Slide 1

Manish Parashar:
Good Afternoon

I am delighted to welcome you to this webinar.

As you know OAC seeks to foster the advanced cyberinfrastructure ecosystem that is critical to the advancement of all areas of science and engineering research and education. The cyberinfrastructure workforce (including students, researchers and practitioners) is an essential component of this ecosystem.

The CyberTraining program addresses the critical gap in education and training for our current and future research workforce in advance cyberinfrastructure. It represents an important and growing component of our portfolio of investments and has received a strong response from the community. I would like to highlight the interdisciplinary nature of the program, as evidenced by the involvement of other directorates including EHR, ENG, GEO, MPS and SBE.

This webinar will focus on the current CyberTraining solicitation, which has been revised based on your feedback, and includes new classes and sizes of awards.

I do hope you find this webinar informative.

I will now turn it over to Dr. Sushil Prasad who is the cognizant program officer for the program.

Hello, thank you for your interest in this revised CyberTraining Solicitation – we are very excited with the expanded scope of this program!
I am Sushil Prasad, a program director in CISE's Office
of Advanced Cyberinfrastructure, or OAC. I am a rotator from Georgia State University, now completing my fourth and final year at NSF. We launched the CyberTraining Solicitation two years ago to address the critical gap in education and training space for our current and future research workforce in advance cyberinfrastructure and in computational and data-driven science and engineering. We had an excellent response with 40 projects in the first round and 56 in the last round. Out of these, we could award 12 projects in the first year and 15 in the second.

Today, I will summarize the key aspects of the CyberTraining solicitation, primarily pointing out the revisions to the solicitation and a few new submission requirements. I have with me a few other Cognizant Program Directors, as this solicitation has participations from many directorates. After our presentation, we will take any questions.

Slide 2:

- This program seeks to prepare, nurture, and grow the national scientific *research* workforce for *creating, utilizing,* and *supporting* advanced cyberinfrastructure to enable and potentially transform fundamental science and engineering research and contribute to the Nation's overall economic competitiveness and security.
- The twin goals of this solicitation are
- (i) to ensure *broad adoption* of CI tools, methods, and resources by the research community in order to catalyze major research advances and to enhance researchers' abilities to lead the development of new CI; and
- (ii) to integrate core literacy and discipline-appropriate advanced skills in advanced CI as well as computational and data-driven science and engineering into the Nation's educational *curriculum/instructional material fabric* spanning undergraduate and graduate courses for advancing fundamental research.
- Let me note that for the purpose of this solicitation, advanced cyberinfrastructure, which I will refer to now on also as CI, is broadly defined as the resources, tools, methods and services for advanced computation, large-scale data handling, networking and security to enable and transform science and engineering research.
- This solicitation calls for innovative and scalable training, education, and curriculum/instructional materials —targeting one or both of the solicitation goals—to address the emerging needs and unresolved bottlenecks in scientific and engineering research workforce development, from the postsecondary level to active researchers.
-

The target communities at various stages of their career pipelines comprise the undergraduate and graduate students, researchers and educators, as well as *CI Professionals.*

Slide 3:

As part of this investment, this solicitation also seeks to broaden CI access and adoption particularly by

(i) those scientific disciplines and institutions with lower levels of CI adoption; and (ii) harnessing the capabilities of larger segments of diverse underrepresented groups. Proposals involving these communities are especially encouraged.

- In the short term, the projects must either catalyze fundamental research in specific NSF-supported disciplines with innovative, scalable, training and educational activities; or result in curriculum/instructional material that is integrated into undergraduate and graduate courses, serving as templates for adoption by other institutions and informing best practices and institutional and disciplinary curriculum.
- It is also the long term goal that we are really excited about!
    - The projects should aim to contribute to the larger goal of an educational ecosystem enabling "Computational and Data-driven Science for All scientists and engineers"

- This embraces computation as the third pillar and data-driven science as the fourth pillar of the scientific discovery process -- in addition to the traditional first and second pillars of theory and experimentation.

As you can see, we are very ambitious!

Slide 4:

- The CyberTraining program is led by the Office of Advanced Cyberinfrastructure (or the OAC).
It also includes a new participation from the Directorate of Social Behavioral and Economic Sciences (SBE).
It also has participation from

- the division of Computing and Communication Foundation (CCF) of CISE
- the Division of Graduate Education (DGE) in the Directorate for Education and Human Resources (EHR),
- all the divisions within the Directorates of Engineering (ENG) and Geosciences (GEO),
- as well as the Astronomy, Materials and Physics divisions in the Directorate of Mathematical and Physical Sciences (MPS).
- Some of these directorates/divisions have specific programmatic areas of interest which have been updated, while others welcome proposals that broadly enhance their relevant research communities in consultation with the Cognizant Program Officer.
- Let me highlight that an intent of the CyberTraining program is to stimulate co-funding between OAC and one or more domain directorates/divisions.

Therefore, the prospective PIs are strongly encouraged to contact the Cognizant Program Officers in OAC as well as in the participating directorates/divisions relevant to their proposals in order to ascertain whether the focus and budget of the proposed activities are appropriate for this solicitation.

Slide 5:

The CyberTraining program focuses on three scientific communities,
CI Contributors is the community of computational and data scientists and engineers who research and develop new CI capabilities, and new approaches and methods.
CI Users is the larger community of domain scientists and engineers who effectively exploit advanced CI capabilities and methods for their research.

Finally, CI Professionals is the community of research CI and professional staff who deploy, manage, and support effective use of research CI.

Slide 6:

- We now review the key revisions for the next competition.
- There are three project classes as defined below:
    - *Pilot* projects, with total budgets of up to $300,000 and with durations of up to two years, are exploratory activities that may lead to *Implementation* projects.
    - *Implementation* projects can be either *Small* (with total budgets of up to $500,000) or *Medium* (with total budgets of up to $1,000,000) for durations of up to four years. Implementation projects make CI training and educational activities or curriculum/instructional materials broadly accessible to a significant portion of a community for one or more disciplines.
    - *Medium Implementation* projects also foster a community to catalyze the adoption of advanced CI methods or to incorporate training resources and materials into the curriculum.
    - *Large-scale Project Conceptualization* projects, with total budgets of up to $500,000 and durations of up to two years, are planning grants for potential future large-scale CyberTraining projects at the level of institutes. The product of a *Conceptualization* project will be a strategic plan that is expected to serve as the conceptual design upon which a subsequent large-scale CyberTraining proposal could be based.
- As I stated earlier, the two solicitation goals have been clarified, and *Pilot* and *Implementation* projects may target one or both of the solicitation goals. *Large-scale Project Conceptualization* projects must address both goals.
- Separate submission tracks for *Cyberinfrastructure Contributors*, *Users*, and *Professionals* have been eliminated. However, we remain focused on these three scientific communities, and projects should target one or more of these communities.

The limit on number of proposals per PI or co-PI has been updated to indicate that an individual may serve as PI or co-PI on only one *Pilot* or *Implementation* proposal to the CyberTraining program per competition. The *Large-scale Project Conceptualization* projects are not included in this limit.

Slide 7:

All proposals should have well-identified proposal elements which clearly address the solicitation-specific review criteria shown here, in addition to addressing the intellectual merit and broader impact criteria.
Reviewers will be asked to evaluate these aspects by answering the following questions:

1. Rationale for challenges identified for research workforce development;
2. Strength of project's plan to address one or both solicitation goals namely to (a) broaden the use of CI methods and resources by the research community, or (b)

integrate CI skills into institutional and disciplinary curriculum/instructional material fabric
    1. Note that at least one goal is needed for *Pilot* and *Implementation* proposals, and both goals are needed for *Large-scale Project Conceptualization* proposals.
3. Potential for scalability and sustainability;
4. Soundness of recruitment and evaluation plan;
5. Effectiveness of proposed “collective impact” strategy to establish a coordination network and a backbone organization (or, Effectiveness of an alternative strategy);
6. Soundness of plans for fostering a suitable community;
7. Feasibility of plans for serving as an information hub and for creating repository infrastructure; and finally,
8. Strength of plans to support and guide other CyberTraining and relevant projects, and the community.

Pilot projects must address items 1 and 2. *Small Implementation* projects must address items 1-5, and *Medium Implementation* projects must also address the item 6. *Large-scale Project Conceptualization* projects must address all 8 items, and both solicitation goals.
- I do want to clarify that research in education is not the goal for this solicitation.

Slide 8:

In the solicitation, each participating division/directorate has included its programmatic areas of interest.
OAC is concerned about all the three communities of CI Professionals, CI Contributors, and CI Users, both current and future generations.
- OAC encourages proposals on technical and research CI professional skills development of future CI Professionals
as well as on skill refinement and career development of current CI Professionals.
- OAC also encourages proposals, relevant to the domain directorates, for training as well as cross-training of the computational and data scientists and engineers who are current and future CI Contributors in contributor-level CI topics such as scalable scientific software development and modeling and simulation, and in advanced domain topics such as domain-specific tools, datasets, and models.
    - OAC is also interested in the larger goal of preparing the Nation’s scientific and engineering research workforce - well-versed in basic CI and computational and data science and engineering literacy. This CI User workforce preparation starts with undergraduate students across all disciplines, and continues to graduate students and postdoctoral fellows, particularly in disciplines and areas with low levels of CI adoption.
OAC also encourages relevant proposals of overlapping concerns with other OAC programs such as Big Data Regional Innovation Hubs (BD Hubs), Campus

Cyberinfrastructure (CC*), Cyberinfrastructure for Sustained Scientific Innovation (CSSI), and Cybersecurity Innovation for Cyberinfrastructure (CICI) programs.

Slide 9:

Supports activities that enable the CMMI community to:
Lead development of new CI that catalyzes major fundamental research advances in CMMI-related fields
More effectively use CI to address fundamental knowledge gaps for topics supported by CMMI.

Slide 10:

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.

Slide 11:

Other Cognizant Program Directors could not be here, but their directorates' programmatic areas interest are in the solicitation which we encourage you to read.
Here are some frequently asked questions:
Q1. 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 by sending a 1-page project summary containing sections on project overview, intellectual merit and broader impact and a few keywords at least a month in advance, and mention this in a **Single Copy Document** (Not in the Project Summary – unlike previous years).

Slide 12:

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 Cyberinfrastructures.

- Cybersecurity proposals must be relevant to scientific research workflow.

This relevance will, of course, vary from undergrads, to grads, to CI professionals, and across disciplines.

Slide 13:

Q3. Do you need Small-size Implementation award before seeking Medium-size Implementation, or a CyberTraining award before a Large Scale Project Conceptualization submission?
No.

Slide 14:

This completes our slide presentation. Please note that these slides and the transcript for this webcast as well as an audio recording will be available at www.nsf.gov/events – e v e n t s.
Now, we welcome your questions. We are four of us here, including Cristina Payne. You may also email to sprasad@nsf.gov for offline questions.
Thank you!