Principles and Practice of Scalable Systems (PPoSS)

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Purpose of this Webinar

- Orient potential proposers
- Summarize the PPoSS program and review criteria
- Answer questions

Webinar Outline

- PPoSS program
- Overview of solicitation (NSF 20-534)
- Questions from the community

NSF PPoSS

- Program overview

PPoSS Program in brief

Projects will span the entire hardware/software stack to develop approaches for performant, scalable, and robust systems, applications, and toolchains.

- principles leading to rigorous and reproducible artifacts for design and implementation of large-scale systems and applications

- methods and processes to guarantee:
  - correctness and accuracy
  - robustness
  - security and privacy

PPoSS Program in brief

Successor to XPS and SPX

Symbiosis across disciplines including

- computer architecture
- high-performance computing (HPC)
- programming languages and compilers
- security and privacy
- systems
- theory and algorithms

PPoSS Motivation and Project Structure

Modern heterogeneous platforms are powerful but make application development difficult. Coupled with new applications and domains, these trends require new abstractions, algorithms, and system stacks.

Proposals must:

- Include at least four different areas
- describe targeted distributed applications, systems, and platforms
- define notions of scale, and describe theoretical and experimental evaluation with respect to the **full hardware/software stack**
- rigorously address correctness and accuracy, security, and privacy
- support end-to-end scalability based on proposed theories and abstractions.

PI teams must bring together expertise in at least four distinct subdisciplines including but not limited to those shown previously.

The NSF 20-534 Solicitation

- Classes of awards
- PI eligibility
- Review criteria

PPoSS Award Classes

Class	Description
Planning	Small-scale one-year efforts to define goals, assemble teams, formulate projects, and build capacity for LARGE projects
LARGE	Large-scale efforts to address full-stack integrated solutions to scalability challenges requiring at least four distinct areas of expertise

Award size by Investment Class

Class	Budget and duration
Planning	*Up to **$250K*** *Up to 1 year*
LARGE	*Up to **$1M/year*** *Up to 5 years*

Anticipated Number of Awards

Award Class	Anticipated Awards
Planning	*Up to **27** awards* *Up to **15** in 2020*
LARGE	*Up to **16** awards* ***NONE** in 2020*

Anticipated Amount of Funding

Award Class	Anticipated Funding
Planning	*Up to **$6.75M**, pending availability*
LARGE	*Up to **$80M**, pending availability*

Timeline

- Planning proposals to NSF 20-534 due March 30, 2020 (no LARGE proposals in 2020)

- Both Planning (only in 2021 and 2022) and LARGE proposals are due in January in later years

- Timeline for 2020:

Solicitation Issued:	December 2019
Proposals (Planning only) due:	March 30, 2020
Review:	May-June 2020
Announcement of Awards:	Fall 2020

PI Eligibility

- **Proposals may only be submitted by:**
  - Universities and Colleges with campuses in US
  - Non-profit, non-academic organizations
- **PI requirements**
  - Tenured or tenure-track position, or
  - Primary, full-time, paid appointment in research/teaching position

See solicitation for details

Supplementary Documents (1)

- **Data Management Plan** (up to two pages)
  - Standard NSF requirement
  - The reviewers pay close attention to the Data Management Plan
- **Postdoctoral Mentoring Plan** (if project includes such trainees)
- **Management and Coordination Plan** (for LARGE proposals as a 3-page limit) should include:
  - the specific roles of the PI, co-PIs, other senior personnel and paid consultants at all institutions involved
  - how the project will be managed across institutions and disciplines
  - identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration
  - pointers to the budget line items that support these management and coordination mechanisms
- **Letters of Collaboration**, if any (see details in solicitation)

Supplementary Documents (2)

- Project Personnel and Partner Organizations
- Provide current, accurate information for all personnel and institutions involved in the project
- The list must include all PIs, Co-PIs, Senior Personnel, paid/unpaid Consultants and Collaborators, Sub-awardees, Postdocs, advisory committee members, and writers of letters of collaboration
- NSF staff will use this information in the merit review process to manage conflicts of interest
- See details in the solicitation

NSF Review Criteria

Reviewers and review panel will address:

- Intellectual Merit,
- Broader Impacts, and

Standard NSF Review Criteria

- Solicitation-Specific Criteria

PPoSS-Specific Review Criteria

in their reviews, panel discussions, and panel summaries

Standard NSF Review Criteria

When evaluating NSF proposals, reviewers will consider:

- What the proposers want to do?
- Why they want to do it?
- How they plan to do it?
- How they will know if they succeed?
- What benefits would accrue if the project is successful?

These issues apply both to the technical aspects of the proposal (intellectual merit) and the way in which the project may make broader contributions (broader impacts)

PPoSS-Specific Review Criteria

To what extent are the targeted distributed applications (e.g., within a large datacenter or across datacenters), systems, and the heterogeneous platforms on which they run described?

To what extent are the relevant notions of scale described along with the vision of how scalability will be theoretically and experimentally evaluated with respect to the full hardware/software stack while accounting for cross-cutting concerns such as rigorously proven correctness and accuracy, security, and privacy?

To what extent will the principles of systems design be demonstrated and how these principles will be incorporated across the **full hardware/software stack**?

To what extent does the project articulate why it is relevant to PPoSS and not to the CISE Core programs?

(Planning grants only): To what extent are plans described to form a team of PIs with complementary expertise to execute the project?

Questions and answers

Questions and Answers (1)

- Are there limits on the number of submissions from any individual?
  - An investigator may participate as PI, co-PI, or Senior Personnel in **no more than two** planning grant proposals and in **no more than one** LARGE proposal submitted each year.
  - An investigator cannot be PI of more than two Planning awards and one LARGE award through the life of this program from FY 2020 to FY 2024.
  - In the event that an individual exceeds these limits, only the first two planning proposals submitted and only the first LARGE proposal received before the deadline will be considered, and the other proposals will be returned without review.

Questions and Answers (2)

- When are proposals due?
  - **March 30, 2020**
  - Proposals must be received by **5 p.m. submitter's local time**.
  - Failure to submit by 5 p.m. submitter's local time will result in the proposal not being accepted.
- How do I submit a proposal to this program?
  - Please carefully read and follow the instructions provided in the solicitation (https://nsf.gov/pubs/2020/nsf20534/nsf20534.htm) and the NSF *Proposal & Award Policies & Procedures Guide (PAPPG)* available at (https://www.nsf.gov/pubs/policydocs/pappg19_1/index.jsp). If you need additional help preparing and submitting your proposal, contact your institution's Sponsored Projects Office.
- Do I need to use Grants.gov or Fastlane to apply?
  - You may use either Grants.gov or Fastlane.

Questions and Answers (3)

- Which of Principles and Practice should a proposal emphasize more?
    - Proposals should emphasize both principles and practice equally. See PPoSS-specific review criteria.
- Is PPoSS targeting a specific notion of scalability?
    - No. The proposal should define what notion of scalability it is using.

Questions and Answers (4)

- Do I have to first obtain or apply for a Planning Grant to become eligible to submit a LARGE proposal?
    - No.

- The solicitation does not say much about planning grants. What is expected in a planning grant proposal?
    - The purpose of a planning grant is to develop capacity and demonstrate readiness to perform the activities of a full-scale project. Team-building and preliminary studies that will convince reviewers (of your eventual LARGE proposal) that you can perform as required are appropriate. A vision for what you hope to achieve in a LARGE project should be given, as well.

On behalf of the National Science Foundation and the PPoSS team

THANK YOU!

Questions?

- Now
- PPoSS@nsf.gov

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