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Harnessing the Data Revolution (HDR): Transdisciplinary Research in Principles of Data Science Phase II (TRIPODS)

HDR TRIPODS Phase II

PROGRAM SOLICITATION
NSF 21-604

REPLACES DOCUMENT(S):
NSF 19-604

National Science Foundation

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. submitter's local time):

November 01, 2021 - November 16, 2021

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

January 04, 2022 - January 24, 2022

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Harnessing the Data Revolution (HDR): Transdisciplinary Research in Principles of Data Science Phase II (TRIPODS)
HDR TRIPODS Phase II

Synopsis of Program:

In 2016, the National Science Foundation (NSF) unveiled a set of "Big Ideas," ten bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering. The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering by bringing together diverse disciplinary perspectives to support convergence research.

NSF's Harnessing the Data Revolution (HDR) Big Idea is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering.

Harnessing the Data Revolution: Transdisciplinary Research In Principles Of Data Science Phase II (HDR TRIPODS Phase II) aims to bring together the electrical engineering, mathematics, statistics, and theoretical computer science communities to develop the theoretical foundations of data science through integrated research and training activities. Phase I, described in solicitation NSF 19-550, supported the development of small collaborative Institutes. Phase II, described in this solicitation, will support a smaller number of larger Institutes, selected from the Phase I Institutes via a second competitive proposal process. All HDR TRIPODS Institutes must involve significant and integral participation by researchers representing the four aforementioned communities. Please note that the ordering of the four communities is alphabetical and is not meant to emphasize any one discipline over another.

When responding to this solicitation, even though proposals must be submitted through the **Directorate for Engineering, Division of Electrical, Communications, and Cyber Systems**, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

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.

- Eyad Abed, Program Director, Division of Electrical, Communications, and Cyber Systems, telephone: (703) 292-2303, email: eabed@nsf.gov
- Funda Ergun, Program Director, Division of Computing and Communication Foundations, telephone: (703) 292-8910, email: fergun@nsf.gov
- Yuliya Gorb, telephone: (703) 292-2113, email: ygorb@nsf.gov
- Tracy Kimbrel, Program Director, Division of Computing and Communication Foundations, telephone: (703) 292-7924, email: tkimbrel@nsf.gov
- Phillip A. Regalia, Program Director, Division of Computing and Communication Foundations, (703) 292-2981, email: pregalia@nsf.gov
- Christopher W. Stark, Program Director, Division of Mathematical Sciences, telephone: (703) 292-4869, email: cstark@nsf.gov
- Huixia Wang, Program Director, Division of Mathematical Sciences, telephone: (703) 292-2279, email: huiwang@nsf.gov
- Zhengdao Wang, Program Director, Division of Electrical, Communications and Cyber Systems, (703) 292-7823, email: zwang@nsf.gov
- Donald Wunsch, Program Director, Division of Electrical, Communications and Cyber Systems, telephone: (703) 292-7102, email: dwunsch@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Continuing Grant

Estimated Number of Awards: 2 to 4

Anticipated Funding Amount: $20,000,000

for this competition, pending the availability of funds.

Subject to availability of funds and quality of proposals, each project is anticipated to total approximately $1 to $2 million per year for five years. Submitted budgets must total at most $10M (with at most $2M in any single budget year) across all collaborative organizations including all direct and indirect costs.

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 least one PI or co-PI must be a PI or co-PI of a Phase I Institute funded under solicitation NSF 19-550, Harnessing the Data Revolution: Transdisciplinary Research in Principles of Data Science Phase I (HDR TRIPODS Phase I). A list of these Phase I Institutes can be found here. PI teams must collectively possess appropriate expertise in all the relevant disciplines and may include researchers in other fields. It is anticipated that, in most cases, this requirement will be met by assembling teams of four or more individuals. Teams may be composed of members at multiple institutions or a single institution.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via FastLane: *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

- **Letter of Intent Due Date(s)** ***(required)*** (due by 5 p.m. submitter's local time):

  November 01, 2021 - November 16, 2021

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

  January 04, 2022 - January 24, 2022

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:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

In 2016, the National Science Foundation (NSF) unveiled a set of "Big Ideas," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/cise/harnessingdata/).

NSF's Harnessing the Data Revolution (HDR) Big Idea is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering. Through this NSF-wide activity, HDR will generate new knowledge and

understanding, and accelerate discovery and innovation. The HDR vision is realized through an interrelated set of efforts in:

- Foundations of data science;
- Algorithms and systems for data science;
- Data-intensive science and engineering;
- Data cyberinfrastructure; and
- Education and workforce development.

Each of these efforts is designed to amplify the intrinsically multidisciplinary nature of the emerging field of data science. The HDR Big Idea will establish theoretical, technical, and ethical frameworks that will be applied to tackle data-intensive problems in science and engineering, contributing to data-driven decision-making that impacts society.

Recognizing the need to engage the relevant communities and foster collaborations, NSF launched the Transdisciplinary Research in Principles of Data Science (TRIPODS) Phase I program in 2016 with the goal of promoting long-term, interdisciplinary research and training activities that engage theoretical computer scientists, statisticians, and mathematicians in developing the theoretical foundations of data science. Twelve TRIPODS Phase I Institutes were established in FY17. Two larger and longer Phase II projects resulted and have recently started.

In 2019, the HDR Program launched three parallel efforts in pursuit of its aims. The *Institutes for Data-Intensive Research in Science and Engineering (I-DIRSE)* activity seeks to create an integrated fabric of interrelated institutes that can accelerate discovery and innovation in multiple areas of data-intensive science and engineering. *HDR: Transdisciplinary Research In Principles Of Data Science Phase I (HDR TRIPODS Phase I)* aims to bring together the electrical engineering, mathematics, statistics, and theoretical computer science communities to develop the theoretical foundations of data science through integrated research and training activities. *HDR: Data Science Corps (DSC)* focuses on building capacity for HDR to help unleash the power of data in the service of science and society. The *DSC* will provide practical experiences, teach new skills, and offer learning opportunities, in a variety of settings, to data scientists and data science students.

A portfolio of awards in each of these tracks (I-DIRSE, HDR TRIPODS Phase I, and DSC) formed the beginning of a broad ecosystem for collaboration and synthesis. Interactions among researchers in all three HDR tracks stimulate convergence among teams that share common scientific themes, and synergies among teams with different skill-sets. To maximize and sustain the impacts of the HDR investments, awardees will be further encouraged to leverage resources and engage with collaborators from outside the HDR community, including NSF's investments in advanced cyberinfrastructure, and the science and engineering research activities supported by NSF including the other NSF Big Ideas. NSF recognizes the transformative potential in convergent approaches that bring together researchers with expertise in various science and engineering domains, including data science, to focus on the fundamental challenges of interpreting complex data and maximizing impacts of advanced methods across the breadth of scientific and engineering inquiry. The potential for identifying and solving these challenges is the vision behind the HDR ecosystem.

In fiscal year 2021, NSF is awarding several HDR Institute projects via solicitation NSF 21-519. The success of the HDR ecosystem will depend on how effectively teams funded in the different investment areas of HDR, including HDR Institutes and HDR TRIPODS Institutes, can interface and leverage their distinct strengths and contributions to address challenging problems in science and engineering.

Harnessing the Data Revolution: Transdisciplinary Research In Principles Of Data Science (HDR TRIPODS) aims to bring together the electrical engineering, mathematics, statistics, and theoretical computer science communities to develop the theoretical foundations of data science through integrated research and training activities. Phase I, described in separate program solicitation NSF 19-550, supports the development of small collaborative Institutes. Phase II (this solicitation) will support a smaller number of larger Institutes, selected from the Phase I Institutes via a second competitive proposal process. All HDR TRIPODS Institutes must involve significant and integral participation by researchers representing the four aforementioned communities. Please note that the ordering of the four communities is alphabetical and is not meant to emphasize any one discipline over another. Fifteen HDR TRIPODS Phase I Institutes have been supported under NSF 19-550. The current solicitation invites these teams to compete for Phase II awards.

II. PROGRAM DESCRIPTION

Phase II of the TRIPODS program will support the development of collaborative Institutes of substantial size that will bring together the four disciplines. Proposals must address fundamental research and training in the theoretical foundations of data science, describe the significant involvement of all four disciplines, and engage with significant data sets and motivating challenges from other fields of science and engineering.

Program and project structures

The structure of a potential TRIPODS Phase II institute should be specified and detailed by the proposing organization. At least one PI or co-PI must be a PI or co-PI of a Phase I Institute funded under solicitation NSF 19-550. Additional personnel and institutions, beyond those associated with a Phase I project, may participate. Multiple Phase I projects may coalesce together to submit a Phase II proposal.

All proposed projects should include plans for activities that can be carried out in hybrid platforms that combine virtual with in-person participation or fully virtual platforms, for at least the first two years of the award. The proposal should clearly demonstrate that the planned activities can be carried out effectively, should public health guidelines limit in-person meetings.

Broad themes of the program

Proposals for TRIPODS Institutes should demonstrate plans to address the following important factors:

- Different communities, such as those that developed business, Internet, and social media applications and those that developed scientific and medical applications, and, indeed, the electrical engineering, mathematics, statistics, and theoretical computer science communities in general, have developed different terminology and formalisms for overlapping concepts and methods. Overcoming these barriers will be crucial for success.
- Algorithms developed for theoretical purposes without good knowledge of application domains will typically fail to take into account peculiarities and incompleteness properties of real data, and this failure will limit their impact.
- While the scientific focus must be on the theoretical foundations, relevance to application domains and industry is important. Effective communication mechanisms will be required to make these stakeholders aware of what the TRIPODS community can offer, and engagement with these communities is critical.
- Data science is already a reality in industrial and scientific enterprises and there is ever-increasing demand from students to get more training in this

field. A remarkable aspect of data science is that many research communities and traditional fields of study identify with the term. However, each field has different interpretations for this concept. Unified curricula for data science should be developed in cognizance of this.
- It will be a challenge to fit the necessary foundations from electrical engineering, mathematics, statistics, and theoretical computer science into a curriculum for data science. On top of these foundations, experimental validation, ethical behavior, and interdisciplinary communication skills (for communication across the four underlying fields as well as with application domains) will be vital components of curricula.
- Data science ranges from experimental design and data collection all the way to data analysis and the final decision-making, i.e., the entire "data to knowledge to action" pipeline. Data provenance, reproducibility, privacy, and algorithmic fairness are all fundamental topics that Institutes should actively investigate. These areas are important for foundational research to make impacts beyond academic environments.
- Data science is iterative, with a dynamic feedback loop. Targets can change as more data are acquired; instead of limiting attention to idealized systems under restrictive assumptions, dynamic data collection is general, heterogeneous, and messy. Many existing tools of electrical engineering, mathematics, statistics, and theoretical computer science are not equipped to handle this aspect of data science problems.

In addition to the factors above, proposers should identify and justify further elements of the foundations of data science that they deem to be critical.

Coordination with the HDR community

As part of the HDR ecosystem, all *HDR TRIPODS Phase II* awards are expected to coordinate with the larger HDR community. One or more award participants, including the project PI, will be expected to attend the annual HDR meeting to exchange effective practices, curricula, assessment strategies, as well as challenges.

Workforce Development

While institute activities are expected to center on advancing research in fundamental data science and fields that require advances in data science, the TRIPODS Institutes can play a significant role in the training of the next generation of scientists and engineers. Proposals should include plans for the involvement of a diverse cohort of students and postdoctoral associates in institute activities, as appropriate, and should include plans to develop and disseminate curricula and learning materials.

Evaluation and Reporting

Projects on the scale of HDR TRIPODS Phase II Institutes call for regular, ongoing evaluation to monitor and evaluate progress in meeting goals, to provide feedback, and to suggest potential changes and improvements. These awards are subject to specific reporting requirements (see the solicitation section on Award Administration Information) about the programmatic activities and the participants involved. In addition, proposals should describe plans for formative evaluation during the course of the Institute activities and for summative evaluation of progress toward the Institute goals (see the solicitation section on Supplementary Documentation).

Summary

In short, a proposal should describe the vision for the proposed Institute as a national resource; the challenges motivating this vision; and the rationale for an Institute to address these challenges. It should define the mission and goals of the proposed Institute; describe how these goals will be achieved, together with appropriate measures to evaluate progress toward these goals; and make a compelling case for the Institute's national scope and anticipated impact on data science. It should indicate the governance and management structure of the proposed Institute; describe the process of generating, selecting, and evaluating the activities of the proposed Institute; and give criteria for the selection of participants and the allocation of funds. It should contain a plan reflecting a proactive approach to diversity; describe how this plan will be implemented; and outline how its outcomes will be measured. It should address the ways in which training of the next generation of data scientists will be integrated with the research program of the proposed Institute; and discuss plans for outreach activities and the dissemination of knowledge generated at the proposed Institute.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant

Estimated Number of Awards: 2 to 4

Anticipated Funding Amount: $20,000,000 for this competition, pending the availability of funds.

Subject to availability of funds and quality of proposals, each project is anticipated to total approximately $1 to $2 million per year for five years. Submitted budgets must total at most $10M (with at most $2M in any single budget year) across all collaborative organizations including all direct and indirect costs.

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 least one PI or co-PI must be a PI or co-PI of a Phase I Institute funded under solicitation NSF 19-550, Harnessing the Data Revolution: Transdisciplinary Research in Principles of Data Science Phase I (HDR TRIPODS Phase I). A list of these Phase I Institutes can be found here. PI teams must collectively possess appropriate expertise in all the relevant disciplines and may include researchers in other fields. It is anticipated that, in most cases, this requirement will be met by assembling teams of four or more individuals. Teams may be composed of members at multiple institutions or a single institution.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Additional Eligibility Info:

Proposals from Minority Serving Institutions are particularly welcome.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required)*:

Potential proposers may not submit a full proposal without first submitting a corresponding Letter of Intent (LOI), compliant with the instructions below, by the LOI submission deadline. Submitting a Letter of Intent does not obligate potential proposers to submit a full proposal. If a collaborative proposal is planned, a single LOI should be submitted by the lead institution only. LOIs are not subject to merit review but instead are used for internal planning purposes. Investigators should not expect to receive any feedback on their Letters of Intent.

Each LOI must include the following information:

In the Synopsis section, include a one-paragraph overview of the plans for a TRIPODS Institute. This should be followed by the heading "Keywords" and a list of 6-12 keywords describing specific topics of research.

In the Project PI and Senior Personnel section, list the full names and organizational affiliations for the PI, up to 4 co-PIs, and any additional Senior Personnel on the planned project, including any intended collaborative proposals or subawardees. All organizations and personnel participating in the subsequent proposal must be included in the LOI.

In the Other Comments section, list the full names and organizational affiliations for the PI and all co-PIs and senior personnel on the planned project, including those listed in the Project PI and Senior Personnel section. These names must be listed one per line, in the following format: Last name, first name, email address, affiliation. Commas must separate these four entries. The point of contact for NSF inquiries must be the same as the project PI, and must appear on the first line. Additional text boxes may be used for more space if the Other Comments box is insufficient.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Submission by an Authorized Organizational Representative (AOR) is not required when submitting Letters of Intent.
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are permitted
- Additional Text 1 is optional when submitting Letters of Intent
- Additional Text 2 is optional when submitting Letters of Intent
- Additional Text 3 is optional when submitting Letters of Intent
- Submission of multiple Letters of Intent is not permitted

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & 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. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- 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 the NSF FastLane system. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.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.

Special instructions for submitting to this HDR TRIPODS Phase II solicitation:

FastLane Users: Proposers are reminded to identify the program solicitation number (located on the first page of this document) in the first block on the NSF Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Please note that even though proposals must be submitted to ENG/ECCS, once received the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page, however you will need to locate the Division Code, Program Code, Division Name, and Program Name for the specific solicitation you are applying to by visiting https://www.fastlane.nsf.gov/pgmannounce.jsp . As stated previously, even though proposals must be submitted to ENG/ECCS, once received the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

The following supplements guidance found in the PAPPG and/or NSF Grants.gov Application Guide.

Cover Sheet

Proposers are reminded to identify the program solicitation number, the Division of Electrical, Communications and Cyber Systems (ECCS) as the organizational unit, and Transdisciplinary Research in Principles of Data Science (TRIPODS) as the program to receive the proposal. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

Project Description

The Project Description is subject to page limits as described below, which will be strictly enforced. The Project Description, limited to 30 pages total, consists of each of the following topics:

- The intellectual focus of the proposed institute; the rationale for the proposed institute, its mission and goals, and its expected impact; plans for future growth and resource development; proposed steps toward developing its role as a national resource; and results of prior NSF support of the Phase I Institute(s) in accordance with the PAPPG requirements for Results from Prior NSF Support. This section is not to exceed 20 pages total including results of prior NSF support, which may take up to 5 pages.

Up to 10 pages may be used for the following three required topics and the PAPPG-required Broader Impacts section:

- A tentative schedule of scientific activities, with plans for Year 1 and a provisional schedule for Years 2 and 3.
- Plans for human resource development, including the selection and mentoring of a diverse cohort of students and postdoctoral participants, as appropriate, and the selection and involvement of researchers at all career levels.
- Plans for outreach and for dissemination of outcomes.

Budget

Provide a five-year budget for the proposed activity. The Budget Justification section should provide a breakdown of planned expenditures in composite budget categories such as Participant Support Costs, including projected head counts for participants.

The budget should include funds to support travel to an annual PI meeting for up to three senior personnel and two graduate students or postdoctoral researchers.

Facilities, Equipment and Other Resources

Include a description of the facilities (including any laboratories or computational facilities) that will be made available for the institute activities.

Supplementary Documentation

Submit Supplementary Documents containing the following information:

- Governance Plan

  Describe the governance structure of the proposed institute, including a list of individuals who have agreed to serve as members of a governing board or advisory council; mechanisms for fiscal and management oversight by a governing board or other group; plans for governing/advisory board membership terms and succession; mechanisms for focusing the proposed institute's activities; mechanisms for choosing programs, selecting participants, and allocating funds; mechanisms for recruitment, selection, and appointment involved in institute leadership succession and other leadership changes; and rationales for the proposed management practices. The Governance Plan may not exceed 5 pages total.

- Management and Collaboration Plan

  Describe the duties and expected contributions of each individual in the institute leadership team. This plan must also describe the expertise in the appropriate disciplines provided by the PIs as required above under "Who May Serve as PI" as well as plans for working together to meet the goals of the program. The Management and Collaboration Plan may not to exceed 5 pages total.

- Broadening Participation Plan

  Describe the proposed institute's plan to increasing diversity, broadening participation, and encouraging involvement of underrepresented groups; how this plan will be implemented, including identification of resources in the budget to support it; and how its outcomes will be measured. Broadening Participation plans should describe context, prior history of training activities, and concrete plans for action and evaluation. The Broadening Participation Plan may not exceed 5 pages total.

- Evaluation Plan

  Describe measures to evaluate progress toward the proposed institute's goals; and a plan for quantitative and qualitative methods to assess the effectiveness and impact of the proposed institute's activities. The Evaluation Plan may not exceed 5 pages total.

- Letters of Collaboration

  Include any letters of collaboration documenting arrangements of significance for the proposed project, including commitments for space, faculty and staff positions, equipment, and access to facilities. Following the PAPPG, such arrangements should be described in the Facilities, Equipment, and Other Resources section of the proposal, and letters of support or endorsement and letters of a laudatory nature for the proposed project are not allowed and are cause for return without review.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Letter of Intent Due Date(s)** ***(required)*** (due by 5 p.m. submitter's local time):

  November 01, 2021 - November 16, 2021

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

  January 04, 2022 - January 24, 2022

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the NSF Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. 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 the NSF FastLane system for further processing.

Proposers that submitted via FastLane 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 *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. 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.C.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.C.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

In addition to the above criteria, the following will be used in the evaluation process:

a. **Vision and community leadership for research and workforce development in foundational data science:** Does the proposal describe a well-integrated research and training program focused on the theoretical foundations of data science and fostering collaboration and interaction among the four communities of TRIPODS – electrical engineering, mathematics, statistics, and theoretical computer science? Is there a strong case for the ability to identify and articulate a vision for the foundations of data science? Does the proposal address strategies for workforce development, including novel educational and training activities?
b. **Transdisciplinarity:** Is the project transdisciplinary, bringing together theories and approaches from the four communities? Does the collective team have expertise representing the four communities? Is there synergy between the different groups? Is the expertise of the PIs complementary and well-suited to the research and training programs developed in this project? Are the specific roles of each collaborating investigator clear? Does the proposal address the "broad themes of the program" listed in the Program Description? Is there a well-developed plan for communication and interaction with the domain sciences and industry?
c. **Project planning and management:** Do the Governance Plan and Management Plan provide the capabilities to guide and manage a project of this size? Does the Evaluation Plan identify clear measures of success along with a plan to evaluate the project with respect to those measures by gathering quantitative and qualitative data? Does the Evaluation Plan provide for thoughtful, ongoing assessment of all Institute activities? How will the assessment be used to inform and improve both daily Institute operations and long-range planning? Is there a well-developed Broadening Participation Plan, including its implementation and measure for outcomes?

B. Review and Selection Process

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

Proposals submitted in response to this program solicitation will be reviewed by ad hoc review and/or panel review. Proposed institutes may receive a site visit or reverse site visit review as well.

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 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 a Grants Officer in the Division of Grants and Agreements. 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.

Special Award Conditions:

- In connection with NSF oversight of investments in the TRIPODS program, grantees are required to keep NSF apprised of meetings of institute governing boards and advisory councils and to allow NSF personnel to observe these meetings.
- The grantee will collaborate with other TRIPODS institutes in maintaining a common web site (currently https://nsf-tripods.org/) that publicizes upcoming activities and disseminates results of the institutes' activities.
- The PI or his/her representative(s) will attend an annual meeting of TRIPODS Institute PIs, at a time and place to be mutually agreed upon.
- Each HDR TRIPODS Institute will be merit reviewed in a site visit during year 2 with continued funding in years 3-5 conditioned on a satisfactory outcome. In addition, site visits may be conducted in other years as determined by NSF.
- Grantees will be required to include appropriate acknowledgment of NSF support under the Harnessing the Data Revolution Big Idea in any publication (including World Wide Web pages) of any material based on or developed under the project, in the following terms:

  "This material is based upon work supported by the National Science Foundation Harnessing the Data Revolution Big Idea under Grant No. (Grantee enters NSF grant number.)"

- Grantees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television and news magazines.

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.

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:

- Eyad Abed, Program Director, Division of Electrical, Communications, and Cyber Systems, telephone: (703) 292-2303, email: eabed@nsf.gov
- Funda Ergun, Program Director, Division of Computing and Communication Foundations, telephone: (703) 292-8910, email: fergun@nsf.gov
- Yuliya Gorb, telephone: (703) 292-2113, email: ygorb@nsf.gov
- Tracy Kimbrel, Program Director, Division of Computing and Communication Foundations, telephone: (703) 292-7924, email: tkimbrel@nsf.gov
- Phillip A. Regalia, Program Director, Division of Computing and Communication Foundations, (703) 292-2981, email: pregalia@nsf.gov
- Christopher W. Stark, Program Director, Division of Mathematical Sciences, telephone: (703) 292-4869, email: cstark@nsf.gov
- Huixia Wang, Program Director, Division of Mathematical Sciences, telephone: (703) 292-2279, email: huiwang@nsf.gov
- Zhengdao Wang, Program Director, Division of Electrical, Communications and Cyber Systems, (703) 292-7823, email: zwang@nsf.gov
- Donald Wunsch, Program Director, Division of Electrical, Communications and Cyber Systems, telephone: (703) 292-7102, email: dwunsch@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov
- 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 (FASED) 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.E.6 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: nsfpubs@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