Cyberinfrastructure for Sustained Scientific Innovation (CSSI)
NSF 20-592

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Directorate for Computer & Information Science & Engineering (CISE)

WEBINAR: SEPTEMBER 16, 2020

Purpose of this Webinar

o Orient potential proposers

o Summarize the CSSI program and review criteria

o Answer questions

o Improve the quality of proposals

Webinar Outline

o CSSI program description

o Overview of solicitation (NSF 20-592)

o Questions from the community – via Zoom Q&A

NSF CSSI Program

○ Supports the **development and deployment** of robust, reliable and sustainable **data and software cyberinfrastructure**

○ Brings innovative capabilities towards sustained scientific innovation and discovery

○ Provides a cross-directorate opportunity to advance common approaches to sustain and innovate research cyberinfrastructures.

○ Follows accepted data management and software development practices

Changes in the current solicitation

○ Elements and Framework Implementations proposals only.

○ A section on General Considerations has been added to clarify the common characteristics of CSSI projects.

○ CSSI specific criteria grouped in three themes.

○ Updates on priorities for the collaborating NSF directorates and divisions has been updated for 2021.

○ The option to request cloud computing resources through an external cloud access entity (CloudBank) is included.

Types of Awards

Investment Class	Description	Estimated Budget
Elements	Small groups that will develop and deploy robust software and data capabilities for which there is a demonstrated need that will advance one or more significant areas of science and engineering.	Up to $600K (up to $200K/yr) Up to 3 years
Framework Implementations	Larger, interdisciplinary teams organized around the development and application of common software and data infrastructure aimed at solving common research problems faced by NSF researchers in one or more areas of science and engineering, resulting in a sustainable community framework serving a diverse community or communities.	$600K - $5M ($200K-$1M/yr) 3-5 years

Eligibility

○ **Proposals may _only_ be submitted by:**

- ○ Universities and Colleges
- ○ Non-profit, non-academic organizations
- ○ NSF-sponsored federally funded research and development centers (FFRDCs) may apply, provided that that they are not including costs for which federal funds have already been awarded or are expected to be awarded.

○ **Limit on Number of Proposals per PI/Co-PI/Senior Personnel: 1**

- ○ An individual may participate as Principal Investigator, co-Principal Investigator or other Senior Personnel in at most one full proposal across all categories of proposal for each deadline.
- ○ In the event that any individual exceeds this limit, any proposal submitted to this solicitation with this individual listed as PI, co-PI, or Senior Personnel after the first proposal is received at NSF will be returned without review. No exceptions will be made.

- ○ **See solicitation for details**

Participating NSF Organizations

- Directorate for Computer and Information Science and Engineering (CISE)
  - Office of Advanced Cyberinfrastructure
  - Division of Computing and Communication Foundations
  - Division of Information and Intelligent Systems

- Directorate for Biological Sciences (BIO)

- Directorate for Education and Human Resources (EHR)

- Directorate for Engineering (ENG)
  - Division of Electrical, Communications and Cyber Systems
  - Division of Chemical, Bioengineering, Environmental and Transport Systems
  - Division of Civil, Mechanical and Manufacturing Innovation

- Directorate for Geosciences (GEO)
  - Division of Atmospheric and Geospace Sciences
  - Division of Earth Sciences
  - Division of Ocean Sciences
  - Office of Polar Programs

- Directorate for Mathematical and Physical Sciences (MPS)
  - Division of Physics
  - Division of Astronomical Sciences
  - Division of Mathematical Sciences
  - Division of Materials Research
  - Division of Chemistry

- Directorate for Social, Behavioral and Economic Sciences (SBE)

https://www.nsf.gov/pubs/2020/nsf20592/nsf20592.htm

A competitive proposal will be

○ *Science-driven:* Promotes science excellence, enabling fundamentally new scientific advances; benefits science and engineering communities beyond initial participants.

○ *Innovative:* Emphasizes unique NSF contributions; builds the capability, capacity, and cohesiveness of a national CI ecosystem; considers both human and technical aspects of the CI.

○ *Collaborative:* Fosters partnerships and community development; actively engages CI experts, specialists and scientists working in concert with the domain scientists who are users of CI.

○ *Leveraged:* Builds on existing, recognized capabilities.

○ *Strategic:* Encourages measurement of progress and sharing of results.

○ *Sustained:* Provides benefits beyond the participants and the lifetime of the award.

Directorate Specific Priorities

Please see the division-level descriptions in the solicitation for complete details of specific priorities across various directorates.

PIs are strongly encouraged to contact program officer(s) from the list of Cognizant Program Officers in the division(s) that typically support the scientists and engineers who would make use of the proposed work.

Proposal Preparation

- The NSF proposal and award process is detailed in the Proposal & Award Policies & Procedures Guide (PAPPG, NSF 20-1).

  https://www.nsf.gov/pubs/policydocs/pappg20_1/

The next slides include aspects that are specific to CSSI.

Cover Sheet

- **NSF Unit of Consideration (program):**
  - The proposals should choose "Software Institutes" as program.

- **Proposal Title**
  - Proposal titles should begin with "Elements:" or "Frameworks:".
  - Examples
    - Elements ::*MyProjectTitle*
    - Frameworks : *MyProjectTitle*

Project Description

In addition to the guidance specified in the PAPPG, address:

- *Project Motivation and Impact* **(Science Driven / Innovation)**

- *Cyberinfrastructure Plans* **(Project plans, and system and process architecture, Building on existing, recognized capabilities, Close collaborations among stakeholders)**

- *Measurable Outcomes* **(Deliverables, Sustained and sustainable impacts, Metrics)**

The project must **explicitly discuss** to which directorates, divisions or offices the proposal is aligned.

If the PI and co-PIs have received prior CSSI funding (including through programs that preceded CSSI), the proposal should briefly discuss what software/data services resulted from **their prior CSSI award(s)** as well as significant outcomes and impacts. This can be done as part of the Results from Prior NSF Support section if appropriate.

Supplementary Documents specific to CSSI (1)

- **Delivery Mechanism and Community Usage Metrics** (2-page limit)
  - Deliverables
    - <u>**What specific services and capabilities**</u> will be delivered by the project, <u>**and how**</u> they are to be delivered?
    - NSF encourages exploration of various delivery mechanisms.
  - Metrics
    - The proposed project must clearly articulate <u>**quantifiable metrics**</u> for <u>**development and delivery**</u> of the services and capabilities to be delivered by the project, and for the anticipated community adoption and usage.
    - These metrics must be quantitative <u>**with targets**</u> identified for each year of the award. These should be simple but should also clearly show what the project will accomplish each year, the impact on science, and the breadth of the user community.

Supplementary Documents specific to CSSI (2)

- **Management and Coordination Plan** (for Framework Implementation proposals only 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

- **Cloud Computing Resources** (if requesting cloud resources through CloudBank only - not to exceed 2 pages)

  1. *The title of the proposal*

  2. *The institution name*

  3. *The anticipated total cost of computing resources, with yearly breakdown*

  4. *Which public cloud providers will be used*

  5. *A technical description and justification of the request, along with how the cost was estimated.*

  The NSF Budget should not include any such costs for accessing public cloud computing resources via CloudBank.org. The total cost of the project, including this cloud computing resource request from CloudBank.org, may not exceed the budget limits for project class of the proposal, as described in this solicitation.

Cloud Computing Resources

The NSF Budget should not include any such costs for accessing public cloud computing resources via CloudBank.org. The total cost of the project, including this cloud computing resource request from CloudBank.org, may not exceed the budget limit described in this solicitation.

For example, consider a proposal submitted to the Elements class, which has a total proposal budget limit of $600,000. If a PI wishes to request $20,000 in cloud computing resources through CloudBank, then his/her proposal should request, as part of the proposal budget, no more than $580,000. The remaining $20,000 for cloud computing resources should be specified in the Supplementary Document. If a proposal is a collaborative project with two PIs from two different organizations, then each PI may request cloud computing resources separately through independent Supplementary Documents as long as the total budget (on the budget pages plus in the Supplementary Documents) does not exceed $600,000.

Proposers should carefully **read** the solicitation

Supplementary Documents specific to CSSI (4)

Letters of Collaboration, if any (see details in solicitation)

Project Personnel and Partner Institutions
- Provide current, accurate information for **all personnel and institutions** involved in the project
- The list must include all PIs, Co-PIs, Senior Personnel, Consultants, 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

- CSSI Specific Review Criteria

  CSSI-Specific Review Criteria

in their reviews, panel discussions, and panel summaries

CSSI Specific Criteria

Project Motivation and Impact

- Science-driven
- Innovation

Cyberinfrastructure Plans

- Project plans, and system and process architecture
- Building on existing, recognized capabilities
- Close collaborations among stakeholders

Measurable Outcomes

- Deliverables
- Sustained and sustainable impacts
- Metrics

CSSI Specific Criteria

Project Motivation and Impact

o *Science Driven*

Do the project outcomes fill well-recognized science and engineering needs of the research community, and advance research capability within a significant area or areas of science and engineering? What are the broader impacts of the project, such as benefits to science and engineering communities beyond initial targets, underrepresented communities, and education and workforce development? What well-recognized science outcomes will be accomplished by the research community through the leveraging of the new CI?

o *Innovation*

How does the project achieve innovation in CI development and use as well as enable research innovation? What innovative and transformational capabilities will the project bring to its target communities? Does the project integrate innovation and discovery into the project activities?

CSSI Specific Criteria

Cyberinfrastructure Plans

o *Project plans, and system and process architecture*

What is the proposed architecture, and what engineering process will be used for its design, development, documentation, testing, validation, and release? How will security, trustworthiness, provenance, reproducibility, and usability be addressed by the project and integrated into the proposed system and the engineering process? How will the CI be adaptable to new technologies and changing requirements?

o *Building on existing, recognized capabilities*

How will the project activities build on and leverage existing NSF and national cyberinfrastructure investments, as appropriate?

o *Close Collaboration among stakeholders*

How will the project activities engage CI experts, specialists, scientists and engineers working in concert with the relevant domain scientists and engineers who are users of CI? How will the project (including collaboration) be managed? What are the community engagement mechanisms?

CSSI Specific Criteria

Measurable Outcomes

○ **Deliverables**

Does the proposed project clearly articulate the services and capabilities to be delivered, and how they are to be delivered?

○ **Metrics**

Does the proposed project clearly articulate quantifiable metrics for development and delivery of the services and capabilities to be delivered by the project, and for the anticipated community adoption and usage? Are quantitative metrics with targets identified for each year of the award?

○ **Sustained and Sustainable Impacts**

How will the project's outcomes and its activities have long-term impacts, and how will these be sustained beyond the lifetime of the award, as appropriate? Are the sustainability approaches following well-established models?

Schedule

- Upcoming Deadline for NSF 20-592

October 28, 2020.

- **Schedule:**

  Proposals Due: October 28, 2020

  Review: Early 2021

  Announcement of Awards: Spring 2021

Thank you!

Questions?

During Webinar: Via Zoom Q&A

After Webinar: CSSIQueries@nsf.gov

Frequently Asked Questions (1)

Q: If I am the PI, co-PI or Senior Personnel on a proposal to CSSI (NSF 20-592):

- Can I be the PI on any other proposal to CSSI   NO
- Can I be a co-PI on any other proposal to CSSI   NO
- Can I be Senior Personnel on any other proposal to CSSI   NO

An individual may participate as PI, co-PI, or other Senior Personnel on at most one proposal across the Elements and Framework Implementations for this solicitation.

In the event that any individual exceeds this limit, any proposal submitted to this solicitation with this individual listed as PI, co-PI, or Senior Personnel after the first proposal is received at NSF will be returned without review.

Frequently Asked Questions (2)

Q: *What types of organizations organizations are allowed to submit proposals?*

- ***Universities and Colleges*** - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- ***Non-profit, non-academic organizations***: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- ***NSF-sponsored federally funded research and development centers (FFRDCs),*** provided that they are not including costs for which federal funds have already been awarded or are expected to be awarded.

Q: *How can other organizations (e.g., industry, international partners) participate?*

Organizations eligible to serve as subawardees are all organizations eligible under the guidelines of the NSF *Proposal & Award Policies & Procedures Guide (PAPPG).*

Frequently Asked Questions (3)

Q: *How can a proposal integrate industry collaboration into the project?*

- Industry participants may be included as a subaward within the proposal.
- Industry investigators may serve as co-PIs or senior personnel on a proposal. (See PAPPG, Part I, E.3).
- Industry participants may be (unfunded) collaborators.
- Industry participation should be integrated through the management plan.

Q: *Can a foreign organization submit a proposal?*

NSF rarely provides support to foreign organizations. NSF will consider proposals for cooperative projects involving US and foreign organizations, provided support is requested only for the US portion of the collaborative effort.

Frequently Asked Questions (4)

Q: We are asked for several additional documents: Two of them are "Project Personnel and Partner Institutions", and "Collaborators and Other Affiliations". How are these documents different, and why does NSF need both of these documents?

- In the "**Project Personnel and Partner Institutions**" you must provide information for <u>all</u> personnel and organizations involved in the <u>proposed project</u>. The list must include all PIs, co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, project-level advisory committee members, and writers of letters of support. The listing is collected by the project lead and entered as a Supplementary Document, which is then automatically included with all proposals in a project. NSF staff and the reviewers use this information in the merit review process to manage conflicts of interest.

- For the "**Collaborators and Other Affiliations**" a completed spreadsheet is entered for each PI, co-PI, or senior personnel within each proposal and, as Single Copy Documents, are available only to NSF staff. Proposers should follow the guidance specified in Chapter II.C.1.e of the NSF PAPPG

Frequently Asked Questions (5)

Q: The program solicitation lists "Deliverables" and "Milestones" in section V. A. under both the 15-page Project Description and under the supplementary document labeled "Delivery Mechanism and Community Usage Metrics". How do we address this?

- The Project description should explicitly address "Deliverables" and "Metrics"

- In addition, the "Delivery Mechanism and Community Usage Metrics" supplemental document is required.

- The two components need not be the same but are required. You can choose to address them with different amount of detail in each of those documents (with a duplication being one option).

Frequently Asked Questions (6)

Q: How does the CSSI program differ from Computational and Data-Enabled Science and Engineering (CDS&E) and OAC core research programs?

- CDS&E and OAC core research programs emphasize research in, rather than the development of, cyberinfrastructure systems.
- CSSI focuses upon development of data and software systems that support research.

Thank you!

Questions?

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