

NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)

PROGRAM SOLICITATION NSF 22-527

REPLACES DOCUMENT(S): NSF 21-550



National Science Foundation

Directorate for Education and Human Resources
Division of Undergraduate Education

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

February 22, 2022

Tracks 1, 2, 3 & Collaborative Planning Grants

February 20, 2023

Third Monday in February, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

The NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program solicitation has been revised for the FY2022 competition, and prospective Principal Investigators are encouraged to read the solicitation carefully. Among the main changes are the following:

Changes Affecting All Proposals

- Projects supporting scholars studying in disciplinary fields in which NSF provides research funding are eligible to apply to the S-STEM program, with the following exclusions: all clinical fields (which are not funded by NSF), degrees in business administration at all levels (BABA/BSBA/BBA, MBA, etc.) and programs for STEM teacher certification or licensure currently covered by the Robert Noyce Teacher Scholarship program (NOYCE).
- All proposers must demonstrate that the degrees pursued by students supported with S-STEM funds are within a disciplinary area of strategic national need for the economic competitiveness or national security of the United States. In addition, proposers must show that upon graduation, S-STEM scholars will have positive job prospects with their earned undergraduate or graduate degrees. The burden to demonstrate this national need and positive job prospect rests on the submitting institution. The mechanism chosen to demonstrate that scholars will be able to find a job upon graduation with an undergraduate or graduate degree and that this project helps address the long-term workforce needs of the United States is entirely up to the proposers. A one-page analysis submitted in supplementary documents is now required. (see section II.B.2 and section V.A.11 for further information)
- PI eligibility limitations for Track 1, 2 and 3 projects have now been relaxed to include academic administrators, as long as the administrator has taught an S-STEM eligible discipline in the past two years.
- Institutional eligibility limitations have also changed.

- An institution may submit up to two proposals in any track (either as a single institution or as sub awardee or as a member of an inter-institutional consortia project) for a given S-STEM deadline. Multiple proposals from an institution must not overlap with regard to S-STEM eligible disciplines.
- Restrictions of eligibility based on a single submission from each distinct college, school, or academic unit under a Dean or equivalent, have been eliminated.

Please note: Restrictions of eligibility to submit proposals covering degrees in disciplines already funded by S-STEM active awards made to the same institution remain in effect. The waiting period of three years is still applicable. This 3-year waiting period restriction does not apply to collaborative planning grants. (see section IV.A for additional details).

- Conditions for collaborative planning grant submissions have changed. Proposals may now request up to \$100,000 for up to one year. The project description should not exceed 6 single-spaced pages. Please note that the Collaborative Planning Grant proposals described in this solicitation are a solicitation-specific project category and are separate and distinct from the type of proposal described in Chapter II.E.1 of the PAPPG. When preparing a Collaborative Planning Grant proposal in response to this solicitation, the "Research" type of proposal should be selected in the proposal preparation module in FastLane or Grants.gov.
- For proposals with a duration of six years, current and pending support should be reported for the first five years of the project. In addition, proposals requesting a six-year duration must be submitted via FastLane because Grants.gov will not accommodate a six-year budget.

The S-STEM program team will host webinars in which key features and expectations of the S-STEM program will be discussed. Information regarding the webinars will be posted to the S-STEM program webpage: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5257.

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

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM)

Synopsis of Program:

In 1998 Congress enacted the American Competitiveness in the Twenty-First Century Act which provided funds to the National Science Foundation (NSF) to create a mechanism whereby the hiring of foreign workers in technology-intensive sectors on H-1B visas would help address the long-term workforce needs of the United States. Initially, scholarships were only provided for students in math, engineering, and computer science. Later legislation authorized NSF to expand the eligible disciplines at the discretion of the NSF director. This revised solicitation expands the eligibility of degrees to most disciplinary fields in which NSF provides research funding (with some exclusions described elsewhere in this document) as long as there is a national or regional demand for professionals with those degrees to address the long-term workforce needs of the United States.

The main goal of the S-STEM program is to enable low-income students with academic ability, talent or potential to pursue successful careers in promising STEM fields. Ultimately, the S-STEM program seeks to increase the number of low-income students who graduate with a S-STEM eligible degree and contribute to the American innovation economy with their STEM knowledge. Recognizing that financial aid alone cannot increase retention and graduation in STEM, the program provides awards to institutions of higher education (IHEs) not only to fund scholarships, but also to adapt, implement, and study evidence-based curricular and co-curricular¹ activities that have been shown to be effective supporting recruitment, retention, transfer (if appropriate), student success, academic/career pathways, and graduation in STEM.

Social mobility for low-income students with academic potential is even more crucial than for students that enjoy other economic support structures. Hence, social mobility cannot be guaranteed unless the scholarship funds the pursuit of degrees in areas where rewarding jobs are available after graduation with an undergraduate or graduate degree.

The S-STEM program encourages collaborations, including but not limited to partnerships among different types of institutions; collaborations of S-STEM eligible faculty, researchers, and academic administrators focused on investigating the factors that affect low-income student success (e.g., institutional, educational, behavioral and social science researchers); and partnerships among institutions of higher education and business, industry, local community organizations, national labs, or other federal or state government organizations, as appropriate.

Scholars must be domestic low-income students, with academic ability, talent or potential and with demonstrated unmet financial need who are enrolled in an associate, baccalaureate, or graduate degree program in an S-STEM eligible discipline. Proposers must provide an analysis that articulates the characteristics and academic needs of the population of students they are trying to serve. NSF is particularly interested in supporting the attainment of degrees in fields identified as critical needs for the Nation. Many of these fields have high demand for training professionals that can operate at the convergence of disciplines and include but are not limited to quantum computing and quantum science, robotics, artificial intelligence and machine learning, computer science, data science and computational science applied to other frontier STEM areas and other STEM or technology fields in urgent need of domestic professionals. It is up to the proposer to make a compelling case that a field is a critical need field in the United States.

S-STEM Eligible Degree Programs

- Associate of Arts, Associate of Science, Associate of Engineering, and Associate of Applied Science
- Bachelor of Arts, Bachelor of Science, Bachelor of Engineering and Bachelor of Applied Science
- Master of Arts, Master of Science and Master of Engineering
- Doctoral

S-STEM Eligible Disciplines

- a. Disciplinary fields in which research is funded by NSF, with the following exceptions:
 1. Clinical degree programs, including medical degrees, nursing, veterinary medicine, physical therapy, and others not funded by NSF, are ineligible degrees.
 2. Business school programs that lead to Bachelor of Arts or Science in Business Administration degrees (BABA/BSBA/BBA) are not eligible for S-STEM funding.
 3. Masters and Doctoral degrees in Business Administration are also excluded.
- b. Technology fields associated with the S-STEM-eligible disciplines (e.g., biotechnology, chemical technology, engineering technology, information technology).

Proposers are strongly encouraged to contact Program Officers before submitting a proposal if they have questions concerning degree or disciplinary eligibility.

The S-STEM program particularly encourages proposals from 2-year institutions, Minority Serving Institutions (MSIs), and urban, suburban and rural public institutions.

[1] an activity at a school or college pursued in addition to the normal course of study.

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.

- Alexandra Medina-Borja, Lead, telephone: (703) 292-7557, email: amedinab@nsf.gov

- Mindy Capaldi, Co-Lead, telephone: (703) 292-2994, email: mcapaldi@nsf.gov
- Michael J. Ferrara, Co-Lead, telephone: (703) 292-2635, email: mferrara@nsf.gov
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- Connie K. Della-Piana, telephone: (703) 292-5309, email: cdellapi@nsf.gov
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- Jill K. Nelson, telephone: (703) 292-5111, email: jnelson@nsf.gov
- Kalyn Owens, telephone: (703) 292-4615, email: kowens@nsf.gov
- Eric J. Sheppard, telephone: (703) 292-5111, email: esheppar@nsf.gov
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- Huihui H. Wang, telephone: (703) 292-4894, email: hhwang@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 75 to 90

subject to availability of funds.

Anticipated Funding Amount: \$80,000,000 to \$120,000,000

The program supports four types of projects subject to availability of funds:

- Awards for Track 1 (Institutional Capacity Building) projects may not exceed \$750,000 total for a maximum duration of 6 years.
- Awards for Track 2 (Implementation: Single Institution) projects may not exceed \$1.5 million total for a maximum duration of 6 years.
- Awards for Track 3 (Inter-institutional Consortia) projects may not exceed \$5.0 million total for a maximum duration of 6 years.
- Collaborative Planning projects may not exceed \$100,000 for a maximum duration of 1 year.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

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

Who May Serve as PI:

For Track 1 (Institutional Capacity Building) and Track 2 (Implementation: Single Institution) projects, the Principal Investigator must be (a) a faculty member currently teaching in an S-STEM eligible discipline, or (b) an academic administrator who has taught in an S-STEM eligible discipline in the past two years. The Principal Investigator must be able to provide the leadership and time required to ensure the success of the project. Projects involving more than one department within an institution are eligible, but a single Principal Investigator must accept

overall management and leadership responsibility. Faculty from all departments involved need to have roles in the project as either Co-Principal Investigators, senior personnel or scholar mentors. Other members of the S-STEM project senior leadership and management team may be listed as Co-Principal Investigators.

For Track 3 (Inter-institutional Consortia) projects, the Principal Investigator must be (a) a faculty member currently teaching in an S-STEM eligible discipline, (b) an academic administrator who has taught an S-STEM eligible discipline in the past two years, or (c) a non-teaching institutional, educational, or social science researcher investigating questions related to low-income student success. The Principal Investigator must be able to provide the leadership and time required to ensure the success of the project. Track 3 consortium proposals must have a Principal Investigator who accepts overall management and leadership responsibility. Faculty from all institutions and departments involved need to have roles in the project as either Co-Principal investigators, senior personnel or scholar mentors. Other members of the S-STEM project senior leadership and management team may be listed as Co-Principal Investigators or as Principal Investigators on collaborative research proposals.

Collaborative Planning grants are intended to help a collection of institutions plan for a future Track 3 proposal. For Collaborative Planning grants, the Principal Investigator must be (a) a faculty member teaching in any S-STEM eligible discipline, or (b) a STEM administrator (department head or above) at one of the institutions within the envisioned inter-institutional consortia, or (c) a non-teaching institutional, educational, or social science researcher investigating questions related to low-income student success. The Principal Investigator on a Collaborative Planning grant must demonstrate the capacity to convene and lead a team of inter-institutional S-STEM eligible faculty and social science or educational researchers focused on low-income student success to write the desired proposal in a 1-year timeframe.

Limit on Number of Proposals per Organization: 2

1. An institution may submit up to two proposals (either as a single institution or as subawardee or a member of an inter-institutional consortia project) for a given S-STEM deadline. Multiple proposals from an institution must not overlap with regard to S-STEM eligible disciplines. See Additional Eligibility Information below for more details (see IV. Eligibility Information).
2. Institutions with a current S-STEM award should wait at least until the end of the third year of execution of their current award before submitting a new S-STEM proposal focused on students pursuing degrees in the same discipline(s).

The above restrictions do not apply to collaborative planning grant proposals.

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

B. Budgetary Information

- **Cost Sharing Requirements:**

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

Not Applicable
- **Other Budgetary Limitations:**

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. submitter's local time):
 - February 22, 2022
 - Tracks 1, 2, 3 & Collaborative Planning Grants
 - February 20, 2023
 - Third Monday in February, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

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

TABLE OF CONTENTS

Summary of Program Requirements

- I. **Introduction**
- II. **Program Description**
- III. **Award Information**
- IV. **Eligibility Information**
- V. **Proposal Preparation and Submission Instructions**
 - A. Proposal Preparation Instructions
 - B. Budgetary Information
 - C. Due Dates
 - D. FastLane/Grants.gov Requirements
- VI. **NSF Proposal Processing and Review Procedures**
 - A. Merit Review Principles and Criteria
 - B. Review and Selection Process
- VII. **Award Administration Information**
 - A. Notification of the Award
 - B. Award Conditions
 - C. Reporting Requirements
- VIII. **Agency Contacts**
- IX. **Other Information**

I. INTRODUCTION

To meet the national need for a globally competitive STEM workforce, the National Science Foundation (NSF) established the Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program in accordance with the American Competitiveness and Workforce Improvement Act of 1998 (P.L. 105-227 and as reauthorized by P.L. 105-313 in 2000 and P.L. 108-447 in 2004). The Act provided funds for NSF to create a mechanism whereby the hiring of foreign workers on H-1B visas would help address the long-term workforce needs of the United States in technology-intensive sectors. The Act assessed a fee on each visa petition on behalf of an individual being hired by a US employer in order to fund scholarships for educating and training American post-secondary students who would in turn become members of the workforce in these high demand sectors. An important feature of the Act was to specify that the scholarships should be provided to low-income students in order to boost economic mobility for as broad a population as possible.

At its core, the S-STEM program seeks to increase the success of domestic low-income students with academic ability, talent or potential and demonstrated financial need who are pursuing associate, baccalaureate, or graduate degrees in eligible disciplines of strategic importance for the Nation. Initially, scholarships were only provided for students in math, engineering, and computer science. Later legislation authorized NSF to expand the eligible disciplines at the discretion of the NSF director. This revised solicitation further expands the eligibility of degrees to all fields funded by NSF as long as there is demand in the regional or national workforce for professionals with those degrees, potential to address the long-term workforce needs of the United States, or other evidence of positive job prospects within the STEM workforce upon graduation with an undergraduate or graduate degree.

II. PROGRAM DESCRIPTION

A. Overview

The S-STEM program provides institutions of higher education (IHEs) with funds for scholarships to encourage and enable domestic low-income students with academic ability, talent or potential and demonstrated financial need to enter the US workforce following completion of associate, baccalaureate, or graduate degrees in S-STEM eligible disciplines. To enable social mobility of these students with academic talent, funds should be allocated to support scholars in areas of regional or national need. Funds also enable IHEs to establish a coherent ecosystem of effective evidence-based practices (curricular and co-curricular activities taking place during the academic year and over the summer and winter break months if appropriate) and to assess the effects of those practices and other factors on retention, student success, academic/career pathways, and degree attainment, including transfer, and entry into the US workforce or graduate

programs in STEM. See Section IV.B.2 for details on some common elements of all Track 1, 2 and 3 proposals and Section V.A.11 for additional details on required supplementary documents.

S-STEM awards in Tracks 1, 2 and 3 facilitate the establishment of infrastructure and collaborations to: (1) provide scholarships to domestic low-income academically talented students with demonstrated financial need pursuing a degree in one of the S-STEM eligible disciplines; (2) adapt and implement evidence-based curricular and co-curricular activities to support NSF S-STEM scholars; (3) increase retention, student success, and graduation of these low-income students in STEM; (4) test strategies for systematically supporting student academic and career pathways in STEM in ways that are congruent with the institutional context and resources; and (5) disseminate findings on what works related to the supports and interventions undertaken by the project, in particular to other institutions working to support low-income STEM students.

In addition to providing funds for scholarships, the S-STEM program also supports the implementation and testing of an ensemble of existing effective evidence-based curricular and co-curricular activities featuring: (1) close involvement of faculty in S-STEM eligible disciplines, (2) student mentoring, (3) provisions and adaptation of activities that support student success, including the formation of student cohorts and other effective practices (e.g., student support services; professional and workforce development activities), (4) covering of academic expenses that become barriers for success for low-income students (e.g., graduation fees, standardize testing fees, graduate school application fees, etc.)

Proposals with a strong focus on workforce development are encouraged to partner with business, industry, local community organizations, national labs, or other federal or state government organizations to provide appropriate opportunities to scholars, including but not limited to internships, research and service-learning activities and other opportunities above and beyond the financial support provided through scholarships.

B. Description of Program Tracks

1. S-STEM Tracks

The following sections describe each track differences:

Track 1 (Institutional Capacity Building)

Track 1 projects seek to increase the participation of institutions that have never had an award from the S-STEM program or the STEM Talent Expansion (STEP) program. This requirement applies to the institution as a whole. One S-STEM or STEP award to any department or school within the institution makes the entire institution ineligible for a Track 1 award.

Track 1 projects must be led by a PI who is (a) a faculty member currently teaching in one of the S-STEM eligible disciplines being pursued by the targeted scholars, or (b) an academic administrator who has taught in one of the eligible disciplines within the two years prior to submission and can dedicate the time necessary to assure project success. The PI must be a member of the proposed project's leadership and management team. The leadership and management team should also include a STEM administrator (department head or above). Faculty members from all departments or academic units involved should have a role in the project either as Co-PIs, senior personnel, or scholar mentors. The project team could include, if appropriate, a non-teaching institutional, educational, or social science researcher to support evidence-based responses to items raised by the external evaluator through formative evaluation. This additional researcher cannot take the place of the external evaluator.

Track 1 proposals may also include a focus on student transfer or progression to graduate school. In this case, if needed, two or more institutions could partner.

Track 1 proposals may request up to \$750,000 total for up to 6 years.

Track 2 (Implementation: Single Institution)

Track 2 proposals have the same S-STEM goals as Track 1 proposals. They generally involve and benefit only one institution, but they will serve more scholars than Track 1 proposals. Any IHE (as described under the eligibility section) can submit a Track 2 proposal, whether or not the institution has received prior S-STEM or STEP awards.

Track 2 proposals may, in some cases, also include a focus on student transfer or progression to graduate school. In this case, if needed, two or more institutions could partner.

Track 2 projects must be led by a PI who is (a) a faculty member currently teaching in one of the S-STEM eligible disciplines being pursued by the targeted scholars, or (b) an academic administrator who has taught in one of the eligible disciplines in the last two years from submission and can dedicate the time necessary to assure project success. The PI must be a member of the proposed project's leadership and management team. The leadership and management team should also include a STEM administrator (department head or above). Faculty members from all departments or academic units involved should have a role in the project either as Co-PIs, senior personnel, or scholar mentors. The project team could include, if appropriate, a non-teaching institutional, educational, or social science researcher to support evidence-based responses to items raised by the external evaluator through formative evaluation. This additional researcher cannot take the place of the external evaluator.

Proposals for Track 2 may request up to \$1,500,000 total for up to 6 years.

Track 3 (Inter-institutional Consortia)

Track 3 projects support multi-institutional collaborations that focus on a common interest or challenge. For example, a collaboration among community colleges and four-year institutions may focus on issues associated with successful transfer of low-income students from 2-year institutions to 4-year programs. In another example, a multi-institutional collaboration may focus on investigating factors, such as self-efficacy or identity, which contribute to the success or degree attainment of domestic, low-income students in different types of institutions.

Proposals with a strong focus on the transfer or advancement of students from one educational level to another should collaborate with appropriate institutional partners. For example, proposals focused on the transfer of students from 2-year institutions to 4-year institutions should include faculty and administrators from 2-year institutions and 4-year institutions in the leadership team; likewise, proposals focusing on the advancement of undergraduate students at predominately undergraduate institutions to graduate programs should include institutions, administrators and Co-PIs representing both the undergraduate programs and the receiving graduate programs.

Track 3 projects have the same overall goals as Track 1 and 2 projects but seek to accomplish these goals at a very large scale by leveraging multi-institutional efforts and infrastructure. In addition to the expectations stated in section II.B.2 for all tracks, Track 3 projects are expected to:

- Establish an authentic, strong and mutually beneficial collaboration across all institutions involved in the consortia, providing comparable benefits to all

- institutions in terms of number of scholarships as well as in the infrastructure established to serve low-income students;
- Establish strong technical assistance and processes that support and manage project activities across institutions involved in the collaborative effort.
- Engage in high quality research to advance understanding of how to adapt, implement and scale up effective evidence-based programs and practices designed to foster positive outcomes for low-income students in STEM.

NSF does not favor a particular research design over others. How the chosen research methods and approaches are aligned with and appropriate for the research goals should be fully explained in the proposal. The ultimate goal of S-STEM is to support low-income students. Projects are strongly discouraged from allowing a desired sample size to play a role in the determination of the size of awarded scholarships.

Track 3 projects are managed by leadership and management teams composed of faculty members who are currently teaching in an S-STEM eligible discipline(s), STEM administrators, and non-teaching institutional, educational, or social science researchers. The PI of Track 3 proposals must be either (a) a faculty member currently teaching in one of the S-STEM eligible disciplines, (b) a STEM administrator (department head or above), or (c) a non-teaching researcher whose expertise is in institutional, educational, or social science research in higher education. Faculty from all the institutions and disciplines involved need to be included in the leadership team and/or senior personnel. The lead PI needs to demonstrate the capacity, experience and resources needed to manage a complex, large-scale project and the necessary time to dedicate to assure project success.

Track 3 proposals may request up to \$5 million total for up to 6 years.

Track 3 projects will be reviewed by NSF during their third year to determine whether satisfactory progress has been made, with continued funding contingent on the result of the third-year review. See section VII.C on reporting requirements.

Collaborative Planning Grants to Develop an Inter-institutional Consortium

Collaborative Planning projects provide support for groups of two or more IHEs and other potential partner organizations to establish fruitful collaborations, increase understanding of complex issues faced by low-income students at each institution, establish inter-institutional agreements when necessary and develop mechanisms for cooperation in anticipation of a future Track 3 proposal that will benefit all institutions and their scholars as equal partners.

This category of projects aims to provide proposers from two or more institutions the funds and time to establish the relationships and agreements necessary for submitting an Inter-institutional Consortia S-STEM proposal. It is expected that proposers will be ready to write and submit this Inter-institutional Consortia proposal within 1-2 years of receiving a Collaborative Planning grant award. Any subsequent proposals to S-STEM based on this work must describe the results of the planning effort.

Inter-institutional Consortia projects represent diverse collaborations, including partnerships between 2-year colleges and 4-year colleges and universities, between 4-year colleges and graduate programs, or between comparable institutions looking to implement and study parallel interventions. As such, Collaborative Planning grants can address these, or other, types of partnerships that might result in a stronger Track 3 proposal. Ideally, planning grants should reflect authentic collaborations between institutions, prepare collaborative partners to award scholarships at all collaborating institutions and provide programming according to each institution's needs assessment and realities.

A Collaborative Planning grant should allow institutions to gather data, design shared mechanisms for data collection and student support, and establish the necessary memorandum of understanding (MOUs) or articulation agreements to facilitate students' transition between institutions and ultimate success. Different methodological approaches may be employed to uncover the needs across institutions. PIs should propose approaches they feel are appropriate to their specific context. Surveys, focus groups, interviews, etc., can also be included in the planning grant as mechanisms to understand the needs of students. Furthermore, Collaborative Planning proposals must include the following elements in the project description:

- what is already known about all potential partner institutions;
- the planning grant goals;
- name of the individuals and offices that will be approached at each institution and description of the potential contributions of collaborators representing multiple perspectives;
- the steps to build effective collaborations to achieve the project goals (needs assessment, articulation agreements; meetings, etc.);
- the steps and actions to further refine and develop the future S-STEM Track 3 proposal, including how programmatic details will be decided (the interventions, the definition of the scholarship eligibility requirements based on institutional data; establishment of scholarship amounts, and methods), leveraging the expertise of the collaborators;
- narrative of how the development of the collaboration will lead to a stronger future Track 3 proposal, and;
- a mechanism to assess the collaborative planning effort's progress towards its stated goals.

If appropriate, Collaborative Planning Grant proposals may request funds to pilot evidence-based supports at one or more institutions in order to collect preliminary data and strengthen those activities. Participating institutions can also test new policies and administrative procedures that, per a needs assessment or other institutional data, have potential to remove barriers or otherwise improve outcomes for potential S-STEM scholars.

Please note that, while collaborative planning projects may wish to share any findings or implementation mechanisms, a formal dissemination plan is not required.

Collaborative planning grants are managed by a PI who is either (a) a faculty member teaching in any S-STEM eligible discipline, (b) STEM administrator (department head of above) at one of the institutions within the envisioned inter-institutional consortia, or (c) a non-teaching researcher whose expertise is in institutional, educational, or social science research in higher education. The PI must provide the required leadership and the capacity to convene and lead a team of inter-institutional STEM faculty and social science or education researchers to write the desired proposal in a 1-2-year timeframe. A successful Track 3 proposal will likely require a range of expertise including STEM faculty and administrators at all institutions, financial aid officers, and education, learning science or social science researchers interested in low-income student success or other pertinent topics. It is ideal that management of the planning grant incorporate the appropriate senior personnel across institutions as needed. Planning grants can also speak to potential gaps in expertise that might hinder a forthcoming Track 3 proposal and work to identify and build relationships with qualified individuals or organizations that would enhance the impact of future collaborative efforts.

Please note that the Collaborative Planning Grant proposals described in this solicitation are a solicitation-specific project category and are separate and distinct from the type of proposal described in Chapter II.E.1 of the PAPPG. When preparing a Collaborative Planning Grant proposal in response to this solicitation, the "Research" type of proposal should be selected in the proposal preparation module in FastLane or Grants.gov.

2. Common Elements.

The following principles and expectations apply to submissions to Track 1 (Institutional Capacity Building), Track 2 (Implementation: Single Institution), and Track 3 (Inter-institutional Consortia). Proposers should read this section as information emphasizing important aspects not to be overlooked and

complementary to the content sections in V.A.5 (Project Description).

Degrees in areas of regional or national need: Proposers must provide evidence that the degrees to be awarded to scholars are in an area of need for the regional or national STEM workforce. Evidence should also be presented indicating that there will be a sufficient number of rewarding positions available for them in the U.S. STEM workforce upon graduation with an undergraduate or graduate degree. Proposers must use publicly available data-driven information to justify their arguments to this effect. A number of statistical resources published by the Department of Labor, the National Center for Science and Engineering Statistics (NCSES), the Department of Homeland Security, and the State Department, among others, are available to assist proposers in making a case (see section V.a.11- "Supplementary Documents" for suggestions on sources of information).

Scholar Eligibility Criteria: See Section IV.B. Additional Eligibility Information, B. Scholarship Recipients for additional details.

Evidence-based, context-specific interventions linked to low-income student needs: All projects must build their project on needs analyses specific to the targeted population of low-income students in the proposed disciplines. See Section V.A.5.a. for additional information on how to establish student needs.

Cohorts and Faculty Mentoring: Educational research has established the importance of mentoring and cohort formation for low-income students. These efforts provide important touchpoints for scholars that can foster a sense of belonging and provide academic support. To this end, IHEs are expected to develop, support, and maintain student cohorts and provide S-STEM scholars with faculty mentors.

The development of strong cohorts is especially important for proposals in which scholars may come from different academic units or departments. In this case, proposers should also ensure that faculty mentors have sufficient expertise to support scholars through any discipline- or major-specific challenges that might arise.

Involvement of Office of Financial Aid and Other Campus Partners: Successful Track 1, 2, and 3 projects must demonstrate the involvement of the Office of Financial Aid. Each institution that will award scholarships must submit a letter from the Office of Financial Aid certifying the Office's understanding of the guidelines and requirements of the S-STEM program, confirming the institutional definition of low income and that the eligible students will meet its definition of low income, and stating their commitment to support the project as described in the proposal if awarded. Internal partnerships with other offices or departments could also be included as appropriate, such as residential life, student services, tutoring centers, institutional research, and diversity, equity, and inclusion.

Determination of Scholarship Amounts: The scholarships awarded are expected to reduce the need for students to work or increase their debt during the academic year. Congress has established the maximum amount of an individual scholarship to be \$10,000 per year for up to 4 years at each institution that a scholar attends or at each academic level.

Any S-STEM scholarship should be treated as a "**last dollar scholarship**" intended to be paid after all other grants and scholarships for which the student qualifies have been awarded; the calculation is based on the gap between what aid has been awarded and what aid is still needed to help a student meet the cost of attendance fully. See section V.A.5.b for more details on cost of attendance, and how to calculate scholarship amounts based on unmet need.

Analysis of Prospective Scholar Pool: All Track 1, 2, and 3 proposals must analyze institutional data at all pertinent institutions to determine the potential number of eligible scholars. The analysis should include information from the Financial Aid offices of all involved institutions and describe the calculation method used to determine the number of students who meet all the eligibility criteria presented. NSF understands that this analysis must rely on current student data and hence may only estimate the pool future scholars. The goal is to deduce how many students would qualify for the scholarships at the time of proposal submission and provide justification for academic requirements.

Describing the general characteristics of the overall population of the institution's low-income students is insufficient to meet this analytical requirement. Instead, the low-income data must be specific to the population of students in the disciplines targeted who meet all the eligibility requirements, both financial and academic, specified in the proposal.

Additional Budget Guidelines:

In all Track 1, 2 and 3 proposals, at least 60% of all funds must be provided solely as pure scholarships to cover the cost of attendance and entered as Participant Support – Stipends (Line F1) on the NSF budget form.

Support for all non-scholarship costs must be included in the remaining 40% of the budget. See additional budget guidelines in section V.A.8

Additional participation requirements in other project activities: S-STEM projects often include enhancements such as seminars, field trips, student-faculty interaction outside classes, research opportunities, tutoring, and internships. Opportunities for extracurricular activities are valuable components of S-STEM projects that can be strongly encouraged but not required. The primary criteria for continued scholarship eligibility should be satisfactory progress towards degree or successful transfer. The one exception is that graduate students can be required to conduct research if they are doing research as part of their thesis or dissertation. Proposals should include adequate justification that any required courses or activities will not increase scholars' time to degree completion. Under no circumstances should the scholarship funds be structured as compensation for either work or participation in other project activities.

Knowledge Generation and Dissemination: Track 1 (Institutional Capacity Building) and Track 2 (Implementation: Single Institution) proposals require a strong evaluation plan, but do not require an additional research component. In contrast, Track 3 (Inter-institutional Consortia) proposals must include both a strong evaluation plan and a strong research component. See additional details in section V.A.5.h.

Student data collection. S-STEM projects (Track 1, 2 and 3) are required to participate in regular NSF-led data collection activities to follow student progress as specified in section VII. C of Reporting Requirements.

Outreach to certain groups: Although a project may conduct targeted recruiting efforts to reach specific student populations, every applicant who meets the given eligibility requirements must receive equal consideration for a scholarship. The program encourages projects to establish recruitment and outreach programs that reach a diverse applicant pool that is inclusive of, but not limited to, members of underrepresented groups in STEM (e.g., African Americans and other Blacks, Hispanics and other Latinos, American Indians, Alaska Natives, Native Hawaiians and Other Pacific Islanders, persons with disabilities, first generation, persons from rural areas, veterans, and in some STEM disciplines, women), with the broad aim of supporting domestic low-income students with academic ability, talent or potential and demonstrated financial need to obtain degrees and enter into the STEM workforce or graduate studies.

III. AWARD INFORMATION

The number and size of awards will vary depending upon the scope of projects and subject to availability of funds. Approximately \$80 - \$120 million is expected to be available annually to support approximately 75 - 90 new S-STEM Awards in these tracks.

Awards to support Track 1 (Institutional Capacity Building) projects may not exceed \$750,000 total over a maximum duration of 6 years. Awards to support Track 2 (Implementation: Single Institution) projects may not exceed \$1,500,000 total over a maximum duration of 6 years. Awards to support Track 3 (Inter-institutional Consortia) projects may not exceed \$5,000,000 total over a maximum duration of 6 years. The level of funding requested should be based on the focus, scope, and size of the effort. Awards to support Collaborative Planning grants may not exceed \$100,000 total for up to one year.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

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

Who May Serve as PI:

For Track 1 (Institutional Capacity Building) and Track 2 (Implementation: Single Institution) projects, the Principal Investigator must be (a) a faculty member currently teaching in an S-STEM eligible discipline, or (b) an academic administrator who has taught in an S-STEM eligible discipline in the past two years. The Principal Investigator must be able to provide the leadership and time required to ensure the success of the project. Projects involving more than one department within an institution are eligible, but a single Principal Investigator must accept overall management and leadership responsibility. Faculty from all departments involved need to have roles in the project as either Co-Principal Investigators, senior personnel or scholar mentors. Other members of the S-STEM project senior leadership and management team may be listed as Co-Principal Investigators.

For Track 3 (Inter-institutional Consortia) projects, the Principal Investigator must be (a) a faculty member currently teaching in an S-STEM eligible discipline, (b) an academic administrator who has taught an S-STEM eligible discipline in the past two years, or (c) a non-teaching institutional, educational, or social science researcher investigating questions related to low-income student success. The Principal Investigator must be able to provide the leadership and time required to ensure the success of the project. Track 3 consortium proposals must have a Principal Investigator who accepts overall management and leadership responsibility. Faculty from all institutions and departments involved need to have roles in the project as either Co-Principal investigators, senior personnel or scholar mentors. Other members of the S-STEM project senior leadership and management team may be listed as Co-Principal Investigators or as Principal Investigators on collaborative research proposals.

Collaborative Planning grants are intended to help a collection of institutions plan for a future Track 3 proposal. For Collaborative Planning grants, the Principal Investigator must be (a) a faculty member teaching in any S-STEM eligible discipline, or (b) a STEM administrator (department head or above) at one of the institutions within the envisioned inter-institutional consortia, or (c) a non-teaching institutional, educational, or social science researcher investigating questions related to low-income student success. The Principal Investigator on a Collaborative Planning grant must demonstrate the capacity to convene and lead a team of inter-institutional S-STEM eligible faculty and social science or educational researchers focused on low-income student success to write the desired proposal in a 1-year timeframe.

Limit on Number of Proposals per Organization: 2

1. An institution may submit up to two proposals (either as a single institution or as subawardee or a member of an inter-institutional consortia project) for a given S-STEM deadline. Multiple proposals from an institution must not overlap with regard to S-STEM eligible disciplines. See Additional Eligibility Information below for more details (see IV. Eligibility Information).
2. Institutions with a current S-STEM award should wait at least until the end of the third year of execution of their current award before submitting a new S-STEM proposal focused on students pursuing degrees in the same discipline(s).

The above restrictions do not apply to collaborative planning grant proposals.

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

There are no restrictions or limits.

Additional Eligibility Info:

A. Institutions

- An institution that is part of a larger system is considered separate for proposal submission purposes if it is geographically separate from the other campus(es) and has its own chief academic officer. The address of the place of performance on the NSF cover sheet should be different as well.
- Institutions with current active S-STEM awards should not submit a new proposal focusing on the same student population until after the third year of execution has been completed and the corresponding annual report approved. For example, if in Fiscal Year 2020 an institution was awarded an S-STEM grant for undergraduate scholarships for students pursuing a BA in Mathematics, the institution should wait until Fiscal Year 2023 to submit a new S-STEM proposal focused on the same population of students.

B. Scholarship Recipients

S-STEM scholarship recipients (i.e., S-STEM scholars) will be selected by the awardee institution(s), but recipients must:

- Be citizens of the United States, nationals of the United States (as defined in section 101(a) of the Immigration and Nationality Act), aliens admitted as refugees under section 207 of the Immigration and Nationality Act, or aliens lawfully admitted to the United States for permanent residence. Please note that Deferred Action for Childhood Arrivals (DACA) individuals are ineligible for support from this solicitation unless they meet the requirements listed in the first sentence of this bullet by the time of application;
- Be enrolled at least half-time as defined by the institution in a program leading to an associate, baccalaureate, or graduate S-STEM eligible degree in an S-STEM eligible discipline;
- Demonstrate academic ability or potential as defined by the institution;
- Be low-income. The definition of low-income must follow the institutional guidelines for income thresholds that qualify the student as low-income (for example, see eligibility requirements for the US Department of Education (DOE) Pell [<https://www2.ed.gov/programs/fpg/index.html>] and TRIOS grant [<http://www2.ed.gov/about/offices/list/ope/trio/incomelevels.html>] programs or for the US Department of Housing and Urban Development (HUD) public housing program [https://www.hud.gov/topics/rental_assistance/phprog]. For graduate students, the institution should define guidelines either based on prior eligibility as an undergraduate student or the establishment of the individual as independent from the student's parents and the calculation of the independent student total income. The institution's definition of low-income must be included in supplementary documents within the letter from the Financial Aid Office.
- Have demonstrated unmet financial need. Demonstrated financial need for undergraduate students is defined by the US Department of Education rules for need-based Federal financial aid Free Application for Federal Student Aid (FAFSA), or, for graduate students, it is defined as financial eligibility for Graduate Assistance in Areas of National Need (GAANN). In the case of S-STEM, institutions are required to follow the calculations in section II.B that include other grants, fellowships and scholarships but not loans (see <https://studentaid.ed.gov/sa/fafsa/next-steps/how-calculated#need-based>). Income from potential work study should not be included in the calculation for undergraduate students. In the case of graduate students, payment for work associated with their own research can be included. Loans should not be included in calculations of unmet need for either undergraduate or graduate students.

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 FastLane or Grants.gov.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

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

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

Full Proposal Content

The following descriptions of content sections refer to Track 1, 2 and 3 proposals. Collaborative planning grant proposals should make sure its content follow the pertinent description in section II.B.1.

1. Cover Sheet

While filling out the cover sheet in FastLane, it is important to choose the program solicitation number indicated on the cover of this document ("NSF Scholarships in Science, Technology, Engineering, and Mathematics") from the list of programs in the "NSF Unit Consideration" section. This choice must be specified in order to have FastLane access the DUE Project Data Form, which is required for S-STEM proposals.

An informative title for the proposed S-STEM project must be provided on the appropriate line. Please use the full project title and refrain from using the "S-STEM" name or acronym, "NSF," or your institution's name in the project title.

2. Project Data Form

A DUE Project Data Form (NSF Form 1295: Project Data Form) must be completed for all proposals. The information on this form is used to direct proposals to appropriate reviewers and to determine the characteristics of projects supported by DUE. In FastLane, this form appears in the list of forms for the proposal only after the appropriate Program Solicitation number has been selected (indicated on the cover of this document) and indicated on the proposal cover sheet that has been saved. Select the appropriate Track in the drop-down menu.

3. Project Summary

The Project Summary is a one-page description of the proposed project that consists of an overview, a statement on Intellectual Merit, and a statement on Broader Impacts. In the overview, provide a brief description of the S-STEM project being proposed. For Track 1, 2 and 3, also include the number of scholarships to be provided, the number of unique scholarship recipients, the disciplinary areas to be served by the scholarship funds, the objectives of the project, the expected retention or transfer and graduation rates, and basic information about the student recruitment, selection, support, and career counseling and placement services to be provided as part of this S-STEM project.

The project summary MUST explicitly address both Intellectual Merit and Broader Impacts in separate statements. See Section VI. A., Proposal Review Process, for a description of the two criteria. NSF will return without review proposals that do not address both criteria in the Project Summary.

4. Table of Contents

The Table of Contents is system-generated and cannot be edited.

5. Project Description

Project Description Content Checklist

The proposal should clearly describe the plan for implementing a program with the goals and characteristics outlined in the prior and following sections. Proposers must make sure that the proposal includes, within the project description, the following:

- Institutional context, student need assessment and a paragraph with the justification of the national need for professionals with degrees in the specific disciplines requested by the proposal. (literal a below)
- Discussion of the Common Elements presented in Section II.B.2: expected student outcomes, scholar eligibility criteria, analysis of the prospective scholar pool, context-specific interventions, cost of attendance, determination of Scholar eligibility, determination of scholarship amounts. (literal b below)
- Clear plans for cohort-building and faculty mentoring activities. (literal d below)
- Description of the rationale (including the pertinent grounding literature) for the implementation of curricular and co-curricular activities, student support services and programs, and their impact on this specific pool of students based on their needs. (literal e below)
- A detailed recruiting plan, reflective of institutional context. (literal e below)
- Results from prior NSF support, in particular any previous or current S-STEM or STEP awards at the institution. (literal f below)
- Description of the management plan, including discussion of the role of faculty in the disciplines in the operation of the project. (literal g below)
- For Track 3, research questions, methods and methodology that will lead to a clear contribution to the knowledge base on how the pertinent evidence-based curricular and/or co-curricular practices affect low-income student success and degree attainment in STEM when coupled with scholarship support. (literal h below)
- For Track 1, 2 and 3, plans for project evaluation (formative and summative). (literal i below)
- Plans for dissemination. For Track 1, 2 and 3, dissemination of results from project evaluation should also contribute to the knowledge base. (literal j below)
- For planning grants, the project description should include a clear timeline of activities over 1 year maximum and description of the proposed activities based on the list of elements in section B under Collaborative Planning Grants.

The Project Description must conform to PAPPG formatting requirements. For Track 1, Track 2 and Track 3 proposals, it must not exceed 15 single-spaced pages. For Collaborative Planning grant proposals, it must not exceed 6 single-spaced pages. Proposals that exceed the page limit will be returned without review.

The Project Description for Collaborative Planning grant proposals must describe relevant institutional needs and challenges and all the rationale and aspects described in section II.B.1.

In addition to the requirements specified in the PAPPG, the Project Description for Track 1, Track 2, and Track 3 proposals must contain the following information:

a. Project Significance, Objectives and Rationale

The project should have specific objectives that reflect the goals of the S-STEM program and a deep analysis of local needs. Institutional self-studies relevant to the targeted student population can be used to provide a more complete picture of what these students need. Based on needs assessment, proposers should focus on implementing appropriate interventions that target cognitive or non-cognitive aspects of their low-income students' experiences and success (such as those that increase their professional identity such as research experiences, internships, participation in student cohorts, the mentor/mentee relationship, self-efficacy interventions).

The proposal should also contextualize the national or regional need that exists for the type of degrees it aims to award in the disciplines being requested. The burden to demonstrate this national need or positive job prospect rests on the submitting institution. In this section proposers may refer the reader to the statistics included in supplementary documents. Data-driven arguments such as projected job growth and expected wages should be used to justify that these high-potential, low-income scholars will be able to fulfill a rewarding career and achieve social mobility upon graduation with an undergraduate or graduate degree while advancing national competitiveness and security. This analysis should be included even if transfer or subsequent graduate study are primary intended pathways for scholars.

It is expected that scholarship recipients will achieve at least one of the following outcomes by the end of the scholarship award period:

- Attain an associate, baccalaureate, or graduate degree in an S-STEM eligible discipline and enter the workforce or a graduate program in STEM;
- Transfer from an associate degree program to a baccalaureate degree program or advance from an undergraduate program to a graduate program in an S-STEM eligible discipline.

b. Pool of Potential Scholars and Determination of Scholarship Amount

All Track 1, 2 and 3 proposals should include the following, as detailed in Section II.B.2: scholar eligibility criteria, each institutions' cost of attendance, a clear mechanism to determine scholar eligibility, a justification of scholarship amounts and an analysis of the prospective scholar pool.

Determination of Scholar Financial and Academic Eligibility: Beyond US citizenship or immigration status of the scholars pursuing an eligible degree program, proposing institutions must determine all three additional eligibility requirements for scholars: low-income status, demonstrated unmet financial need per

FAFSA² or GAANN³, and academic ability, talent or potential. By Congress mandate, all students who meet a project's eligibility requirements terms of low income, financial need, and academic talent must have an equal opportunity to receive scholarships, regardless of any other factors.

Cost of attendance: Cost of Attendance (COA), determined by each educational institution, is the total amount it will cost a student to go to school, including tuition and fees; on-campus room and board (or a housing and food allowance for off-campus students); allowances for books, supplies, computer equipment, transportation, loan fees, dependent care, mandatory health insurance, graduation fees, and costs related to a disability; and miscellaneous expenses. It is recommended that the PI work closely with the campus financial aid office to establish the institutional COA.

Unmet Need Calculations: In demonstrating unmet need, financial aid offices should **not** include student loans (for either undergraduate or graduate students) or undergraduate work study. Instead, the S-STEM scholarship should be used to reduce or replace scholars' need to work or acquire additional debt, to the extent possible. The calculation of need may include any other grants, fellowships, or scholarships that the student is entitled to.

- Financial eligibility : The institution's definition of low-income must be included in the proposal and in the letter from the Financial Aid Office or equivalent submitted in supplementary documents. When determining eligibility, IHEs must first determine which students are low-income and then, from that pool, determine the level of unmet need. Demonstrated unmet financial need is not equivalent to low-income status. A student can be low-income and have a generous scholarship that covers all the student's expenses and therefore not have unmet need. Conversely, a student can demonstrate unmet need but not satisfy any acceptable definition of low-income.

Unmet financial need is calculated in part by the institution's determination of cost of attendance (COA). Generally, the Financial Aid Office determines unmet need for undergraduate students as:

COA – Expected Family Contribution (EFC) – other grants and scholarships (for the purpose of this program should exclude loans and work) = Unmet Need.

The EFC is determined by the FAFSA form and represents the expected family contribution toward the COA (<http://www.fafsa.ed.gov>).

In the case of graduate students, each institution should present the method selected to assess not only unmet need but also low-income status. One of the biggest considerations is whether graduate students are considered dependent or independent from their parents' income. Students who are married, have children, are over 24 years of age, or are veterans of the US armed forces are generally considered independent by FAFSA provided they have filed independently from their parents in the last two tax cycles. Their income from all sources can be counted independently from their parents', but all scholarships and fellowships should be included in the calculation of unmet need. Institutions can add additional requirements such as prior PELL eligibility during undergraduate studies or other metrics, but those are at the discretion of the institution's financial aid office. It has been documented that low-income students tend to carry over more debt than their counterparts, according to the Council of Graduate Schools (<https://cgsnet.org/data-sources-increasing-number-graduate-and-professional-students-are-former-PELL-recipients-0>). These debts compounded by potential unmet financial needs from their graduate degree can prevent these students from attaining advanced degrees, thus acting as a deterrent of upward social mobility.

NSF cannot prescribe the way in which local financial aid offices or departments develop policies or manage their students. NSF relies on local standard financial aid office policies to define low-income status in the same way that each institution determines measures of academic ability, talent or potential for its students. However, these definitions need to be disclosed in the proposal.

- Academic eligibility : In addition to meeting the financial criteria, scholars should also demonstrate academic ability, talent or potential, and be pursuing a degree in an S-STEM eligible field. To ensure scholars meet these requirements, IHEs are expected to establish clear and equitable selection criteria for scholarships and describe how scholars will be selected out of the pool of all qualified individuals. Academic ability, talent or potential must be defined by the institution in a way that allows for equitable consideration of all students.

Projects that aim at a progression from undergraduate to graduate or from masters to Ph.D. level, need to be proactive and understand graduate school eligibility for S-STEM scholars. PIs are encouraged to work with graduate admission committees to understand how ideas of merit, academic ability and intelligence may be shaping faculty's risk-averse decisions (see Posselt, Julie R. *Inside Graduate Admissions: Merit, Diversity, and Faculty Gatekeeping*. Cambridge, MA and London, England: Harvard University Press, 2016. <https://doi.org/10.4159/9780674915640>). In addition, projects should establish holistic approaches that put appropriate weight to application elements such as letters of recommendation that may exhibit ambiguity when referring to low-income domestic students, or to prior research experiences during summers for a student who needed to work during those periods. PIs are encouraged to avoid putting too much weight on criteria that keep inequities in place.

When discussing the pool of potential scholars, data on all low-income students at the institution is insufficient unless it addresses the disciplines and academic eligibility requirements put forth in the proposal. For example, consider a project that targets computer science students and defines a student to be low income if they are Pell eligible. In this case, the potential pool of applicants should be calculated by considering historic or current data for computer science students who are both (a) Pell eligible, (b) have demonstrated unmet financial need, and (c) meet measurable academic eligibility requirements imposed by the project team (e.g., above certain GPA, above an SAT threshold, etc.). The following table (or similar) should be included in this section:

Department	Number of domestic Low-Income Students with Unmet Need Currently Registered (per year if applicable)					Average GPA	Average unmet need
	1st year	2nd Year	3rd Year	4th Year	other years...		
A							
B							
C							
Total Number of Eligible Students							

All proposals should provide an estimate and justification for the average scholarship amount. This value should balance the desire for a project to benefit the maximum number of students possible against the likelihood of students graduating in STEM. NSF expects that all projects will support scholars until graduation or transfer.

c. Retention and Graduation

Proposals should also include current 1-year retention rates and graduation rates for the above pool of students in each S-STEM eligible discipline that is included in the proposal.

d. Activities and Infrastructure on which the Current Project Builds

S-STEM projects should build on existing academic infrastructure and student supports. Proposals should discuss such already existing academic and student supports that are relevant to the S-STEM project and describe ways in which the S-STEM project will use or enhance those structures (e.g., mentoring, residential life, tutoring, etc.). Proposals should describe and justify their adaptation of those support services and programs implemented for S-STEM scholars and other STEM students. If the institution or a member of a consortium of institutions has had a previous S-STEM and/or STEP award, proposals should also show how the proposed project will build on lessons learned from those efforts.

e. S-STEM Evidence-Based Student Support Services and Programs

Proposals must include a literature review that establishes the rationale for new proposed evidence-based activities to be implemented. These activities need to respond to the documented low-income student and institutional needs or goals. Evidence from the research literature that those supports are effective given the institutional context is needed. These evidence-based interventions should be linked to the needs identified and the target student population.

It is expected that awardee institutions will have or will adapt existing high-quality evidence-based practices (e.g., curricular and co-curricular activities; professional, and workforce development activities) designed to enhance student learning, academic performance, retention to graduation, and career counseling or higher education placement. For all tracks, the selection of activities, students support services and other planned interventions should draw upon the ways in which the impact of these evidence-based approaches can be assessed.

All Track 1, 2 and 3 proposals must include detailed plans to provide scholars with STEM faculty mentors and placement in student cohorts as discussed in Section II.B.

S-STEM scholarships may not be, nor appear to be, payment for services. Since the scholarship often provides funds that allow a student to concentrate on full-time studies, opportunities for extracurricular activities are valuable components of S-STEM projects that can be strongly encouraged but not required. The primary criteria for continued scholarship eligibility should be satisfactory progress towards degree or successful transfer. The one exception is that graduate students can be required to conduct research if they are doing research as part of their thesis or dissertation. Proposals should include adequate justification that any suggested courses, seminars, or other activities will not increase scholars' time to degree completion.

See Section V.A.8 below for further discussion of budget details.

f. Results from Prior NSF Support

Report on the results from related prior NSF support in accordance with NSF PAPPG requirements (see Chapter II.C.2.d(iii) of the PAPPG). Additionally, if there have been any prior S-STEM or Science, Technology, Engineering, and Mathematics (STEM) Expansion Program (STEP) awards at the institution, even if not to the same group of PI or Co-PIs, those results should be included here. The proposed project should build on the institutional experience from the prior or ongoing project. Proposals should include quantitative and qualitative outcomes of any current or former project(s) and how the experience has informed plans for the current project. Proposers may use the NSF web search [<http://go.usa.gov/X5F>], at the bottom of the program webpage select the link "What Has Been Funded (Recent Awards Made Through This Program, with Abstracts)" to search for prior awards in the S-STEM program. Required information is listed below.

Results from prior or ongoing STEP and S-STEM awards should include at a minimum: Award number(s); amount of the scholarship; number of scholarship recipients; number and percentage of recipients transferring from 2-year institutions to 4-year programs (if appropriate); number of recipients graduating; percentage of recipients graduating; and number and percentage of recipients leaving the program. If available, proposers could include a concise description of the project activities, retention, and graduation rates. Descriptions of the results from prior S-STEM and/or STEP support must also discuss: (1) lessons learned from the implementation of project activities and outcomes of the project(s) and (2) how these lessons influenced the proposed project.

g. S-STEM Project Management Plan

S-STEM projects must be guided by a management plan in which the key personnel and project logistics are defined. The roles and responsibilities of the personnel involved should be clear. The proposal must describe specific roles for each person in the project. The lead PI will have overall responsibility for administering the project and for interacting with NSF.

Responsibility for activities such as recruitment, selection, and retention of students; studies to determine the effectiveness of project activities; maintenance of S-STEM records; coordination of data collection, analysis, and reporting responsibilities; oversight of student supports; and implementation of a process by which students who lose S-STEM eligibility will be replaced by new students, etc., must be assigned in this plan.

h. Generation of Knowledge

Track 1 and Track 2 projects are expected to contribute to knowledge by disseminating results from their external evaluation reports. Track 3 projects are expected to generate knowledge through external evaluation as well as through a clear research plan based on the scalability of the interventions to different institutions. This research is led by PIs, Co-PIs or senior staff who are faculty in social sciences or educational research. *The faculty involved in the research component of Track 3 proposals cannot act as external evaluators for the project or work.*

The nature of S-STEM projects generally aligns with generation of knowledge through efficacy or effectiveness studies, as outlined in the Common Guidelines for Education Research and Development (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126). In this context, S-STEM projects should strive to increase understanding about the contributions that proposed student supports can make to program goals of STEM retention and graduation when coupled with scholarships. All proposals should include robust dissemination plans to share the project's implementation mechanisms, Scholar outcomes and/or other findings with communities that are similarly engaged in efforts to improve outcomes for low-income STEM students.

For Tracks 1 and 2, projects should strive to inform understanding about the effectiveness¹ of factors and/or activities associated with retention, student success, transfer, academic/career pathways, and degree attainment through the dissemination of their evaluation results. The project's effectiveness should be assessed according to the nature of the problem that the proposed approach is intended to address. While an external evaluator independent from the project team must be substantively responsible for the design and execution of the evaluation plan, dissemination of what works is still the responsibility of the PI team. Incorporation of local expertise in institutional, educational, or social science research could provide significant guidance for the development and execution of focused programming and facilitate generation of knowledge but is not a requirement for Track 1 and 2.

For Track 3, proposals should clearly describe the approach and research questions to be tested and should provide a strong theoretical or empirical justification for their choices, including the role and impact of institutional and student contexts. Research questions must be grounded in the literature but should also be informed by and linked to the specific needs of the student population being served at the different institutions in the consortia. The study design should leverage this justification to identify suitable project data, describe plans for data collection, and select appropriate methodologies for data analysis. These features of the

study design should be aligned with the scope and focus of the project approach. The inclusion of appropriate expertise in institutional, educational, or social science research is expected to guide the development and implementation of knowledge generation within the project. The research component of Track 3 projects is different from the external evaluation and should not be executed by the same personnel. External evaluation is discussed in the next section.

i. Evaluation

Each Track 1, 2 and 3 proposal should describe a clear and specific external evaluation plan that is clearly aligned with the stated goals of the project and is executed by an external evaluator as detailed in Section II.B. The evaluation plan must include periodic formative evaluation to guide project improvement and to allow for any necessary corrective action, and summative evaluation to assess and document project outcomes, accomplishments, and lessons learned over the full duration of the project. Summative evaluation generally reports on the number of students who graduated from the program, their career trajectories and the implementation and lessons learned through the life of project. Beyond the direct impact on S-STEM scholars, S-STEM projects should also attempt to measure the project's outcomes and/or impacts on the departments and/or disciplines involved, and on the institution.

The evaluation design should match the scope of the project and funds dedicated to evaluation efforts should be commensurate to the time requirements needed by a professional external evaluator to execute the plan appropriately. A theory of change or logic model is expected. A bio sketch with the qualifications and evaluation experience of the external evaluator should also be included in supplementary documents.

The evaluation must be executed by an evaluator that is external to the project to provide objective and independent feedback regarding the progress of the overall project. The external evaluator may be employed by a project's home institution, as long as he or she works in a separate organizational unit (e.g., a different department) that has a different reporting line than that of the project's home unit. The evaluator should not be Co-PI or senior personnel on the project but should be compensated appropriately using other direct cost lines, such as consulting or other direct costs. The budget justification for the external evaluation budget line should specify how many hours/days the evaluator will dedicate and the going rate.

Collaborative Planning Grant proposals do not require an external evaluator but should include a mechanism to assess the collaborative planning effort's progress towards its stated goals.

j. Dissemination

All Track 1, 2 and 3 proposals should include robust dissemination plans to share the project's implementation mechanisms, Scholar outcomes and/or other findings with communities that are similarly engaged in efforts to improve outcomes for low-income STEM students.

k. Broader Impacts

As specified in the PAPPG, the Project Description also must contain, as a separate section within the narrative, a section labeled "Broader Impacts".

6. References Cited

References should draw on the discipline-based education research literature, on the literature on STEM teaching and learning, and on the research literature on higher education.

7. Biographical Sketches

Include a biographical sketch (following the instructions in the current PAPPG) for the Principal Investigator and each listed Co-Principal Investigator and/or Senior Personnel.

8. Budget, Budget Justification, and Allowable Costs

Provide a budget for each year of support requested. The maximum duration for a Track 1, 2 or 3 project is expected to be 6 years. Proposals requesting a six-year budget must be submitted via FastLane.

The maximum S-STEM request for Track 1 may not exceed \$750,000. The maximum S-STEM request for Track 2 may not exceed \$1,500,000. The maximum S-STEM request for Track 3 may not exceed \$5,000,000.

It is expected that proposers will request funds commensurate with the number of eligible scholars determined by the Analysis of Prospective Scholar Pool. In addition, proposers are strongly encouraged to request funds for the number of years needed to support all students in different cohorts to graduation or successful transfer. For example, projects that aim to support entering first year students to complete a bachelor's degree could support three 4-year cohorts of students over six years. Projects that aim to support students to earn an associate degree could support five 2-year student cohorts.

The following instructions refer to the NSF proposal budget form. The sections and budget line designations correspond to the FastLane budget screen.

- For Tracks 1, 2 and 3 allocations for scholarships should be indicated in NSF budget form section F, "Participant Support," line F.1 - "Stipends" of the FastLane budget form. Scholarships may be requested for up to \$10,000 per student per year. Because many students may not be eligible for the maximum scholarship amount of \$10,000, the proposal should explain how the number of scholarships requested and the average total amount of scholarship funds requested were determined. It is expected that scholarships to individual students may vary because of differences in unmet financial need.
- At least 60% of the total requested amount must go to pure scholarships to cover the cost of attendance of domestic low-income students with academic talent and demonstrated financial need. The number of unique students helped each year should be recorded in every budget year.
- Faculty salary requests must be accompanied by an appropriate indication of the fraction of academic or summer months to be paid by the grant.
- For Tracks 1, 2, and 3 funds must be requested for expenses related to supporting the implementation and testing of high quality extant curricular and co-curricular activities, student support, project evaluation, dissemination, and project management. These costs may include funds associated with personnel required to implement project activities. These direct costs must be assigned to the appropriate NSF budget categories on the NSF budget form and must be explained in the budget justification. Refer to the PAPPG instructions for appropriate categories. Items that are for direct support of Scholar participants (for example, student travel to professional meetings or meeting registrations) should be listed in the "Participant Support" section on lines F.2, "Travel" or F.3, "Subsistence." Other costs should be listed in other sections of the budget as appropriate. These non-scholarship costs could include:
 - Support for adaptation and implementation of high-quality evidence-based academic and non-academic student support efforts. Group activities, such as peer mentoring, tutoring, seminar series, bridge programs, and career development programs, may serve both scholars and other students but individual funds can only be allocated to support scholars.
 - Career counseling and job placement services for S-STEM scholars.

- o Support for Scholar professional development experiences, such as internships, research experiences, and conference attendance. These experiences may be year-long or take place during academic recess periods, such as over summer or winter breaks. Note that NSF is particularly interested in supporting internships and research experiences in fields identified as critical needs for the Nation. These fields include quantum computing and quantum science, robotics, artificial intelligence and machine learning, computer science, data analytics, and other frontier STEM areas in need of domestic professionals.
- o Mental health services.
- o Equipment and internet services for the use of the scholars exclusively.
- o Support for management and external evaluation (formative and summative) of the project.
- Indirect costs (NSF budget form line I) are subject to the institution's current Federally negotiated indirect cost agreement. The total budget request (sum of direct and indirect costs to be entered on budget line J) must not exceed the amount set for each type of project. Prospective PIs should consult with their university Office of Sponsored Programs about the calculation of indirect costs.
- Proposals can include within their scholarship budgets funds to support scholars overcoming financial hurdles that prevent them from continuing in school or degree obtainment. For example, help to students who meet the low-income definition and who have completed all degree requirements in the field(s) supported by the proposal, but cannot obtain their degree because of debt to the college or university is possible. These scholarship supports cannot exceed the \$10,000 per year of allowable funds per student. Other supports who do not count as scholarships can be paid out of the 40% remaining budget funds (e.g., payments to students for participation in internships, research experiences, conference attendance, etc.)
- Collaborative Planning grants must not plan to award scholarships and can use 100% of the budget for direct and indirect costs to pay for allowable expenses needed to accomplish the goals of the project.

For Tracks 1, 2, 3 and Collaborative Planning grants, funds should also be included for the PI or another member of the leadership team to attend periodic S-STEM PI Conferences. For Tracks 1, 2 and 3 these funds should cover participation for at least one member of the PI team to come to Washington DC every other year (at least 3 times during the life of the award). For Track 3 proposals, in addition to the above, funds for the entire leadership team (including subawardee PIs) to come to Washington for the third-year review should be included.

For proposals in all tracks, including Collaborative Planning grants, the level of funding requested should be congruent with the focus, scope, and size of the effort.

9. Current and Pending Support

See PAPPG Chapter II.C.2.h. For proposals with a duration of six years, current and pending support should be reported for the first five years of the project.

10. Facilities, Equipment, and Other Resources

See PAPPG Chapter II.C.2.i.

11. Supplementary Documentation

Supplementary documents are limited to the specific types of documents listed in PAPPG Chapter II.C.2.j with the following exceptions for Track 1, 2 and 3 proposals:

- Proposals must include an analysis of at most one page that considers the job prospects, either regionally or nationally, that scholars are expected to have with their earned degrees, even in cases where transfer or graduate study is being promoted as a primary pathway for scholars. All proposers must demonstrate that the degrees to be supported with S-STEM funds are within a disciplinary area of strategic national need for the economic competitiveness and national security of the United States. Equally important, low-income students with academic ability, talent or potential must be able to achieve a rewarding and career with income to achieve social mobility. Positive job prospects are expected for S-STEM scholars. A number of statistical resources, such as the US Department of Labor projections of new jobs and projected growth rate in an specific occupation in the Occupational Outlook Handbook [Home : Occupational Outlook Handbook : U.S. Bureau of Labor Statistics \(bls.gov\)](http://www.bls.gov); the O*NET Program is also a primary source of occupational information which allows to drill down to state, zip code information on wages and employment trends <https://www.onetonline.org/>; projections of employment and job openings in S&E and other selected occupations published by the National Center of Science and Engineering Statistics (NCSES) <https://nces.nsf.gov/pubs/nsb20212/u-s-stem-workforce-definition-size-and-growth#tableCtr4420>, and the H1-B visa detailed occupation reports by Department of Homeland Security [Characteristics of H-1B Specialty Occupation Workers FY 2020 \(uscis.gov\)](http://uscis.gov) among many others. The mechanism chosen to demonstrate that scholars will be able to find a job upon graduation is entirely up to the proposers. This analysis should not exceed one page and should be uploaded as supplemental document in the corresponding section. In addition to this 1-page analysis, proposers should provide a one paragraph summary of this occupational context in the project description section A.
- Proposals must include a letter from the Financial Aid Office or equivalent that includes the commitments and information outlined in Section II.B.
- Proposals must include the following information in a single document PDF entitled "Project Details" in tabular form. If scholarships of different amounts or lengths of time are planned, the first table should be duplicated multiple times to capture all the information. For collaborative and multi-institutional proposals, the requested data should be provided for each institution separately.

Name of institution =	<i>Enter Name</i>
Anticipated number of unique scholars supported =	<i>Enter Number</i>
Anticipated average annual amount of each scholarship =	<i>Enter Amount or Range</i>
Anticipated number of years of scholarship support per Scholar =	<i>Enter Number or Range</i>

Name of degree on diploma awarded to scholars:	
Name #1	
Name #2	
Name #3	
Name #4, etc.	

- Proposals should include the biographical sketches in NSF format of all key collaborators not included as senior personnel, such as the external evaluator, advisory board members, or other consultants engaged with the project.

Proposals that include supplementary documents beyond those specified in the PAPPG and in this solicitation may be returned without review.

[1] Institute of Education Sciences, US Department of Education, and the National Science Foundation. (2013). Common Guidelines for Education Research and Development: A Report from the Institute of Education Common Guidelines for Education Research and Development, Sciences, US Department of

Education and the National Science Foundation, August 2013, [NSF 13-126](#). Arlington, VA: National Science Foundation.

[2] <http://www.fafsa.ed.gov>

[3] <https://www2.ed.gov/programs/gaann/faq.html#q17>

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

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. submitter's local time):

February 22, 2022

Tracks 1, 2, 3 & Collaborative Planning Grants

February 20, 2023

Third Monday in February, Annually Thereafter

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the NSF Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The NSF Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening

participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

competitiveness of the United States; and enhanced infrastructure for research and education.

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

Additional Solicitation Specific Review Criteria

In addition to the standard NSF Intellectual Merit and Broader Impacts Criteria, reviewers will be asked to consider the extent to which the project is aligned with the spirit of the legislation that created the program in view of:

- The case made about the regional or national need for professionals with degrees being awarded in this project.
- The information provided about the likelihood of low-income scholars to find a rewarding job in the STEM workforce upon graduation with either an undergraduate or graduate degree.

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

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

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

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project

reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

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

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

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

S-STEM Monitoring system: In response to the need for NSF to report on the operation and success of the S-STEM program, an additional web-based data collection site has been developed for the purpose of collecting information about program participants. This system: S-STEM.ORG is maintained by an external contractor.

Each S-STEM PI is required to complete information about each S-STEM Scholar and subsequently update the information reported through the website during each semester of continued S-STEM support. Instructions will be provided shortly after the award to successful grantees. This information must be provided within 30 days of the beginning of each semester or quarter and includes the following information about each S-STEM Scholar: name, permanent address, school address, major, career goals, race/ethnicity (student's option to report), disabilities (student's option to report), gender, date of birth, grade point average, participation in an internship (in an S-STEM-related area), and student employment (part-time or full-time; not necessarily in an S-STEM-related area). Any information that would permit identification of individual responses will be held in strict confidence.

Third Year Review for S-STEM Track 3 Inter-institutional Consortium awards: Track 3 projects are required to participate in a Third-Year Review that will focus on accomplishments, challenges, changes in the project, and lessons learned. Instructions will be provided in advance to the third-year anniversary to successful Track 3 grantees. Third year reviews provide feedback and guidance for project implementation and assessment of project outcomes. Project teams present information on the status of project activities and outcomes to date. After the review of project documentation and a presentation by the awardee team, a team of S-STEM staff will acknowledge accomplishments, discuss shortcomings, and make recommendations to improve project implementation as appropriate. If a third-year review is not satisfactory, NSF reserve reserves the right to cancel the project.

Data collection efforts from S-STEM Resource and Evaluation Center (S-STEM-REC): NSF is planning to fund a Resource and Evaluation Center tasked with collecting and synthesizing outcomes and achievements of Track 1, 2 and 3 projects nationwide. Projects are required to collaborate with the S-STEM-REC initiatives to showcase the impact of S-STEM funding.

Projects are required to cooperate and participate in a third-party independent evaluation of the S-STEM program.

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:

- Alexandra Medina-Borja, Lead, telephone: (703) 292-7557, email: amedinab@nsf.gov
- Mindy Capaldi, Co-Lead, telephone: (703) 292-2994, email: mcapaldi@nsf.gov
- Michael J. Ferrara, Co-Lead, telephone: (703) 292-2635, email: mferrara@nsf.gov
- Thomas D. Kim, Co-Lead, telephone: (703) 292-4458, email: tkim@nsf.gov
- Susan Carson, telephone: (703) 292-5111, email: scarson@nsf.gov
- Mary Crowe, telephone: (703) 292-5111, email: mcrowe@nsf.gov
- Michael J. Davis, telephone: (703) 292-5111, email: mdavis@nsf.gov
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For questions related to the use of FastLane or Research.gov, contact:

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

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

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