NSF 24-560: Data Science Corps

Program Solicitation

Document Information

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- Posted: March 25, 2024
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June 21, 2024

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Important Information And Revision Notes

This is a revision of NSF 21-523, the solicitation for Harnessing the Data Revolution (HDR): Data Science Corps (DSC) Building Capacity for HDR. As part of this revision, proposers are encouraged to pay particular attention to the following:

- The solicitation supports opportunities for undergraduates (including students from community colleges, Minority Serving Institutions, other emerging research institutions, and institutions in EPSCoR jurisdictions) and grade 6-12 teachers and students.
- Expected award size is revised.
- Prospective PIs must respond to one or more described mechanisms for data science education and training.
- Solicitation-specific criteria are revised.
- Prospective PIs are encouraged to plan activities over hybrid platforms that provide in-person and remote learning to further broaden the participation of diverse student cohorts.

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:

Data Science Corps (DSC)

Synopsis of Program:
The objective of the Data Science Corps program is to help build a strong national data science infrastructure and workforce. The Data Science Corps program seeks to engage data science students in real-world data science implementation projects. This engagement will help bridge the data-to-knowledge gap in organizations and communities at all levels, including local, state, and national, and will empower better use of data for more effective decision making. Data Science Corps participants will be able to sharpen their skills in data science by working on real-world projects focused on specific community needs, including rural communities, urban communities, academia, industry, or government. This partnership between communities and data scientists will serve the nation by helping produce a workforce-ready cohort of data scientists and technologists, who have experience with data science in action in real-world settings. The program welcomes proposals that seek to broaden participation in science, technology, engineering and mathematics (STEM) and STEM education.

This solicitation prompts the community to respond to one or more mechanisms by which to provide students with data science education and training, including in data science issues related to knowledge representation and creation and use of knowledge graphs. The solicitation supports opportunities for undergraduates (including students from community colleges, Minority Serving Institutions, other emerging research institutions as defined in the CHIPS and Science Act, https://www.congress.gov/bill/117th-congress/house-bill/4346, and institutions in EPSCoR jurisdictions), and grade 6-12 teachers and students. When responding to this solicitation, even though proposals must be submitted through the Directorate for STEM Education, Division of Research on Learning in Formal and Informal Settings (EDU/DRL), once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

This solicitation grew out of the NSF-wide activity known as Harnessing the Data Revolution (HDR), a national-scale activity to enable new modes of data-driven discovery addressing fundamental questions at the frontiers of science and engineering. HDR has supported an interrelated set of efforts in foundations of data science; data-intensive research in science and engineering; and education and workforce development.

Contact Information:

General inquiries may be addressed to HDR-DSC@nsf.gov.

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

Cognizant Program Officer(s):

- Stephanie D. Teasley, Program Director, EDU/DRL, telephone: (703) 292-8752, email: steasley@nsf.gov
- Sylvia Spengler, Program Director, CISE/IIS, telephone: (703) 292-7347, email: sspengle@nsf.gov
- Chaitanya Baru, Senior Advisor, TIP/OAD, telephone: (703) 292-4596, email: cbaru@nsf.gov
- Paul Tymann, Program Director, EHR/DUE, telephone: (703) 292-2832, email: ptymann@nsf.gov
- Jemin George, Program Officer, TIP/ITE, telephone: (703) 292-2251, email: jgeorge@nsf.gov
- Raleigh Martin, Program Director, GEO/EAR, telephone: (703) 292-7199, email: ramartin@nsf.gov
- Jennifer Noll, Program Director, EDU/DRL, telephone: (703) 292-8117, email: jnoll@nsf.gov
- Christopher Stark, Program Director, MPS/DMS, telephone: (703) 292-4869, email: cstark@nsf.gov
- Patricia Van Zandt, Program Director, SBE/BCS, telephone: (703) 292-7437, email: pvanzand@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
• 47.070 --- Computer and Information Science and Engineering
• 47.074 --- Biological Sciences
• 47.075 --- Social Behavioral and Economic Sciences
• 47.076 --- STEM Education
• 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 10 to 15

Ten to fifteen awards are anticipated.

Anticipated Funding Amount: $10,000,000

Up to $10,000,000 is expected to be available, subject to availability of funds. Awards will typically be in the range of $800,000 to $1,200,000 for a duration of three years.

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

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 laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI: 1

An individual may participate in only one proposal as Principal Investigator, co-Principal Investigator, or Senior Personnel in any project. This eligibility constraint will be strictly enforced to treat everyone fairly and consistently. If an individual exceeds this limit, any proposal submitted after the first proposal is received at NSF will be returned without review. No exceptions will be made.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions
• **Letters of Intent:** Not required
• **Preliminary Proposal Submission:** Not required
• **Full Proposals:**

**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**

• **Full Proposal Target Date(s):**
  - June 21, 2024

**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.

**I. Introduction**

The objective of the *Data Science Corps* program is to help build a strong national data science infrastructure and workforce. The *Data Science Corps* program seeks to engage data science students in real-world data science implementation projects. This engagement will help bridge the data-to-knowledge gap in organizations and communities at all levels, including local, state, and national, and will empower better use of data for more effective decision making. *Data Science Corps* participants will be able to sharpen their skills in data science by working on real-world projects focused on specific community needs, including rural communities, urban communities, academia, industry, or government. This partnership between communities and data scientists will serve the nation by helping produce a
workforce-ready cohort of data scientists and technologists, who have experience with data science in action in real-world settings.

II. Program Description

This solicitation has a primary focus on broadening participation in data science for undergraduates (including students in community college, Minority-Serving Institutions, other emerging research institutions, and institutions in EPSCoR jurisdictions), and teachers and students in grades 6 -12. Equitable access to data science education presents an opportunity to open doors to higher education, higher-paying careers, and support a more engaged citizenry. The DSC solicitation prompts the PI community to envision and implement diverse and creative mechanisms by which to provide all students with age and developmentally appropriate data science training to gain the expertise needed for understanding and interpreting data. The DSC funded projects should contribute to research and practice that supports data science literacy and practices, as well as creating and enhancing the theoretical and empirical foundations for effecting data science learning. Proposals responsive to this solicitation respond to and implement one or more of the four following mechanisms:

I. Learning in the Community: Effective data science education and training happens in the community. PIs are encouraged to engage students with stakeholder communities, so that students can obtain immersive educational and training experiences via hands-on training on real-world problems and data generated by and of importance to communities at all levels, thus expanding the supply of data science talent in support of local, regional, and national economies and society at large.

II. Flexible Educational Pathways: Flexible educational pathways with multiple points of entry can be effective mechanisms to integrate and provide data science education and training to students with varied educational backgrounds and experiences, skill level, and technical maturity. Effective pathways provide students with data science expertise in a tiered manner in support of building a diverse workforce trained in data management, data analytics, and data-driven decision-making.

III. Across the Data Life Cycle: Foundational data science education and training needs to expose students to a variety of disciplinary approaches that track the full data life cycle, from data collection, processing, storage, to data management, analytics, and decision-making. PIs are encouraged to address the inherent interdisciplinarity of data science and bring multiple perspectives, including but not limited to computer science, statistics, mathematics, and information technology.

IV. Data Science in STEM: Today’s very large datasets and modern data science tools are revolutionizing scientific inquiry knowledge generation, and advancement across the scientific disciplines. NSF welcomes proposals that provide data science training to students pursuing their primary studies in diverse scientific and engineering disciplines and so drive data-centric inquiry and innovation in the sciences.

Competitive proposals additionally establish the central role of ethics in data science training and are expected to instill and cultivate ethics across the proposed student experiences. Meaningful student experiences include exposure to FAIR (Findability, Accessibility, Interoperability, and Reuse of digital assets: https://www.go-fair.org/fair-principles/) and CARE principles (Collective Benefit, Authority to Control, Responsibility, and Ethics: https://www.gida-global.org/care), in alignment with goals for the 2023 Federal Year of Open Science (https://www.usgs.gov/special-topics/year-of-open-science/news/white-house-office-science-technology-policy-open-science).

To support the development of a diverse STEM workforce, prospective PIs are encouraged to expand the participation of diverse students in the Data Science Corps program and broaden opportunities to student groups, Institutions of Higher Education, and geographic regions that are not yet fully represented in STEM disciplines. Projects responding to this solicitation should also support diversity among participating units and bring together diverse teams that engage in a tight and meaningful collaboration activity within or among educational institutions. These efforts should be described in the Management and Coordination Plan to be submitted as a Supplementary Document.

Program Structure
All Data Science Corps awards will interact and coordinate with one another. One or more award participants, including the project PI, will be expected to attend the annual PI meeting to exchange effective practices, curricula, assessment strategies, as well as challenges. Budget for such attendance should be included in each project.

While we encourage all proposed projects to envision in-person activities, we prompt the prospective PIs to consider leveraging hybrid platforms that combine virtual with in-person student participation to facilitate equitable participation in the Data Science Corps program by students of all backgrounds and needs, as well as facilitate student engagement with diverse data- and/or problem-providing communities.

Project Structure

Collaborative proposals may be submitted to NSF in one of two methods: as a single proposal, in which a single award is being requested (with subawards administered by the lead organization); or by simultaneous submission of proposals from different organizations, with each organization requesting a separate award. (See Proposal Preparation Instructions). Proposals focusing on under-served communities/organizations in K-12 and/or higher education, and involving collaborations led by or including Minority-Serving Institutions, other emerging research institutions, and institutions in EPSCoR jurisdictions are especially encouraged.

Where available, projects are encouraged to consult their institutional office of community engagement. Additional resources that may be useful to PIs preparing to respond to this solicitation include:

- The 2022 National Academies of Sciences, Engineering, and Medicine "Foundations of Data Science for Students in Grades K-12" (https://www.nationalacademies.org/our-work/Foundations-of-data-science-for-students-in-grades-K-12-a-workshop) is a workshop that explored the rapidly growing field of K-12 data science education.
- The GoFair Initiative's "FAIR Principles" (https://www.go-fair.org/fair-principles/)
- The Research Data Alliance "Implementing the CARE Principles: The CARE-full Process" (https://www.gida-global.org/care)
- The Committee on STEM Education of the National Science and Technology Council's five-year strategic plan, "Charting a Course for Success: America's Strategy for STEM Education" (https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/12/STEM-Education-Strategic-Plan-2018.pdf). The report is one of many resources available to prospective PIs to situate their activities within and building upon the scientific knowledge base of effective STEM education practices.
- Additional references can be obtained from searches of scholarly literature for publications on service-learning, community-based learning, data science education, and diversity, equity, and inclusion in STEM. The publications and other resources that provide the project's educational context should be included in the references.

It is expected that the collaborating units in a single-institution project or collaborating organizations in a multiple-organizations project will coordinate and work closely with one another. Closely coordinated activities include developing a common set of criteria for recruiting and incentivizing the participation of students at the various units or organizations,
designing effective practices for preparing participants who have different levels of skill and technical expertise, as well as effective practices for development of Data Science Corps projects, and identifying and implementing suitable activities in response to one or more of the mechanisms outlined above. Collaborating activities should be described in the Management and Coordination Plan. This plan should also describe how the undertaken activities ensure broad representation across diverse groups and institutions underrepresented in STEM.

Units or organizations collaborating on a Data Science Corps project should identify a lead PI among them. The lead PI's unit or organization will undertake additional responsibilities related to coordination, monitoring, and evaluation of the award. In particular, the lead unit or organization should:

- Coordinate the award and provide necessary faculty professional development and mentoring:
  Work closely with the collaborating unit(s) or organization(s) to execute the overall award and develop criteria for recruiting and incentivizing the participation of students at the various organizations; and
  As necessary, organize and coordinate faculty professional development and mentoring to help faculty prepare students for community engagement and technical components of the project.

- Curate and publish information to the Data Science Corps community:
  Disseminate information about specific projects and project organizations that can potentially serve as sources of Data Science Corps projects. A growing knowledge base of effective practices would increase the effectiveness of the NSF Data Science Corps program in accomplishing its overall mission and objectives. Projects and project organizations could additionally use this information to accommodate Data Science Corps students/participants at various skill levels in Data Science Corps projects more effectively. This information needs to be discussed in the Data Management Plan.

Non-lead units or organization(s) should:

- Prepare students/participants for participation in the Data Science Corps projects, as well as mentor student participants while they are in the program and working on projects.
- Contribute to the curation and publication of information by the lead unit or organization, as described above.

Assessment of Student Learning and Program Evaluation

Data Science Corps awards must assess student learning and other outcomes, as well as evaluate overall project effectiveness. (Please see https://www.purdue.edu/research/docs/pdf/2010NSFuser-friendlyhandbookforprojectevaluation.pdf for more information about program evaluation).

Student assessment should aim to answer the following types of questions:

- What is the impact of the Data Science Corps experience on student gains in data science knowledge?
- What is the impact of the Data Science Corps experience on student gains in areas such as teamwork, entrepreneurship, critical thinking, communication, collaboration, creativity, and ethics?
- Has the Data Science Corps increased student persistence, employment pathways, and furthering education in a Science, Technology, Engineering, and Mathematics (STEM) related career path?

Project evaluation efforts should address issues related to the overall impact of the award. Examples of relevant questions include:

- Did the award reach its goals? Why or why not?
- Has the award been effective at developing models for communication and engagement among disciplines at the student level and among faculty?
- Are the materials reusable and generalizable?
Co-Funding Opportunities

The Eric and Wendy Schmidt Fund for Strategic Innovation has committed to providing an unrestricted donation to the NSF for the purpose of funding data science learning opportunities for students in grades 6 through 12. NSF and Schmidt Futures will provide funds toward awards in this age range. Schmidt representatives will have access to all the proposals targeting this age range, be invited to sit in on the NSF review panel's discussion of those proposals, and be able to discuss the reviews with the NSF Data Science Corps Program Directors.

III. Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 10 to 15

Ten to fifteen awards are anticipated.

Anticipated Funding Amount: $10,000,000

Up to $10,000,000 is expected to be available, subject to availability of funds. Awards will typically be in the range of $800,000 to $1,200,000 for a duration of three years.

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

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 laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI: 1

An individual may participate in only one proposal as Principal Investigator, co-Principal Investigator, or Senior Personnel in any project. This eligibility constraint will be strictly enforced to treat everyone fairly and consistently. If an individual exceeds this limit, any proposal submitted after the first proposal is received at NSF will be returned without review. No exceptions will be made.

Additional Eligibility Info:
Proposals from Minority Serving Institutions, other emerging research institutions, and institutions in EPSCoR jurisdictions are encouraged.

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.

The following information supplements the guidelines and requirements in the NSF PAPPG:

1. Proposal Titles: Proposal titles must indicate the DSC program, followed by a colon, then the title of the project. For example, a DSC proposal title would be DSC: Title. Titles of collaborative proposals arranged as separate submissions from multiple organizations should begin with "Collaborative Research: DSC:" followed by the title of the project. For example, the title of each proposal for a collaborative set of proposals would be Collaborative Research: DSC: Title.

2. Budget for participating organizations. Student participation costs should be budgeted under the Participant Support line of the budget. All other costs should be in the appropriate budget category.

3. Supplementary Documents

a. Management and Coordination Plan (page limit: three pages). Every proposal must contain a clearly labeled "Management and Coordination Plan" that describes in detail the timeline of activities, how the project will be managed across units or organizations, the specific roles of the PI, co-PIs, and other senior personnel at all participating units or organizations, and coordination mechanisms that convey a tight and meaningful collaboration between all participating units or organizations. Proposals missing the Management and Coordination Plan will be returned without review.
PIs are strongly encouraged to plan for hybrid environments of virtual and in-person meetings among the personnel of participating units or organizations. Specifically, they need to convey how activities can be effectively carried out over the three-year period.

b. Data Management and Sharing Plan (page limit: two pages). Proposals must include a Supplementary document of no more than two pages, labeled “Data Management and Sharing Plan” and provided by the lead organization. This Supplementary Document should describe how the proposal conforms to the NSF policy on dissemination and sharing of research results. In particular, the document should describe how projects will make available for broad dissemination products of their Data Science Corps activity to ensure reproducibility of this activity.

For additional information, see: https://www.nsf.gov/bfa/dias/policy/dmp.jsp.

c. Human Subjects and Vertebrate Animals research. Documentation regarding research involving the use of human subjects, hazardous materials, vertebrate animals, or endangered species should be included where applicable. (See PAPPG Chapter II.E.4 and II.E.5.) Note that aspects of project evaluation or research about project effectiveness may involve gathering information from or about students and members of the community. Such work is likely to require IRB review.

d. A list of Project Personnel and Collaborating Organizations (Note: In separately submitted collaborative proposals, in which each institution submits a separate proposal, only the lead institution should collect and provide this information). 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, funded/unfunded Consultants or Collaborators, Subawardees, Postdoctoral Researchers, and project-level advisory committee members. This list should be numbered and included (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:

1. Maria Hernandez; XYZ University; PI
2. John Je; University of PQR; Senior Personnel
3. Jane Brown; XYZ University; Postdoctoral Researcher
4. Bob Adams; ABC Inc.; Paid Consultant
5. Mary White; Welldone Institution; Unfunded Collaborator
6. Tim Green; ZZZ University; Subawardee

Note the distinction between this numbered listing and Collaborators and Other Affiliations Information, is that a Single Copy Document is required for each individual identified as Senior/Key Personnel.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Budget Preparation Instructions:

Budgets for all projects must include funding for one or more designated award representative(s) (PI/co-PI/Senior/Key Personnel or NSF-approved replacement) to attend the annual Data Science Corps meeting during the proposed lifetime of the award (per Schedule of Activities above). For budget preparation purposes, PIs should assume these meetings will be held each year in the Washington, DC area.

C. Due Dates

- Full Proposal Target Date(s):

June 21, 2024
The FY 2024 competition is expected to be the only competition under this program.

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/ProposalPreparationa

For Research.gov user support, call the Research.gov Help Desk at 1-800-381-1532 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.


When submitting via Grants.gov, NSF strongly recommends applicants initiate proposal submission at least five business days in advance of a deadline to allow adequate time to address NSF compliance errors and resubmissions by 5:00 p.m. submitting organization's local time on the deadline. Please note that some errors cannot be corrected in Grants.gov. Once a proposal passes pre-checks but fails any post-check, an applicant can only correct and submit the in-progress proposal in Research.gov.

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 and Sharing Plan and the Mentoring Plan, as appropriate.

**Additional Solicitation Specific Review Criteria**

The proposals will also be evaluated using the following additional criteria:

- **Unit or Organizational diversity.** Whether the proposal has ensured diversity among partnering organizations, e.g., by including different types of Institutes of Higher Education, such as two- and four-year colleges, Minority-Serving Institutions, and research universities.

- **Coordinated collaboration activities.** Whether the proposal describes mechanisms that promote effective collaborations among all participating organizations.

- **Assessment of Student Learning and Program Evaluation.** Whether the proposal describes appropriate mechanisms to address the Assessment of Student Learning and Program Evaluation.

**B. Review and Selection Process**

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel 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 proposers whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new recipients 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.


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:

Recipients will be required to attend the annual DSC PI Meetings.

Recipients will be required to include appropriate acknowledgment of NSF support under the DSC 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 Data Science Corps under Grant No.” (NSF award number.)

Recipients co-funded by NSF and Schmidt Futures under this funding opportunity will be required to include appropriate acknowledgment of the support of Schmidt Futures and NSF in reports and publications on work performed under this award. An example of such an acknowledgement would be:

“This material is based upon work supported by a joint Schmidt Futures, a philanthropic initiative founded by Eric and Wendy Schmidt, and NSF activity under NSF Award No. [NSF award number]."
Recipients also will be required to acknowledge NSF support (and Schmidt Future if applicable) using the language specified above during all news media interviews, including popular media such as radio, television and news magazines, as well as in social media platforms.

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 annual project report, and a project outcomes report for the general public.

Failure to provide the required annual or final annual 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 annual 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.


VIII. Agency Contacts

Contact Information:

General inquiries may be addressed to HDR-DSC@nsf.gov.

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

Cognizant Program Officer(s):

- Stephanie D. Teasley, Program Director, EDU/DRL, telephone: (703) 292-8752, email: steasley@nsf.gov
- Sylvia Spengler, Program Director, CISE/IIS, telephone: (703) 292-7347, email: sspengle@nsf.gov
- Chaitanya Baru, Senior Advisor, TIP/OAD, telephone: (703) 292-4596, email: cbaru@nsf.gov
- Paul Tymann, Program Director, EHR/DUE, telephone: (703) 292-2832, email: ptymann@nsf.gov
- Jemin George, Program Officer, TIP/ITE, telephone: (703) 292-2251, email: jgeorge@nsf.gov
- Raleigh Martin, Program Director, GEO/EAR, telephone: (703) 292-7199, email: ramartin@nsf.gov
- Jennifer Noll, Program Director, EDU/DRL, telephone: (703) 292-8117, email: jnoll@nsf.gov
- Christopher Stark, Program Director, MPS/DMS, telephone: (703) 292-4869, email: cstark@nsf.gov
- Patricia Van Zandt, Program Director, SBE/BCS, telephone: (703) 292-7437, email: pvanzand@nsf.gov

For questions related to the use of NSF systems contact:

- NSF Help Desk: 1-800-381-1532
• 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.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: 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 proposers 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 proposers 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:

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Office of Budget, Finance, and Award Management
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