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

PROGRAM SOLICITATION
NSF 19-540

REPLACES DOCUMENT(S):
NSF 18-524

National Science Foundation

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

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

March 06, 2019

September 18, 2019

Third Wednesday in September, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

For Track 1 (Building Capacity), an eligible institution may submit only one proposal. The award limit and duration for Track 1 are up to $2,500,000 over a period of up to 5 years.

For Track 2 (HSIs New to NSF), there are no restrictions or limits on the number of proposals submitted. The award limit and duration for Track 2 are up to $300,000 over a period of up to 3 years.

Proposals for a Resource Hub are not accepted.

An institution that is part of a larger system is considered separate for proposal submission purposes if it is geographically separate from the other campus(es) and has its own chief academic officer.

For Track 1 (Building Capacity), Priority Area 3 has been renamed from “Research on Broadening Participation in STEM” to “Teaching and Learning in STEM.”

Conference proposals may be submitted in consultation with a program officer.

Webinar. The HSI Program team, in collaboration with the NSF Division of Grants and Agreement (DGA), will host webinars after the release of this solicitation. Key features and expectations of the HSI Program as well as guidance on proposal preparation and submission will be discussed with potential PIs and their authorized organizational representatives responsible for submitting proposals to the HSI Program. Information regarding the webinar will be posted to the HSI Program webpage: https://nsf.gov/ehr/HSIProgramPlan.jsp.

The **HSI Certification Form** signed by the authorized organizational representative must be included as a supplementary document with the proposal.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1), which is effective for proposals submitted, or due, on or after January 28, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

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

Synopsis of Program:

The Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program) seeks to enhance the quality of

undergraduate STEM education at HSIs and to increase retention and graduation rates of undergraduate students pursuing degrees in science, technology, engineering, and mathematics (STEM) at HSIs. In addition, the HSI Program seeks to build capacity in undergraduate STEM education at HSIs that typically do not receive high levels of NSF grant funding. The National Science Foundation (NSF) established the HSI Program in response to the Consolidated Appropriations Act, 2017 (P.L. 115-31) and the American Innovation and Competitiveness Act (P.L. 114-329). The HSI Program is aligned with NSF's commitment to increase access for underrepresented groups to the Nation's STEM enterprise.

In designing the HSI Program, NSF sought community input by several mechanisms (https://nsf.gov/ehr/HSIProgramPlan.jsp) and has continued to gather community input to inform future components of, or modifications to, the HSI Program.

To be eligible for HSI Program funding, the institution serving as the awardee organization must, at the time of application, be accredited, offer undergraduate educational programs in STEM, and satisfy the definition of an HSI as specified in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a). Institutions should review the legislation before certifying their eligibility for this program (http://legcounsel.house.gov/Comps/HEA65_CMD.pdf).

The HSI Program will accept proposals in two tracks:

1. **Track 1: Building Capacity** funds projects up to $2,500,000 for up to 5 years and is open to all eligible institutions. This track has three priority areas: Critical Transitions; Innovative Cross-Sector Partnerships; and Teaching and Learning in STEM.
2. **Track 2: HSIs New to NSF** funds projects up to $300,000 for up to 3 years and is open only to eligible institutions that have never received NSF funding, or that have not received NSF funding in the five years preceding the proposal deadline.

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 Camacho, telephone: (703) 292-2834, email: ecamacho@nsf.gov
- Jennifer E. Lewis, telephone: (703) 292-2938, email: jenlewis@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: 15

The program estimates making awards for 10 Track 1 (Building Capacity) projects and 5 Track 2 (HSIs New to NSF) projects.

Anticipated Funding Amount: $15,000,000

For new HSI Program awards, subject to the availability of funds.

NSF anticipates that approximately $15,000,000 will be available for new and continuing awards in this program in FY 2019. In FY 2019, the HSI Program expect to fund new awards for Track 1 and Track 2 totaling $13,000,000.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Eligible institutions must be accredited and offer undergraduate educational programs in STEM and satisfy the HSI definition 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.)
- For Track 2 (HSIs New to NSF), proposals will only be accepted from eligible institutions that have never received NSF funding or have not received funding from NSF in the five years prior to the proposal deadline.

Who May Serve as PI:

- The Lead Principal investigator (PI) must be employed by the eligible institution submitting the proposal.

Limit on Number of Proposals per Organization:

- For Track 1 (Building Capacity), an institution can submit only one proposal.
- For Track 2 (HSIs New to NSF), there are no restrictions or limits.

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

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

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

  March 06, 2019

  September 18, 2019

  Third Wednesday in September, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

TABLE OF CONTENTS

Summary of Program Requirements

I. **Introduction**
II. **Program Description**
III. **Award Information**
IV. **Eligibility Information**
V. **Proposal Preparation and Submission Instructions**
   A. Proposal Preparation Instructions
   B. Budgetary Information
   C. Due Dates

D. FastLane/Research.gov/Grants.gov Requirements
VI. **NSF Proposal Processing and Review Procedures**
A. Merit Review Principles and Criteria
B. Review and Selection Process
VII. **Award Administration Information**
A. Notification of the Award
B. Award Conditions
C. Reporting Requirements
VIII. **Agency Contacts**
IX. **Other Information**

I. INTRODUCTION

The National Science Foundation (NSF) established the Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program) in response to the Consolidated Appropriations Act, 2017 (P.L. 115-31) and the American Innovation and Competitiveness Act (P.L. 114-329). The HSI Program seeks to enhance the quality of undergraduate STEM education at Hispanic-serving institutions (HSIs) [see Reference 1] and to increase retention and graduation rates of undergraduate students pursuing degrees in STEM fields at HSIs. In addition, the HSI Program seeks to build capacity at HSIs that typically do not receive high-levels of NSF grant funding. By enhancing undergraduate STEM education, the HSI Program will contribute to the development of a well-qualified and diverse STEM workforce.

In designing the HSI Program, NSF sought community input in a variety of ways that included releasing a Dear Colleague Letter (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17092), awarding conference grants to seek stakeholder input, establishing and holding a meeting of the Building Capacity at Hispanic-Serving Institutions Subcommittee (HSI Subcommittee) of the Education and Human Resources (EHR) Advisory Committee, and conducting three virtual listening sessions that invited commentary from members of the HSI community (https://nsf.gov/ehr/HSIProgramPlan.jsp). To focus the comments from the three virtual meetings, five priority areas identified in listening session that the Quality Education for Minorities (QEM) Network conducted in 2009 were used: (1) Student support; (2) Faculty support; (3) STEM curricula enhancement and alignment; (4) Integration of research and education; and (5) Partnerships. Based on the feedback from these listening sessions and from the HSI Subcommittee report (https://www.nsf.gov/ehr/Materials/HSISubcommitteeReport.pdf), NSF developed the HSI Program. NSF will continue to gather community input to inform future components of, or modifications to, the HSI Program.

The Improving Undergraduate STEM Education (IUSE) program is a Foundation-wide effort to accelerate improvements in the quality and effectiveness of undergraduate education in all STEM fields. The importance of the undergraduate experience is well established for preparing both a diverse STEM workforce and a STEM-literate public ready to support and benefit from the progress of science [see References 2 – 9]. The IUSE initiative underpins NSF's commitment to the highest caliber undergraduate STEM education through a Foundation-wide framework of investments. By improving the quality and effectiveness of undergraduate education in all STEM fields, these investments enable NSF to lead progress nationally toward a diverse and innovative workforce and a STEM-literate public. Through the IUSE framework, NSF coordinates its investments in undergraduate programs and undergraduate STEM education to enhance coherence and impact, and to use shared metrics and program evaluation approaches where appropriate. These investments are made across all directorates and address both general trends and specific disciplinary needs. Examples of general trends include the use of active learning approaches in undergraduate instruction, the increase of undergraduate research courses, and attention to undergraduate degree completion. IUSE also seeks to broaden participation in STEM fields from all sectors and groups in society. The HSI Program is part of the IUSE Foundation-wide effort to improve undergraduate STEM education.

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 science, technology, engineering, and mathematics (STEM) discoveries and innovations by focusing on broadening participation in these fields at scale. HSI Program proposers are especially encouraged to establish collaborations, as appropriate, with national network INCLUDES projects (see https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp), provided the collaboration strengthens both projects.

References

[1] The Higher Education Act of 1965 (P.L. 89-329) [As Amended Through Public Law 113–67, Enacted December 26, 2013]; http://legcounsel.house.gov/Comps/HEA65_CMD.pdf

[2] Planning Committee for the National Summit on Developing a STEM Workforce Strategy, Board on Higher Education and Workforce, Policy and Global Affairs, National Academies of Sciences, Engineering, and Medicine, Joe Alper (Rapporteur) Developing a National STEM Workforce Strategy: A Workshop Summary, National Academies Press, 2016.

[3] Committee on Barriers and Opportunities in Completing two-year and four-year STEM Degrees, Board on Science Education, Policy and Global Affairs, National Academy of Engineering, National Academies of Sciences, Engineering, and Medicine, Shirley Malcom and Michael Feder (Editors), Barriers and Opportunities for two-year and four-year STEM Degrees, National Academies Press, 2016.

[4] National Research Council, Discipline-based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering. Washington, DC: National Academies Press, 2012. https://www.nap.edu/catalog.php?record_id=13362

[5] NSF INCLUDES Initiative, https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp

[6] Kober, N., Reaching Students: What Research Says About Effective Instruction in Undergraduate Science and Engineering. Board on Science Education, Division of Behavioral and Social Sciences and Education, Washington, D.C.: The National Academies Press, 2015. http://www.nap.edu/catalog.php?record_id=18687

[7] The Coalition for Reform of Undergraduate STEM Education, Catherine L. Fry (Editor), Achieving Systematic Change: A Source Book for Advancing and Funding Undergraduate STEM Education. Washington, D. C.: The Association of American Colleges and Universities, 2014. https://www.aacu.org/sites/default/files/files/publications/E-PKALSourcebook.pdf

[8] Committee on Science Literacy and Public Perception of Science; Board on Science Education; Division of Behavioral and Social Sciences and

Education; National Academies of Sciences, Engineering, and Medicine, Catherine E. Snow and Kenne A. Dibner (Editors), Science Literacy: Concepts, Contexts, and Consequences, Washington DC: The National Academies Press, 2016

[9] Booth, W.C, Colomb, G. C., and Williams, J. M. The Craft of Research, Chapter 4, Section 4.1.1, The University of Chicago Press, 2008.

II. PROGRAM DESCRIPTION

A. OVERVIEW

Projects supported by the HSI Program are expected to be evidence-based as well as generate new knowledge about how to enhance undergraduate STEM education to increase retention and graduation rates of undergraduate students pursuing degrees in STEM fields at HSIs. The HSI Program is interested in the successful advancement of undergraduates at HSIs through critical transitions, including the transition from lower-division to upper-division coursework. The HSI Program also encourages projects that develop mutually beneficial cross-sector partnerships (e.g., industry-academic partnerships) that enhance STEM teaching and learning, and workforce development. Projects may also develop teaching and learning strategies and models in STEM. In addition, the HSI Program seeks to build capacity to enhance undergraduate STEM education at HSIs that typically do not receive high levels of NSF grant funding. HSI Program proposals should include a research plan, a project evaluation plan, and a dissemination plan.

As a key component of NSF's Improving Undergraduate STEM Education (IUSE) initiative, the HSI Program will support activities that improve STEM learning and learning environments, broaden participation in STEM, build institutional capacity for STEM learning, and/or develop the professional STEM workforce of tomorrow.

B. PROGRAM TRACKS

1. Track 1: Building Capacity

There are three priority areas within this track: Critical Transitions, Innovative Cross-Sector Partnerships, and Teaching and Learning in STEM. Proposals should focus on one or more of these priority areas, as appropriate to the project goals. The proposal should identify its priority area(s) in both the summary and the body of the proposal.

Priority Area 1: Critical Transitions

Priority Area 1 supports projects that address the retention of undergraduate students in STEM programs. Projects in this priority area should address critical transitions on the way to degree attainment which may include i) the transition from lower- to upper-division coursework at individual institutions, ii) the transfer of students from two-year institutions to four-year institutions, and/or iii) the transition from secondary education to undergraduate education of students enrolled in a STEM undergraduate degree-granting program.

All proposals that include the Critical Transitions focus should include a clear statement of the targeted area (e.g., transition from lower-division to upper-division coursework), along with institutional data that demonstrates a need for the proposed project. The proposed project should identify and investigate factors that affect student success and subsequent graduation. In addition, a mechanism should be described to track student outcomes.

Proposals that address the transition of students from two-year to four-year institutions or from secondary schools to undergraduate institutions should include mutually beneficial institutional partnerships. Institutional partnerships should have in place or plan to develop articulation agreements for the transfer of students from one institution to another that leads to STEM degree attainment. These partnerships and agreements should fit the needs and situations of all institutions involved. Projects are encouraged to establish processes that support/manage project activities across the partner institutions.

For all proposals that focus on or include Critical Transitions, successful project leadership teams will typically include STEM administrators and those who specialize in higher education issues and processes. The project teams should have representation from all institutional partners with explicit roles and responsibilities. There should be evidence of administrative commitment to the project from each institution. Project structure may include collaborative applications or subawards, as appropriate for the institutions involved.

HSI Program projects that address Critical Transitions are expected to contribute new knowledge, through implementation design or research, about strategies and models that increase student retention and graduation rates in STEM degree programs at HSIs. To facilitate building new knowledge, the HSI Program has identified a set of questions that may be used as a guide in developing proposals. Potential answers to these questions may contribute to building the knowledge base over time. Please note that these questions are not intended as limiting, and that a wide variety of questions not listed here may also be appropriate for investigation.

- What culturally responsive instructional and curricular practices contribute to successful navigation of critical transition points in undergraduate education?
- What institutional indicators or cultural factors should be considered in curricular redesign and alignment efforts that increase STEM degree completion?
- How does institutional data indicate the need for the redesign and/or alignment to support transitions in STEM programs?
- What curricular materials and methods of instruction at HSIs have the highest potential to support student transitions in STEM programs?
- How does alignment of STEM curriculum (between two-year and four-year institutions and within institutions) support student transitions? What strategies can be employed to align curricula that will lead to successful student transitions and degree attainment?
- How can a cross-section of faculty (e.g., tenured/tenure-track, adjunct, lecturer) contribute to planning, development, and implementation of activities that enhance student retention at critical transition points?
- What institutional programs (e.g., student affairs, student support services, residential life) lead to successful transitions and degree attainment? What factors best support students before, during, and after critical transitions?
- What other supports (e.g., community- and family-based resources) contribute to successful student transitions and degree attainment?

Priority Area 2: Innovative Cross-Sector Partnerships

HSI Program projects that address Priority Area 2 are expected to develop cross-sector partnerships that lead to increased student engagement in STEM research and learning experiences while also generating knowledge about how cross-sector partnerships contribute to STEM teaching and learning, and workforce development. This priority area supports mutually beneficial partnerships that yield benefits to society, enhance the capacity for research at

partner institutions, and facilitate cross-sector knowledge generation and transfer. Partners may include industry, government, academic institutions, non-profit organizations, and local communities. The role and responsibilities of each partner should be explicitly described in the proposal.

Priority Area 2 supports projects that address immediate challenges and opportunities facing the development of a more diverse STEM workforce. Today's research problems are complex and their solutions often require interdisciplinary teams and cross-sector partnerships. If STEM professionals are prepared to be effective at collaborative, interdisciplinary problem-solving, then more successful solutions are likely to emerge. Projects should prepare students for future STEM careers by increasing access to experiential professional development opportunities that help build the technical and non-technical skills required in STEM, both inside and outside of academia. Innovative Cross-Sector Partnerships may provide opportunities for faculty engagement in interdisciplinary and cross-sector STEM research. These projects are also expected to inform best practices for STEM workforce development in higher education.

A variety of institutional partnerships can be envisioned and the HSI Program has identified areas that can be considered. A set of guiding questions below may be used in developing proposals and may collectively help to build the knowledge base about the value and effectiveness of the partnerships over time. Please note that these questions are not intended as limiting, and that a wide variety of questions not listed here may also be appropriate for investigation.

- What new knowledge can be generated about how cross-sector partnerships contribute to STEM teaching and learning and workforce development?
- How do cross-sector partnerships develop and/or apply culturally competent approaches to enhance the undergraduate STEM experience?
- How do cross-sector student research experiences lead to increased recruitment and retention of a diverse STEM workforce?
- What aspects of cross-sector mentoring enhance student research at HSIs?
- What kinds of cross-sector partnerships foster faculty research and teaching (e.g., curriculum redesign and alignment, and/or new pedagogies)?
- How can project activities be sustained beyond the term of the project period?

Priority Area 3: Teaching and Learning in STEM

Priority Area 3 supports efforts that generate new knowledge about teaching and learning strategies and curricular models that improve undergraduate STEM education for a culturally diverse student population. It also supports the creation and adaptation of learning materials and teaching strategies to enhance STEM learning and lead to measurable gains and implementable models. This priority area supports projects that enhance understanding of how students learn STEM topics and how faculty adopt culturally relevant instructional approaches in STEM.

Investigators who include this priority area in their proposals should propose strategies and models that enhance student engagement and learning, which lead to increased retention and graduation rates. Institutions may request funds to support the adaptation and implementation of existing academic and student support activities; however, the proposal should identify what new knowledge will be generated by the project.

Investigators may consider behavioral, cognitive, affective, learning, and social differences as well as organizational, institutional, or systemic processes that may affect student engagement and learning. It is expected that projects in this priority area will include investigators (internal or external to the institution) with demonstrated expertise in education research and/or social science research methods, as well as knowledge about STEM programs.

To facilitate building the knowledge base on Teaching and Learning in STEM, the HSI Program has identified a set of guiding questions that may be considered. Projects are not expected to provide definitive answers to all of the questions that follow. These are guiding questions that can collectively help to build the knowledge base over time. Please note that these questions are not intended as limiting, and that a wide variety of questions not listed here may also be appropriate for investigation.

- How does training in implicit bias or cultural competence contribute to teaching effectiveness of faculty and staff, student sense of belonging and learning, and institutional culture at all levels?
- What kinds of faculty development lead to increased use of innovative, culturally relevant, and evidence-based teaching approaches? What aspects of faculty development lead to student engagement, learning and degree attainment?
- How do teaching supports (such as graduate or undergraduate teaching assistants, near-peer mentoring, or learning assistants) contribute to student learning and engagement and degree attainment?
- How does the development and deployment of innovative assessment tools to measure student learning affect retention, advancement, and graduation of students from HSIs? What issues are important in assessing student learning at HSIs?
- What evidence-based active learning strategies and interventions are successful in HSIs? What modifications to these activities can improve their efficacy and cultural relevance?
- What novel curricular materials and methods of instruction developed and used at HSIs have the potential to improve student learning in STEM?

2. Track 2: HSIs New to NSF

This track seeks to build capacity in undergraduate STEM education at HSIs that either have never received NSF funding or have not received funding from NSF in the five years prior to the proposal deadline. This track is designed to stimulate implementation, adaptation, and innovation in one or more of the three priority areas identified in Track 1, and to increase the number of HSIs participating in NSF programs.

Track 2 projects will develop evidence-based innovative models that address retention and graduation rates of students pursuing associate or baccalaureate degrees in STEM. Projects may be guided by the set of questions above or have a research question(s) and/or hypothesis to be addressed. Anticipated new knowledge to be generated from the project should be described. It is expected that some of the funded Track 2 projects will serve as pilots for ideas that may be expanded in future proposals in Track 1 or other NSF programs.

Collaborations between currently funded NSF projects and HSIs New to NSF projects are encouraged. Proposers are strongly encouraged to use resources developed by other NSF awardees and to consult with people from these projects and centers. Track 2 proposals should be commensurate with available resources. If some resources needed to complete the proposed activities are not available at the proposing institution, the needed resources may be obtained via partnerships with other institutions. Such partnerships will support development and capacity of the proposing institution. In such partnerships, the Lead Principal Investigator must be employed by an eligible Track 2 institution.

3. Conferences

Proposals for conferences addressing critical challenges in undergraduate STEM education at HSIs may be submitted at any time following consultation with a program officer. Conference proposals that address increasing the diversity of institutions and faculty participating in the HSI Program are encouraged. Proposals may involve collaborations of education researchers and scientists in the STEM disciplines to ensure that undergraduate STEM education addresses the cultural differences of diverse student populations. Information about preparing a Conference Proposal is contained in PAPPG

Chapter II.E.7.

C. PROJECT APPROACHES

Every project should include both a research design, project evaluation, and dissemination plan appropriate to the size and scope of the project. The research design addresses a research question and/or hypothesis that is important to the project and the field. The evaluation plan examines all aspects of the project activities to inform the project's progress towards its goals. The research design together with the project evaluation provide evidence of the project's overall impact. The dissemination plan disseminates the results broadly to enhance scientific and technological understanding.

Research Design

All proposals should be based on relevant current literature and evidence-based practices; this literature base should be adequately described in the proposal. Each proposal should include clearly-defined goals, measurable objectives, strategies to attain the objectives, and project evaluation activities aligned to the goals and objectives. As appropriate, proposals should also describe mechanisms to effectively and efficiently transfer findings into educational practice for use by other educators, researchers, and policymakers. Sustainability of project activities beyond the funding period should be addressed.

Reflecting the project goals and strategies, proposals should include one or more research questions and/or hypotheses to be investigated. The proposals should explain the significance of answering the proposed question(s) and summarize the evidence or theory that motivates the question(s). Proposals are expected to include a clear description of the alignment of research questions with methodologies. Proposals should explain how the project will generate knowledge to better understand issues in the recruitment, retention, degree attainment, and entry into the STEM workforce of undergraduate students. The research plan should be appropriate to the size and scope of the project and be managed by the project leadership team. Successful proposals will have well aligned research questions/hypotheses, methods, analyses, project activities, and project evaluation.

HSI Program proposals are expected to include a detailed research plan that has the following research design components:

- One or more explicit research questions and/or hypotheses that are aligned with and grounded in the research literature.
- Research questions and/or hypotheses, methodologies and analyses aligned with project activities and project evaluation.
- Identification and description of the data to be collected, measurement instruments or procedures to be used in collecting data, and evidence of the reliability and validity of instruments.
- Identification of the analytic or other proposed procedures for data analyses as related to project hypotheses or research questions.
- A detailed plan and timeline of how the project design phases will be developed to inform the project's research questions and/or hypotheses.
- Inclusion of education research or social science research expertise may be helpful on the project leadership team to provide guidance in research design or methodologies, instrument implementation or development, data analysis, or qualitative research procedures as appropriate.

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.

Project Evaluation: Measures to Assess Success

All proposals are expected to include a well-reasoned, well-organized plan for carrying out the proposed activities, including mechanism(s) to assess success. The project plan should indicate (e.g., through the inclusion of a logic model) the connections among project goals, activities, outputs, and outcomes. As part of their plans for assessing success, proposals need to indicate how projects will provide ongoing critical reviews of all components of their design and activities (including theoretical frameworks, project activities, data collection plans, analysis plans, and reporting plans). In detailing plans for assessing success, proposals should do the following.

- Explain why the plan is appropriate given the size and scope of the project.
- Describe the qualitative and/or quantitative measures that will inform the project team about progress toward achieving goals and specific objectives.
- Provide a timeline that clarifies responsibilities for generating, interpreting, and using evidence of success.
- Describe how the evidence arising from these critical reviews will be utilized (e.g., for continuous quality improvement, program management, and/or accountability purposes).
- Indicate how input from the independent evaluator or evaluation team will inform the design, conduct, and interpretation, use, and dissemination of findings resulting from activities to assess success.

The following references may be helpful in designing mechanisms and a plan for assessing success of the project:

- The American Evaluation Association's Guiding Principles for Evaluators: http://www.eval.org/p/cm/ld/fid=51
- The Joint Committee on Standards for Educational Evaluation: http://www.jcsee.org/program-evaluation-standards-statements
- AIHEC Indigenous Evaluation Framework: https://portalcentral.aihec.org/Indigeval/Lists/IndigenousEvaluationFrmWork/AllItems.aspx
- Evaluation e-library of the American Evaluation Association Resource Library: http://www.eval.org
- Evidence: An Essential Tool Report: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0531
- User-Friendly Handbook for Mixed Method Evaluations: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf97153
- The 2010 User-Friendly Handbook for Project Evaluation: http://evalu-ate.org/featured_resources/resources/2010_user_friendly_handbook/

Dissemination

A proposal must include a communication strategy for ensuring that the findings of the project reach broad audiences, including, where appropriate, scholars, practitioners, policymakers and public audiences. The knowledge generated by the proposal should be widely disseminated to broad 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.

III. AWARD INFORMATION

Approximately $15 million is anticipated, pending availability of funds. Grants may be awarded in sizes and durations, as summarized below. It is

expected that the project's budget request matches the scope of the project.

Anticipated number, duration, and size of new awards:

1. Track 1 Projects:
    - Number of awards: 10
    - Project length: Up to five years
    - Award size: Up to $2,500,000
    - Grant administration: Continuing or standard grants
2. Track 2 Projects:
    - Number of awards: 5
    - Project length: Up to three years
    - Award size: up to $300,000
    - Grant administration: Continuing or standard grants

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Eligible institutions must be accredited and offer undergraduate educational programs in STEM and satisfy the HSI definition 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.)
- For Track 2 (HSIs New to NSF), proposals will only be accepted from eligible institutions that have never received NSF funding or have not received funding from NSF in the five years prior to the proposal deadline.

Who May Serve as PI:

- The Lead Principal investigator (PI) must be employed by the eligible institution submitting the proposal.

Limit on Number of Proposals per Organization:

- For Track 1 (Building Capacity), an institution can submit only one proposal.
- For Track 2 (HSIs New to NSF), there are no restrictions or limits.

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

There are no restrictions or limits.

Additional Eligibility Info:

- An institution that is part of a larger system is considered separate for proposal submission purposes if it is geographically separate from the other campus(es) and has its own chief academic officer.

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, Research.gov, 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 Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at:

(https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via FastLane or Research.gov. 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.

REQUIRED COMPONENTS FOR ALL PROPOSALS

a. Cover Sheet: While filling out the cover sheet in FastLane, it is important to choose the HSI Program solicitation number indicated on the cover of this document from the list of programs in the "NSF Unit Consideration" section. This choice must be specified in order to have FastLane access the Project Data Form, which is required for HSI Program proposals. 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.

   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.

b. Project Data Form: A Project Data Form must be completed for all proposals. The information on this form is used to direct proposals to appropriate reviewers and to determine the characteristics of projects supported by the HSI Program. In FastLane, this form appears in the list of forms for the proposal only after the appropriate Program Solicitation number has been selected (indicated on the cover of this document) and indicated on the proposal cover sheet that has been saved. Select the appropriate Track in the dropdown menu.
c. Project Summary (1 page): The Project Summary must include an Overview, a statement on Intellectual Merit, and a statement on Broader Impacts. The Overview must clearly describe the nature of the project and indicate the key guiding research questions and/or hypotheses being addressed. In the Overview, indicate which priority areas are addressed.
d. Project Description (15 pages; including Results from Prior NSF Support):
    i. The Project Description must include 1) a separate section labeled “Intellectual Merit” as well as a separate section labeled “Broader Impacts." In addition, the project narrative must include 1) an explanation of the project's motivating rationale, goals, objectives, deliverables, and activities; and include 2) a project timeline; 3) a management plan; 4) the roles and responsibilities of the PI, co-PI(s), and other senior personnel; 5) a plan for sustainability after the period of NSF funding; 6) an evaluation plan (see Project Evaluation under Section II of this solicitation); 7) a dissemination plan; and 8) results from prior NSF support (see PAPPG). Submission of the evaluation plan in supplementary documents is not allowable and such proposals will be subject to return without review as they will not meet the 15-page requirement. The proposal should include a component that outlines a strategy for the integration of NSF-funded awards at the institution, if applicable. The independent evaluator should be identified (see Project Evaluation under Section II of this solicitation). PIs are cautioned that the Project Description must be self-contained and that URLs must not be used.
    ii. Proposals should discuss existing institutional programs and initiatives that are relevant to the project. Proposals should describe and justify the adaptation of program elements implemented and explain how the project builds or extends current programs. If the institution or a member of a consortium of institutions has had a previous award relevant to the project, show how the proposed project will build on lessons learned from these efforts. Existing activities should not be included as proposed activities to be supported by the project.
    iii. All projects should advance understanding and generate new knowledge about undergraduate STEM education. All projects should draw on the research literature and discuss the issues or gaps in the literature that the project plans to address. The proposal should identify anticipated new contributions to knowledge as well as a discussion of the project’s significance. The contribution to new knowledge should be relevant to the needs of the institution; draw on the research literature on evidence-based practices; state research questions that guide the investigations; and describe how the research questions will be answered.
    iv. All proposals must include a project evaluation plan that describes the mechanisms that will be employed to assess success, indicating how the resulting evidence will be employed for project improvement purposes. The evaluation must be led by an expert independent evaluator or evaluation team.
    v. The project leadership team should reflect the diversity in expertise needed to successfully manage the proposed project. The project leadership team must include a STEM faculty member currently teaching in one of the STEM disciplines. It is expected that projects will include investigators (internal or external to the institution) with demonstrated expertise in education research and/or social science research methods, as well as knowledge about STEM programs. Include a description of the responsibilities, qualifications, and level of effort of the key personnel involved in the project, including the roles of consultants and advisors at each stage of the project. The proposal should address how project activities, communications, and relationships will be managed across collaborating individuals and institutions.
e. References Cited (no page limit; see NSF PAPPG for format guidelines): Bibliography for Project Description only. References should draw on the discipline-based education research literature, on the literature on STEM teaching and learning, and on the research literature on higher education. If the referenced document is available electronically, the website address should also be identified.
f. Biographical Sketch(es): Required for each individual identified as senior personnel and is limited to two pages using NSF format.
g. Budgets and Budget Justification (see Section V. B. Budgetary Information for additional budget preparation instructions).
h. Current and Pending Support (use NSF format).
i. Facilities, Equipment and Other Resources (use NSF format). Proposers should include an aggregated description of the internal and external resources (both physical and personnel) that the organization and its collaborators will provide to the project, should it be funded. No quantifiable financial information should be provided. Such information must be provided in this section, in lieu of other parts of the proposal (e.g., budget justification, project description). The description should be narrative in nature and must not include any quantifiable financial information. See PAPPG for additional information. Please note that this section is a required part of the proposal.

   All information necessary for the review of a proposal must be contained in Sections a through i of the proposal. Appendices may not be included. Applications that are incomplete may be returned without review.

j. Special Information and Supplementary Documentation:
    i. **Postdoctoral Mentoring Plan** (1 page; if applicable)
    ii. **Data Management Plan** (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).

In addition to the PAPPG, the HSI Program requires the following supplementary documents.

iii. **HSI Certification Form** signed by the authorized organizational representative of the lead institution (https://nsf.gov/ehr/HSIProgramPlan.jsp).
iv. The **biographical sketch of the independent evaluator(s)** must be included and uploaded as a single PDF file in the Other Supplementary Documents section of the proposal.
v. **Letters of Support** that document what is being committed that is of significance to the project. Letters 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.

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

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Equipment Limitations:

- Equipment costs cannot exceed 30% of the total NSF budget requested. Equipment requests must be clearly disclosed in the proposal budget, justified in the budget justification, and be included in the NSF award budget.

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 the PI to attend a one to two-day grantee meeting every year of the project.
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):

  March 06, 2019

  September 18, 2019

  Third Wednesday in September, Annually Thereafter

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@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 or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *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 underrepresented minorities 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.

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.

Additionally, it is suggested that the developer of new materials license all work (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 Camacho, telephone: (703) 292-2834, email: ecamacho@nsf.gov
- Jennifer E. Lewis, telephone: (703) 292-2938, email: jenlewis@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
• **To Order Publications or Forms:**	
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