

Computer and Information Science and Engineering (CISE): Core Programs, Large Projects

PROGRAM SOLICITATION NSF 23-524

REPLACES DOCUMENT(S): NSF 19-589



National Science Foundation

Directorate for Computer and Information Science and Engineering
Division of Computing and Communication Foundations
Division of Computer and Network Systems
Division of Information and Intelligent Systems

Submission Window Date(s) (due by 5 p.m. submitter's local time):

February 14, 2023 - February 28, 2023

September 16, 2024 - September 30, 2024

September 14, 2026 - September 28, 2026

IMPORTANT INFORMATION AND REVISION NOTES

- Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in Important Notice No. 147. In support of these efforts, research proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov, and may not be prepared or submitted via FastLane.
- The CISE Core Programs had a Large category of proposals up to solicitation [NSF 19-589](#), but the Large category was allowed in CNS only. This solicitation replaces the Large category from [NSF 19-589](#) and extends the divisions to include CNS, CCF, and IIS.

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) that is in effect for the relevant due date to which the proposal is being submitted. The NSF PAPPG is regularly revised and it is the responsibility of the proposer to ensure that the proposal meets the requirements specified in this solicitation and the applicable version of the PAPPG. Submitting a proposal prior to a specified deadline does not negate this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Computer and Information Science and Engineering (CISE): Core Programs, Large Projects

Synopsis of Program:

The NSF CISE Directorate supports research and education projects that develop new knowledge in all aspects of computing, communications, and information science and engineering through core programs. The core programs for the participating CISE divisions include:

- Division of Computing and Communication Foundations (CCF):
 - Algorithmic Foundations (AF) [program](#) ;
 - Communications and Information Foundations (CIF) [program](#) ;
 - Foundations of Emerging Technologies (FET) [program](#) ; and
 - Software and Hardware Foundations (SHF) [program](#) ;
- Division of Computer and Network Systems (CNS):
 - Computer and Network Systems (CSR) [program](#) ;
 - Networking Technology and Systems (NeTS) [program](#) ;

- Division of Information and Intelligent Systems (IIS):
- o Human-Centered Computing (HCC) [program](#);
 - o Information Integration and Informatics (III) [program](#); and
 - o Robust Intelligence (RI) [program](#).

This solicitation invites proposals on bold new ideas tackling ambitious and fundamental research problems within scope of one or more of the participating CISE divisions core programs listed above, and that are well suited to a large-scale integrated collaborative effort. Teams should consist of two or more investigators (PI, co-PI(s), or other Senior Personnel) with complementary expertise. Investigators are strongly encouraged to come together within or across disciplines and/or institutions and combine their creative talents to identify compelling, transformative research agendas where the impact of the results will exceed that of the sum of each of their individual contributions. Investigators are especially encouraged to seek out partnerships in a wide class of institutions that together produce innovative approaches to the proposed research.

Proposals that are focused on research infrastructure are not appropriate for this solicitation.

Proposers are invited to submit proposals with total budgets from \$3,000,000 to \$5,000,000 and durations up to five years.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Marilyn M. McClure, Program Director, CNS, telephone: (703) 292-5197, email: mmcclure@nsf.gov
- Ann C. Von Lehmen, Program Director, CNS, telephone: (703) 292-4756, email: avonlehm@nsf.gov
- Hector Munoz-Avila, Program Director, IIS, telephone: (703) 292-4481, email: hmunoz@nsf.gov
- Balakrishnan Prabhakaran, Program Director, IIS, telephone: (703) 292-4847, email: bprabhak@nsf.gov
- Sankar Basu, Program Director, CCF, telephone: (703) 292-7843, email: sabasu@nsf.gov
- Danella Zhao, Program Director, CCF, telephone: (703) 292-4434, email: dzhao@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 4

Approximately 4 awards will be made in each competition, pending availability of funds and quality of proposals received (continuing grants)

Anticipated Funding Amount: \$20,000,000

Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and quality of proposal received.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- 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.

Who May Serve as PI:

At the time of submission, any PI, co-PI, or other senior project personnel must hold either:

- a tenured or tenure-track position, or
- a primary, full-time, paid appointment in a research or teaching position

at a US-based campus of an organization eligible to submit to this solicitation (see above), with exceptions granted for family or medical leave, as determined by the submitting organization. Individuals with *primary* appointments at for-profit non-academic organizations or at overseas branch campuses of US IHEs are not eligible.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

An individual may participate as PI, co-PI, or Senior Personnel in no more than one Core Programs, Large Projects proposal submitted to each deadline window, for a maximum of three over the course of the entire program. Note that limits on participation apply only to this solicitation, and do not carry over from other solicitations that have limits.

These eligibility constraints will be strictly enforced in order to treat everyone fairly and consistently. Any proposal that exceeds this limit at the time of submission for any PI, co-PI, or Senior Personnel will be returned without review. **No exceptions will be made.**

Proposals submitted in response to this solicitation may not duplicate or be substantially similar to other proposals concurrently under consideration by NSF.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide (PAPPG)* guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
 - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:**

Not Applicable
- **Other Budgetary Limitations:**

Not Applicable

C. Due Dates

- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):
 - February 14, 2023 - February 28, 2023
 - September 16, 2024 - September 30, 2024
 - September 14, 2026 - September 28, 2026

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The NSF Directorate for Computer and Information Science and Engineering (CISE) supports transformative research and education projects that develop new knowledge in all aspects of computing, communications, and information science and engineering through multiple research programs across one office and three divisions. The three CISE divisions are participating in this solicitation.

- The Division of Computing and Communication Foundations (CCF) supports research that studies the foundations of computing and communication.
- The Division of Computer and Network Systems (CNS) supports research that studies novel or enhanced computing and networking, including using new technologies or new ways to apply existing technologies, with a focus on systems.
- The Division of Information and Intelligent Systems (IIS) supports research that studies the inter-related roles of people, computers, and information.

Program Vision: The CISE Core Programs, Large Projects solicitation seeks to fill a gap between the [CISE core Medium projects](#) and larger-scale projects such as [Expeditions in Computing](#). It supports groundbreaking research, within the scope of one or more of the participating CISE core programs, that requires large research teams with combined contributions to computer and information science and engineering research where the impact of the results will exceed the sum of each of their individual contributions. The program has the following goals:

- To address groundbreaking computer and information science and engineering research problems across CISE disciplines that can only be addressed by large research teams with combined contributions that are clearly beyond the sum of each of their individual contributions;
- To encourage organizational collaborations and linkages within and between campuses, schools, other relevant organizations (such as industry and nonprofits/foundations) as appropriate, to creatively assemble teams with appropriate expertise; and
- To foster activities to broaden participation in research and education.

II. PROGRAM DESCRIPTION

Large projects must be comprehensive and well-integrated, tackling ambitious computer and information science and engineering problems that are well suited to a large-scale, integrated, collaborative project. The Core Programs, Large Projects solicitation seeks transformative ideas on any single or multi-disciplinary topic within computer and information science and engineering that clearly demonstrate the need for funding at the scale of this solicitation. Proposals should make a convincing case that the collaborative contributions of the project team will be greater than the sum of each of their individual contributions. Research agendas may tackle a major fundamental problem in a single field, or span multiple fields, or subfields.

Proposals should identify a computer and information science and engineering grand challenge and an agenda to tackle such a challenge. The proposal must explicitly identify the participating CISE core programs it covers and make the case for why the challenge is within the scope of one or more of these participating core programs. This should be addressed with a rationale for the project, which describes the unique opportunities to be pursued and indicates its potential impact. In this spirit, proposals should explain why existing CISE core programs for Small and Medium size projects (\$600,000 over three years and \$1,200,000 over four years, respectively) are inadequate to address the grand challenge. A strong rationale must be provided that explains why a budget of this magnitude is required to carry out the proposed work. Teams should consist of two or more investigators (PI, co-PI(s), or other Senior Personnel) with complementary skillsets, and a team of students and/or postdoctoral researchers.

A Large proposal is expected to present a large, full-scale computer and information science and engineering research project with an overarching research goal and a clearly identified collaborative project team. CISE Core Programs, Large Projects are expected to serve as nexus points for collaborative efforts, creating a forum through which investigators come together within or across disciplines and/or institutions and combine their creative talents to identify compelling, transformative research agendas with maximum impact, where the results will be greater than the sum of each of their individual contributions. CISE Core Programs, Large Projects are envisioned to promote organizational collaborations and linkages within and between campuses and schools, and foster activities to broaden participation in research and education.

To this end, a Large proposal must define the roles of all members of the team and the synergies among them in a Management and Coordination plan (3-page limit, to be submitted as a Supplementary Document). This plan should include: 1) the specific roles of the PI, co-PIs, other senior personnel, and paid consultants at all organizations involved to demonstrate that the project personnel have distinct but complementary expertise; 2) how the project will be managed within or across organizations, including how team coordination will be evaluated; 3) the methods, measures, and/or metrics related to how the team will evaluate technical milestones, and their impact on the project; 4) identification of the specific coordination mechanisms that will enable cross-organization

and/or cross-expertise scientific integration and achieve synergy within the team; and 5) pointers to the budget line items that support these management and coordination mechanisms.

Management and coordination activities must be documented in the annual reports and will be monitored by the managing program officer. Some awards may be selected for post-award site visits.

ACCESS TO EXPERIMENTAL RESEARCH INFRASTRUCTURE

PIs may consider utilizing NSF-supported research infrastructure (such as the [Platforms for Advanced Wireless Research](#), [FABRIC](#), [Chameleon](#), [CloudLab](#)) when formulating their research plans and submitting proposals. Descriptions of the capabilities of each system and their availability can be found at their websites: <https://advancedwireless.org/>, <https://fabric-testbed.net/>, <https://www.chameleoncloud.org/>, <https://cloudlab.us/>.

CloudBank OPTION FOR CLOUD COMPUTING RESOURCES

Proposals may request cloud computing resources to use public clouds such as Amazon Web Services (AWS), Google Cloud Platform (GCP), IBM Cloud, and Microsoft Azure. Cloud computing resources described in proposals may be obtained through an external cloud access entity ([CloudBank](#)) supported by NSF's [Enabling Access to Cloud Computing Resources for CISE Research and Education \(Cloud Access\) program](#).

Proposers should describe this request in a Supplementary Document including: (a) which public cloud providers will be used; (b) anticipated annual and total costs for accessing the desired cloud computing resources, based on pricing currently available from the public cloud computing providers; and (c) a technical description of, and justification for, the requested cloud computing resources. The proposal budget should not include the costs for accessing public cloud computing resources via CloudBank. Also, the total cost of the project, including the cloud computing resource request, may not exceed the budget limit described in this solicitation.

For example, this solicitation limits project budgets to \$5,000,000. If a PI wishes to request \$100,000 in cloud computing resources through CloudBank, then the proposal budget should not exceed \$4,900,000. The remaining \$100,000 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 the amount requested for cloud computing resources in the Supplementary Documents) does not exceed \$5,000,000.

If incorporating this request into the proposal, a proposer should include "CloudAccess" (one word without spaces) as a keyword on the Project Summary page, at the end of the Overview section (before the section on Intellectual Merit). Proposers may contact CloudBank (see <https://www.cloudbank.org/faq>) for consultation on estimating the costs for using cloud computing resources.

See Section V.A. Proposal Preparation Instructions, Supplementary Documents, for more information on how to describe the cloud computing resource request as well as the associated budget.

Data Management Plan: The data management plan must describe steps to ensure that relevant software and hardware artifacts, data and the results are available (for a reasonable time) beyond the end of the project lifecycle. For details, see the Directorate for Computer & Information Science & Engineering (CISE) Data Management Plan at https://www.nsf.gov/cise/cise_dmp.jsp.

REPRODUCIBILITY AND SHARING

In the interest of completeness and transparency, PIs must describe, as part of their Data Management Plans, how they will provide access to well-documented datasets, modeling and/or simulation tools, and code bases to support reproducibility/replicability of their methods and results for a reasonable time beyond the end of the project lifecycle.

FAIRNESS, ETHICS, ACCOUNTABILITY, AND TRANSPARENCY

Issues of fairness, ethics, accountability, and transparency (FEAT) are important considerations for many core topics in computer and information science and engineering. In projects that generate artifacts ranging from analysis methods to algorithms to systems, or that perform studies involving human subjects, PIs are encouraged to consider the FEAT of the outputs or approaches. CISE is also interested in receiving proposals whose *primary* foci are on methods, techniques, tools, and evaluation practices as means to explore implications for FEAT. In the exploration and use of FEAT concepts, PIs are strongly encouraged to select and articulate their own disciplinary or interdisciplinary approaches consistent or aligned with these concepts.

BROADENING PARTICIPATION IN COMPUTING

CISE has long been committed to Broadening Participation in Computing (BPC). The underrepresentation of many groups — including women, persons with disabilities, Blacks and African Americans, Hispanics and Latinos, American Indians, Alaska Natives, Native Hawaiians, and Other Pacific Islanders — in computing deprives large segments of the population of the opportunity to be creators of technology instead of only consumers. Ending underrepresentation will require a range of measures, including institutional programs and activities as well as culture changes across colleges, departments, classes, and research groups.

CISE continues the BPC effort started in 2018 that encourages the research community to engage in meaningful BPC activities. The CISE BPC effort builds on many of the programs, research, and resources created through CISE's past and ongoing investments in BPC, and it aligns with the recommendations of the Strategic Plan for Broadening Participation produced by the CISE Advisory Committee in 2012. **Each Large project must include a BPC plan** (see details in Proposal Preparation). CISE encourages the use of the resources available at the NSF-funded BPCnet Resource Portal (<https://bpcnet.org>). BPCnet provides BPC project and departmental plan templates, suggested activities, opportunities for consultant services, and publicly available data to support PIs and Departments in creating their BPC Plans. *CISE encourages PIs to leverage departmental plans verified by BPCnet to coordinate efforts within their institution.* BPC plans must include roles for all PIs and co-PIs and be included as a Supplementary Document, following the guidelines as described in the Proposal Preparation Instructions.

A meaningful BPC plan can answer positively to the following five elements:

- Goal and Context: Does the plan describe a goal and the data from your institution(s) or local community that justifies that goal?
- Intended population(s): Does the plan identify the characteristics of participants from an underrepresented group listed above, including school level (e.g., African American undergraduates or female high-school students)?
- Strategy: Does the plan describe activities that address the stated goal(s) and intended population(s)?
- Measurement: Is there a plan to measure the outcome(s) of the activities?
- PI Engagement: Is there a clear role for each PI and co-PI? Does the plan describe how the PI is prepared (or will prepare or collaborate) to do the

proposed work?

All PIs and co-PIs are expected to participate in BPC activities in a manner aligned with their personal contexts, interests, and skills. More information regarding the BPC effort can be found at <https://www.nsf.gov/cise/bpc>.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 4

Approximately 4 awards will be made in each competition, pending availability of funds and quality of proposals received (continuing grants)

Anticipated Funding Amount: \$20,000,000

Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and quality of proposal received.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- 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.

Who May Serve as PI:

At the time of submission, any PI, co-PI, or other senior project personnel must hold either:

- a tenured or tenure-track position, *or*
- a primary, full-time, paid appointment in a research or teaching position

at a US-based campus of an organization eligible to submit to this solicitation (see above), with exceptions granted for family or medical leave, as determined by the submitting organization. Individuals with *primary* appointments at for-profit non-academic organizations or at overseas branch campuses of US IHEs are not eligible.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

An individual may participate as PI, co-PI, or Senior Personnel in no more than one Core Programs, Large Projects proposal submitted to each deadline window, for a maximum of three over the course of the entire program. Note that limits on participation apply only to this solicitation, and do not carry over from other solicitations that have limits.

These eligibility constraints will be strictly enforced in order to treat everyone fairly and consistently. Any proposal that exceeds this limit at the time of submission for any PI, co-PI, or Senior Personnel will be returned without review. **No exceptions will be made.**

Proposals submitted in response to this solicitation may not duplicate or be substantially similar to other proposals concurrently under consideration by NSF.

Additional Eligibility Info:

For IHEs and non-profit, non-academic organizations with international branch campuses, this solicitation restricts eligibility to research activities using the facilities, equipment, and other resources of the campuses located in the US only.

Further, subawards are not permitted to international branch campuses of US-based proposing organizations eligible to submit to this solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via Research.gov. PAPPG Chapter II.E.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.D.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

PIs and co-PIs are encouraged to report demographic information on the "My Profile" page within Research.gov, available at <https://www.research.gov/accountmgmt/#/user/profile>.

Proposal Titles:

Proposal titles should begin with "CISE", followed by a colon, followed by "Large", then the title of your project: as in **CISE: Large: Title**

If you submit a proposal as part of a set of collaborative proposals, the title of the proposal should start with the words "Collaborative Research", followed by a colon, then "CISE", followed by a colon, then "Large", followed by a colon, and then the title of your project. For example, if you are submitting a collaborative set of proposals then the title of each would be **Collaborative Research: CISE: Large: Title**.

Project Summary:

The Project Summary should include an overview of the project, a statement on the **intellectual merit** of the proposed activity, a statement on the **broader impacts** of the proposed activity, and a set of keywords. It should provide a rationale for the *Large* project, describing the unique opportunities to be pursued, and indicating its potential impact. The summary should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should also include a clear description of the proposed *Large* project, its overarching goals, its distinguishing features, and foci.

All proposal project summaries must include 3-6 keywords that describe the general area(s) of the investigation, to assist in identifying reviewers with appropriate knowledge and expertise to review the proposal. *The list of keywords should be the last paragraph of the Overview section of the Project Summary.*

The keywords should describe the main scientific/engineering areas explored in the proposal. Keywords should be prefaced with "Keywords" followed by a colon and each keyword set should be separated by semicolons. Keywords should be of the type used to describe research in a journal submission and may include technical areas of expertise necessary to review the proposal.

For example, they might appear as, **Keywords: XXX; YYY; ZZZ.**

If cloud computing resources are being requested from CloudBank, then the keyword "CloudAccess" (one word without space) should be included at the end of the Overview section (before the section on Intellectual Merit) on the Project Summary page.

Project Description:

Length of Project Description –

- Describe the research and education activities to be undertaken in **up to 20 pages**.

Proposals that exceed this limit will be returned without review.

Budget:

Budgets for all projects must include funding for one or more designated project representatives (PI/co-PI/senior researcher or NSF-approved replacement) to attend each annual PI meeting during the proposed lifetime of the award.

As noted in the Proposal Preparation Instructions, a portion of the budget for each Core Programs, Large Projects proposal may be used to engage relevant Broadening Participation in Computing (BPC) expertise to help plan, organize, coordinate and execute BPC activities.

The total budget of the project, including any cloud computing resource request from CloudBank, may not exceed the budget limits described in this solicitation. The total cost of the cloud computing resources requested from Cloudbank should not be included in the NSF budget, and should be specified only in the associated supplementary document (see below for additional instructions).

Example: This solicitation limits project budgets to \$5,000,000. If a PI wishes to request \$100,000 in cloud computing resources through CloudBank, then his/her proposal should request, as part of the proposal budget, no more than \$4,900,000. The remaining \$100,000 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 \$5,000,000.

Data Management Plan:

The Data Management Plan should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. In the interest of completeness and transparency, PIs must describe, as part of their Data Management Plans, how they will provide access to well-documented datasets, modeling and/or simulation tools, and code bases to support reproducibility/replicability of their methods and results for a reasonable time beyond the end of the project lifecycle.

For additional information on the Dissemination and Sharing of Research Results, see: <https://www.nsf.gov/bfa/dias/policy/dmp.jsp>.

For specific guidance for Data Management Plans submitted to the Directorate for Computer and Information Science and Engineering (CISE) see: https://www.nsf.gov/cise/cise_dmp.jsp.

See also the guidance on Reproducibility and Sharing in the Program Description section above.

Supplementary Documents:

In the Supplementary Documents section, upload the following information where relevant:

A list of Project Personnel and Partner Organizations (required) (Note: In collaborative proposals, the lead organization should provide this information for all participants):

Provide current, accurate information for all personnel and organizations involved in the project. NSF staff will use this information in the merit review process to manage reviewer selection. The list **must** include all PIs, co-Pis, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, and project-level advisory committee members. This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:

- Mei Lin; XYZ University; PI
- Jak Jabes; University of PQR; Senior Personnel
- Jane Brown; XYZ University; Postdoctoral Researcher
- Raket Ademas; ABC Inc.; Paid Consultant
- Maria Wan; Welldone Institution; Unpaid Collaborator
- Rimon Greene; ZZZ University; Subawardee

Cloud Computing Resources (if applicable):

- If requesting cloud computing resources, include a description of the request (not to exceed two pages) that includes: The title of the proposal and the institution name followed by the following information: (a) specific cloud computing providers that will be used; (b) anticipated annual and total costs for accessing the desired cloud computing resources, along with a description of how the cost is estimated; and (c) a technical description of, and justification for, the requested cloud computing resources.
- The NSF Budget should not include any costs for accessing cloud computing resources via CloudBank. The total cost of the project, including this cloud computing resource request, may not exceed the budget limit as described in this solicitation. Proposers should include "CloudAccess" (one word without space) as a keyword on the Project Summary page, at the end of the Overview section (before the section on Intellectual Merit).

Management and Coordination Plans:

Note: In collaborative proposals, the lead organization should provide this information for all participants.

Since the success of collaborative research efforts called for in this solicitation are known to depend on thoughtful coordination mechanisms that regularly bring together the various participants of the project, **each Core Programs, Large Projects proposal must include a Management and Coordination Plan of up to three pages** even when the investigators are affiliated with the same institution. Large Projects submitted under this solicitation should consist of two or more investigators (PI, co-PI and/or other Senior Personnel) and a team of students and/or postdoctoral researchers. Since the success of collaborative research efforts is known to depend on thoughtful coordination mechanisms that regularly bring together the various participants of the project, up to three pages are allowed for Management and Coordination Plans. Plans must be submitted as a document under Supplementary Documents. The length and level of detail provided in the Plan should be commensurate with the complexity of the proposed project and should include any proposed collaboration with industry and international partners, and any other unpaid collaborators on the project. Management and Coordination Plans and proposed budgets should demonstrate that key personnel, and especially lead PIs, have allocated adequate time for both their individual technical contributions and the leadership of collaborative activities necessary to realize the synergistic effects of larger-scale research.

The length of and degree of detail provided in the Plan should be commensurate with the complexity of the proposed project and should include any proposed collaboration with industry and international partners, and any other unpaid collaborators on the project. This Plan should include: 1) the specific roles of the PI, co-PIs, other senior personnel, and paid consultants at all organizations involved to demonstrate that the project personnel have distinct but complementary expertise; 2) how the project will be managed within or across organizations and expertise, including how team coordination will be evaluated; 3) methods, measures, and/or metrics related to how the team will evaluate technical milestones, and their impact on the project; 4) identification of the specific coordination mechanisms that will enable cross-organization and/or cross-expertise scientific integration and achieve synergy within the team; and 5) pointers to the budget line items that support these management and coordination mechanisms.

If a Core Programs, Large Project proposal does not include a Management and Coordination Plan, that proposal will be returned without review.

Broadening Participation in Computing (BPC) Plans:

Each project must include a BPC plan as a supplementary document at the time of submission. Each plan should begin with the heading "Broadening Participation in Computing (BPC) Plan" – followed by either "**Standalone**" or "**Connected**".

- A **Standalone BPC Plan** does not include Departmental BPC Plans. Instead, the BPC activities of all PIs are listed in a single document that is up to 3 pages for the whole project and specifically addresses all five elements of a BPC plan: (1) the goal and context of the proposed activity, (2) intended population(s), (3) strategy, (4) measurement, and (5) PI engagement. *This option must be used if one or more of the collaborating institutions does not*

have a Departmental BPC Plan verified by BPCnet.

- A **Connected BPC Plan** may be used when each PI and co-PI will engage in an activity listed in a Verified Departmental BPC Plan from their institution. Note that the (1) goal and context, (2) intended population, (3) strategy, and (4) measurement are already addressed in Verified Departmental BPC Plans. Therefore, a **Connected BPC Plan** is a document that only has to address the following, organized as:
 - up to 2 pages that describe (5) what strategies in the departmental plan the PI and co-PIs will focus on, their specific roles, and their preparation for their work;
 - followed by the verified Departmental BPC Plans from each institution.

As noted in the Budget Instructions, a portion of the budget for each Large proposal may be used to engage relevant BPC expertise to help plan, organize, coordinate, and execute these activities. BPC activities should be pervasive and proportional to the breadth and scale of the project team. Additional resources and information, including examples of meaningful BPC activities and metrics, can be found on the CISE BPC webpage: <https://www.nsf.gov/cise/bpc/> and bpcnet.org.

The BPC plans should be submitted as one document (including departmental plans for Connected BPC plans) under the "Supplementary Documents" section by the lead institution. The BPC plan should not be utilized as a space to elaborate on other broader impact activities unrelated to addressing members of groups underrepresented in computing.

Any organizational resources that support BPC activities should also be described in the Facilities, Equipment and Other Resources section of the proposal (for additional information about Facilities, Equipment and Other Resources, see PAPPG Chapter II.D.2) if not already described in a linked departmental plan.

Other supplementary documents:

- Documentation of collaborative arrangements of significance to the proposal through Letters of Collaboration (if applicable):
- A letter of collaboration from any entity not receiving funds from the project budget should be provided at the time of submission of the proposal. Such letters should appear on the organization's letterhead and be signed by the appropriate organizational representative. These letters must not deviate from the restrictions and requirements set forth in the NSF PAPPG Chapter II.D.2.

Please note that letters of support may not be submitted. Such letters do not document collaborative arrangements of significance to the project, but primarily convey a sense of enthusiasm for the project and/or highlight the qualifications of the PI or co-PI. **Reviewers will be instructed not to consider these letters of support in reviewing the merits of the proposal.**

Single Copy Documents:

Suggested reviewers (optional):

To increase the diversity of the reviewer pool, CISE actively encourages each proposer to include a list of suggested reviewers (including email addresses and organizational affiliations) whom they believe are especially well qualified to review the proposal and are not conflicted with project personnel. Suggestions for reviewers from groups underrepresented in computing are especially encouraged. Proposers should follow the guidance in PAPPG Chapter II.D.1.

Submission Checklist:

In an effort to assist in proposal preparation, the following checklist is provided as a reminder of the items that should be checked before submitting a proposal to this solicitation. This is a summary of the requirements described above. For the items marked with (RWR), the proposal will be returned without review if the required item is noncompliant at the time of proposal submission.

- The last line of the Overview section of the Project Summary must consist of the word "Keywords" followed by a colon and between 3-6 keyword sets, separated by semi-colons.
- The proposal title should comply with the requirements under Proposal Preparation Instructions above.
- (RWR) The total budget for Core Programs, Large Projects proposals **must not** exceed \$5,000,000, including any potential cloud credits, and excluding funds for any embedded REU supplements. For separately-submitted collaborative proposals, this is the total across all participating organizations.
- (RWR) The Project Description is limited to no more than 20 pages.
- (RWR) A Management and Coordination Plan (up to three pages) must be provided as a Supplementary Document. The Management and Coordination Plan should include all organizations participating, not a separate plan for each organization.
- Letters of collaboration should be included as supplementary documents from any project partner not receiving funds from the project budget.
- If requesting public cloud resources through CloudBank, a supplementary document of up to two pages must be provided, and the 'CloudAccess' keyword should be specified in the Project Summary.
- (RWR) A BPC plan is required as a Supplementary Document with a title clearly identifying it as such. Collaborative proposals should submit one BPC plan, as described in the proposal preparation instructions.

Proposals that do not comply with the requirements marked as RWR will be returned without review.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):

February 14, 2023 - February 28, 2023

September 16, 2024 - September 30, 2024

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <https://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to Research.gov for further processing.

Proposers that submitted via Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.D.2.d(i). contains additional information for use by proposers in development of the Project Description section of the proposal). Reviewers are strongly encouraged to review the criteria, including PAPPG Chapter II.D.2.d(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to 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, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. 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?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

For proposals submitted to this solicitation, reviewers will be asked to:

- Comment on the extent to which the project scope justifies the level of investment requested, and the size of the proposed project team which may be larger than required for a Small or Medium proposal to the existing Core programs.
- Comment on the degree to which the Management and Coordination Plan adequately demonstrates that the participating investigators will work synergistically to accomplish the project objectives.
- Comment on whether the Broadening Participation in Computing (BPC) plan meaningfully addresses the five elements of a BPC Plan: (1) the goal and context of the proposed activity, (2) intended population(s), (3) strategy, (4) measurement, and (5) PI engagement.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, or Reverse Site Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division

Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements or the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by an NSF Grants and Agreements Officer. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, [Ensuring the Future is Made in All of America by All of America's Workers](#) (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's [Build America, Buy America](#) webpage.

Special Award Conditions:

Awardees will be required to attend annual PI meetings. Management and coordination activities must be documented in the annual reports and will be monitored by the managing program officer. Some awards may be selected for post-award site visits.

CISE plans to conduct an evaluation of BPC activities. This evaluation may be conducted by a third-party, working in coordination with and on behalf of NSF. Awardees must participate in this evaluation and provide information about project outcomes to support it.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in

advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Awardees must report BPC activities and outcomes in the Special Reporting Requirements section of annual reports submitted to NSF. That section of the annual report should include:

- A summary of what each PI and co-PI did, including any changes to the plan;
- Numbers of events, participants, and participant demographics (if there are barriers to collecting this data, describe those limitations and provide the best estimates possible); and
- A reflection (supported by data if available) on progress, any unexpected challenges or results, and anything planned.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Marilyn M. McClure, Program Director, CNS, telephone: (703) 292-5197, email: mmcclure@nsf.gov
- Ann C. Von Lehmen, Program Director, CNS, telephone: (703) 292-4756, email: avonlehm@nsf.gov
- Hector Munoz-Avila, Program Director, IIS, telephone: (703) 292-4481, email: hmunoz@nsf.gov
- Balakrishnan Prabhakaran, Program Director, IIS, telephone: (703) 292-4847, email: bprabhak@nsf.gov
- Sankar Basu, Program Director, CCF, telephone: (703) 292-7843, email: sabasu@nsf.gov
- Danella Zhao, Program Director, CCF, telephone: (703) 292-4434, email: dzhao@nsf.gov

For questions related to the use of NSF systems contact:

- NSF Help Desk: 1-800-673-6188
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on [NSF's website](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <https://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation

accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.F.7 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <https://www.nsf.gov>

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nspubs@nsf.gov
 - or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See [System of Record Notices](#), NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314

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