Cyberinfrastructure for Sustained Scientific Innovation (CSSI) NSF 22-632

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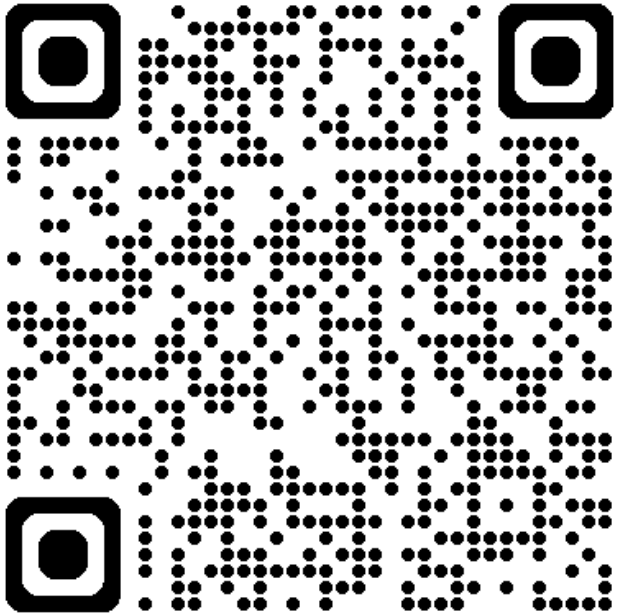
Office of Advanced Cyberinfrastructure (OAC)
Directorate for Computer & Information Science & Engineering (CISE)
Webinar: November 18th, 2025

Send all inquiries to CSSIQueries@nsf.gov

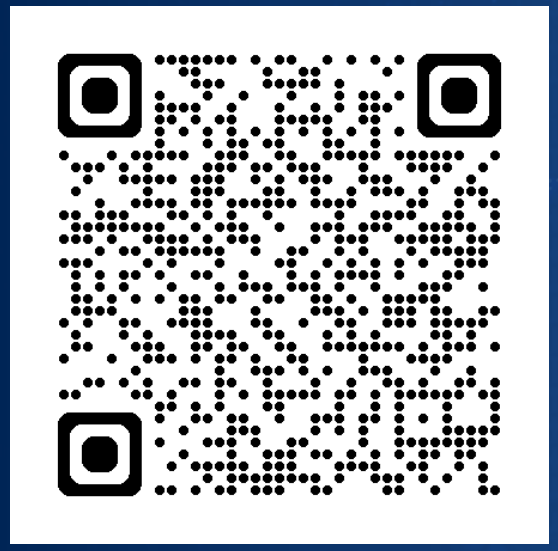
Recordings and slides: https://www.nsf.gov/events/nsf-cyberinfrastructure-sustained-scientific-innovation/2025-11-18

Fill out the survey to be an OAC reviewer



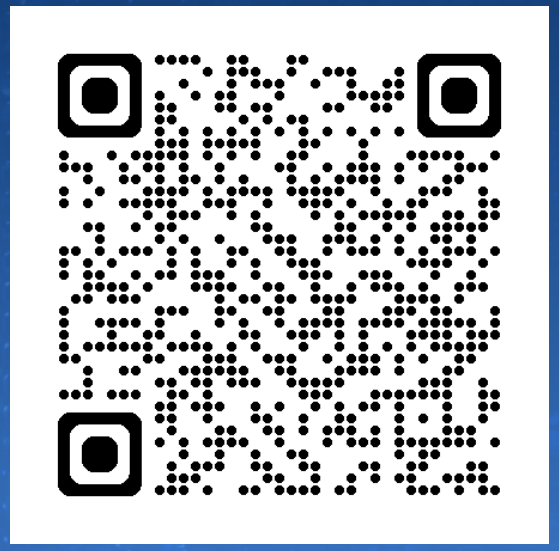
https://touchpoints.app.cloud.gov/touchpoints/27d37df2/submit

Additional Resources for Proposers



https://www.nsf.gov/policies/pappg/24-1

https://www.nsf.gov/updates-on-priorities



https://www.nsf.gov/executive-orders

Purpose of This Webinar

- Summarize the CSSI program and review criteria
- Answer questions from the community
- Improve the quality of proposals

Webinar Outline

- Overview of solicitation (NSF 22-632)
- Questions from the community – via Zoom Q&A
  - Answers to some commonly asked questions in the end

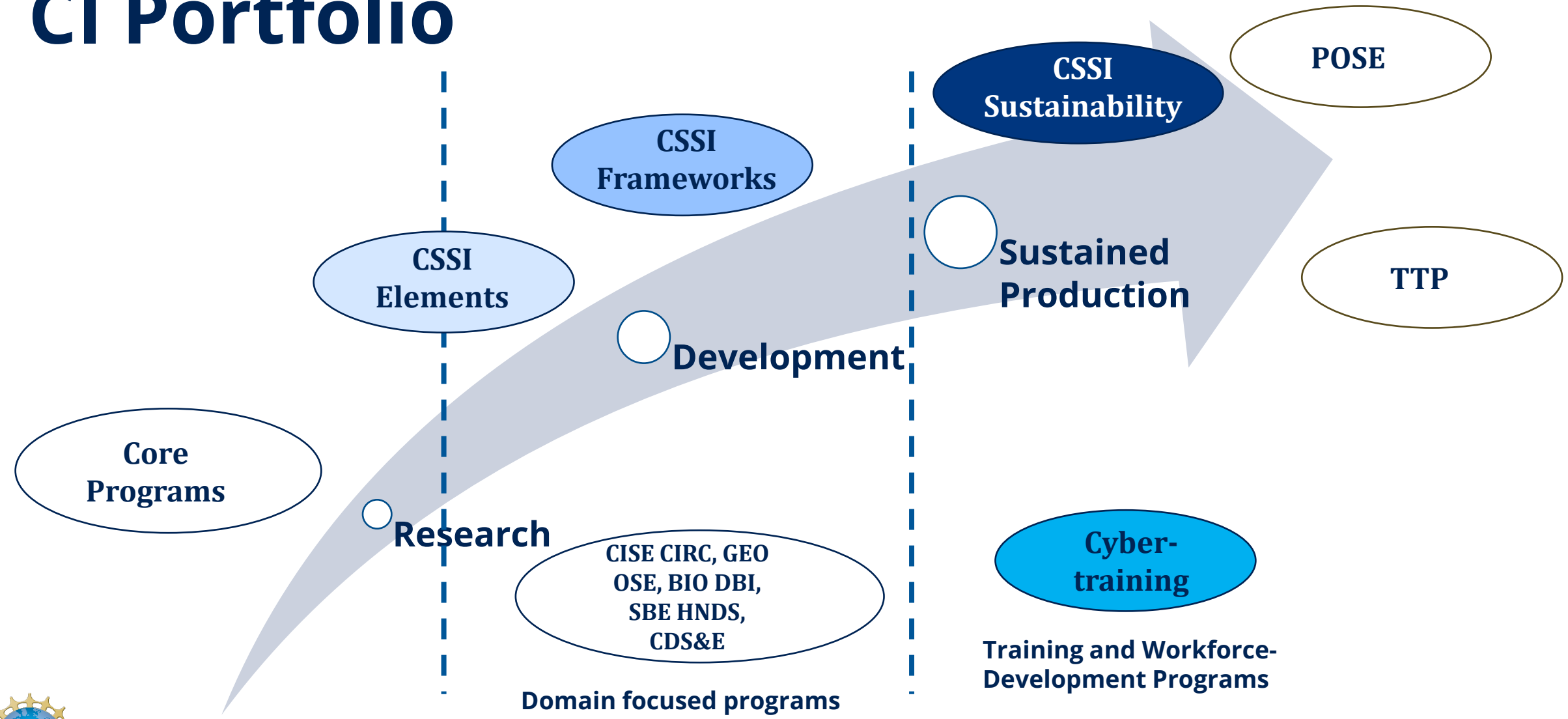
https://www.nsf.gov/pubs/2022/nsf22632/nsf22632.htm

Deadline: Dec 01, 2025

NSF CSSI Program

- Seeks to fund projects that **translate core innovations into tools and services** that enable a sustainable CI for broad use by science and engineering research communities.
- Supports the **development and deployment** of robust, reliable and sustainable **data and software cyberinfrastructure** (CI)
- Provides a **cross-directorate** opportunity to advance common approaches to sustain and innovate research CI
- The program emphasizes **integrated CI services**, quantitative **metrics** with targets for **delivery** and **usage** of these services, and **research community creation and support**.

CSSI within the NSF/OAC Software/Data CI Portfolio



Before Starting on a CSSI Proposal …

- Is the basic research leading to CI development done?
- Who is the target user community?
  - ✗ *Your research group only*
  - ✗ *Your home institution only*
  - ✓ A clearly identified research community
- Is there a demonstrated need in that community?

CSSI Award Classes

Project Class	Description
Elements	Small groups that will create and deploy robust capabilities for which there is a demonstrated need that will advance one or more significant areas of S&E. (Awards <= $600K, up to 3 years)
Framework Implementations	Larger, interdisciplinary teams organized around the development and application of common infrastructure aimed at solving common research problems faced by NSF researchers in one or more areas of S&E, resulting in a sustainable community framework serving a diverse community or communities. (Awards between $600K - $5 Million, between 3-5 years)
Transition to Sustainability	Groups who will execute a well-defined sustainability plan for existing CI with demonstrated impact in one or more areas of S&E supported by NSF. The sustainability plan should enable new avenues of support for the long-term sustained impact of the CI. (Awards <= $1 Million, up to 2 years)

Budget Limits

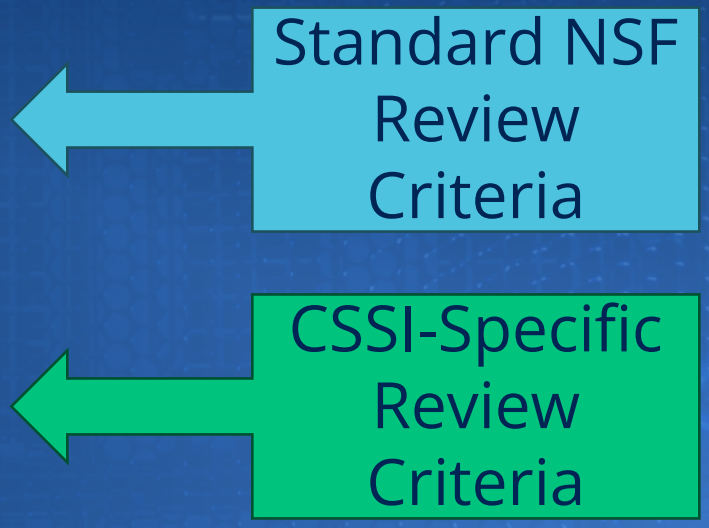
- ***Elements*** awards shall not exceed a total of $600,000 and 3 years of duration **(up to $200,000 per year)**.
- ***Framework Implementations*** awards shall range between $600,001 and $5,000,000 for 3-5 years of duration **($200,000 to $1,000,000 per year).**
- ***Transition to Sustainability*** awards shall not exceed a total of $1,000,000 and 2 years of duration **(up to $500,000 per year).**

Proposals exceeding the total allowed budget ($600K, $5M, or $1M for Elements, Frameworks, and Sustainability tracks) will be returned without review.

NSF Review Criteria

Reviewers and the review panel will address

- Intellectual Merit,
- Broader Impacts, and
- CSSI Specific Review Criteria



in their reviews, panel discussions, and panel summaries

Intellectual Merit

- What is the potential for the proposed activity to **advance knowledge and understanding** within its own field or across different fields?
- To what extent do the proposed activities suggest and explore **creative, original, or potentially transformative concepts**?
- Is the plan for carrying out the proposed activities **well-reasoned, well-organized, and based on a sound rationale**? Does the plan incorporate a **mechanism to assess success**?
- How **well qualified is the individual, team, or organization** to conduct the proposed activities?
- Are there **adequate resources available to the PI** (either at the home organization or through collaborations) to carry out the proposed activities?

Broader Impacts

- What is the potential for the proposed activity to **benefit society or advance desired societal outcomes**?
- To what extent do the proposed activities suggest and explore **creative, original, or potentially transformative concepts**?
- Is the plan for carrying out the proposed activities **well-reasoned, well-organized, and based on a sound rationale**? Does the plan incorporate a **mechanism to assess success**?
- How **well qualified** is the individual, team, or organization to conduct the proposed activities?
- Are there **adequate resources** available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

https://www.nsf.gov/funding/learn/broader-impacts

Project Motivation and Impact

- ***Science Driven***
  - Does the proposed CI:
    - Fill well-recognized science and engineering needs of the research community?
    - Advance research capability within a significant area or areas of science and engineering?
    - Benefit science and engineering communities beyond initial targets?
  - What well-recognized science outcomes will be enabled by this CI?
- ***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?

Cyberinfrastructure Plans

- ***Project plans, and system and process architecture***
  - What is the proposed architecture, and the software engineering process?
  - How will security, trustworthiness, provenance, reproducibility, and usability be addressed?
  - How will the CI be adaptable to new technologies and changing requirements?
- ***Building on existing, recognized capabilities***
  - How will the project activities build on and leverage existing NSF and national cyberinfrastructure investments, as appropriate?
- ***Close collaboration among stakeholders***
  - How will the project activities engage CI experts, specialists, scientists and engineers working in concert with the CI users?
  - How will the project (including collaboration) be managed?
  - What are the community engagement mechanisms?

Measurable Outcomes

- ***Deliverables***
  - Does the proposed project clearly articulate the services and capabilities to be delivered
  - How they are to be delivered?
- ***Metrics***
  - Are there clearly articulated 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?

Participating NSF Directorates

- Computer and Information Science and Engineering (CISE)
- Biological Sciences (BIO)
- Education and Human Resources (EDU)
- Engineering (ENG)
- Geosciences (GEO)
- Mathematical and Physical Sciences (MPS)
- Social, Behavioral and Economic Sciences (SBE)

Not all directorates are participating at the same level, and some have specific research and education priorities.

CSSI Directorate Priority Areas

- PIs are strongly encouraged to **identify the target disciplines** in the proposal summary and project description
- PIs are strongly encouraged to send a draft project summary that addresses the intellectual merit, broader impact, and alignment with **solicitation-specific review criteria** to the CSSI program.
  - Identify research topics, NSF directorates, or program directors in your email.

Email CSSIQueries@nsf.gov

Eligibility

- **Proposals may <u>only</u> be submitted by the following lead organizations:**
  - Institutions of Higher Education
  - Non-profit, non-academic organizations
  - Only NSF-sponsored federally funded research and development centers (FFRDCs) may apply, provided 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: "<u>one</u>"**
  - An individual may participate as Principal Investigator, co-Principal Investigator or other Senior Personnel in at most one 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.

Research.gov and Cover Sheet Common Questions

- **NSF Unit of Consideration (program):**
  - Choose CSE (CISE)
  - The proposals should choose “Software Institutes” as program.
- **Proposal Title**
  - Proposal titles should begin with “Elements:”, “Frameworks:”, or “Sustainability:”
  - Examples
    - **Elements:** Data-Science Methods for Resource Allocation During Characterization of Dynamic Systems
    - **Collaborative Research: Frameworks:** Designing Next-Generation MPI Libraries for Emerging Dense GPU Systems
    - **Collaborative Research: Sustainability:** A Community-Centered Approach for Supporting and Sustaining Parsl
- **Type of Proposal: "Research"**
  - Not "Research Infrastructure"

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 description must explicitly discuss the directorates or offices to which 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.

Supplemental Documents

1) **Delivery Mechanism and Community Usage Metrics** (all proposals, 2-page limit)
2) **Project Personnel and Partner Institutions** (all proposals)
3) **Management and Coordination Plan** (Framework proposals only, 3-page limit)
4) **CI Professional Mentoring and/or Development Plan** (if requesting funding to support a CI professional, 2-page limit)
5) **High Throughput Computing Resources** (if requesting HTC resources through PaTH, 2-page limit)
6) ~~**Cloud Computing Resources** (if requesting cloud resources through CloudBank, 2-page limit)~~
7) **Mentoring Plan** (if supporting post-doctoral scholars or graduate students, see NSF PAPPG Chapter II.D.2.i(i))
8) **Data Management and Sharing Plan** (all proposals, 2-page limit, see NSF PAPPG Chapter II.D.2.i(ii))
9) **Letters of Collaboration** (if any, see NSF PAPPG Chapter II.D.2.i(iii))

Delivery Mechanisms and Community Usage Metrics (Supplemental Document)

- Quantifiable metrics to measure the community adoption, usage, or other type of engagement.
  - Include target metric values for each year of the proposed project.
- These metrics should also be appropriate for the program-specific areas targeted by the project, as well as for the proposed type of CI to be developed.
- The viability of the mechanisms employed for collecting the metrics should be described.

~~Cloud Computing Resources Plan~~

- **Proposers needing commercial cloud computing resources should request these through NAIRR Pilot and ACCESS through the CloudBank 2 resource provider.**
- **The “Cloud Access” mechanism of previous CSSI solicitations is no longer supported**

OAC provides many resources and services

Examples include:

National Computing, Data, and AI Resources

ACCESS Advancing Innovation
ALLOCATIONS SUPPORT OPERATIONS METRICS

PATh PARTNERSHIP to ADVANCE THROUGHPUT COMPUTING
Throughput Computing, Data, and Support

NRP NATIONAL RESEARCH PLATFORM

SGX3
Science Gateways

NAIRR Pilot National Artificial Intelligence Research Resource Pilot

Training, Workshops, and More

- https://support.access-ci.org/events
- https://portal.osg-htc.org/documentation/support_and_training/training/materials/
- https://nairrpilot.org/pilotevents
- https://www.nrp.ai/training/

Community and Workforce Development

ms-cc.org in partnership with Internet2
Minority Serving CI Consortium
www.ms-cc.org

CaRCC Campus Research Computing Consortium
Campus Research Computing Consortium
www.carcc.org

TRUSTED CI
THE NSF CYBERSECURITY CENTER OF EXCELLENCE

Portals

- **ACCESS: https://access-ci.org/**
- **PATh: https://path-cc.io/**
- **NAIRR Pilot: https://nairrpilot.org**
- **CaRCC: https://carcc.org/**
- SGX3: https://sciencegateways.org/
- LCCF: https://lccf.tacc.utexas.edu/
- MSCC: https://www.ms-cc.org/
- Trusted CI: https://www.trustedci.org/

CSSI Return Without Review Criteria

- Any proposal submitted to this solicitation with an individual listed as PI, co-PI, or Senior Personnel after the first proposal is received at NSF with that individual will be returned without review.
  - You can be PI, Co-PI, or Senior Personnel on ONE proposal per funding cycle
- Proposals missing any of the required documents may be returned without review.
  - This includes supplemental documents
- Full proposals containing items other than those required by the solicitation or by the PAPPG will be returned without review.
- Proposals with budgets exceeding the maximum total will be returned without review.

Send all inquiries to CSSIQueries@nsf.gov

Register for the December 8th CyberTraining Webinar

Serve as a reviewer for CSSI, CyberTraining, and other OAC programs

https://touchpoints.app.cloud.gov/touchpoints/27d37df2/submit

Commonly Asked Questions (1)

Q: If I am the PI, co-PI or Senior Personnel on a proposal to CSSI (NSF 22-632):

- *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**

These limits apply to proposals submitted within the same funding cycle.

An individual may participate as PI, co-PI, or other Senior Personnel on at most one proposal across the Elements, Framework Implementations, and Transition to Sustainability class of awards 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.

Commonly Asked Questions (2)

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

- ***Institutions of Higher Education:*** 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 sub-awardees are all organizations eligible under the guidelines of the NSF *Proposal & Award Policies & Procedures Guide (PAPPG)*.

Commonly 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, I.I.E.2).
- 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.

Commonly 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 **all** personnel and organizations involved in the proposed project. **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.D.2.h (iii) of the NSF PAPPG

Commonly 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).

Commonly Asked Questions (6)

Q: How does the CSSI program differ from programs such as Computational and Data-Enabled Science and Engineering (CDS&E), CISE Core, and Pathways to enable Open-Source Ecosystem (POSE), and CyberTraining research programs?

- CISE Core and CDS&E research programs emphasize research in, rather than the development of, cyberinfrastructure.
- POSE supports the intentional transition of open-source products into open-source ecosystems (management, admin, legal/governance, onboarding, user discovery, test/eval, security/privacy)
- CSSI focuses upon development of sustainable data and software CI that support research.
  - The transition to sustainability track focuses on executing a well-defined sustainability plan for existing CI
- CyberTraining supports efforts to improve adoption of CI resources, some of which could be developed through CSSI