills of future CI Professionals
 - skill refinement and career development of current CI Professionals.
- CIC: training/cross-training of the computational and data scientists and engineers in topics such as
 - scalable modeling and simulation, and
 - advanced domain topics such as domain-specific tools
- CIU: larger goal of preparing research workforce - well-versed in basic CI and CDS&E literacy
 - undergraduate students and graduate students across all disciplines,

Programmatic Areas of Interest: GEO

- Eva Zanzerkia

- GEO is not highlighting specific areas in the context of this solicitation.
 - It welcomes proposal that broadly enhance the GEO-relevant communities of the 3 CI communities in consultation with the Cognizant Program Officer.
- The Office of Polar Programs (OPP)
 - high latitude ocean circulation, atmospheric conditions, marine and terrestrial ecosystems and biogeochemistry,
- The Division of Atmospheric and Geospace Sciences (AGS)
 - fundamental science questions related to atmospheric and geospace research, including processes that impact humans and society,
- The Division of Earth Sciences (EAR)
 - structure, composition, and evolution of the Earth, the interaction with life, and the processes that govern the formation/behavior of the Earth's materials.
- The Division of Ocean Sciences (OCE)
 - advance understanding of all aspects of the global oceans and ocean basins, including their interactions with people and the integrated Earth system.

Programmatic Areas of Interest: ENG

CMMI Focus – Jo Culbertson

- Graduate students, post doctoral fellows and researchers
- Development and use of CI tools and their integration into CMMI domain research
- Enhance capabilities CMMI community to use advanced computation and data effectively in fundamental research across the CMMI portfolio

Programmatic Areas of Interest: MPS

- Bogdan Mihaila

MPS is not highlighting *specific* areas in the context of this solicitation.

- ✓ Support workshops and summer schools focused on training students and postdocs in computational methods on advanced computing architectures.
- ✓ High-performance computing and data analytics methods introduced in the context of specific scientific applications relevant to MPS communities.
- ✓ Lectures accompanied by problem sessions and hands-on activities on actual hardware.
- ✓ Online sharing of workshop materials and recorded presentations on dedicated websites.

FAQ

Q1. Can my proposal address more than 1 track?

- Yes. The intent is to identify the track that is closely aligned to the main thrust of your project, while allowing overlap with other track(s).

Q2. Is the consultation with a Cognizant Program Officer required?

- No. But its is strongly encouraged that you consult with me (with OAC leading this solicitation) and any other Cognizant Program Officer at least a month in advance, and mention this in your Project Summary.

FAQ

Q3. Can the duration of my project be fewer than 3 years

- Yes, the duration can be from 1 to 3 years.

Q4. 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 Cyberinfrastructures**
- This relevance will **vary** from undergrads, to grads, to CI professionals, and across disciplines.

Thank you!

Questions: sprasad@nsf.gov

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