

NSF 25-528: Translation and Diffusion (TD)

Program Solicitation

Document Information

Document History

- **Posted:** December 20, 2024

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U.S. National Science Foundation

Directorate for STEM Education

Research on Learning in Formal and Informal Settings

Full Proposal Deadline(s) (due by 5 p.m. submitting organization's local time):

April 01, 2025

February 04, 2026

First Wednesday in February, Annually Thereafter



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Important Information And Revision Notes

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:

Translation and Diffusion (TD)

Synopsis of Program:

This solicitation addresses issues of translation and diffusion that arise in moving knowledge gained from fundamental learning and education research toward application in PreK-12 STEM classroom practice or leveraging knowledge derived from effective practice toward driving fundamental research. The first goal of this funding opportunity is to encourage the scientific study of theories, frameworks, and models for the translation and diffusion of knowledge, especially between fields and across contexts and levels-of-analysis (e.g., biological to cognitive/socio-emotional to behavioral; individual to classroom to broader demographic variables; lab to classroom to school to district). The second goal is to advance or move specific practice, research or scientific discovery in STEM education reciprocally along the research-practice continuum.

The Translation and Diffusion (TD) solicitation invites four types of proposals: **Research on Translation or Diffusion** proposals request funding to conduct scholarship that will advance the sciences of translation or diffusion of fundamental research knowledge toward PreK-12 formal STEM education practice by developing or refining theories, frameworks, or models (or adapting those from other domains) and conducting related research. Such proposals may also address the leveraging of effective classroom practices toward the enrichment of foundational research, constructs and models. We note that bi-directional movement across boundaries is a mutually beneficial reciprocal process. **Proof-of-Concept Research** proposals request funding to explore the feasibility and viability of particular knowledge or products generated from STEM education research toward advancing practice in formal PreK-12 settings (even if it is still basic or applied research and development rather than implementation). The goals are to facilitate the process by which the promise that the initial insight holds for research and practice can be

realized. The outcome of such a project would lay the methodological, theoretical, empirical, design, or social foundation for conducting systematic work at the next stage of development or at the next level of analysis. Empirical and theory-building efforts to adapt initial insights from research or practice across significantly different contexts, populations, domains, and levels-of-analysis are also welcome. **Synthesis** proposals critically integrate the current state of knowledge on a particular topic relevant to translation and diffusion in formal PreK-12 STEM education. Such proposals should include the state of the knowledge across disciplinary communities and across relevant literatures, identify the lacunae in STEM education knowledge, and, where appropriate, lay out the next steps for future research and development. **Conference / Workshop** proposals relevant to the call are also welcome.

Broadening Participation In STEM

NSF recognizes the unique lived experiences of individuals from communities that are underrepresented and/or under-served in science, technology, engineering, and mathematics (STEM) and the barriers to inclusion and access to STEM education and careers. NSF highly encourages the leadership, partnership, and contributions in all NSF opportunities of individuals who are members of such communities supported by NSF. This includes leading and designing STEM research and education proposals for funding; serving as peer reviewers, advisory committee members, and/or committee of visitor members; and serving as NSF leadership, program, and/or administrative staff. NSF also highly encourages demographically diverse institutions of higher education (IHEs) to lead, partner, and contribute to NSF opportunities on behalf of their research and education communities. NSF expects that all individuals, including those who are members of groups that are underrepresented and/or under-served in STEM, are treated equitably and inclusively in the Foundation's proposal and award process.

NSF encourages IHEs that enroll, educate, graduate, and employ individuals who are members of groups underrepresented and/or under-served in STEM education programs and careers to lead, partner, and contribute to NSF opportunities, including leading and designing STEM research and education proposals for funding. Such IHEs include, but may not be limited to, community colleges and two-year institutions, mission-based institutions such as Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), women's colleges, and institutions that primarily serve persons with disabilities, as well as institutions defined by enrollment such as Predominantly Undergraduate Institutions (PUIs), Minority-Serving Institutions (MSIs), and Hispanic Serving Institutions (HSIs).

"Broadening participation in STEM" is the comprehensive phrase used by NSF to refer to the Foundation's goal of increasing the representation and diversity of individuals, organizations, and geographic regions that contribute to STEM teaching, research, and innovation. To broaden participation in STEM, it is necessary to address issues of equity, inclusion, and access in STEM education, training, and careers. Whereas all NSF programs might support broadening participation components, some programs primarily focus on supporting broadening participation research and projects. Examples can be found on the NSF [Broadening Participation in STEM](#) website.

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.

- David Daniel, telephone: (703)292-8037, email: ddaniel@nsf.gov
- Gregg E. Solomon, telephone: (703) 292-8333, email: gesolomo@nsf.gov
- Lindsay Portnoy, telephone: (703) 292-8848, email: lportnoy@nsf.gov

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

- 47.076 --- STEM Education

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15

Anticipated Funding Amount: \$7,000,000

Subject to 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 sub-awards 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.
- For-profit organizations: U.S.-based commercial organizations, including small businesses, with strong capabilities in scientific or engineering research or education and a passion for innovation.
- State and Local Governments
- Tribal Nations: An American Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a federally recognized tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. §§ 5130-5131.
- Foreign organizations: For cooperative projects involving U.S. and foreign organizations, support will only be provided for the U.S. portion.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Prospective proposers from other FFRDCs, including NSF sponsored FFRDCs, must follow the guidance in PAPPG Chapter I.E.2 regarding limitations on eligibility.

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:

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**

- Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide (PAPPG)* guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
- Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

Not Applicable

- **Other Budgetary Limitations:**

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. submitting organization's local time):

April 01, 2025

February 04, 2026

First Wednesday in February, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.


I. Introduction


The purpose of the Translation and Diffusion (TD) program is to foster the reciprocal process by which scientific knowledge is translated and diffused to and from practice in a responsible and ethical manner that serves the goals of STEM education practice while enriching the sciences informing it. The importance of overcoming impediments to the translation of insights between research and practice has long been recognized by fields as diverse as medicine, international development, public policy, defense, and agriculture. It is no less true for STEM education. Too often, insights gleaned from basic research that have real implications for STEM educational practice are left to languish in siloed literatures. They fail to move along the continuum to more applied research and development communities, which hinders the likelihood of effective integration into STEM educational practice. Similarly, insights gleaned from practice that

could drive scientific inquiry and discovery are not adopted in research communities. The result is lost opportunities to study the role of context, complexity, and explanatory power associated with the authentic application of promising principles in practice to scientific theories, frameworks, and models. Indeed, it is striking the extent to which insights, even from related research fields, asking the same questions at the same level of analysis, seldom systematically engage one another. Equally as harmful, basic research knowledge is, too often, prematurely applied in practice, with investigators skirting the intermediate stages in which more applied research and development (R&D) communities bring their expertise to bear in addressing salient issues and engaging factors necessary for transforming those insights for successful implementation in complex real-world settings. The result is lost opportunities for improvement, decreased performance, unintended negative consequences, or even a reform-weariness on the part of practitioners along with a concomitant reticence to adopt future research-based innovations.

Addressing both the challenges and opportunities related to translation and diffusion entails bringing together, in a systematic fashion, the theoretical frameworks, methodological and analytic approaches, and empirical findings from a broad array of disparate fields. It also entails a human and social capital effort, as individuals and teams are mobilized to do the kind of work that is required to move these insights along. This solicitation strongly welcomes proposals that focus on educational and systemic challenges facing under-served, under-resourced, and underrepresented communities in formal PreK-12 STEM education.

The first goal of this funding opportunity is to advance the sciences of translation and diffusion in STEM education, broadly construed, especially between fields and across levels-of-analysis and contexts. The second goal is to facilitate actual efforts at moving specific research knowledge, along this continuum within STEM education, by providing funding for early steps such as proof-of-concept research and human and social capital network development. Indeed, there are increasingly urgent calls for federal funding agencies explicitly to support efforts to understand the processes involved in sustainability and scaling in order to move research findings to practical knowledge, more potentially usable by educators (National Academies of Sciences, Engineering, and Medicine. 2022, 2024). This solicitation represents a larger effort of EDU to move STEM education inquiry and discovery toward useable STEM practice, to improve understanding of the components and complexity of effective practice, and to accelerate the mobilization of knowledge in a manner that is both based in evidence as well as evidence generating.

National Academies of Sciences, Engineering, and Medicine (2022). *The Future of Education Research at IES: Advancing an Equity-Oriented Science*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26428> .

National Academies of Sciences, Engineering, and Medicine (2024). *Scaling and Sustaining Pre-K-12 STEM Education Innovations: Systemic Challenges, Systemic Responses*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/27950> .

II. Program Description

TD invites four types of proposals:

Research on Translation or Diffusion proposals request funding to conduct research that will advance the sciences of translation or diffusion of research knowledge, along the STEM research-practice continuum. Such proposals may entail developing theories, frameworks, or models and conducting empirical research. They also may entail the exploration and adaptation of models to the field of education from other domains (e.g., agricultural extension models or bench-to-bedside models of translational medicine) or the development of novel approaches specific to STEM learning and education. Proposals may also study the emergence of questions, theories, models, methods, products, and findings and how they diffuse across fields and along the continuum between basic research and practice and how they move across levels of scale in formal PreK-12 STEM education. Proposals may include, but are not limited to, studies of multidisciplinary teams engaged in translation and diffusion or other relevant aspects of human and social capital. The program is methodologically agnostic, and projects could entail case studies, ethnography, surveys, social network analysis, systematic or integrative reviews, bibliometric analysis, experiments, or any other rigorous means that warrant the kinds of claims the proposal describes. **Proposals may request funding for up to \$1 million with a duration of up to three years.**

Proof-of-Concept Research proposals embody specific models to translate findings across levels-of-analysis. For example, taking basic research insights derived within specific disciplines or contexts of application toward more complex and authentic applications or determining if a specific concept or skill from the more basic literature is an appropriate target for STEM education. Empirical and theory-building efforts to adapt initial insights from research or practice across significantly different contexts, populations, domains, and levels-of-analysis are also welcome. Proof-of-Concept Research proposals aim to move particular knowledge or products on the research-practice continuum closer to practice or identifying the constructs and interactions associated with demonstrably effective practice.

Insights from education practice can drive and enrich scientific theory, model-building, and research agendas. For example, taking into account variation in instruction, context, and other considerations from authentic settings enriches and connects areas of scientific inquiry. Thus, projects that address questions about how, where, and why successful practices are effective, uncovering deep principles, and identifying important mediating and moderating factors associated with such practices in the service of enriching theory, model building, and understanding the dynamics of effective practice are also candidates for consideration. Proposals must explicitly articulate a vision or model for how the results from this project might eventually move through levels of analysis toward practice. Analogous to the "bench-to-bedside" vision of translational medicine, *proposals must articulate a plausible route along the research-practice continuum in STEM education over time and across levels-of-analysis*. It is highly unlikely that this would be possible within the scope of a single award. Rather, the output of a proof-of-concept award would lay the theoretical, empirical, design, or social foundation for conducting systematic work at the next stage of development or level of analysis. Proposals should be explicit about what community or literature would likely take up the work at the next stage and how members of that community would find out about this work. **Proposals may request funding for up to \$1 million with a duration of up to three years.**

Synthesis proposals may request funding for projects that critically integrate the current state of knowledge on a particular topic relevant to translation and diffusion in STEM education. Synthesis studies may be in the form of a literature review, qualitative or mixed methods meta-synthesis, or meta-analysis. They should strive both to present the state of the knowledge *across fields* and, where appropriate, highlight issues for future research and development. Synthesis proposals should explain and justify the methodological approach to be adopted and should outline the steps for literature identification, decision points (e.g., identifying inclusion and exclusion criteria and outcome measures of interest), and systematic techniques to ensure all relevant research is included, and that information is gathered accurately across studies. Proposals should place particular emphasis on the goals and outcomes of the synthesis and the dissemination plan. Synthesis proposals should target novel and potentially transformative translational issues in the field. Investigators are encouraged to contact a cognizant TD Program Officer prior to submission. Proposals **may request funding for up to \$500,000 with a duration of up to three years.**

Conference/Workshop proposals may request funding to address a specific activity related to translation or diffusion. They may bring together stakeholders to develop research agendas for the field, model-building, and other activities important to moving issues of translation and diffusion forward. This will likely entail the identification of the expertise needed, disciplinary and methodological knowledge, and the general setting of plans to move an insight or hypothesis along the research-to-practice continuum toward the next stage or level of analysis. Conferences might address questions such as: What are viable models for translation and diffusion in education? What's ready for translation, and to whom and where? How do we know? And, if ready, what would effective translation of a particular promising principle or practice entail? These can be tantamount to planning grants. **Investigators must contact a cognizant TD Program Officer prior to submission. Although flexible, funding typically ranges between \$25,000 and \$99,000.** When preparing a Conference proposal, proposers must follow the guidance for Conference proposals contained in PAPPG Chapter II.F.8.

III. Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15

Anticipated Funding Amount: \$7,000,000

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 sub-awards 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.
- For-profit organizations: U.S.-based commercial organizations, including small businesses, with strong capabilities in scientific or engineering research or education and a passion for innovation.
- State and Local Governments
- Tribal Nations: An American Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a federally recognized tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. §§ 5130-5131.
- Foreign organizations: For cooperative projects involving U.S. and foreign organizations, support will only be provided for the U.S. portion.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Prospective proposers from other FFRDCs, including NSF sponsored FFRDCs, must follow the guidance in PAPPG Chapter I.E.2 regarding limitations on eligibility.

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:

There are no restrictions or limits.

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 instructions supplement guidelines in the PAPPG and *NSF Grants.gov Application Guide*:

Proposal Set-up. Select "Prepare New Full Proposal" in Research.gov. Search for and select this solicitation in Step 1 of the Full Proposal wizard. In Step 3, Proposal Type, select "Research" or "Conference" as appropriate.

Cover Sheet.

The box for Human Subjects must be checked; this box should not be left blank. The Human Subjects box should be marked as pending if an Institutional Review Board (IRB) is either (1) reviewing the project plan and has not yet determined a ruling of "approved" or "exempt", or (2) the project plan has not yet been submitted to an IRB for review. If human subjects activities are exempt from IRB review, enter the appropriate exemption number in the space provided.

To avoid delays in processing award recommendations, **it is strongly recommended that PIs begin the process of obtaining appropriate IRB approvals or exemptions** as needed for projects involving human subjects. No awards will be made without such approvals or exemptions.

Project Summary. The Project Summary should indicate whether the proposal is a Research on Translation and Diffusion, Proof-of-Concept Research, Synthesis, or Conference proposal. In addition, the Project Summary should indicate **five keywords** that best describe the theory, research methodology, any specific STEM disciplinary content that is to be studied (e.g., algebra), and potential stakeholder communities, as appropriate.

Project Description. Per the guidance in the PAPPG, the Project Description must contain, as a separate section within the narrative, a section labeled **Broader Impacts** that includes a discussion of specific broader impacts goals and outcomes and a plan and resources allocated to achieve them (more information about Broader Impacts may be found in the PAPPG and on the [NSF website](#)). Proposers may decide where to include this section within the Project Description. The proposal must also describe **Results from Prior NSF Support** for related projects in which the PI or co-PI have been involved, as outlined in the PAPPG.

Budget and Budget Justification.

Funds should be budgeted for the principal investigator or a project member to attend a two-day grantees' meeting in the Washington, D.C. area every other award year.

Supplementary Documentation.

Supplementary documents should include **Letters of Collaboration** from project partners, the **Mentoring Plan** (*if applicable*), the **Data Management and Sharing Plan** and a **List of Project Personnel** described below. Letters of support from persons endorsing the project but not making a substantial commitment to the project are not allowed. Inclusion of any other information in the supplementary documents or as an appendix will result in the proposal being returned without review.

Data Management and Sharing Plan: Data management and sharing plans will be reviewed by panelists and program directors and should be written with sufficient clarity and detail to support proposal processing and the merit review process. Generic data management and sharing plans should be avoided. Each data management and sharing plan should describe the data, metadata, samples, software, curricula, documentation, publications, and other materials to be generated during the proposed research. Data management and sharing plans should reflect the best practices and standards for the proposed research and types of data being generated, whether experimental, computational, text-based, media or physical materials. TD expects its award recipients to describe how data and related materials are generated to allow others to reproduce the research study. Further the data management and sharing plan should support the sharing of data, products, and methods in such a way that others can understand, validate, replicate, and build upon the research findings. For more information, please consult the recently released [Companion Guidelines on Replication and Reproducibility in Education Research](#).

List of All Project Personnel: Provide a list of all project personnel in the Supplementary Document section. Include 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 should include all PIs, co-PIs, senior/key personnel, funded/unfunded consultants, or collaborators, sub-awardees, postdoctoral researchers (if known), and project-level advisory committee members. This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:

1. Ebony Johnson-Smith; XYZ University; PI
2. John Garcia; University of PQR; Senior/Key Personnel

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Limits as laid out in the body of the program description.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. submitting organization's local time):

April 01, 2025

February 04, 2026

First Wednesday in February, Annually Thereafter

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/ProposalPreparation

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/applicants>. 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.

The NSF [Grants.gov Proposal Processing in Research.gov informational page](#) provides submission guidance to applicants and links to helpful resources including the NSF [Grants.gov Application Guide](#), [Grants.gov Proposal Processing in Research.gov how-to guide](#), and [Grants.gov Submitted Proposals Frequently Asked Questions](#). Grants.gov proposals must pass all NSF pre-check and post-check validations in order to be accepted by Research.gov at NSF.

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 acknowledgment 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.

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)*; and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF

Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

Administrative and National Policy Requirements

Build America, Buy America

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

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for infrastructure projects under 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.

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.

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:

- David Daniel, telephone: (703)292-8037, email: ddaniel@nsf.gov
- Gregg E. Solomon, telephone: (703) 292-8333, email: gesolomo@nsf.gov
- Lindsay Portnoy, telephone: (703) 292-8848, email: lportnoy@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/recipients 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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Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
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