Slide 1 –
Hello, thank you for your interest in this new CyberTraining Solicitation – we are very excited!
I am Sushil Prasad, a program director in CISE's Division
of Advanced Cyberinfrastructure, or ACI. I am a rotator from Georgia State University. My research is in Parallel Processing. In addition, since 2010, I have also been working on a curriculum initiative to infuse parallel and distributed computing topics into the undergraduate core curriculum of computer science and computer engineering. This curriculum has had wide adoption including significant impact on ACM's CS2013 Curricula.
Today, I will summarize key aspects of the CyberTraining solicitation. I have with me other Cognizant Program Directors, as this solicitation has participations from many directorates. After my presentation, we will take any questions.

Slide 2 – Overarching Goals
- The overarching goal of this program is to prepare, nurture and grow the national scientific workforce for *creating, utilizing,* and *supporting* advanced cyberinfrastructure (or, CI)
    - that enables cutting-edge science and engineering and contributes to the Nation's overall economic competitiveness and security.
- 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, and services for advanced computation, data handling, networking and security.
- The need for such scientific workforce development programs are highlighted by multiple reports and new initiatives including the NSCI, the National Academies report on Future Directions of CI, and the Federal Big Data R&D strategic plan.

Slide 3 – Solicitation Goals
- This solicitation calls for developing innovative, scalable and informal - out of class
- training programs to address both the emerging needs and unresolved bottlenecks in the scientific workforce development
        of targeted, multidisciplinary communities,
        at the postsecondary level and beyond.
- The target communities at various stages of their career pipelines comprise *CI Professionals* as well as the undergraduate and graduate students, researchers and educators.
- In the short term, we invite projects that will result in innovative and informal training models and pilot activities,
    - These will complement and leverage the state of art in curricular offerings and best practices in academia and elsewhere.
- It is 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 Science for All."
- 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 – NSF wide Participation
- The CyberTraining program is led by the Division of Advanced Cyberinfrastructure (ACI) from the Directorate for Computer and Information Science and Engineering (CISE).
- It also includes participation from CISE's Computing and Communication Foundation (CCF),
  - all the divisions within the Directorates of Engineering (ENG), Geosciences (GEO), and Mathematical and Physical Sciences (MPS), as well as
  - the Division of Graduate Education (DGE) in the Directorate for Education and Human Resources (EHR).

Slide 5 – Community and Strategies
There are three communities of concern for the CyberTraining program. These are
- *CI Professionals:*
  - *These are the* research cyberinfrastructure and professional staff who develop, deploy, manage and support effective use of research CI;
- *CI Contributors:*
  - *These are the* computational and data scientists and engineers who are researchers and developers of new CI capabilities; and
- *CI Users:*
  - *These are the* scientists and engineers who effectively exploit the advanced CI capabilities and methods.
- We anticipate proposals for informal training, retraining, cross-training and related activities
  The topics will be related to methods and resources of advanced cyberinfrastructure and of computational and data science and engineering,
  The levels will range from basic literacy to advanced.
- The target communities at various stages of their career pipelines comprise *CI Professionals*
  - as well as the undergraduate and graduate students, post-docs,
  - research scientists and faculty researchers and educators from both the *CI Contributor* and *CI User* communities.
- The activities can include retraining and cross-training of the faculty mentors and course instructors themselves to keep up with the dynamic knowledge landscape.

- This is one of the ways for obtaining a multiplier effect.
- One of our primary goal is to broaden CI access and adoption by three kinds of communities:
  - These include deepening accessibility of methods and resources of advanced CI to a wide range of *institutions* with lower levels of CI adoption
  - These also include those *scientific communities and disciplines* with lower levels of CI adoption;

Also, we intend to harness the capabilities of a larger segments of diverse underrepresented groups

Slide 6 – Short Term Impacts

As you conceive of novel training models and activities, we would like to challenge you and your team to explore the following aspects for short-term impacts:
  (i)   preparing a better scientific workforce for advanced CI;
  (ii)   broadening adoption and accessibility of shared computing and data resources by various disciplines, institutions, and groups;
  (iii)   complementing and leveraging the state of art in curricular offerings and educational material in academia, industry and elsewhere;
  (iv)   creating alliances and backbones for *collective impact; I will have more on collective impact later.*
  (v)   providing on-demand, personalized accessibility*;*
  (vi)   Exploring ways of drawing students into computational disciplines (X+Computing and Computing+X);
  (vii)   identifying areas of workforce demand and career pathways;
  (viii) innovating in training/certification models, curriculum, educational material and activities, and their sustainability; and
  (ix)   leveraging and contributing to NSF cyberinfrastructure and research projects (such as XSEDE, NanoHub, CyVerse, LIGO, and NHERI).

Slide 7 – Long Term Impacts

Training is a **vehicle** for achieving long term goals while meeting short term objectives.
In the longer term, you should explore how your project contributes to one or more of the following program goals:
  (i)   As I mentioned earlier, see how your project contributes to an educational ecosystem enabling "Computational and Data Science for All"*;* or
  (ii)   Contribute to an ubiquitous and scalable educational cloud infrastructure for online, dynamic, personalized lessons and certifications.
  (iii)   Or, establishes deeper engagement with various disciplines, institutions, and groups*;*
  (iv)   Or, develops curriculum and instructional material
        - that will feed into undergraduate courses and be formally adopted into the disciplinary or general education *core* curriculum*, or*

- guide the best practices in teaching pedagogy and standards formulations for *minimum skill sets* in collaborations with the key stakeholders; or
(i)   Help establish clear career pathways and employment opportunities for the scientific communities of our concern

Slide 8 – Stakeholders & Training Modes

- You are encouraged to engage all relevant stakeholders by forging alliances, and forming backbones for *collective impact,* which is particularly necessary in order to address the long-standing, unresolved bottlenecks.
- Stakeholders may include academia, computing centers and related entities, public and private institutions,
    - professional/disciplinary associations which can be instrumental in curriculum standards and broader adoption,
    - government and industry research labs, industry, authors and publishers, and federal, state and local agencies,
    - and may cross national boundaries.
    - However, NSF funds may only be used to support US-based researchers.
- You may explore various training modes and informal education models that can build upon and go beyond the following examples:
    - summer institutes hosting participants for a few weeks employing logistics similar to Research Experiences for Undergraduates (REU) sites
        - but note that the CyberTraining solicitation will not accept submissions for REU sites.
    - intensive, short-duration training workshops;
    - workshop and conference training/tutorial tracks;
    - massive open online courses, small private online courses, and online self-paced training;
    - collaboratively taught courses with remote and local instruction; and
    - programming and other competitions and awards.

Slide 9 – Solicitation specific Review Criteria

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. Are the training, education, and workforce challenges identified sound?
2. What is the potential to attain the proposed impacts in the short and long term?
3. To what extent can the project meet its broadening access and adoption challenges with respect to the Nation's scientific workforce and advanced CI?

4. How well would the project engage the key stakeholders, leverage prior work, and forge partnerships for collective impact?
5. What is the potential for the project to scale in the longer term?
6. What is the potential for the key activities to be sustained beyond NSF funding?
7. Are the plans for recruitment and evaluation sound?
8. In addition, are the plans for management and collaboration effective?

- I do want to clarify that research in education is not the goal for this solicitation.

Slide 10 – FY 17: Award Framework

Each CyberTraining award will range from $300,000 to $500,000 per award and will be up to 3 years in duration.

There will be 10-15 awards.

A total budget of $4.5M is expected, contingent upon the availability of funds.

- Budget can be higher with possible ***co-funding from participating Directorates/Divisions***

There are three tracks for submissions:

(i) The first is the track for **CI Professionals.** This is aimed at the training and career pathway development of research cyberinfrastructure and professional staff who develop, deploy, manage, and support effective use of advanced CI **for research**;

(ii) The second is **Domain science and engineering track.** This is aimed primarily at the communities of *CI Contributors* and the sophisticated *CI Users. These should be be* aligned with the research and education priorities of the participating domain directorates;

(iii) The third track is on **Computational and data science literacy.** This is aimed at the *CI User* community at the undergraduate level, impacting the general college curriculum or the core curriculum of disciplines in the longer term.

- Your project can overlap tracks, but do identify your major thrust when you submit.

Slide 11 – FY 17: Submission Logistics

- The CyberTraining submissions are due by Jan 18 of 2017.
    - Prospective investigators are ***strongly encouraged*** to contact the Cognizant Program Officers in CISE/ACI ***and*** in the participating directorate/division(s) relevant to their proposal
        - to ascertain whether the focus and budget of the proposed activities are appropriate for this solicitation.

- You typically can start consultation by sending an email to us with a 1-page project summary – use CyberTraining in the subject line.

- We are asking that you complete such consultations at least one month in advance of the submission deadline**.**

- The principal investigators should include the names of the Cognizant Program Officers they consulted in their Project Summary.

- We do intend to expedite reviewing to enable successful awardees to organize activities during the summer of 2017.
- If you are interested in serving in panels, please let us know as well.
- Based on the community response and needs, in the subsequent years, NSF may consider introducing larger size awards in order to accommodate larger projects.

Slide 12 – Example Projects

Let me provide some example projects by track, serving only to exemplify the nature of the three submission tracks:

For CI Professionals track:

(a) Training and certification of *CI Professionals* in cybersecurity technology and management; or

 (b) Working with neuroscientists to effectively use advanced CI to share software and data;

For Domain science and engineering track:

(a) Training geoscience graduate students to develop scalable, parallel, and distributed software for high-performance computing; or

(b) Cross-training of computing and engineering students and faculty in advanced manufacturing;

For Computational and data science literacy track:

(a) Instructor training for computational science literacy across all STEM disciplines in minimum core topics; or

(b) Software and data literacy for natural science undergraduates.

Slide 13 – Thank you

This completes my 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. You may also email to sprasad@nsf.gov.

Thank you!