Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program)

PROGRAM SOLICITATION
NSF 20-599

REPLACES DOCUMENT(S):
NSF 19-540

National Science Foundation

Directorate for Education and Human Resources
   Division of Human Resource Development
   Division of Undergraduate Education

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

February 10, 2021

    Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

February 10, 2021

Second Wednesday in February, Annually Thereafter

    Track 3: Institutional Transformation Projects (ITP) full proposal deadline.

August 25, 2021

Last Wednesday in August, Annually Thereafter

    Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

IMPORTANT INFORMATION AND REVISION NOTES

The Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program) now accepts proposals in three tracks: Track 1: Planning or Pilot Projects (PPP) ranging from $200K to $400K; Track 2: Implementation and Evaluation Projects (IEP) ranging from $500K to $1M; and Track 3: Institutional Transformation Projects (ITP) up to $3M.

A Student Mentoring Plan, as a supplementary document, is now required for all proposals requesting stipends or wages to support undergraduate or graduate students.

All tracks may request funds to support STEM faculty to conduct research aligned with the proposed project and to support undergraduate research.

Conference proposals may be submitted by institutions of higher education and non-profit organizations after consultation with an HSI program officer. Proposal Preparation Instructions have been updated significantly. Please see section V of the solicitation for further information.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 20-1), which is effective for proposals submitted, or due, on or after June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

    Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program)

Synopsis of Program:

    The goals of the HSI program are to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) education and to increase the recruitment, retention, and graduation rates of students pursuing associate's or baccalaureate degrees in STEM. Achieving these, given the diverse nature and context of the HSIs, requires additional strategies that support building capacity at HSIs

through innovative approaches: to incentivize institutional and community transformation; and to promote fundamental research (i) on engaged student learning, (ii) about what it takes to diversify and increase participation in STEM effectively, and (iii) that improves our understanding of how to build institutional capacity at HSIs. Intended outcomes of the HSI Program include broadening participation of students that are historically underrepresented in STEM and expanding students' pathways to continued STEM education and integration into the STEM workforce.

The HSI program is aligned with the National Science Board's vision for, and the NSF's commitment to, a more diverse and capable science and engineering workforce.[1,2] HSIs are heterogeneous and unique in many respects.[3] Some HSIs have well-established undergraduate STEM programs while others are just beginning to create STEM programs. Whether 2-year or 4-year, public or private, the HSIs serve a wide range of students with a diverse set of educational backgrounds. The need for tailored initiatives, policies, and practices (mindful of socio-cultural awareness) should meet the students' needs and institutions' expectations while advancing undergraduate students at HSIs toward higher levels of academic achievement in STEM. This is the motivation behind three HSI program tracks: *Track 1: Planning or Pilot Projects (PPP); Track 2: Implementation and Evaluation Projects (IEP)*; and *Track 3: Institutional Transformation Projects (ITP). Track 3, ITP,* is motivated by work on organizational identities for HSIs that suggest that organizational culture and identity play a key role in the success of an HSI in promoting student success in STEM.[4]

The HSI program accepts proposals in the following tracks:

Track 1: The **Planning or Pilot Projects (PPP)** track provides a funding opportunity for institutions that are new to NSF[5] or are Primarily Undergraduate Institutions (PUIs[6]), including community colleges. The PPP has been designed to link with the other two tracks. The PPP track seeks to enhance undergraduate STEM education and build capacity at less-resourced institutions and to increase these institutions' ability to compete for NSF funding from other programs.

Planning projects in this track undertake the activities necessary to develop a future HSI program Track 2 or Track 3 proposal submission. **Pilot** projects in this track may be carried out to achieve a short-term, well-defined goal to enhance the availability of high-quality undergraduate STEM education at the HSI and gather preliminary data for future HSI program Track 2 or Track 3 proposals. Importantly, Pilot projects may also develop fundamental STEM education research capacity on student learning at HSIs, discovering effective means for diversifying and increasing participation in STEM. All PPP projects must include project evaluation and dissemination components.

Track 2: The **Implementation and Evaluation Projects (IEP)** track supports the implementation of evidence-based unit-, department-, or multi-department-level activities that will enhance the quality of undergraduate STEM education. All HSI institution types are encouraged to apply, especially PUIs (including community colleges). These projects may design and implement a new educational practice or practices, and/or adapt/replicate evidence-based practices that are already known to be effective.

IEP may conduct research that promotes one or more of the HSI program goals, including research on indicators of effective and successful undergraduate STEM education at HSIs. These projects must include both project evaluation and dissemination components, as well as an education research component. The IEP strategies are expected to be institutionalized and sustainable.

Track 3: The **Institutional Transformation Projects (ITP)** track supports institution-wide structural or systemic changes to enhance undergraduate STEM education at the proposing HSI. The ITP must be grounded in STEM education research and broadening participation research and be designed to make institutional infrastructure and policy changes to support long-term institutional changes that encourage and support faculty in implementing evidence-based practices that enhance student outcomes in STEM at the proposing HSI.

Under the **ITP** track, research (including foundational research) that improves our understanding of how to build HSI institutional capacity in STEM is encouraged. Such research should result in a strategic understanding about how the multiple components of the HSI program goals work synchronously to advance STEM education. All institution types are encouraged to apply, especially PUIs (including community colleges). Proposed activities can include adaptation of evidence-based strategies and/or the design and implementation of innovative strategies. The ITP must include both project evaluation and dissemination components, as well as an education research component. The ITP proposed structural or systemic changes are expected to be institutionalized and sustained by the HSI.

All tracks may support faculty research that is inter-, multi-, or trans-disciplinary, discipline-specific research, STEM education research, discipline-based STEM education research, or broadening participation research. Research may be based at their home institution, an NSF-funded research center, another institution of higher education, and/or a national laboratory. Fundamental research is particularly encouraged on engaged student learning at HSIs, and on effectively diversifying and increasing participation in STEM at HSIs. Research-related funds may be requested for undergraduate student research, supplies, equipment required to carry out the research, and faculty research development activities.

Proposed faculty research should support the overarching goals of the HSI program which seek to improve and enhance undergraduate STEM education, including undergraduate student research experiences. Proposed research should also explain how it will catalyze new faculty research activity in addition to supporting on-going faculty research activities. Each faculty member receiving funds to conduct research must include a four-page Faculty Research Plan in which one to two pages are used to describe the faculty member's track record in diversity, equity, and inclusion (DEI), mentoring, and advancing diverse students in STEM.

All projects must generate new knowledge through project evaluation activities and articulate a plan for dissemination of findings. Track 2 (IEP) and Track 3 (ITP) proposals must additionally generate new knowledge about how to improve access to and/or the quality of STEM education through a well-constructed STEM education research plan that is aligned with the project's goals. Additionally, proposals must provide institutional data with a narrative explaining the institution's need for the project and its ability to enhance the quality of undergraduate STEM education.

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[1] *Vision 2030*, National Science Board, https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf

[2] *Building the Future Investing in Innovation and Discovery: NSF Strategic Plan 2018-2022.* https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf18045.

[3] National Academies of Sciences, Engineering, and Medicine. 2019. Minority Serving Institutions: America's Underutilized Resource for Strengthening the STEM Workforce. Washington, DC: The National Academies Press. https://doi.org/10.17226/25257.

[4] García, Gina A. 2017. "Defined by outcomes or culture? Constructing an organizational identity for Hispanic-serving institutions." *American Educational Research Journal*, 54(1): 111S-134S.

[5] The definition and guide to *New to NSF* can be found on Chapter II of proposal preparation instructions https://www.nsf.gov/pubs/policydocs/pappg18_1/pappg_2.jsp.

[6] PUIs are "accredited colleges and universities (including two-year community colleges) that award Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./ D.Sci. degrees in all NSF-supported fields during the combined previous two academic years." PUI definition obtained from https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5518.

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.

- For general inquiries, contact: NSF-EHR-HSI@nsf.gov

- Erika Tatiana Camacho, telephone: (703) 292-2834, email: ecamacho@nsf.gov

- Michael J. Davis, telephone: (703) 292-7166, email: mdavis@nsf.gov

- For general inquiries contact, telephone: (703)292-4649, email: NSF-EHR-HSI@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: 20 to 37

The program estimates making

- 15 to 25 Planning or Pilot Project awards,
    - $200,000 – single institution
    - $300,000 – collaborative
    - Plus $100,000 incentive to partner with one or more community colleges
    - For two-year-long projects

- Up to 10 Implementation and Evaluation Project awards, and
    - $500,000 – single institution
    - $800,000 – collaborative
    - Plus $200,000 incentive to partner with one or more community colleges
    - For three- to five-year-long projects

- 1 or 2 Institutional Transformation Project award per fiscal year.
    - Up to $3,000,000
    - For five-year-long projects

Anticipated Funding Amount: $11,000,000

The number of new awards is subject to the availability of funds.

In FY 2021, the HSI program expects to fund new awards totaling $11,000,000.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- non-profit institutions.

    To be eligible for HSI funding in Track 1: Planning or Pilot Projects (PPP), Track 2 Implementation and Evaluation Projects (IEP), and Track 3 Institutional Transformation Projects (ITP), an institution must achieve each of the following criteria on or before the proposal deadline date:

    a. Be an accredited institution of higher education.
    b. Offer undergraduate STEM educational programs that result in certificates or degrees. Exception note: An institution submitting a PPP Track proposal does not currently need to offer STEM certificates or degrees, but may submit a proposal to develop such programs or enhance the STEM courses provided as part of other

degree programs.

    c. Satisfy the definition of an HSI as specified in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a). The HSI Certification Form is required with submission of the proposal. (See section V of the solicitation.) Institutions should review the legislation before certifying their eligibility for this program at https://www.govinfo.gov/content/pkg/USCODE-2011-title20/html/USCODE-2011-title20-chap28-subchapV-partA-sec1101a.htm.

- PPP track proposals will only be accepted from institutions new to NSF or Primarily Undergraduate Institutions (PUIs) including community colleges. For PUI certification, a representative of the institution submitting as a PUI proposal must sign a Certification of PUI Eligibility (see Section V below for the required template) to be included in the Supplementary Documentation section of the proposal.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

- Planning or Pilot Projects (PPP) track: An eligible institution cannot have more than two active PPP awards. A new PPP proposal can be submitted by an institution with two active PPP awards if at least one of the awards has had its final report submitted before the submission deadline for HSI proposals. Institutions with an active HSI Track 1: Building Capacity award under the previous solicitations 18-524 and 19-540 are not eligible to submit PPP proposals or receive a PPP award until the prior HSI award's final report is submitted.
- Implementation and Evaluation Projects (IEP) track: An eligible institution cannot have more than two active IEP awards. A new IEP proposal can be submitted by an institution with two active IEP awards if at least one of the awards has had its final report submitted prior to the HSI proposal submission deadline. A collaborative award counts as an HSI IEP award for all institutions. For institutions with a current Track 1: Building Capacity award under the previous solicitations 18-524 and 19-540, each award is considered an IEP award for the purpose of calculating active awards for this track.
- Institutional Transformation Projects (ITP) track: One submission per institution is allowed. Previous ITP awardees are not eligible to submit a proposal in the ITP track.

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

An individual may be listed as PI on only one proposal and Co-PI on at most two proposals per submission period.

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 10, 2021

      Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

  February 10, 2021

  Second Wednesday in February, Annually Thereafter

      Track 3: Institutional Transformation Projects (ITP) full proposal deadline.

August 25, 2021

Last Wednesday in August, Annually Thereafter

Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

The goals of the HSI program are to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) education and to increase the recruitment, retention, and graduation rates of students pursuing associate's or baccalaureate degrees in STEM. Achieving these, given the diverse nature and context of the HSIs, requires additional strategies that support building capacity at HSIs through innovative approaches: to incentivize institutional and community transformation; and to promote fundamental research (i) on engaged student learning at HSIs, (ii) about what it takes to diversify and increase participation in STEM effectively, and (iii) that improves our understanding of how to build institutional capacity at HSIs. Intended outcomes of the HSI Program include broadening participation of students that are historically underrepresented in STEM and expanding students pathways to continued STEM education and integration into the STEM workforce [1],[2],[3],[4].

Building organizational capacity, as encouraged by the explanatory statement of the Consolidated Appropriations Act, 2017 Public Law 115-31, is concerned with the creation and implementation of flexible systems that support both new and old ideas. Building capacity should involve developing structures that foster students' and/or faculty growth while meeting the students *where they are* in their college careers academically, financially, and socially [5],[6]. Institutional structures may also include socio-cultural supports and collaborative processes that promote effective learning environments and inclusiveness as well as mechanisms to support personal development and professional learning for students [7].

The HSI program is designed to support the wide range of institutional types of HSIs, as well as prepare for the participation of emerging HSIs in the future. HSIs are a diverse collection of institutions with varying organizational structures and with multiple student characteristics (e.g., low-income, first generation, underrepresented minority, and returning students) that impact the learning landscape and the approaches for enhancing undergraduate STEM education [5]. Given our nation's STEM workforce needs and the shifts in demographics, with Hispanics/Latinos projected to comprise 25 percent of the U.S. population by 2045, increasing undergraduate STEM degree attainment at HSIs is essential to sustain the economic and social well-being of the U.S. [8],[9].

To help meet the need for increased undergraduate STEM degree attainment, proposers are encouraged to use an intersectional perspective in designing

proposals across all tracks in the HSI program. An intersectional lens takes into consideration the interconnectedness of overlapping social identities, and can help shape a project's design and conceptualization of inclusivity to better serve students [10]. More than 50% of Hispanic/ Latino/a undergraduate students attend HSIs, and an intersectional approach to meeting them *where they are* could significantly impact the diversity of undergraduate STEM degrees awarded and STEM professionals in the U.S. [5].

Before beginning the HSI program, NSF sought community input through a Dear Colleague Letter [11] calling for conference grants in order to convene stakeholders. NSF also conducted virtual listening sessions to invite commentary from members of the HSI community (https://nsf.gov/ehr/HSIProgramPlan.jsp). In addition, NSF established a subcommittee of its standing Federal Advisory Committee for Education and Human Resources that drafted a report to NSF identifying five key components for an HSI program: (1) Faculty development, (2) Curriculum redesign, (3) Undergraduate research, (4) Transitions, and (5) Metrics for success [12]. These five components guide the priorities of the HSI program and its types of projects, including support for research in capacity building and institutional transformation. Rigorous research should generate critical knowledge about how these five key components work together to improve the quality of undergraduate STEM education at HSIs.

Project teams are encouraged to establish mutually beneficial collaborations with other HSIs, especially HSI community colleges, and other institutions of higher education. In addition, project teams are encouraged to explore collaborations with the NSF INCLUDES National Network [13]. NSF INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science) is a comprehensive national initiative designed to enhance U.S. leadership in STEM discoveries and innovations by focusing on broadening participation in STEM fields at scale. Finally, to contribute to a highly skilled and diverse workforce, proposers are encouraged to consider projects that will educate students in high demand topical areas, such as data science, and industries of the future (artificial intelligence, next generation wireless, advanced manufacturing, quantum information science, and biotechnology) [14],[15].

References

[1] The Higher Education Act of 1965 (P.L. 89-329) [As Amended Through Public Law 11531, Enacted May 5, 2017]; https://uscode.house.gov/statutes/pl/115/31.pdf.

[2] U.S. Code, Title 42, Chapter 16, Section 1862o12: Hispanic-serving institutions undergraduate program. https://uscode.house.gov/view.xhtml?req= (title:42%20section:1862o-12%20edition:prelim).

[3] U.S. Code, Title 42, Chapter 16, Section 1862p4: Undergraduate broadening participation program. https://uscode.house.gov/view.xhtml?req= (title:42%20section:1862p-4%20edition:prelim).

[4] Explanatory statement of Consolidated Appropriations Act, 2017 Public Law 115-31, https://www.congress.gov/congressional-record/2017/5/3/house-section/article/H3327-1.

[5] National Academies of Sciences, Engineering, and Medicine. 2019. Minority Serving Institutions: Americas Underutilized Resource for Strengthening the STEM Workforce. Washington, DC: The National Academies Press. https://doi.org/10.17226/25257.

[6] Mitchell, Coral, and Larry Sackney. *Profound improvement: Building capacity for a learning community*. Taylor & Francis, 2011.

[7] García, Gina A. 2017. "Defined by outcomes or culture? Constructing an organizational identity for Hispanic-serving institutions." *American Educational Research Journal*, 54(1): 111S-134S.

[8] Crisp, G. and Nora, A., 2012. Overview of Hispanics in science, mathematics, engineering and technology (STEM): K-16 representation, preparation and participation.

[9] 2017 National Population Projections, www.census.gov/library/visualizations/2018/comm/hispanic-projected-pop.html.

[10] Núñez, A.M., 2014. Advancing an intersectionality framework in higher education: Power and Latino postsecondary opportunity. In *Higher education: Handbook of theory and research* (pp. 33-92). Springer, Dordrecht.

[11] NSF Dear Colleague Letter: Improving Undergraduate STEM Education in Hispanic Serving Institutions (HSIs), NSF-17092. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17092.

[12] National Science Foundation Report to the Education and Human Resources Advisory Committee on Building Capacity at Hispanic Serving Institutions, Sep 29, 2017. https://www.nsf.gov/ehr/Materials/HSISubcommitteeReport.pdf.

[13] NSF INCLUDES Initiative, https://www.nsf.gov/news/special_reports/big_ideas/includes.jsp.

[14] NSFs 10 Big Ideas. https://www.nsf.gov/news/special_reports/big_ideas/.

[15] Vision 2030, *National Science Board*. https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf.

II. PROGRAM DESCRIPTION

A. OVERVIEW

Project activities and interventions supported by the HSI program are expected to be evidence-based and generate new knowledge in line with the HSI program goals specified in the Synopsis and Introduction sections. The HSI program recognizes that putting existing research-based practices into place may be the most important solution for improving undergraduate STEM[1] education and broadening participation in STEM at the proposing HSI(s). Consequently, conceptual replication[2] or adaptation studies are encouraged. Such replication/adaptation efforts will help propagate and evaluate the effectiveness of evidence-based STEM broadening participation interventions, and teaching and learning approaches in new environments. The HSI program is also interested in the successful advancement of undergraduates at HSIs through critical transitions, including the transfer of students from two-year to four-year institutions and the transition from secondary education to undergraduate education of students enrolled in a STEM undergraduate degree-seeking program.

All tracks may request funds to support STEM faculty research aligned with the proposed project, including support of undergraduate research. For example, a proposal to revamp the physics curriculum to include research experiences in the critical transition from lower to upper division courses could request funds to support faculty members whose research would be part of the proposed project. This may include inter-, multi-, or trans-disciplinary research, discipline-specific research, STEM education research, discipline-based STEM education research, or broadening participation research at their home institution, an NSF-funded research center, another institution of higher education, and/or a national laboratory. Fundamental research on engaged student learning at HSIs and on what it takes to diversify and increase participation in STEM at HSIs is particularly encouraged.

While research-related funds may be requested for supplies, equipment required to carry out the research, and faculty research development activities, the proposal should clearly explain how these funds will enhance the quality of undergraduate STEM education at the HSI. It should also explain how it will catalyze new faculty research activity in addition to supporting on-going faculty research activities. Each faculty member receiving funds to conduct research must include a four-page Faculty Research Plan in which one to two pages are used to describe the faculty member's track record in diversity, equity, and inclusion (DEI), mentoring, and advancing students in STEM. Discussions of mentoring and advancing students in STEM may include, but are not limited to, success with undergraduates in research.

B. PROGRAM TRACKS

The HSI program accepts proposals for three types (tracks) of projects.

Track 1: Planning or Pilot Projects (PPP) provide two years of support to Principal Investigators at Primarily Undergraduate Institutions (PUIs), including community colleges or institutions new to NSF, for either a planning project or a pilot project as described below.

    a. Planning projects are designed to undertake an undergraduate STEM education institution-wide assessment and catalyze the necessary collaborations/ partnerships in order to inform the development of an HSI proposal for the IEP or ITP track.
    b. Pilot projects are designed to achieve a short-term well-defined goal to enhance the quality and availability of undergraduate STEM education degree programs and certifications and/or to address undergraduate broadening participation challenges in STEM. NSF anticipates that many Pilot project awardees will also use the results from their project to lay the foundation for a future IEP or ITP proposal.

Planning Projects: Examples of possible planning activities include, but are not limited to: completing an institutional STEM undergraduate needs assessment; conducting a literature review to identify potential evidence-based practices to implement; site visits to learn about promising practices in STEM undergraduate education; professional development for faculty on STEM education or broadening participation research skills, small projects of evidence-based interventions; data collection to support scale up of effective local strategies; and/or building cross-sector partnerships (with industry, academic institutions, non-profit organizations, government agencies, and local communities).

These examples are intended to illustrate some of the appropriate activities for Planning Projects. NSF encourages the institution to propose activities necessary to improve the quality of undergraduate STEM education. In addition, Planning Projects should address access to STEM courses and degrees based on the institution's current STEM undergraduate program capacity and long-term plans for building STEM education programs. Planning Projects may be focused on one or more STEM disciplines, including STEM education programs. Planning Projects may focus entirely on education or broadening participation research initiation efforts.

Pilot Projects: Pilot Projects may support the implementation of evidence-based strategies to make improvements to the HSIs undergraduate STEM curriculum and co-curricular programs and/or broaden the participation of historically underrepresented groups in STEM. Pilot Projects should have a well-defined, measurable outcome aligned with one or more of the HSI program goals. Pilot Projects can adapt previously successful approaches for a new institutional context and/or STEM discipline, and study the adaptation to inform others interested in adapting those approaches. These projects must be accomplished within a two-year timeline for the PPP track. In addition to curricular and broadening participation foci, Pilot Projects may be focused on training students in high demand fields, including artificial intelligence, data science, quantum computing, and advanced manufacturing.

Examples of Pilot Projects might include enhancing laboratory classes to earn accreditation (or certification) for a STEM degree program; developing courses necessary for a new STEM degree program; providing faculty development to implement evidence-based teaching strategies; examining the impact of undergraduate research on student retention; and/or focusing on a critical transition such as the successful integration of transfer students into a degree program. Pilot Projects may also focus on developing STEM education or broadening participation research expertise within the proposing institution. For example, a Pilot Project may support a preliminary study of the impact on learning outcomes of interdisciplinary laboratory approaches in a first-year course, or the effect of student bystander training in creating a more inclusive climate in introductory chemistry courses.

Track 2: Implementation and Evaluation Projects (IEP) provide three to five years of support for STEM unit-, department-, or multi-department-level projects to enhance undergraduate STEM education. The focus of the IEP should be supported by institutional data showing STEM undergraduate education areas that need improvements. IEP can include activities that strengthen the research base in STEM education, and/or broadening participation. IEP activities can focus on making undergraduate STEM educational improvements by working with all those involved in teaching at the given level in the institution including students, part-time faculty, non-tenure-track faculty, and tenure-track and tenured STEM faculty.

The IEP track supports research studies that promote one or more of the HSI program goals as well as replication or adaptation studies that examine one or more of the HSI program goals in the context of the proposing institution. The project goals and proposed activities should be based on the existing STEM education literature and aligned with the long-term plans of the unit(s) or department(s). For example, approaches taken to improve undergraduate STEM education should have a direct connection to the strategic plans for STEM in the unit(s) or department(s) and be described in the proposal. All IEP must include an education research component as well as project evaluation and dissemination components.

Institutionalization and sustainability of IEP activities are expected. Projects may focus on any areas of interest to the institution and the HSI community, such as critical transitions, cross-sector partnerships, building capacity, gatekeeper courses, co-curricular programs, recruitment, retention and graduation, and broadening participation efforts for historically underrepresented groups in STEM. For example, an institution might have evidence suggesting that improvements to a single STEM course could significantly increase the number of STEM majors who persist into upper division courses. If so, the proposal could focus its entire effort on improving that single course and associated interventions that enable students to succeed. Alternatively, an institution might have evidence of performance gaps in engineering of first-generation female STEM students with high financial need in comparison with other students. Such evidence might be used to justify a proposal focused on improving hands-on components in engineering introductory courses and developing targeted mentoring and/or advising for students with high financial need.

Although the IEP focus is on improvements to STEM education at the college or department level, projects are encouraged to include mutually beneficial collaborations or partnerships. For example, collaborations or partnerships among several institutions implementing similar interventions could enhance the student outcomes, reduce costs by sharing resources, and/or increase the available data for the required STEM education research component mentioned above. Furthermore, such collaborations may be necessary or beneficial to answer the proposed research questions.

A group of institutions might also focus on coordinating improvements to student support service units and/or to one or more introductory STEM courses at all collaborating or partnering institutions. Potential collaborators may include K-12 schools, other institutions of higher education, non-profit organizations, industry, and community-based organizations. These collaborators are not required to submit institutional data described in the supplementary documents section although such data may be useful to fully describe the nature and proposed execution of the project. Review of proposals with collaborations will include close attention to the robustness of the collaborations, including whether they are equitable and mutually beneficial.

If an HSI has received an IEP or Track 1 Building Capacity award from a previous HSI solicitation (NSF 18-524 or NSF19-540), a new proposal for an IEP should provide complete information on the outcomes and impact of the previous HSI program project. Past awardees must not propose simply to continue activities of the previous award. **Rather, a new proposal should be based on a thorough evaluation and assessment of both the previous award and an assessment of the current state of the institution.** Such projects are expected to capitalize on any previous HSI program awards, build on the progress and achievements, and identify new strategies to be implemented to enhance undergraduate STEM education excellence.

Track 3: Institutional Transformation Projects (ITP) provide five years of support for institution-wide, systemic change projects grounded in STEM education research and broadening participation research. The ITP should be designed to make institutional infrastructure and policy changes to support long-term institutional changes that encourage and support faculty to implement evidence-based practices that enhance student outcomes in STEM at the proposing HSI. These practices may include adaptation/replication of known evidence-based strategies and/or design and implementation of new strategies.

ITP activities are expected to be grounded in one or more theories (or hypotheses) of organizational change and effective institutional processes. An institution's educational policies and practices as well as campus climate are known to shape and influence students' academic experiences, access to resources, and success. In particular, unwelcoming practices in one or more courses or departments in STEM may negatively affect students' consideration of, enrollment in, and completion of a STEM degree.[3]

The ITP can create institution-wide strategies to transform their policies or practices to foster welcoming STEM learning environments that promote students' learning and engagement in all STEM disciplines at the proposing HSI. Projects may conduct research that advances understanding of the institutional culture and identity on students' learning outcomes in undergraduate STEM education. For example, projects may investigate the interplay of the institutional identity and students' social identities affecting students' STEM success at the proposing HSI.

Importantly, the ITP should impact all STEM disciplines at the proposing institution. Therefore, the PIs should comprise a multidisciplinary team with the expertise and experience needed to implement the proposed project. The PI team may have members from other institutions or non-profit organizations to augment the team's expertise, which should be explained in the project description and management plan. (For more information on the project management plan see required components for all proposals in the Proposal Preparation section of the solicitation.)

The project team should include an upper-level administrator with institution-wide responsibility and authority over STEM education at the institution. The approaches taken to improve undergraduate STEM education should clearly serve the institution's student body, leverage the strengths of its faculty and staff, align with the institution's mission and strategic plan, and consider the community in which the institution is situated. Evidence of institutional commitment to the proposed work should be part of the proposal.

All ITP proposals must include institutional data contextualizing the institution's need and ability to provide excellent undergraduate STEM education promoting a more diverse and capable STEM workforce. Effective projects will recognize that STEM higher education is a complex system and that achieving improvements at scale will require analyzing and addressing organizational factors, such as institutional policies, practices, and opportunities for growth. Successful proposals will move beyond simply counting the number of majors toward systemic changes and major shifts that lead to transformation. The ITP, with its focus on transforming a specific HSI, may include collaborations among institutions through subawards only (if expertise is not available in the submitting HSI).

Examples of systemic change activities include, but are not limited to, creating new instructional resources available to all STEM departments and infrastructure to support faculty use of evidence-based teaching strategies in all STEM classrooms and labs. Continual improvement of all systemic change activities is expected. Achieving this goal may include institutional changes to expectations for faculty teaching and service, as well as changes to policies for faculty hiring, promotion, salary, and tenure. It may also include hiring of new STEM education research faculty to support improvements and monitoring of undergraduate STEM education.

ITP proposals are encouraged to describe plans for helping build capacity at HSIs that typically do not receive high levels of NSF funding. This could be done in many different ways, for example, through sharing resources, catalyzing faculty communities or networks between the institutions to help faculty explore novel ideas on training students in high demand STEM areas, or co-training of STEM faculty and students, and/or other activities that enhance undergraduate STEM education.

The ITP is expected to increase knowledge about effective STEM education and broadening participation. This may be achieved through posing one or more research questions that will be answered through the course of the study or through evaluation of project activities, impacts, or outcomes. Projects should include a well-designed plan to gather data and should specify methods of analysis that will be employed to answer the questions posed and mechanisms to evaluate success of the project. Projects should also specify strategies for generating and using formative and summative assessment of project processes, outputs, and/or outcomes.

Summary table comparing highlights of the HSI tracks. Please see the full text of this solicitation for further information.

Project Tracks	Multiple Organizations	Maximum Budget and Project Duration	Maximum Number of Awards per PI/ Institution
Track 1: Planning or Pilot Projects (PPP)	Optional; Collaborative Projects and/or subaward	• $200,000 – single institution • $300,000 – collaborative • +$100,000 incentive to partner with one or more community colleges • Two years	2 active awards per institution, including awards from previous solicitations (see full solicitation for details)
Track 2: Implementation and	Optional;	• $500,000 – single institution • $800,000 – collaborative • +$200,000 incentive to partner with one or	2 active awards per institution, including awards from previous solicitations (see

Evaluation Projects (IEP)	Collaborative Projects and/or subaward	more community colleges • Three - five years	full solicitation for details)
Track 3: Institutional Transformation Projects (ITP)	Optional; Only through subawards (if expertise not available in submitting HSI)	• $3,000,000 • Five years	1 submission per institution; previous ITP track awardees are not eligible to apply

Workshops and Conferences: Proposals for conferences addressing critical challenges in undergraduate STEM education and broadening STEM participation at HSIs may be submitted at any time following consultation with an HSI program officer. Non-profit organizations may also submit conference proposals; these include institutions and organizations such as K-12 schools, non-HSIs, community-based organizations, and professional organizations that promote broadening participation in STEM, diversity, equity, and inclusion in STEM, and advancement of STEM education. Conference proposals that address increasing the diversity of institutions and faculty participating in the HSI program are strongly encouraged. Workshop proposals that catalyze knowledge exchange in the training of undergraduates at HSIs in areas related to the NSF Big Ideas and industries of the future (artificial intelligence, advanced manufacturing, quantum information science, and next generation wireless) are encouraged. Workshops that speak to the complex challenges at HSIs and their diverse student populations such as implicit bias training, the role of intersectionality, and creating an inclusive environment for underrepresented undergraduate students and faculty in STEM at HSIs are encouraged. Conferences that promote building communities among HSIs (both HSI awardees and non-awardees) where resources can be leveraged are welcomed. These examples of potential conferences and workshops are meant to be illustrative. Information about preparing a Conference proposal is contained in PAPPG Chapter II.E.7.

NSF CAREER Program: The HSI program encourages proposals on research addressing issues about STEM education at HSIs to the NSF Faculty Early Career Development Program (CAREER). These awards support early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization. Activities pursued by early-career faculty should build a firm foundation for a lifetime of leadership in integrating education and research. NSF encourages submission of CAREER proposals from early-career faculty at all CAREER-eligible organizations and especially encourages women, members of underrepresented minority groups, and persons with disabilities to apply. Please see Program Solicitation NSF 20-525 for more information https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214.

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[1] All the STEM fields supported by NSF are supported by the HSI program.

[2] NSF-IES *Companion Guidelines on Replication & Reproducibility in Education Research* (NSF 19-022); https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19022.

[3] Núñez, A.M., 2014. Advancing an intersectionality framework in higher education: Power and Latino postsecondary opportunity. In *Higher education: Handbook of theory and research* (pp. 33-92). Springer, Dordrecht.

III. AWARD INFORMATION

In FY 2021, the HSI program expects to fund new awards totaling $11,000,000, subject to the availability of funds

Grants may be awarded in the sizes and durations summarized below. It is expected that the proposal budget request matches the scope of the project.

Anticipated number, duration, and size of new awards:

Track 1: Planning or Pilot Projects (PPP)

- Number of awards: 15 -25
- Project length: Two years
- Award size: Up to $200,000 (single institution), up to $300,000 (collaborative), with up to $100,000 additional funding to partner with one or more community colleges.

Track 2: Implementation and Evaluation Awards (IEP)

- Number of awards: Up to 10
- Project length: Three to five years
- Award size: Up to $500,000 (single institution), up to $800,000 (collaborative) with up to $200,000 additional funding to partner with one or more community colleges.

Track 3: Institutional Transformation Projects (ITP)

- Number of awards: 1-2
- Project length: Five years
- Award size: Up to $3,000,000

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- non-profit institutions.

To be eligible for HSI funding in Track 1: Planning or Pilot Projects (PPP), Track 2 Implementation and Evaluation Projects (IEP), and Track 3 Institutional Transformation Projects (ITP), an institution must achieve each of the following criteria on or before the proposal deadline date:

   a. Be an accredited institution of higher education.
   b. Offer undergraduate STEM educational programs that result in certificates or degrees. Exception note: An institution submitting a PPP Track proposal does not currently need to offer STEM certificates or degrees, but may submit a proposal to develop such programs or enhance the STEM courses provided as part of other degree programs.
   c. Satisfy the definition of an HSI as specified in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a). The HSI Certification Form is required with submission of the proposal. (See section V of the solicitation.) Institutions should review the legislation before certifying their eligibility for this program at https://www.govinfo.gov/content/pkg/USCODE-2011-title20/html/USCODE-2011-title20-chap28-subchapV-partA-sec1101a.htm.

- PPP track proposals will only be accepted from institutions new to NSF or Primarily Undergraduate Institutions (PUIs) including community colleges. For PUI certification, a representative of the institution submitting as a PUI proposal must sign a Certification of PUI Eligibility (see Section V below for the required template) to be included in the Supplementary Documentation section of the proposal.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

- Planning or Pilot Projects (PPP) track: An eligible institution cannot have more than two active PPP awards. A new PPP proposal can be submitted by an institution with two active PPP awards if at least one of the awards has had its final report submitted before the submission deadline for HSI proposals. Institutions with an active HSI Track 1: Building Capacity award under the previous solicitations 18-524 and 19-540 are not eligible to submit PPP proposals or receive a PPP award until the prior HSI award's final report is submitted.
- Implementation and Evaluation Projects (IEP) track: An eligible institution cannot have more than two active IEP awards. A new IEP proposal can be submitted by an institution with two active IEP awards if at least one of the awards has had its final report submitted prior to the HSI proposal submission deadline. A collaborative award counts as an HSI IEP award for all institutions. For institutions with a current Track 1: Building Capacity award under the previous solicitations 18-524 and 19-540, each award is considered an IEP award for the purpose of calculating active awards for this track.
- Institutional Transformation Projects (ITP) track: One submission per institution is allowed. Previous ITP awardees are not eligible to submit a proposal in the ITP track.

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

An individual may be listed as PI on only one proposal and Co-PI on at most two proposals per submission period.

Additional Eligibility Info:

Each campus that is part of a system may be considered a separate institution for HSI program proposal submission purposes if the campus is geographically separate from the other campus(es), and if the campus has its own chief academic officer.

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.

Project Data Form: The information on this form is used to direct the proposal to appropriate reviewers and to determine the characteristics of NSF-supported projects. Take special care to identify the proper track for your proposal in Item 1 on the form. For any audience code(s) marked in Item F (e.g., women, minorities, persons with disabilities), include in the Project Description a substantive discussion of the specific strategies that the project will employ to affect the audience(s). Note: In FastLane, the Project Data Form will show up in the list of forms for your proposal only after you have (1) selected the correct Program Announcement/Solicitation No. on the Cover Sheet and (2) saved the Cover Sheet. Grants.gov users should refer to Section VI.5. of the NSF Grants.gov Application Guide for specific instructions on how to submit the Project Data Form. Please note that this form is distinct from the Institutional Data Narrative, described in Supplementary Documentation.

Cover Sheet

Under "NSF Unit Consideration" please select:

- "HRD- Division of Human Resource Development" or "DUE- Division of Undergraduate Education" as the division.
- "HSI" as the program.

Adhere to the following instructions for the title:

- Track 1: Planning or Pilot Project (PPP) proposals: Begin the project title with either "HSI Planning Project:" or "HSI Pilot Project:"
- Track 2: Implementation and Evaluation Project (IEP) proposals: Begin the project title with "HSI Implementation and Evaluation Project:"
- Track 3: Institutional Transformation Projects (ITP) proposals: Begin the project title with "HSI Institutional Transformation Project:"

Review the regulations regarding Human Subjects (45 CFR 690.101-124 https://www.nsf.gov/bfa/dias/policy/human.jsp). Please note that Human Subjects regulations also govern activities that have to do with safeguarding individually identifiable information such as student and faculty surveys and data. Therefore, many IEP and ITP projects and possibly Pilot Projects may need to be reviewed by the Human Subjects Institutional Review Board (IRB) for the institution. If the project will be IRB reviewed, please indicate on the cover sheet that the review is pending. If the proposal has already been IRB reviewed and found to be exempt, please indicate so on the cover sheet. If the IRB has already given approval of the activities include a letter from the IRB and indicate the expiration date of the IRB approval on the cover sheet. Please note that an award cannot be made unless the IRB process has been completed and documentation has been received by the program director prior to recommending the award.

All proposals submitted to the HSI program must have the HUMAN SUBJECTS box checked and the applicable IRB status of the project indicated. Additional guidance on the use of Human Subjects is available in the PAPPG, Chapter II.D.5.

REQUIRED COMPONENTS FOR ALL PROPOSALS

In addition to the requirements specified in the PAPPG, each proposal should include the following components in the Project Description.

Project Description:

All proposal types should include:

Description of the HSI Context and undergraduate STEM education offerings:

For the PPP track, include unit-, department-, or institution-level data at a sufficient level of detail to justify the need for the proposed project and with a narrative describing and contextualizing the data. Data for each institution in a collaborative proposal should be included. Collaborative proposals are as defined in NSF PAPPG (II.D.3).

For the IEP and ITP tracks,

- Include institutional data on the institution's undergraduate STEM education degree programs, certificates, and other undergraduate STEM education offerings. Data for each institution in a collaborative proposal should be included. Collaborative proposals are as defined in NSF PAPPG (II.D.3).
- Include demographic data, to the extent that it can be obtained, on the representation of undergraduate students in *each* STEM program of the disciplines[1] and departments involved in the proposed project compared to the demographics of the total undergraduate student enrollment at the institution. Provide definitions and be consistent and clear when using full-time equivalent (FTE) enrollment and/or head count enrollment of undergraduate students, including, how FTE is calculated from part-time enrollment data. Provide a narrative to describe and contextualize this data. Data for each institution in a collaborative proposal should be included.
- Summarize the HSI's and PI team's track record in diversity, equity, and inclusion (DEI), mentoring, and advancing students in STEM. Explain how this project builds on past or current efforts by the institution to broaden participation of students historically underrepresented in STEM and how this project fits with the institution's long-term plans.
- The proposal may describe how the NSF HSI project will be integrated with other NSF-funded awards and/or U.S. Department of Education's Hispanic-Serving Institution awards to the institution; see https://www2.ed.gov/about/offices/list/ope/idues/hsidivision.html for more information.

Description of the specific project components to be implemented:

- Describe the undergraduate STEM education areas for improvement that the project intends to address, the specific evidence-based strategies that will be implemented to address those needs, and the characteristics of students that will be impacted by the project.
  - Proposed activities should consider enrollment differences by race, ethnicity and gender in the general undergraduate student population at the institution compared to participation in STEM programs and include plans for addressing any STEM participation gaps.
  - It may be important to include an intersectional lens when analyzing STEM participation gaps and developing strategies to address them. An intersectional framework recognizes that race, ethnicity, and gender do not exist in isolation from each other and from other categories of social identity such as low-income, first generation, English as a second language, LGBTQ, disability, and other identities.
  - Faculty development should include DEI as a foundation for any instructional training and development for example, but not limited to, culturally relevant and sensitive pedagogy training, implicit bias awareness and mitigation, stereotype threat, microaggressions, and fixed vs. growth mindset.

- The approaches taken to improve undergraduate STEM education should clearly serve the institution's student body, leverage the strengths of its faculty and staff, align with the institution's mission and strategic plan, and consider the community in which the institution is situated.
- Reference the literature and knowledge base of undergraduate STEM education research and broadening participation research on which the proposal is built.
- Describe plans for creating a climate conducive to learning and inclusion at the HSI as well as equitable excellent undergraduate STEM education. PI and Co-PIs should demonstrate a track record for creating an inclusive climate and advancing students at HSIs.
- PPP projects may include the development of an IEP or ITP proposal as a project activity.
- HSIs that are "Doctoral Universities" (defined in the Carnegie Classification of institutions of higher education) are encouraged to help build undergraduate STEM education capacity at non-Doctoral Universities as part of the IEP and ITP. These efforts should be clearly articulated in the proposal. This could be done in many different ways, such as through a formal collaboration that aligns STEM undergraduate courses to support transfer students and articulation agreements, by training HSI STEM faculty on evidence-based strategies, sharing of STEM education resources such as laboratory equipment, providing access to research facilities, and/or developing research opportunities for both students and faculty that enhance undergraduate student STEM education.
- The appropriateness of each activity for the institution and its intended outcome(s) should be clearly explained. This description should include who will be involved in conducting and overseeing the activities as well as summarizing the knowledge base on which the proposal will build.

Project Management Plan

- A project management plan indicating who will be responsible for the different components of the project must be included as well as
  - a Student Mentoring Plan if funds are requested to support students in the HSI proposal, and
  - a Faculty Research Plan if funds are requested for faculty research. (See supplementary documentation section in the solicitation documentation for more information.)
- A timeline for implementation of the project should be included.
- At least one member of the PI team is required to participate in an annual NSF-sponsored two-day annual PI meeting which is open to the entire PI team. PIs should budget for this expense.
- For the PPP award, two members of the PI team are required to participate in an annual NSF-sponsored evaluation and research design two-day workshop held prior to the required two-day annual PI meeting. PIs should budget for this expense.
- All PPP proposals should include an implementation/management plan and an evaluation plan consistent with the scope and scale of the project.
- ITP teams are expected to be interdisciplinary with the expertise and experience needed to implement the proposed project. The PI team may have members from other institutions or non-profit organizations if the proposing institution does not have the necessary expertise; sufficient justification for their incorporation must be included. In addition, the project team should include an upper-level administrator in the PI team with institution-wide responsibility and authority over STEM education at the institution.

Communication Plan

Every proposal must include a substantive plan for sharing project results across broad audiences. These audiences can include students, educators and STEM education researchers, policymakers, and public audiences. Proposals should identify the key elements of a communication plan, such as target audiences and identification of the channels, media, or technologies appropriate for reaching specific audiences. All HSI program projects are encouraged to create and maintain a project website so that others may view the ideas and results. IEP and ITP should include a plan for sharing the project's STEM education research results including a discussion of the transferability and scalability of the project. A description of the tools, materials, and other resources to be developed by the project should also be included; these items should be made available to others. The scale of the communication plan and effort should reflect the scale of the proposed project and intended results.

Commitment and Sustainability

Organizational commitment from administrators and leaders to the proposed project activities is vital for successful projects and for sustainability of promising activities. Letters of collaboration or support from key HSI administrators with authority related to faculty and undergraduate STEM education are required and should be submitted as supplementary documents. The key administrators may be different for different projects and will depend on the scope of the project (unit-, department-, or institution-wide). Planning proposals should discuss the commitment of leadership to pursuing STEM education enhancements either with additional grants or through changes to current practices. IEP proposals should discuss how the successful components developed under the project will be sustained by the HSI. ITP are expected to lead to long-term organizational change in the way that the institution supports faculty to provide high quality undergraduate STEM education and experiences. Therefore, ITP are expected to consider sustainability and institutionalization of the project activities from the beginning of the project and include time and effort toward sustainability and institutionalization in the project management plan.

Letters of collaboration or commitment may include information related to sustainability and commitment of institutional leaders to the HSI project and do **not** need to be limited to the recommended language in the NSF PAPPG (II.C.2.j). Letters of support that merely endorse the project or offer nonspecific support for the project activities should not be included and the proposal may be returned without review if general support letters are included. Note that organizational commitment can also be demonstrated through commitment to project sustainability. For guidance on voluntary uncommitted cost sharing please review the NSF Proposal and Award Policies and Procedures Guide (PAPPG), Chapter II.C.2.g(xii).

Project Evaluation

Evaluation of the HSI projects is a high priority for this program. All **Planning/ Pilot Projects (PPP), Implementation and Evaluation Projects (IEP), and Institutional Transformation Projects (ITP)** proposals should include a section that describes how the project will assess progress, document outcomes, and evaluate success in achieving its stated goal(s). The project evaluation should be designed to serve as a valuable source of information on how the project is being implemented, specifically, what works and what should be modified. The evaluation plan should be based on benchmarks, indicators, or expected outcomes related to project goals and activities. Evaluation plans should include a logic model or other tool that connects the project goals to the specific activities, and outputs, as well as the outcomes.

Evaluation plans should be appropriate to the size and scope of the project, and include both formative and summative components as appropriate based on the evaluation questions of interest along with a proposed timeline. The purpose of a formative evaluation is to provide information for project improvement. The purpose of a summative evaluation is to assess the quality and impact of a fully implemented project. Formative evaluation plans outline methods for documenting progress toward project goals and should include a feedback feature that allows for continuous improvement of the project activities. In some cases, formative evaluation may be internal to the project and the rationale for this must be justified in the proposal. A summative evaluation collects information about outcomes and related processes, strategies, and activities that have led to the demonstrated outcomes.

All HSI project evaluation plans should:

- provide a logic model or theory of change that connects specific activities to expected outputs and outcomes;

- specify the benchmarks, indicators, and evaluative approach(es) that will be employed to assess progress (during and at the completion of the project);
- include a timeline that indicates who will have responsibility for which evaluative activities. Depending on the size and scope or the project, it may be appropriate for the project evaluation to be led by an expert independent evaluator or evaluation team.
- describe how the results of evaluative activities will be used, including to support project management and inform the preparation of annual and final project reports to NSF; and
- be adequately resourced. The budget MUST include reasonable resources for the project evaluation. Evaluation costs in the budget justification should be broken down by hourly or daily rate, with an anticipated number of and detailed information about hours or days that will be dedicated to evaluation efforts indicated in the budget justification.

Evaluators are expected to adhere to the American Evaluation Association's Guiding Principles for Evaluators (http://www.eval.org/p/cm/ld/fid=51), and project evaluations are expected to be consistent with standards established by the Joint Committee on Standards for Educational Evaluation (http://www.jcsee.org/program-evaluation-standards-statements).

The following references may be helpful in designing an evaluation plan:

- AAAS Measuring Diversity: An Evaluation Guide for STEM Graduate School Leaders, available at: https://live-nsfagep.pantheonsite.io/wp-content/uploads/2011/04/MeasuringDiversity-EvalGuide.pdf
- Common Guidelines for Research & Development, available at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126
- The 2010 User-Friendly Handbook for Project Evaluation, available at: https://www.informalscience.org/sites/default/files/TheUserFriendlyGuide.pdf
- Framework for Evaluating Impacts of Informal Science Education Projects, available at: https://www.informalscience.org/sites/default/files/Eval_Framework.pdf
- User-Friendly Handbook for Mixed Method Evaluations, available at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf97153
- Framework for Evaluating Impacts of Broadening Participation Projects, available at: https://www.nsf.gov/od/broadeningparticipation/framework-evaluating-impacts-broadening-participation-projects_1101.pdf
- AGEP Evaluation Tools, available at: http://www.nsfagep.org/evaluation-resources/.

IEP and ITP proposals STEM Education Research Plan

All Track 2: Implementation and Evaluation Projects (IEP) and Track 3: Institutional Transformation Projects (ITP) proposals should include a detailed STEM education or broadening participation research plan. This research plan should be appropriate to the size and scope of the project and be managed by the project leadership team. The research and evaluation plans may be designed to utilize the same data; however, the research plan will use these data to address a research question and/or hypothesis that is important to the project and the field with the goal of producing new research knowledge.

It should be clear in the proposal which team members and/or consultants will undertake the research and their relevant qualifications should be included. The research plan should include the following information:

- The research question(s) and/or hypotheses to be investigated, including a discussion of the theory or theories grounding the research and testable hypotheses and a clear statement of the contributions the study will make to the knowledge base in undergraduate STEM education, at HSIs and in general. Adaptation or replication studies of promising interventions and effectiveness studies are permitted.
- A detailed plan for addressing the research questions, specifying, as appropriate:
  - the study design,
  - underlying methodological assumptions,
  - the population(s) of interest and any sampling plans,
  - metrics, measures and instruments to be employed, including information on the reliability, validity, and appropriateness of proposed measures and instruments or specific plans for establishing them if not initially known,
  - secondary data to be analyzed and/or data collection plans, and
  - analysis plans.
  - Quantitative studies should specify statistical methods to be used. Qualitative studies should specify procedures to collect, code, reduce, and analyze data and specific conceptual frameworks that will guide analyses.
- A timeline that identifies who will be responsible for completing each task. IEP and ITP may offer a postdoctoral research fellowship to a social science or educational researcher to provide career opportunities; if postdoctoral scholars are supported in the project be sure to include a postdoc mentoring plan as a supplementary document.

The research plan of the IEP and ITP proposals can include elements that enhance the STEM education research and broadening participation research expertise and capacity at the HSI.

Proposals are encouraged to be informed by the:

- Common Guidelines for Education Research and Development available online at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126
- Companion Guidelines on Replication & Reproducibility in Education Research, available at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19022.

SUPPLEMENTARY DOCUMENTATION (ALL PROPOSALS)

Follow all PAPPG guidelines as well as the additional guidelines given below.

Letters of Collaboration or Commitment

One letter of collaboration or commitment is required that discusses the institution's leadership (President, Provost, or Chancellor for ITP; Provost or Dean for IEP) commitment to the implementation of the proposed ITP or IEP and potential institutionalization of changes to sustain improvements to STEM undergraduate education. Letters for partnerships indicating the partner's commitment and role in the proposed activities are required for all tracks if partnerships are part of the proposed project. All letters of collaboration should follow PAPPG guidelines (see Chapter II.C.2.d(iv), II.C.2.j) except as otherwise noted in this solicitation. Letters of support that merely endorse the project or offer nonspecific support for project activities should not be included and the proposal may be returned without review if general support letters are included.

Faculty Research Plan (4 pages)

Projects requesting research funds must include a four-page Faculty Research Plan, as a supplementary document, for each faculty member receiving funds. One to two pages should describe the researcher's track record in diversity, equity, and inclusion (DEI), mentoring, and advancing undergraduate students in STEM with the remaining pages describing the proposed research.

Student Mentoring Plan(s) (1 page for undergraduate students and 1 page for graduate students, if applicable)

Track 1 (PPP), 2 (IEP), and 3 (ITP) proposals requesting stipend or wages to support students, including for undergraduate research support, must submit, as a supplementary document, a description of the mentoring activities that will be provided to the students. Student Mentoring Plans for undergraduate students should be separate and different from mentoring plans for any graduate students that are involved in the project. Student Mentoring Plans should not only speak to research mentoring for the students, but how they will be mentored to achieve the next level in their scholastic or professional careers.

Postdoctoral Mentoring Plan (1 page)

Required by NSF if postdoctoral support is requested in the NSF budget.

Data Management Plan (1-2 pages)

This document must be included and follow the guidance in the PAPPG and the Directorate for Education and Human Resources (https://www.nsf.gov/bfa/dias/policy/dmp.jsp).

HSI Certification Form signed by the authorized organizational representative of the institution(s) (https://nsf.gov/ehr/Pubs/HSICertForm.pdf).

The **biographical sketch of the independent evaluator(s)** must be included and uploaded as a single PDF file.

Certification of PUI Eligibility. A Certification of PUI Eligibility, *following the format below and executed by an Authorized Organizational Representative,* must be included in PUI requests (Planning or Pilot Projects (PPP) only). A current, signed Certification, included on institutional letterhead, should be scanned and included as a PDF file.

Certification of PUI Eligibility

By submission of this proposal, the institution hereby certifies that the originating and managing institution is an accredited college or university that awards Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but has awarded 20 or fewer PhD/DSci degrees in all NSF-supported fields during the combined previous two academic years.

Authorized Organizational Representative……………………………………………………………………..

Typed Name and Title..

Signature.. Date...................................

Institutional Data Narrative

Each proposal must include institutional data with a narrative describing and contextualizing the institution's need for the proposed project and potential to build capacity for excellent undergraduate STEM education. To align with NSF's commitment to a more diverse and capable STEM workforce, proposals submitted by institutions that do not currently have a diverse undergraduate STEM population should incorporate a well-thought-out plan to move toward their institution's current overall level of diversity. Mechanisms that will be put in place to achieve this goal can be part of the proposed project.

For the IEP and ITP tracks, baseline data may include

1. institutional data of student demographics and enrollment from the HSI(s) applying to this program;
2. student demographics and enrollment for each discipline that is included in the proposed project;
3. retention rates for each discipline that is included in the proposal; and
4. graduation rates for each discipline that is included in the proposal.

These baseline data will also be useful for project evaluation. Proposals may also provide IPEDS data or spreadsheets from the HSI's Office of Institutional Research (or other office) with the requested information.

The addition of other documents in this section of supplementary documentation may result in the proposal being returned without review.

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[1] Institutions that are applying for the PPP or IEP tracks which have yet to reach equitable representation should, in addition, incorporate a well-thought-out plan to achieve such representation for relevant disciplines associated with the proposal project.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Equipment Limitations:

- Equipment costs should not exceed 30% of the total NSF budget requested. Equipment requests must be clearly disclosed in the proposal budget, justified in the budget justification as to how it is required to carry out the research, and be included in the NSF award budget. For budgeted research funds exceeding 30% of the final budget, PIs must justify how this component is instrumental to enhance undergraduate education.

Partner Funding Limitations:

- Partners that are not HSIs can only be funded through a subaward for the PPP and IEP tracks.

NSF funds may not be used to support expenditures that would normally be made in the absence of an award, such as costs for routine teaching activities

(including curriculum development) and laboratory upgrades (supplies and computers). NSF project funds may not be used for:

- replacement equipment or instrumentation that does not significantly improve instructional capability; teaching aids (e.g., films, slides, projectors, "drill and practice" software);
- vehicles, trailers, laboratory furnishings, or general utility items such as office equipment (including word-processing equipment), benches, tables, desks, chairs, storage cases, and routine supplies;
- maintenance equipment and maintenance or service contracts;
- the modification, construction, or furnishing of laboratories or other buildings; and
- the installation of equipment or instrumentation (as distinct from the on-site assembly of multi-component instruments, which is an allowable charge).

Budget Preparation Instructions:

Other Budgetary Requirements

1. **Required Meeting Travel:** All proposals should budget for one to two PI team members to attend an annual two-day PI meeting every year of the project. In addition, two members of the PI team for Planning or Pilot Projects (PPP) should budget to attend an Evaluation and Research Design two-day workshop held prior to the required two-day annual PI meeting.
2. **Student Support:** Financial support may be provided to student participants under the HSI program projects. However, financial support may only be provided to students who are U.S. citizens, nationals, or permanent residents.
3. **Professional Development Workshops:** In proposals that involve professional development workshops, reasonable travel costs and costs for subsistence (lodging and meals) during the workshop may be included in project budgets. In addition, funds may be requested for a reasonable stipend per workshop day for participants; requests for such stipends must be specific to the target audience and must be fully justified, for example, to assure participation by faculty with few professional development opportunities or from institutions that justify need.
4. **Evaluation:** Funds to support an evaluator independent of the project must be requested. The requested funds must match the scope of the proposed evaluative activities. The evaluator may be employed by a project's home institution, as long as the evaluator 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.

C. Due Dates

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

  February 10, 2021

      Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

  February 10, 2021

  Second Wednesday in February, Annually Thereafter

      Track 3: Institutional Transformation Projects (ITP) full proposal deadline.

  August 25, 2021

  Last Wednesday in August, Annually Thereafter

      Track 1: Planning or Pilot Projects (PPP) and Track 2: Implementation and Evaluation Projects (IEP) full proposal deadline.

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 FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane and Research.gov 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 two NSF criteria for Intellectual Merit and Broader Impacts, additional HSI proposal review criteria include:

- How well does the proposal make the case for the need and design of the project to enhance the quality of undergraduate STEM education, participation of historically underrepresented groups in STEM, and student outcomes?
- When necessary, how well does the proposal use an intersectional lens to identify issues, to monitor project implementation, and to understand project impact on the undergraduate student populations (e.g., low-income, first generation, underrepresented minority [URM], transfer and returning students, etc.)?

How well does the proposal meet one or more goals of the HSI program?

- Enhance the quality of undergraduate STEM education at HSIs,
- Increase the recruitment, retention, and graduation rates of all undergraduate students pursuing STEM degrees at HSIs,
- Promote research on engaged student learning at HSIs and about what it takes to diversify and increase participation in STEM effectively,
- Incentivize institutional or community transformation,
- Build STEM education research capacity at HSIs.

The HSI program goals are stated as follows in the previous sections: The goals of the HSI program are to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) education and to increase the recruitment, retention, and graduation rates of students pursuing associate's or baccalaureate degrees in STEM. Achieving these, given the diverse nature and context of the HSIs, requires additional strategies that support building capacity at HSIs through innovative approaches: to incentivize institutional and community transformation; and to promote fundamental research (i) on engaged student learning at HSIs, (ii) about what it takes to diversify and increase participation in STEM effectively, and (iii) that improves our understanding of how to build institutional capacity at HSIs. Intended outcomes of the HSI program include broadening participation of students that are historically underrepresented in STEM and expanding students' pathways to continued STEM education and integration into the STEM workforce.

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.

Special Award Conditions:

Projects may be asked to cooperate and participate in a third-party independent evaluation of the HSI program.

Developers of new materials are required to license all work under the Creative Commons guidelines (except for computer software source code, discussed below) created with the support of the grant under either the 3.0 Unported or 3.0 United States version of the Creative Commons Attribution (CC BY), Attribution-ShareAlike (CC BY-SA), or Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) license.

These licenses allow subsequent users to copy, distribute, transmit, and adapt the copyrighted work and requires such users to attribute the work in the manner specified by the grantee. Notice of the specific license used would be affixed to the work, and displayed clearly when the work is made available online. For general information on these Creative Commons licenses, please visit http://creativecommons.org/licenses/.

It is expected that computer software source code developed or created with grant funds be released under an intellectual property license that allows others to use and build upon the work. The grantee may release all new source code developed or created with grant funds under an open license acceptable to the Free Software Foundation (http://gnu.org/licenses/) and/or the Open Source Initiative (http://opensource.org/licenses/).

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.

All HSI program awardees are required to submit an annual evaluation of the project in the annual and final project reports.

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:

- For general inquiries, contact: NSF-EHR-HSI@nsf.gov

- Erika Tatiana Camacho, telephone: (703) 292-2834, email: ecamacho@nsf.gov

- Michael J. Davis, telephone: (703) 292-7166, email: mdavis@nsf.gov

- For general inquiries contact, telephone: (703)292-4649, email: NSF-EHR-HSI@nsf.gov

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

- FastLane and Research.gov Help Desk: 1-800-673-6188

- FastLane Help Desk e-mail: fastlane@nsf.gov.

- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

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

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

> The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.
>
> To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at https://www.nsf.gov
>
> - **Location:**   2415 Eisenhower Avenue, Alexandria, VA 22314
>
> - **For General Information** (NSF Information Center)**:**   (703) 292-5111
>
> - **TDD (for the hearing-impaired):**   (703) 292-5090
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or telephone:	(703) 292-8134
● **To Locate NSF Employees:**	(703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See System of Record Notices, NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314

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