

NSF 24-596: NSF National Resource Coordination Center on Improving Undergraduate STEM Education (IUSE Center)

Program Solicitation

Document Information

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U.S. National Science Foundation

Directorate for STEM Education

Division of Undergraduate Education

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

November 14, 2024



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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:

NSF National Resource Coordination Center on Improving Undergraduate STEM Education (IUSE) (IUSE Center)

Synopsis of Program:

NSF seeks proposals to create an NSF National Resource Coordination Center on Improving Undergraduate STEM Education (IUSE) (**IUSE Center**) that will be an intellectual partner to the IUSE: EDU community and NSF. Working in concert with the IUSE: EDU program, the goal of the IUSE Center is to serve as a focal point and intellectual partner for the IUSE: EDU community. The objectives of the IUSE Center are to:

- Enhance the reach and influence of IUSE investments by facilitating communication, engagement, and networking among IUSE: EDU award recipients, prospective recipients, and other stakeholders; and
- Provide support and resources for development and maintenance of IUSE: EDU projects, especially for prospective recipients and those underrepresented in the IUSE: EDU award recipient community.

The IUSE Center will be expected to work collaboratively with NSF and the IUSE: EDU community to design, implement, and execute its activities and ensure the inclusion of diverse educators and education researchers representing the full range of the nation's talent pool, of eligible institutions and organizations, and of STEM education efforts funded through the IUSE: EDU Program.

Broadening Participation In STEM

NSF recognizes the unique lived experiences of individuals from communities that are underrepresented and/or underserved 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.

- Ellen M. Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Jennifer E. Lewis, telephone: 703) 292-7340, email: jenlewis@nsf.gov
- Eleanor Sayre, telephone: (703) 292-2997, email: esayre@nsf.gov
- Keith A. Sverdrup, telephone: (703) 292-4671, email: ksverdru@nsf.gov

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

- 47.076 --- STEM Education

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

One five-year award is anticipated, subject to availability of funds.

Anticipated Funding Amount: \$7,500,000

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.
- 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.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization: 1

An organization may submit only one IUSE Center proposal as a single organization, a sub-recipient, or a member of a collaborative research project.

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

An individual may only serve as PI or co-PI on one IUSE Center proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

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

Not Applicable

- **Other Budgetary Limitations:**

Not Applicable

C. Due Dates

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

November 14, 2024

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

I. Introduction

Science and engineering are key to the nation's economic progress and there are unparalleled opportunities to develop and expand the science and technical workforce to meet the demands of the future¹. Key to this endeavor is STEM education, to prepare students for the future workforce and to educate the Nation about the advances and benefits that science and engineering bring to national and global challenges.

The mission of EDU is to achieve excellence in U.S. science, technology, engineering and mathematics (STEM) education at all levels and in all settings (both formal and informal) in order to support the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry that have access to the ideas and tools of science and engineering². In fulfilling this mission, EDU seeks to support NSF's mission to advance the health, prosperity, welfare, and security of the nation by empowering emerging STEM talent to fully participate in national science and engineering efforts.

NSF's Improving Undergraduate STEM Education (IUSE) Initiative is a Foundation-wide effort to accelerate improvements in the quality and effectiveness of undergraduate education in all STEM fields. Through this framework, NSF coordinates its investments in undergraduate programs and undergraduate STEM education to support the agency's commitment to the highest caliber undergraduate STEM education. The IUSE: EDU program seeks to promote novel, creative, and transformative approaches for generating and using new knowledge about STEM teaching and learning to improve STEM education for all undergraduates at two-year and four-year institutions of higher education³.

There is a critical need to develop, accumulate, and share knowledge based on basic and applied research in undergraduate STEM education. Efforts to broaden participation, foster diversity, improve institutional climate, and improve STEM teaching and learning at all levels are constantly evolving to better support undergraduate STEM education. Investments made by the IUSE: EDU program seek to contribute to the educational and capacity-building goals of the NSF Directorate for STEM Education and to the strategic goals and objectives of NSF.

The IUSE Center will serve as a focal point and intellectual partner for the IUSE: EDU program. The IUSE Center will enhance the reach of the IUSE: EDU program by facilitating communication, engagement, and networking among IUSE: EDU award recipients, prospective recipients, and other stakeholders. The IUSE Center will also provide support and

resources for developing and maintaining IUSE: EDU projects especially for prospective recipients and those underrepresented in the IUSE: EDU award recipient community.

¹ 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. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf22068.

² Directorate for STEM Education (EDU): About EDU. <https://www.nsf.gov/edu/about.jsp>.

³ Improving Undergraduate STEM Education: Directorate for STEM Education (IUSE: EDU). <https://new.nsf.gov/funding/opportunities/improving-undergraduate-stem-education-directorate>.

II. Program Description

NSF seeks proposals to create an NSF National Resource Coordination Center on Improving Undergraduate STEM Education (IUSE) (**IUSE Center**) that will be a focal point and intellectual partner to the IUSE: EDU community and to NSF to enhance the overall reach and influence of IUSE: EDU investments. The IUSE Center will be expected to work collaboratively with NSF and the IUSE: EDU community of investigators and educators to design, implement, and execute its activities and to ensure the inclusion of diverse researchers and educators from across the full range of our nation's talent pool of eligible institutions and organizations and of STEM education, STEM education research, and disciplinary education research funded by the IUSE: EDU program.

The IUSE Center is meant to meet the critical need to facilitate coordination and support of the IUSE: EDU STEM education, STEM education research, and disciplinary education research communities.

To facilitate communication, engagement, and networking among IUSE: EDU award recipients, prospective recipients, and other stakeholders, the IUSE Center should:

- Convene biannual national IUSE: EDU PI meetings in years 2 and 4 of the award;
- Convene regional or other gatherings as appropriate to the mission of the IUSE Center;
- Develop and support a website, blog, video library, and/or other resources for presenting and archiving materials of interest to the IUSE: EDU community; and
- Coordinate with other relevant NSF resource hubs, centers, and NSF programs to support engagement of the IUSE: EDU community with others in related efforts.

To provide support and resources for development and maintenance of IUSE: EDU projects, especially for prospective award recipients and those underrepresented in the IUSE: EDU recipient community, the IUSE Center should:

- Develop and nurture networks to connect and support IUSE: EDU investigators and potential investigators at all stages of their careers;
- Host webinars or other events, either virtually or in person, for prospective proposers in geographic areas and for groups underrepresented in the IUSE: EDU portfolio; and
- Provide guidance and mentoring for organizations and investigators new to the IUSE: EDU community to develop project ideas, to write and submit proposals, and to manage awards, including guidance and support for developing protocols for use of human subjects in research, for high-quality project evaluation, and for managing federal budgets.

The IUSE Center will enable NSF to connect, expand, and leverage the contributions of the IUSE: EDU program to improve undergraduate STEM education.

III. Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

One five-year award is anticipated, subject to availability of funds.

Anticipated Funding Amount: \$7,500,000

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.
- 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.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization: 1

An organization may submit only one IUSE Center proposal as a single organization, a sub-recipient, or a member of a collaborative research project.

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

An individual may only serve as PI or co-PI on one IUSE Center proposal.

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.

Title of proposed project: The title of the proposed project should begin with "IUSE Center".

Project description: The Project Description is limited to 15 pages and must comply with all formatting requirements of the current PAPPG. In addition to the requirements outlined in the NSF PAPPG, proposals should address the following elements in the 15-page project description:

Project Activities and Rationale

The project description should provide a clear and concise description of the IUSE Center activities, including goals, objectives, and outcomes for each activity. The rationale for each activity should be provided. Proposals should cite relevant literature on effective communication, community building, resource sharing, and networking when appropriate. This description should have enough detail for reviewers to evaluate the quality and expected outcomes of the proposed activities.

Communication and Outreach

The proposal should include clear descriptions of planned communication and outreach activities including plans for building and maintaining a website dedicated to Center activities, and plans for authoring and releasing newsletters, blogs, and/or other communications as appropriate.

Management Plan

Describe the plan for implementing the Center's activities over the five-year period of the award. This section should include descriptions of IUSE Center staff positions, their roles and responsibilities, and the time and effort on the project. The project PI should include sufficient time and effort to manage Center activities and a dedicated project manager should be included in the leadership team. An advisory committee that includes representatives from those served by the IUSE: EDU Center (e.g. academic institutions, professional societies focused on undergraduate STEM education, STEM education researchers, and STEM educators) is required. This advisory committee will advise the team on the activities of the Center and, at a minimum, annual meetings of the committee should be planned. This section should include a project timeline with appropriate milestones; the timeline should include plans for at least two reverse site visits that may include external panelists and NSF staff.

Evaluation Plan

The proposal must include plans for formative and summative evaluation and identify an evaluator who is independent of the project and external to the organization. The evaluation plan should refer to the project activity goals and objectives. Formative evaluation should include a plan for collecting and analyzing data to inform the development of the Center's approaches and decision-making and should include indicators of progress for assessing the project's implementation processes and adaptations. Formative evaluation reports are expected to be included in annual Research Performance Progress Reports. The summative evaluation should assess the impact of the project activities and progress toward the overall goals and objectives and should be shared with the cognizant program officer and included in the project's final Research Performance Progress Report. Consider consulting NSF's [User-Friendly Handbook for Project Evaluation](#) for formative and summative evaluation guidance.

Other Required Sections: Per guidance in the PAPPG, the Project Description must contain, as a separate section within the narrative, a section labeled "**Broader Impacts**". Proposers can decide where to insert 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(s) have been involved, as outlined in the PAPPG.

Supplementary Documentation.

Data Management and Sharing Plan: All data collected for IUSE projects must accord with the [EDU Data Management Guidance](#). The Data Management and Sharing Plan should describe how the proposal will conform to NSF policy on protection of data and dissemination and sharing of project results. The plan will be reviewed by panelists and program directors and is an integral part of the proposal. Generic plans should be avoided.

Letters of Collaboration: Letters of Collaboration from project partners may be included. A description of Letters of Collaboration and suggested text is included in PAPPG Chapter II.D.2. Letters of support from persons endorsing the project but not making a substantial contribution to the project are not allowed.

Project Personnel: In addition to guidance provided in the PAPPG on required Special Information and Supplementary Documentation, please provide a list of all project personnel in the Supplementary Documents section. Provide current and 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/Key Personnel, funded/unfunded Consultants or Collaborators, Sub-recipients, Postdoctoral Researchers, project-level advisory board members, and writers of letters of collaboration. 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 with a new numbered line. For example:

- Full Name; ABC University; PI
- Full Name; University of XYZ; Senior/Key Personnel
- Full Name; PQR Inc.; External Evaluator
- Full Name; Excellent Research Organization; Advisory board member

Appendix: Not permitted. The 15 pages of the Project Description should contain all the information needed to describe the project. Proposals submitted with an Appendix will be returned without review.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

November 14, 2024

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/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 web page: <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 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.

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](#) web page

Special Award Conditions:

Special Award Conditions: The IUSE: EDU Center award will be made in the form of a cooperative agreement. The cooperative agreement will include special conditions relating to the period of performance, detailed work description, award recipient responsibilities, NSF responsibilities, funding and funding schedule, reporting and evaluation requirements, senior/key personnel, and other conditions. NSF will provide general oversight and monitoring of the IUSE: EDU Center and the external evaluation to help assure effective performance and administration, as well as facilitating any coordination necessary to further the objectives of the IUSE: EDU program. Within the first 60 days of the award, the lead organization should submit a strategic plan for the IUSE: EDU Center for confirmation by NSF.

The IUSE Center award recipient should plan for at least two reverse site visits. Reverse site visits will generally occur near the end of years 1 and 3 of the award, prior to the planned national PI meetings. These reviews will focus on accomplishments, challenges, changes in the project, and lessons learned. PIs will be provided with expectations and requirements at least 3 months in advance of the review.

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.

The Center recipient will be expected to report annually on progress toward the Center's goals and activities and annual Research Performance Progress Reports must include agendas, meeting notes, and other artifacts of IUSE: EDU recipient and prospective recipient convenings as well as agendas, minutes, and recommendations from advisory committee meetings. RPPRs must also include formative evaluation reports from the project evaluator and the final report must include a summative evaluation report.

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:

- Ellen M. Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Jennifer E. Lewis, telephone: (703) 292-7340, email: jenlewis@nsf.gov
- Eleanor Sayre, telephone: (703) 292-2997, email: esayre@nsf.gov
- Keith A. Sverdrup, telephone: (703) 292-4671, email: ksverdru@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.

Please note that contact information is current at the time of publication. Please see the [IUSE: EDU program website](#) for any updates to the points of contact.

IX. Other Information

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

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

About The National Science Foundation

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

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

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

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

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

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

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

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

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: 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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Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314

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