

# Tribal Colleges and Universities Program (TCUP)

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## PROGRAM SOLICITATION

NSF 11-538

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### REPLACES DOCUMENT(S):

NSF 10-501

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National Science Foundation

Directorate for Education & Human Resources  
Division of Human Resource Development

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

July 21, 2011

Initiation Project Proposals

August 04, 2011

Targeted STEM Infusion Project Proposals

August 04, 2011

Proposals for Research Initiation Awards

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

Proposals Accepted Anytime

Planning Grant Proposals; Broadening Participation Research in STEM Education Proposals

## IMPORTANT INFORMATION AND REVISION NOTES

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A revised version of the NSF Proposal & Award Policies & Procedures Guide (PAPPG), [NSF 11-1](#), was issued on October 1, 2010 and is effective for proposals submitted after January 18, 2011. Please be advised that the guidelines contained in [NSF 11-1](#) apply to proposals submitted in response to this funding opportunity.

**Cost Sharing:** The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: Grant Proposal Guide (GPG) [Chapter II.C.2.g\(xi\)](#) for further information about the implementation of these recommendations.

**Data Management Plan:** The PAPPG contains a clarification of NSF's long-standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. A link to data management requirements and plans relevant to EHR is available [here](#) on the NSF website. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

**Postdoctoral Researcher Mentoring Plan:** As a reminder, each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. FastLane will not accept submission of proposals that seek postdoctoral support without a Postdoctoral Researcher Mentoring Plan. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

#### Revision Notes

Proposals for the Pre-Engineering Education Collaboratives (PEEC), STEM Teachers of Excellence Education Projects (STEEP), and Innovation through Institutional Integration (I<sup>3</sup>) tracks are not being accepted for the 2011 competition. In addition to tracks for Planning Grants and Initiation Projects, this solicitation includes the following new tracks: Targeted STEM Infusion Projects (TSIP), Broadening Participation Research in STEM Education (BPR), and Research Initiation Awards (RIA).

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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Program Title:

## Synopsis of Program:

The Tribal Colleges and Universities Program (TCUP) provides awards to Tribal Colleges and Universities, Alaska Native-serving institutions, and Native Hawaiian-serving institutions to promote high quality science, technology, engineering and mathematics (STEM) education, research, and outreach. TCUP-eligible institutions are predominantly two-year and community colleges. Support is available to TCUP-eligible institutions (see the Additional Eligibility subsection of Section IV of this solicitation) for **Planning Grants, Initiation Projects, Broadening Participation Research in STEM Education (BPR) Projects, Targeted STEM Infusion Projects (TSIP), and Research Initiation Awards (RIA)**. Through these mechanisms, along with collaborations with other National Science Foundation (NSF) units and its work with other organizations, TCUP aims to increase Native individuals' participation in STEM careers and the quality of STEM programs at TCUP-eligible institutions. TCUP strongly encourages the inclusion of activities that will benefit veterans.

**Planning Grants** provide support to undertake self-analysis of the TCUP-eligible institution's undergraduate STEM programs to identify components that need improvement or enhancement in order to ensure a high-quality undergraduate STEM education.

**Initiation Projects** provide support to design, implement and assess comprehensive institutional efforts to increase the numbers of STEM students and the quality of their preparation by strengthening STEM education and research. Initiation Projects create and/or adapt and assess innovative models and materials for teaching and learning in STEM, embody knowledge about how students learn most effectively in STEM teaching and learning activities, and bring STEM disciplinary advances into the undergraduate experience.

**Broadening Participation Research in STEM Education (BPR)** provides support for research projects that seek to create and study new models and innovations in STEM teaching and learning, enhance the understanding of the participation of diverse groups in STEM education and inform education practices and interventions. BPR projects add new research-based strategies and models to broadening participation in STEM and increase the capacity of scholars in TCUP-eligible institutions to conduct this type of research.

**Targeted STEM Infusion Projects (TSIP)** provide support toward achieving a short-term, well-defined goal that promises to improve the quality of undergraduate STEM education at an eligible institution. Targeted STEM Infusion Projects could, for example, enhance academic infrastructure by systematically adding traditional knowledge to the scope or content of a STEM course, updating curriculum, modernizing laboratory research equipment, or improving the computational network array for research and education.

**Research Initiation Awards (RIA)** provide support for faculty members in STEM areas at TCUP-eligible institutions to pursue research at an NSF-funded Center, at a research-intensive institution, or at a national laboratory. Awards are intended to help further the faculty member's research capability and effectiveness, to improve research and teaching at his or her home institution, and to involve undergraduate students in research experiences. These awards are particularly appropriate as a means of recruiting and retaining highly qualified scientists and engineers at TCUP-eligible institutions.

Other funding opportunities include: Conferences, Symposia, and Workshops; EARly-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID) grants; and Grant Supplements for existing awards. PIs are invited to seek supplemental support from NSF for their participating students and faculty who are accepted as participants in one of four Department of Energy initiatives: Science Undergraduate Laboratory Internships (SULI), Faculty-Student Teams (FaST), Community College Institutes (CCI), and Pre-Service Teacher (PST) Internships. The Dear Colleague Letter is found [here](#). The initiatives are intended to support the research opportunities in DoE national laboratories during the summer.

## Cognizant Program Officer(s):

- Lura Chase, Program Director, telephone: (703) 292-8682, email: [lchase@nsf.gov](mailto:lchase@nsf.gov)
- Keith A. James, Program Officer, 815.13, telephone: (703) 292-8447, email: [kjames@nsf.gov](mailto:kjames@nsf.gov)
- Denise Spain, Program Specialist, 815, telephone: 703-292-5189, email: [dspain@nsf.gov](mailto:dspain@nsf.gov)

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

- 47.076 --- Education and Human Resources

## Award Information

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**Anticipated Type of Award:** Standard Grant or Continuing Grant

**Estimated Number of Awards:** 18 to 23 - Up to 2 Planning Grants, up to 5 Broadening Participation Research Projects, up to 10 Targeted STEM Infusion awards, and up to 2 Research Initiation Awards will be made pending the availability of funds. Up to 4 Initiation Project awards will be made as continuing grants pending the availability of funds.

**Anticipated Funding Amount:** \$7,000,000 pending the availability of funds.

## Eligibility Information

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### Organization Limit:

Proposals may only be submitted by the following:

- Tribal Colleges and Universities, Alaska Native-serving institutions and Native Hawaiian-serving institutions as defined in Section IV of this solicitation. Priority for TSIP awards will be given to TCUP-eligible institutions that have not previously received Implementation-level support.

### PI Limit:

For the Planning Grant and Initiation Project award tracks, the Principal Investigator (PI) is expected to be the chief academic officer of the institution, or another senior academic officer responsible for oversight and

management of curriculum and instructional policies for the institution. All full time faculty members at TCUP-eligible institutions are eligible to serve as PI on Broadening Participation Research in STEM Education. Typically, the PI for Targeted STEM Infusion Projects and Research Initiation Award proposals would be a member of the STEM faculty. Prospective PIs are encouraged to consult TCUP program staff.

**Limit on Number of Proposals per Organization:**

Eligible institutions may receive only one Planning Grant. Eligible institutions may receive consecutive, but not concurrent, Initiation Project awards. There is no limit on the number of Targeted STEM Infusion Projects or Broadening Participation Research projects per TCUP-eligible institution. No more than two Research Initiation Awards will be made per institution in any year.

**Limit on Number of Proposals per PI:**

None Specified

## Proposal Preparation and Submission Instructions

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### A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - 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: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://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. proposer's local time):
  - July 21, 2011  
Initiation Project Proposals
  - August 04, 2011  
Targeted STEM Infusion Project Proposals
  - August 04, 2011  
Proposals for Research Initiation Awards
- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
  - Proposals Accepted Anytime  
Planning Grant Proposals; Broadening Participation Research in STEM Education Proposals

## Proposal Review Information Criteria

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**Merit Review Criteria:** National Science Board approved criteria apply.

## Award Administration Information

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

**Reporting Requirements:** Standard NSF reporting requirements apply.

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## I. INTRODUCTION

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The Tribal Colleges and Universities Program (TCUP) is managed by the Division of Human Resource Development (HRD), which is part of the Directorate for Education and Human Resources (EHR) of the National Science Foundation (NSF). NSF supports research at the frontiers of knowledge, across all fields of science, technology, engineering, and mathematics and all levels of STEM education. NSF enables innovation and discovery in science, technology, engineering, and mathematics by educating and preparing a diverse and able STEM workforce motivated to participate at the frontiers of science. NSF is committed to reaching across society to ensure that the rich diversity of the nation's cultures is well represented in the STEM workforce and that individuals engaged in STEM fields are trained to participate fully in the global research enterprise.

### The Directorate for Education and Human Resources

The mission of EHR is to achieve excellence in U.S. STEM education at all levels and in all settings (both formal and informal) in order to support the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry that has access to the ideas and tools of science and engineering. Specific EHR goals are:

1. Prepare the next generation of STEM professionals and attract and retain more Americans to STEM careers.
2. Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in STEM education and that integrates research and education.
3. Increase the technological, scientific and quantitative literacy of all Americans so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.
4. Broaden participation (individuals, geographic regions, types of institutions, STEM disciplines) and close achievement gaps in all STEM fields.

### The Division of Human Resource Development

The Division of Human Resource Development serves as a focal point for NSF's agency-wide commitment to enhancing the quality and excellence of STEM education and research through broadening participation by historically underrepresented groups - minorities, women, and persons with disabilities. Priority is placed on investments that promise innovation and transformative strategies and that focus on creating and testing models that ensure the full participation of and provide opportunities for the educators, researchers, and institutions dedicated to serving these populations. Programs within HRD have a strong focus on partnerships and collaborations in order to maximize the preparation of a well-trained scientific and instructional workforce for the new millennium.

### The HRD Theory of Change

HRD's fundamental mission of broadening participation in STEM is embedded in the greater EHR and NSF goals. A basic premise of all HRD programs is that increasing the successful participation of individuals from underrepresented groups in STEM will result in quality research, the implementation and testing of evidence-based practices, critical review of program results to assess impact, data-driven continuous improvement, and broad dissemination of program findings for wide uptake of effective strategies. HRD, through these activities, ties directly to the development and expansion of a diverse, highly capable STEM workforce that can lead innovation and sustain U.S. competitiveness in the science and engineering enterprise.

HRD has an overall goal to increase the successful participation of underrepresented minorities, women and girls, and persons with disabilities in STEM. Each HRD program, with specific goals and objectives related to the larger goal of broadening participation, carries out its work based on similar operating principles: (1) establish priorities and develop solicitations that reflect the goals, priorities, and the state of the field; (2) fund research to build the knowledge base in the field, especially in the area of broadening participation in STEM; (3) fund the implementation of evidence-based educational practices or strategies, such as alliances, STEM capacity building, and transition to the workforce; (4) monitor funded projects and require rigorous project evaluation to determine the impact of NSF projects and inform project development; (5) use findings from monitoring and evaluation activities to improve or adjust program parameters; and (6) require and support dissemination of findings from projects to assure broader impact of funded projects.

To meet the challenges presented by the nation's increasing needs in STEM, the Tribal Colleges and Universities Program is committed to enhancing the quality of undergraduate science, technology, engineering, and mathematics education and research at Tribal Colleges and Universities, Alaska Native-serving institutions, and Native Hawaiian-serving institutions. TCUP seeks

development of STEM education initiatives to support the preparation of a science and engineering workforce that is broadly inclusive and capable of performing in an international research and development environment in order for the U.S. to remain at the forefront of world science and technology.

In alignment with the goals of the Directorate for Education and Human Resources and the Division of Human Resource Development, TCUP has identified the following priorities: innovation in instruction and curriculum development; providing access to exciting STEM research experiences for undergraduate students; recruitment and retention; critical transitions from K-12 to undergraduate, 2- year to 4-year, and undergraduate to graduate. Proposals submitted to TCUP are encouraged to address one or more of these priorities. Improving student performance in science and mathematics requires an adequate supply of well-qualified STEM teachers [1], [2], and community colleges play a vital role in the preparation of those teachers, particularly among underserved populations. TCUP strongly encourages PIs to address STEM teacher preparation at either the associate or baccalaureate level to help increase the number and quality of future science and mathematics teachers. A new focus of TCUP is the recruitment and retention of veterans in STEM fields as a means to diversify and increase the STEM workforce. Proposals that recruit a cohort of veterans and suggest strategies to retain them, are strongly encouraged.

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[1] The President's Council of Advisors on Science and Technology (2010). Executive Report to the President. *Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future*. <http://www.whitehouse.gov/ostp/pcast>.

[2] Kuenzi, J. (2008). CRS Report for Congress. *Science, Technology, Engineering and Mathematics (STEM) Education: Background, Federal Policy and Legislative Action*. Congressional Research Service, Domestic Social Policy Division. Order Code RL33434.

## II. PROGRAM DESCRIPTION

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The Tribal Colleges and Universities Program promotes improvement and continued quality in undergraduate science, technology, engineering and mathematics instructional and outreach programs at Tribal Colleges and Universities, Alaska Native-serving institutions and Native Hawaiian-serving institutions.

Through this program, assistance is provided to eligible two-year and four-year institutions in their efforts to bridge the digital divide, prepare students for careers in STEM fields, and build the STEM capacity of Native communities toward achieving community goals. TCUP projects are also intended, in their entirety and in the long-term, to promote innovation in STEM education in all settings (including, e.g., other Minority Serving institutions and mainstream educational institutions). TCUP and the National Science Foundation allow proposers flexibility and creativity in the design of efforts to improve undergraduate STEM education. Proposed activities should be the result of a careful analysis of institutional needs, address institutional and NSF goals, and have the potential to result in significant and sustainable improvement of STEM programs. TCUP emphasizes the expansion of course and degree offerings, development of undergraduate research opportunities, faculty skills, and STEM-education technologies; and the integration of community goals and traditional knowledge with mainstream STEM education and research. Support is available for focused STEM interventions, STEM-education research, and the implementation of comprehensive institutional approaches to strengthening STEM teaching, learning, and application. Partnerships among institutions of higher education and collaborations with K-12 schools, tribal government units or other relevant groups are encouraged.

TCUP support is available through Planning Grants, Initiation Projects, Broadening Participation Research in STEM Education projects, Targeted STEM Infusion Projects and Research Initiation Awards. Typical project goals and approaches (described in greater detail below) include course, degree, and curriculum development, reform and enhancement; faculty professional development; the integration of active learning tactics into the STEM curriculum; community outreach and engagement; student support; internships and other educational enrichment activities; student recruitment, retention and placement; infusion of technology to enhance STEM instruction; collaborations with other educational institutions, business, or other community partners; and activities that enhance the knowledge and skills of technical support personnel. Proposals that include these or other activities that will meet institutional and community needs are encouraged. While the primary focus of TCUP is at the associate and baccalaureate degree levels, proposers are encouraged to include methods to promote successful advancement by students through the critical transition points: the transition between high school and college, 2- and 4-year colleges, undergraduate and graduate studies, and from college to the workplace. A new focus of TCUP is the recruitment and retention of veterans in STEM fields as a means to diversify and increase the STEM workforce. Proposals that recruit a cohort of veterans and suggest strategies to retain them, are strongly encouraged.

**Planning Grants** provide support to undertake self-analysis of the TCUP-eligible institution's undergraduate STEM programs to identify components that need improvement or enhancement in order to ensure a high quality undergraduate STEM education. Planning Grants should also examine existing activities and strategies across the nation that could be implemented in a proposed project to improve the quality and competitiveness of undergraduate STEM education at the institution. Proposed activities should include an institutional STEM self-analysis leading to an action plan. This should include activities and strategies to identify the strengths, weaknesses, and opportunities that affect the capacity and effectiveness of the institution to attract, retain, and educate students in STEM fields and graduate them prepared for further study (transfer to a four-year institution or graduate school) or the STEM workforce. Typical activities include: data collection and analysis, stakeholder consultation, development of potential activities and strategies, site visits to model programs, and data gathering for a proposal for an Initiation Project. TCUP Planning Grants typically provide up to \$50,000 for up to one year. Eligible institutions may receive only one Planning Grant. TCUP will accept proposals for Planning Grants at any time: there is no deadline for Planning Grants. Interested individuals are strongly encouraged to discuss this option with a TCUP program officer.

**Initiation Projects** provide support to design, implement and assess comprehensive institutional efforts at eligible two-year or four-year colleges to increase the numbers of students in STEM and the quality of their preparation by strengthening STEM education and research. Initiation Projects create and/or adapt and assess innovative models and materials for teaching and learning in STEM, embody knowledge about how students learn most effectively in STEM teaching and learning activities, and bring STEM disciplinary advances into the undergraduate experience. Projects that may result in new STEM degrees at the associate or baccalaureate levels are encouraged. Proposers are encouraged to analyze the strengths and potential of the institution in STEM. Based on this analysis, they should design innovative educational strategies appropriate in content and context to increase the capacity and effectiveness of the institution to attract, retain, and educate students in STEM. The students should graduate prepared to pursue further study at the baccalaureate or graduate level, or to join the STEM workforce. Dissemination of successful models, effective methods, and innovative materials for educating STEM students are critical aspects of Initiation Projects. Initiation Project components may include, but are not limited to: developing and assessing innovative STEM curriculum and teaching and learning techniques, using cyberinfrastructure for anytime, anywhere learning; providing novel undergraduate student development activities and educational enrichment services; enhancing undergraduate student research experiences; providing activities that promote the development of a globally engaged workforce; creating new approaches to recruitment and retention of undergraduate STEM students; providing faculty professional development in effective STEM teaching; preparing K-12 STEM teachers; addressing the critical transitions from K-12 to undergraduate; 2-year to 4-year, and undergraduate to graduate; and implementing other activities that enhance the quality

and competitiveness of undergraduate STEM programs.

TCUP encourages the submission of proposals from eligible institutions that have completed the necessary planning activities (with or without NSF support) to develop an appropriate strategy for STEM instructional improvement. Initiation Projects will typically be awarded for up to five years, in amounts of up to \$500,000 per year dependent on performance; total funding per project is not expected to exceed \$2,500,000. Initiation Projects should actively engage STEM faculty members who will be responsible for the successful implementation of the proposed project.

**Broadening Participation Research in STEM Education (BPR)** provides support for research projects that seek to create and study new models and innovations in STEM teaching and learning, enhance understanding of the participation of diverse groups in STEM education and inform education practices and interventions. BPR projects add new research-based strategies and models to broadening participation in STEM and increase the capacity of scholars in TCUP-eligible institutions to conduct this type of research. Proposed research may investigate behavioral, cognitive, affective, learning and social differences as well as organizational, institutional or systemic processes that may impact participation in STEM education. BPR projects are likely to use methods from sociology, psychology, anthropology, economics, statistics, and other social and behavioral science and education disciplines. Successful proposals will be grounded in appropriate theory and incorporate recent innovations and advances in research methodologies, conceptual frameworks and/or data gathering and analytic techniques. The goal of this track is to enhance understanding of the underlying issues affecting the differential participation rates of students from underrepresented groups in STEM. The BPR track will catalyze acquisition of knowledge on what types of interventions have what types of impact on learning, persistence, and success in STEM for which groups under what conditions and in what contexts. The Broadening Participation Research in STEM Education track exists across programs in the Division of Human Resource Development and may be found in the following solicitations: Louis Stokes Alliances for Minority Participation (LSAMP); Historically Black Colleges and Universities Undergraduate Program (HBCU-UP); Research in Disabilities Education (RDE); Research on Gender in Science and Engineering (GSE); and Tribal Colleges and Universities Program. Priorities and restrictions on study populations and awardee institutions may apply depending on the HRD program to which the proposal is submitted.

The TCUP Broadening Participation Research in STEM Education track provides support to undertake a one-to-three year educational research project that will inform STEM education and research programs at TCUP-eligible institutions. BPR awards will be up to \$300,000 for up to three years. BPR proposals should be theory-based and employ sound research methodology and projects should contribute to broad scientific understanding of STEM education. Research proposed in the BPR track must be within the scope of areas supported within the NSF's Directorate of Education and Human Resources. Potential education research topics include (but are not limited to) place-based learning; student retention; diffusion of innovations; curricular enhancements; technology in education; integration of student research with disciplinary learning; effectiveness in STEM teacher education; or the identification of successful curriculum or student-support models. Studies of educational components across multiple TCUP-eligible institutions are encouraged. Projects that include TCUP students on the research team are encouraged. College faculty members who are not experienced educational researchers are encouraged to partner with experienced researchers from other institutions. Proposals can be submitted by partnerships of multiple TCUP-eligible institutions, but proposals must be submitted and directed by a TCUP-eligible institution.

**Targeted STEM Infusion Projects (TSIP)** provide support toward achieving a short-term, well-defined goal that promises to improve the quality of undergraduate STEM education at eligible institutions. Targeted STEM Infusion Projects could develop innovative learning experiences in emerging fields of science and engineering such as energy science, climate science, and other dynamic interdisciplinary and multidisciplinary fields. Projects could develop creative uses of cyberinfrastructure for anytime, anywhere learning in STEM and next generation STEM undergraduate programs. Projects could enhance academic infrastructure by systematically adding traditional knowledge to the scope or content of STEM courses, updating curriculum, modernizing laboratory research equipment, or improving the computational network array for research and education. Such approaches could help to improve the preparedness of students for further study and the recruitment of qualified STEM faculty. Projects could enhance existing degree programs, establish new degree programs at the associate or baccalaureate level, secure specialized accreditation or certification, or infuse STEM programs with disciplinary field advances and evolving workforce requirements. These approaches should be aimed at improving the academic preparation of graduating students and recruiting more students to the program. Projects could build explicit collaborations between STEM disciplines and teacher education programs. Typically, projects are focused on one activity within a single STEM department; however interdisciplinary and cross-disciplinary projects are encouraged. Eligible institutions may include strategies to bring scientists and educators in STEM fields to their institutions as visiting faculty in order to help establish new courses or degree programs, build partnerships to promote successful student matriculation to mainstream universities, or otherwise support success of the educational mission of the institution.

Competitive proposals will describe clearly the innovation in undergraduate STEM education the project will realize. Appropriate short-term goals should be easily measurable and attainable within the project time frame, and appropriate metrics should be identified. The proposal also should include activities for dissemination of project results.

Normal operating activities such as salaries to teach existing classes and normal recruitment and outreach activities will not be funded. TSIP proposals are not supplements to existing TCUP projects. Targeted STEM Infusion Project awards are up to three years and up to \$500,000. Eligible institutions do not need to have an existing Initiation Project or other (i.e., PEEC or STEEP) implementation award in order to submit a TSIP proposal.

**Research Initiation Awards (RIA)** provide support for faculty members in STEM areas at TCUP-eligible institutions to pursue research at an NSF-funded Center, at a research-intensive institution, or at a national laboratory. Awards are intended to help further the faculty member's research capability and effectiveness, to improve research and teaching at his or her home institution, and to involve undergraduate students in research experiences. These awards are particularly appropriate as a means of recruiting and retaining highly qualified scientists and engineers at TCUP-eligible institutions. Research Initiation Awards are for up to two years and and up to \$200,000.

**Other Funding Opportunities** offered through TCUP include support for Conferences, Symposia, and Workshops; EARly-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID); and Grant Supplements for existing awards. Such proposals may be submitted, as described in the Grant Proposal Guide (GPG), which is available at <http://www.nsf.gov>.

Through a Cooperative Activity with the Department of Energy, supplements are available for Science Undergraduate Laboratory Internships (SULI), Faculty-Student Teams (FaST), Community College Institutes (CCI), and Pre-Service Teacher (PST) Internships.

For Conferences, Symposia, and Workshops, see GPG, II.D.8.

For Early-concept Grants for Exploratory Research (EAGER), see GPG II.D.2

For Grants for Rapid Response Research (RAPID), see GPG, II.D.1.

For a supplement through the Cooperative Activity with the Department of Energy, see the Dear Colleague Letter, found [here](#).

The following illustrates possible topics, as well as some aspects of project design, to consider for all TCUP proposals:

**CURRICULUM ENHANCEMENT:** Course and curriculum development or enhancement are critical to achieve institution-wide

improvements in undergraduate STEM education. Applicants may include plans to strengthen and update the STEM curricula through the development, adaptation and implementation of instructional materials, experiences and practices. Supportable activities include, but are not limited to:

- development and introduction of STEM programs or degrees to be offered locally or shared between partner institutions;
- restructuring the STEM curricula, courses and laboratories through the incorporation of advances in science and engineering knowledge, research-based teaching and learning techniques and practices, and through the integration of technology and cyberlearning into the curricula;
- revision of STEM gate-keeping and bottleneck courses based on appropriate content and performance standards;
- alignment of curriculum to promote student transfer between partner institutions toward advanced degree completion;
- integration of student research, community service and other active learning pedagogies into the curriculum; and,
- researching the effectiveness, for student and community groups, of models and approaches to implementing STEM education at TCUP-eligible institutions.

FACULTY DEVELOPMENT and INTERACTIONS: A well-trained faculty with continuous learning opportunities is a key factor for institutional quality and the success of undergraduate education. TCUP proposals may include faculty development activities such as (but not limited to) the following:

- sabbaticals to enhance research competencies and knowledge of recent technological developments;
- visitation or exchange programs to develop research or education skills, or develop opportunities to engage in collaborative research and education projects with partner institutions;
- participation in professional development workshops on innovative teaching practices and assessment, including distance education methodologies;
- professional development workshops on the use of laboratory equipment, techniques, safety, quality control, or innovations in cyberlearning;
- special seminars to enhance disciplinary knowledge;
- faculty reassigned time or release-time to participate in appropriate STEM curricular improvement and academic enhancement activities;
- support for faculty opportunities to participate in research and community service in conjunction with student experiences; and,
- faculty reassigned time or release-time to mentor students.

UNDERGRADUATE TRAINING and RESEARCH EXPERIENCES: Eligible institutions may apply for funding for stipends for students (U.S. citizens and permanent residents, only) to support their engagement in STEM related research or training activities or appropriate community service. Research experiences may be on campus with local investigators or at off-campus sites (e.g., industrial, academic, governmental research laboratories). Community service may be provided off-campus. Activities suitable for TCUP support include, but are not limited to the following:

- research experience at academic institutions, industrial laboratories, national laboratories, or NSF-supported research centers that complement students' academic studies;
- internships or cooperative education opportunities at appropriate off-campus sites that are demonstrably related to students' STEM knowledge and skill development;
- student internships at local schools that put into practice technical training or STEM skills; and,
- service by students to help the local community meet STEM-related aspects of community needs, goals or objectives.

For both undergraduate and faculty development experiences, the TCUP program also encourages inclusion of international experiences where relevant and feasible. PIs are encouraged to consider adding international activities to their proposals. Additional opportunities for funding for international experiences can be found through NSF's Office of International Science and Engineering (OISE) and can be found at [the OISE website](#).

### III. AWARD INFORMATION

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#### Planning Grants

- Number of awards: Up to 2
- Project Length: One year
- Award Size: Up to \$50,000

#### Initiation Projects

- Number of awards: Up to 4
- Project Length: Up to five years
- Award Size: Up to \$2.5 million
- Note: Funds should be budgeted for the PI and PD to attend a three-day grantee meeting in the Washington, DC area and a TCUP Leaders' Forum each award year; as well as a single reverse site visit at NSF.

#### Broadening Participation Research in STEM Education

- Number of awards: Up to 5
- Project Length: Up to three years
- Award Size: Up to \$300,000
- Note: Funds should be budgeted for the PI to attend a three-day grantee meeting in the Washington, DC area each award year.

#### Targeted STEM Infusion Projects

- Number of awards: Up to 10
- Project Length: Up to three years
- Award Size: Up to \$500,000
- Note: Funds should be budgeted for the PI to attend a three-day grantee meeting in the Washington, DC area each award year.

#### Research Initiation Awards

- Number of awards: Up to 2
- Project Length: Up to two years

- Award Size: Up to \$200,000
- Note: Funds should be budgeted for the PI to attend a three-day grantee meeting in the Washington, DC area each award year.

## IV. ELIGIBILITY INFORMATION

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### Organization Limit:

Proposals may only be submitted by the following:

- Tribal Colleges and Universities, Alaska Native-serving institutions and Native Hawaiian-serving institutions as defined in Section IV of this solicitation. Priority for TSIP awards will be given to TCUP-eligible institutions that have not previously received Implementation-level support.

### PI Limit:

For the Planning Grant and Initiation Project award tracks, the Principal Investigator (PI) is expected to be the chief academic officer of the institution, or another senior academic officer responsible for oversight and management of curriculum and instructional policies for the institution. All full time faculty members at TCUP-eligible institutions are eligible to serve as PI on Broadening Participation Research in STEM Education. Typically, the PI for Targeted STEM Infusion Projects and Research Initiation Award proposals would be a member of the STEM faculty. Prospective PIs are encouraged to consult TCUP program staff.

### Limit on Number of Proposals per Organization:

Eligible institutions may receive only one Planning Grant. Eligible institutions may receive consecutive, but not concurrent, Initiation Project awards. There is no limit on the number of Targeted STEM Infusion Projects or Broadening Participation Research projects per TCUP-eligible institution. No more than two Research Initiation Awards will be made per institution in any year.

### Limit on Number of Proposals per PI:

None Specified

### Additional Eligibility Info:

Organizations eligible to submit TCUP proposals are Tribal Colleges and Universities, Alaska Native-serving institutions and Native Hawaiian-serving institutions. Multiple campuses of one university system are normally encouraged to consider collaborative submissions. Executive Order 13021 defines Tribal Colleges and Universities ("tribal colleges") as those institutions cited in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (7 U.S.C. 301 note), and other institutions that qualify for funding under the Tribally Controlled Community College Assistance Act of 1978, (25 U.S.C. 1801 et seq.), as well as Navajo Community College as authorized in the Navajo Community College Assistance Act of 1978, Public Law 95-471, Title II (25 U.S.C. 640a note). The term "Alaska Native-serving institution" means an institution of higher education that is an eligible institution under section 1058(b) of the Higher Education Act; and that, at the time of submission, has an undergraduate enrollment that is at least 20 percent Alaska Native students. The term "Native Hawaiian-serving institution" means an institution of higher education that is an eligible institution under section 1058(b) of the Higher Education Act; and that, at the time of submission, has an undergraduate enrollment that is at least 10 percent Native Hawaiian students.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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**Full Proposal Preparation Instructions:** Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- 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 Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nspubs@nsf.gov](mailto:nspubs@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: ([http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://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) 292-7827 or by e-mail from [nspubs@nsf.gov](mailto:nspubs@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 the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on

collaborative proposals.

All proposals to TCUP should include the following information that supplements the GPG:

#### **Initiation Project Proposals Require the Following Additional Information**

Proposals for Initiation Projects should provide a clear picture of the current status of the institution's STEM infrastructure and an institutional plan to enhance the STEM program by indicating the anticipated value added by the NSF-supported efforts;

Initiation Projects are intended to implement significant and sustainable enhancements to the institution's STEM instructional capacity. They should involve all key governance and instructional stakeholders. Therefore, proposals to this TCUP strand should include a description of the project management structure. In addition to the Principal Investigator, (normally, the chief academic officer of the institution, or another senior academic officer responsible for oversight and management of curriculum and instructional policies for the institution), typical project organization consists of a Project Director, and a Steering Committee with lead faculty from the relevant disciplines or programs and administrators from partner institutions, if any.

Initiation Project proposals should also include a plan for establishing an external advisory committee, normally convened by the college or university president or another ranking institutional representative not designated as key personnel on the project. The PI cannot chair the advisory committee, nor can other members of the project leadership serve on the advisory committee. This committee will help guide the implementation and assessment of project activities. The size of the committee is left to the discretion of the proposers. However, there should be adequate representation from partner institutions, industry and the local community, as appropriate, and adequate expertise and experience with the topical and programmatic emphases of the project. Prospective candidates for the committee should be identified in the Project Description.

Initiation Projects are intended to continue beyond the period of NSF funding. Successful proposals should provide evidence of the commitment of the proposing institution to the improvement of undergraduate STEM education including plans and resource alignment strategies to continue elements of the project after NSF funding ends.

A crucial element is an evaluation and assessment plan within the Project Description, so that project development and implementation can be monitored at all stages. One of the key objectives of TCUP is to improve the quality of undergraduate STEM education through the development, adaptation and implementation of effective educational techniques and practices to enhance STEM instruction. Accordingly, proposed evaluation and assessment plans should include indicators (as relevant given the specific proposed project) of progress that address the extent to which:

- educational techniques and practices shown to be effective elsewhere are adapted or modified for use at the awardee institution;
- a plan has been developed to identify specific intended outcomes, methods of assessing them, and design for measuring the impact of the project on those outcomes;
- faculty at the awardee institution have been prepared to use the modified educational techniques or practices;
- modified techniques or practices have been incorporated into the curriculum;
- innovative courses or program components are developed;
- the effectiveness of specific planned educational techniques, practices, courses or other implementation components is assessed;
- the equipment has been successfully incorporated into the curriculum (for those projects that acquire equipment); and
- project activities are demonstrated to affect student learning and student access to quality STEM education as defined by measurable quantitative student-based outcomes pre- and post-TCUP investment; e.g., number of STEM majors involved in active learning activities, research activities, or community service; number of STEM majors who have enrolled in and successfully completed newly developed or revised courses or programs; rates of successful completion of STEM gate-keeper courses; student retention in STEM disciplines; number of STEM graduates with grade point averages of 3.0 or higher; number of STEM students matriculating into 4-year colleges or graduate programs; and number of graduates that enter the STEM workforce.

All successful Initiation Project proposals must articulate a dissemination plan that may include but is not limited to:

- Use of cyberlearning or internet diffusion systems, public media networks, or other innovative digital and print publications to provide information about strategies, activities, and evaluation findings related to increasing participation and success in STEM education among target groups
- Translation of project outcomes into models that work to mitigate differences in TCUP-community STEM education or workforce participation and creation of materials that engage appropriate practitioner and public audiences.
- Presentations to organizations or other audiences that have access to particular practitioner communities (e.g., professional associations or teacher organizations) of strategies and materials based on project results and providing strategies for reaching their members or other audiences with the resources.

Appendices are not accepted.

Prospective proposers are encouraged to confer with NSF TCUP staff prior to proposal submission.

#### **Broadening Participation Research in STEM Education Proposals Require the Following Additional Information**

TCUP-eligible institutions may submit proposals for Broadening Participation Research in STEM Education projects focused on educational advancement and educational attainment in STEM. Any topic(s) in STEM education and learning at the undergraduate level could be targeted for a TCUP BPR proposal.

Proposals for TCUP BPR projects should be based on a research design that derives from theory and incorporates appropriate and proven methodologies and strategies to: (1) identify the research questions; (2) implement the collection and analysis of data; and (3) interpret the resulting measures and findings generated by the study. The results might lead to enhanced understanding of issues such as (but not limited to):

- Influences on the effectiveness of partnerships with and pipelines from K-12 education.
- Educational factors, including curriculum development and content or pedagogy, that impact success in STEM learning and achievement;
- Educational factors that facilitate (or inhibit) progression from undergraduate study to STEM careers;
- Educational factors that facilitate (or inhibit) progression from undergraduate study to STEM graduate study at department and/or institutional levels;
- STEM learning and achievement outcomes from different approaches to integrating STEM content with place-based education, or with local or traditional knowledge; or
- Influences on effective integration of formal instruction with research or applied experiences.

The research proposal must address the usefulness of the anticipated outcomes to science-based knowledge of, for example, transforming student learning, transforming recruitment and retention strategies and practices in STEM education at critical educational junctures, or development of the STEM workforce. Research project proposals are neither a substitute for, nor can they

be exactly the same as, the evaluation plan for a TCUP Initiation Project, Targeted STEM Infusion Project, Research Initiation Award or Planning Grant proposal. Evaluation and research proposals may overlap to some extent, but the latter should make a significantly greater contribution to scientific knowledge about STEM education, and have a greater focus on studying educational initiatives in ways that are both internally and externally (i.e., generalizable) valid. A plan for dissemination of research results (described further below) must also be included in BPR proposals.

TCUP BPR studies should reflect the challenges and opportunities for STEM education at TCUP-eligible institutions, and in Native communities. Outcomes of the proposed research should be developed with the intent to provide a framework to inform all education, including faculty and teachers, administrators, parents, the community, policymakers, and education researchers. It is anticipated that these efforts may also contribute to the future development of effective learning experiences, retention, and academic success in STEM of *all* students.

Partnerships among multiple TCUP-eligible institutions or between a TCUP-eligible institution and a mainstream institution are encouraged. A TCUP-eligible institution must be the lead institution. Individuals at TCUP-eligible institutions may serve as PI or co-PI on a TCUP BPR proposal even if they are not currently directly involved in an existing (or concurrently proposed) TCUP Initiation or other (i.e., PEEC or STEEP) implementation project.

A dissemination plan must be included in a TCUP BPR proposal. Suggested dissemination of BPR project results may include but is not limited to:

- Publication in educational research or scientific journals.
- Use of cyberlearning or internet diffusion systems, public media, or other digital and print publications to publicize information about research results related to increasing participation and success in STEM education among target groups.
- Translation of project outcomes into models that work to mitigate differences.
- Creation of materials for TCUP-community STEM education or workforce participation that engage appropriate practitioner and public audiences.
- Presentations to STEM-discipline conference or other audiences (e.g., professional associations or teacher organizations) of project results.

### **Research Initiation Award Proposals Require the Following Additional Information**

In addition to following the general format for research proposals as described in the GPG, Research Initiation Award (RIA) proposals submitted must also adhere to the following special instructions:

It is the responsibility of the PI to find a research collaborator at an NSF funded research center, such as a Center for Research Excellence in Science and Technology, Engineering Research Center, Materials Research Science and Engineering Center, Physics Frontier Center, Science and Technology Center, Science of Learning Center; at a national laboratory; or with a research group at a research university. The PI should plan to conduct research during the summer months at the research collaborator's site and make arrangements for continuing the research during the academic year at his or her home institution. Support can be provided for release time during the academic year, summer salary for the PI, travel and housing at the research site for the PI and undergraduate students, and stipends for undergraduate student research experiences.

Project Summary (one-page limit):

The RIA project summary should provide a succinct summary of the intellectual merit of the proposed project. This should include the potentially transformative nature of the proposed research. Describe the broader impacts of the proposed work, including benefits to society, dissemination of work, enhancements to scientific knowledge, as well as how the proposed activity will broaden participation of underrepresented groups. Project summaries that do not contain separate paragraphs that are labeled and explicitly address both intellectual merit and broader impacts will be returned without review.

Project Description (15 page limit, including tables, figures, and other visual supplements):

The RIA project description should provide a detailed statement of the proposed research to be undertaken. It should contain:

- A brief description of the PI's overall research and education goals.
- A detailed description of the proposed research activities including any preliminary data already available and a description of data that the PI plans to obtain.
- The relationship of the proposed activities to the PI's projected longer term research goals.
- A discussion of how those activities will benefit the research capacity at the institution.
- A discussion of how undergraduate students will be involved in this research.
- A plan for dissemination of this research.
- A plan for evaluation of this project.

Budget:

- Cost of equipment cannot exceed 20% of the total budget.

Special Information and Supplementary Documentation:

Include the following:

- A letter of commitment from the PI's Department Chair or Dean stating that the PI will have institutional support in terms of allowance for release time, travel for research purposes, and access to existing research facilities.
- A research plan jointly developed by the PI and the research collaborator at the research center, university, or national laboratory where the PI conducts his or her research.
- A letter of support from the PI's research collaborator at the research center, university, or national laboratory where the PI conducts his or her research.
- A mentoring plan from the PI for the undergraduate students that are involved in the project.

### **Project Evaluation**

All proposals to any strand of the TCUP program should provide objectives, benchmarks, and indicators of progress that will be used to judge the effectiveness of the project. The specific elements of the evaluation plan will vary depending on the type and details of project but, in general, evidence of STEM knowledge, skill and aptitude development; and both quantitative and qualitative (e.g., the process of change in organizational culture; student-participants' and other constituents' perceptions of the program) indicators of progress in STEM education should be included.

Each TCUP proposal submission is expected to include a plan for effective project evaluation. An individual must be explicitly designated in the proposal to lead the evaluation. The evaluation plan must correspond to the overall stated goals and objectives of the project.

**Initiation Projects:** Formative and summative evaluations should include holistic assessments of student recruitment; curriculum

development; and faculty development activities and achievements in addition to evaluation of the direct outcomes (e.g., student participation and achievement; progression of students to advanced degrees or to the workforce) of the educational intervention. Yearly reports should include evaluation indicators to date. Reporting of full evaluation activities should be included in the final project report.

For information about evaluation methodology, see:

- User-Friendly Handbook for Mixed Method Evaluations ([NSF 02-057](#));
- the [Online Evaluation Resource Library](#);
- the models and checklists available online from the University of Western Michigan's [Evaluation Center](#);
- and contact the American Indian Higher Education Consortium ([AIHEC](#)) about the report *Indigenous Evaluation Framework: Telling Our Story in Our Place and Time* (LaFrance & Nichols, 2010).

Additional funding opportunities for broadening STEM education research topics in student learning, recruitment, retention, persistence to degree, and other STEM educational research for underrepresented minority populations are available throughout the NSF. Examples include:

- the Directorate for Geosciences' [Geosciences Education](#) program or [Opportunities for Enhancing Diversity in the Geosciences](#) program;
- or the Directorate for Engineering's Broadening Participation Research Initiation Grants in Engineering ([BRIGE](#)) program.

Please refer to the NSF Website for additional information. See especially educational research funding opportunities from other HRD programs (e.g., LSAMP), and those in the NSF's Division of Undergraduate Education (DUE). Information on DUE programs can be found on its [website](#).

## B. Budgetary Information

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**Cost Sharing:** Inclusion of voluntary committed cost sharing is prohibited

**Other Budgetary Limitations:**

Funds should be budgeted for the principal investigator and project director of Initiation Projects to attend two grantee meetings each year: a three-day meeting in the Washington, DC area and another two-day Leaders' Forum in the midwest or western United States. Funds should be budgeted for the principal investigator of Research Initiation Awards, and the principal investigator and project director of Broadening Participation Research projects and Targeted STEM Infusion Projects to attend a three-day grantee meeting each year in the Washington, DC area. Initiation Projects should also budget funds for the project leadership to participate in a reverse site visit to NSF over the course of the total award period.

## C. Due Dates

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

July 21, 2011

Initiation Project Proposals

August 04, 2011

Targeted STEM Infusion Project Proposals

August 04, 2011

Proposals for Research Initiation Awards

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

Proposals Accepted Anytime

Planning Grant Proposals; Broadening Participation Research in STEM Education Proposals

## D. FastLane/Grants.gov Requirements

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- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail [fastlane@nsf.gov](mailto:fastlane@nsf.gov). The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

**Submission of Electronically Signed Cover Sheets.** The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **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: [http://www07.grants.gov/applicants/app\\_help\\_reso.jsp](http://www07.grants.gov/applicants/app_help_reso.jsp). In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding 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](mailto: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.

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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.

### A. NSF Merit Review Criteria

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All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

**What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

**What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

NSF staff also will give careful consideration to the following in making funding decisions:

**Integration of Research and Education**

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

**Integrating Diversity into NSF Programs, Projects, and Activities**

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- 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.

### B. Review and Selection Process

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Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. 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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, 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.

In all cases, 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 and 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.

## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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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

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An NSF award consists of: (1) the award letter, 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 letter; (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 letter. 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 [http://www.nsf.gov/awards/managing/award\\_conditions.jsp?org=NSF](http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto: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 Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=aag](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

**Special Award Conditions:** The Foundation and project leaders to whom it makes awards are obliged to conform to the various acts governing activities affecting the environment and cultural or historic properties. Project leaders should be aware of these acts and adhere to their requirements. Project leaders proposing work that may affect cultural or historic properties, or whose work involves tribal lands must cooperate with the agency in complying with the consultation requirements of section 106 of the National Historic Preservation Act. Project leaders are encouraged to contact TCUP for more information about cultural or historic impact considerations of their proposed field work. For additional information on cultural or historic preservation issues, see the Advisory Council on Historic Preservation's web site [here](#).

### C. Reporting Requirements

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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 at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after 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 that PI. 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 FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report 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.

## VIII. AGENCY CONTACTS

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General inquiries regarding this program should be made to:

- Lura Chase, Program Director, telephone: (703) 292-8682, email: [lchase@nsf.gov](mailto:lchase@nsf.gov)
- Keith A. James, Program Officer, 815.13, telephone: (703) 292-8447, email: [kjames@nsf.gov](mailto:kjames@nsf.gov)
- Denise Spain, Program Specialist, 815, telephone: 703-292-5189, email: [dspain@nsf.gov](mailto:dspain@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto:fastlane@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](mailto:support@grants.gov).

## IX. OTHER INFORMATION

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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, National Science Foundation Update is a free e-mail subscription service 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 Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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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.

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