Centers of Research Excellence in Science and Technology (CREST) and HBCU Research Infrastructure for Science and Engineering (RISE)

PROGRAM SOLICITATION
NSF 12-533

REPLACES DOCUMENT(S):
NSF 11-520

National Science Foundation

Directorate for Education & Human Resources
Division of Human Resource Development

Letter of Intent Due Date(s) *(required)* (due by 5 p.m. proposer's local time)**:**

February 24, 2012

CREST Centers and HBCU-RISE

Supplement Due Date(s) (due by 5 p.m. proposer's local time)**:**

March 19, 2012

SBIR/STTR Diversity Collaborative Supplements (Spring Request)

October 17, 2012

SBIR/STTR Diversity Collaborative Supplements (Fall Request)

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

April 23, 2012

CREST Centers, CREST Partnership Supplements, HBCU-RISE, CREST-BPR

IMPORTANT INFORMATION AND REVISION NOTES

Revision Summary

The Organizational Limit for CREST Center Proposals has been expanded to include institutions that serve populations of students with disabilities, as designated by the National Science Foundation.

For CREST Proposals, the number of Subprojects is limited to 3 or 4. Each Subproject Narrative is limited to a total of 9 pages, as described in Section V of this solicitation. Specific instructions for including Subproject Narratives into the Special Information and Supplementary Documents Section of the Proposal are also included in Section V.

Language has been added to the FY12 Solicitation to emphasize the development of plans for increasing diversity through the participation of women, underrepresented minorities, and persons with disabilities, who are U.S. citizens, nationals, and permanent residents in all organizational levels of CREST and HBCU-RISE awards.

This solicitation includes a new track for proposals addressing Broadening Participation Research in STEM, with particular emphasis on the goals of the CREST Program. The CREST Program will provide support for research projects that seek to create and study new theory-driven models and innovations to enhance our understanding of the differential participation and success of students, postdoctoral researchers, and faculty from underrepresented groups, to inform practices and interventions that will promote the integration and enhancement of research and education at minority-serving institutions, and to understand the role of a diverse advanced STEM workforce in enabling innovation and promoting scientific breakthroughs. BPR projects will add new research-based strategies and models to broadening participation in STEM and increase the capacity of scholars at minority-serving institutions to conduct this type of research.

This solicitation contains an emphasis on the special expectations for Phase II CREST Center proposals, as described in Section II.1. Due to constraints on available funds in the CREST Program, it will not be possible to recommend an award for every eligible Phase II CREST Center proposal.

The distinctions between HBCU-RISE awards and CREST Center awards, apart from award size and duration, have been emphasized in Section II.3.

Although the present solicitation includes a track for SBIR/STTR Phase IIa Diversity Collaborative Supplements, the availability of funds for this track are limited in FY2012; and there is an expectation that fewer such supplements may be recommended for awards than in previous funding cycles.

Important Reminders

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, or due, on or 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. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. 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. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Centers of Research Excellence in Science and Technology (CREST)
and HBCU Research Infrastructure for Science and Engineering (HBCU-RISE)

Synopsis of Program:

The Centers of Research Excellence in Science and Technology (CREST) program makes resources available to enhance the research capabilities of minority-serving institutions through the establishment of centers that effectively integrate education and research. CREST promotes the development of new knowledge, enhancements of the research productivity of individual faculty, and an expanded presence of students historically underrepresented in science, technology, engineering, and mathematics (STEM) disciplines. HBCU-RISE awards specifically target HBCUs to support the expansion of institutional research capacity as well as an increase in the production of doctoral students, especially those from groups underrepresented in STEM, at those institutions.

The CREST/HBCU-RISE Program intends to support the following types of projects:

CREST Center awards provide multi-year support (typically 5-year, $5M) for eligible minority-serving institutions (MSI) that demonstrate a strong research and education base, a compelling vision for research infrastructure improvement, and a comprehensive plan with the necessary elements to achieve and sustain national competitiveness in a clearly defined and focused area of science or engineering research. These Centers will demonstrate a clear vision and synergy with the broad goals of the CREST Program and the Human Resource Division with respect to development of a diverse, advanced STEM workforce. CREST Centers are expected to provide leadership in the involvement of groups traditionally underrepresented in STEM at all levels (faculty, students, and postdoctoral researchers) within the Center. Centers use either proven or innovative mechanisms to address issues such as recruitment, retention and mentorship of participants from underrepresented groups.

CREST Partnership Supplements support the establishment or strengthening of partnerships and collaborations between existing CREST centers and nationally or internationally recognized research centers in areas of mutual research interest and high priority for the CREST institution.

HBCU Research Infrastructure for Science and Engineering (RISE) awards support the development of research capability at Historically Black Colleges and Universities that offer doctoral degrees in science and engineering disciplines. Supported projects must have a unifying research focus in one of the research areas supported by NSF, a direct connection to the long-term plans of the host department(s) and the institutional mission, and plans for expanding institutional research capacity as well as increasing the production of doctoral students, especially those underrepresented in STEM.

CREST Broadening Participation Research awards (new track) will be investigator-initiated empirical research projects that seek to advance the understanding of how enhanced research capacity at MSIs affects the differential participation and success of graduate students, postdoctoral fellows, and faculty from groups underrepresented in STEM. The relationship of these issues to the development of research capacity and to the conduct of a nationally competitive scholarly research enterprise will be at the core of these projects.

SBIR/STTR Phase IIa Diversity Collaboration Supplements provide an opportunity for existing SBIR/STTR Phase IIa projects to initiate collaborations with minority-serving institutions that have existing CREST and HBCU-RISE awards. These supplemental proposals are administered by and co-funded with the NSF Directorate for Engineering, in the Division of Industrial Innovation and Partnerships (ENG/IIP).

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.

- Victor A. Santiago, telephone: (703) 292-4673, email: vsantiag@nsf.gov

- Claudia Rankins, Program Director, 810, telephone: (703) 292-8109, fax: (703) 292-9018, email: crankins@nsf.gov

- Juan E. Figueroa, Program Officer, ENG/IIP, SBIR/STTR, telephone: (703) 292-7054, fax: (703) 292-9057, email: jfiguero@nsf.gov

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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: 13 to 16 - Up to 3 CREST Center continuing grants, up to 5 CREST Partnership Supplements, up to 2 HBCU-RISE standard grants, up to 2 Broadening Participation Research standard grants and supplements, up to 4 SBIR/STTR Diversity Collaborative Supplements.

Anticipated Funding Amount: $6,500,000 for new awards - $3,000,000 for CREST Centers ($1,000,000 1st year commitments), $500,000 for CREST partnership supplements and $2,000,000 for HBCU-RISE standard grants, up to $600,000 for Broadening Participation Research standard grants and supplements. Up to $200,000 from CREST and $200,000 from ENG/IIP for co-funded SBIR/STTR Diversity Collaborative Supplements.

Eligibility Information

Organization Limit:

- **CREST** Center proposals are invited from minority-serving institutions of higher education in the United States. This denotes institutions that have undergraduate enrollments of 50% or more (based on total student enrollment) of members of minority groups underrepresented among those holding advanced degrees in science and engineering fields: African Americans, Alaska Natives, American Indians, Hispanic Americans, and Native Pacific Islanders. Eligibility as a minority-serving institution will be determined by reference to the Integrated Postsecondary Education Data System (IPEDS) of the US Department of Education National Center for Education Statistics (http://nces.ed.gov/ipeds/). Proposals are also invited from institutions of higher education that primarily serve populations of students with disabilities (http://www.nsf.gov/od/broadeningparticipation/nsf_frameworkforaction_0808.pdf).

  Preference will be given to institutions with demonstrated strengths in NSF-supported fields, as evidenced by a developing capacity to offer doctoral degrees in one or more science (including social, behavioral, and economic science), technology, engineering, or mathematics disciplines. Institutions must also demonstrate a willingness and capacity to serve as a resource center in one or more of the proposed research areas, must possess a demonstrated commitment and track record in enrolling and graduating scientists and engineers from underrepresented groups, and must have the ability to establish strong collaborations in the proposed fields of research. Priority consideration will be given to science and engineering disciplines or research areas in which minorities are significantly underrepresented.

- **HBCU-RISE** proposals are invited from Historically Black Colleges and Universities that offer doctoral degrees in science (including social, behavioral, and economic science), technology, engineering and mathematics disciplines.

- **SBIR /STTR** diversity collaborative supplement proposals are invited from current SBIR/STTR Phase IIA grantees and their CREST or HBCU-RISE institution partners.

- **CREST - BPR** proposals are invited from institutions meeting the organizational eligibility for CREST or HBCU - RISE proposals.

PI Limit:

Principal Investigators for CREST, HBCU-RISE, and SBIR/STTR awards must be employed by a CREST, HBCU-RISE, or SBIR/STTR-eligible institution, respectively.

Limit on Number of Proposals per Organization:

Only one CREST Center proposal may be submitted per eligible institution. An institution may have only one active CREST award, irrespective of focus area. Centers that have completed two prior, consecutive 5-year CREST awards may not recompete. However, new research teams from former awardee institutions may submit proposals in disciplinary areas that are significantly different from those of the previous award(s).

Only one HBCU-RISE proposal may be submitted per eligible institution. An institution may have only one active HBCU-RISE award.

There is no limit to the number of proposals that may be submitted to the CREST-BPR track. Eligible institutions may submit a proposal along the BPR track to other programs in the HRD Division, which offer that track.

Limit on Number of Proposals per PI:

Eligible individuals may be listed as the principal investigator or co-principal investigator on only one CREST or HBCU-RISE proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required for CREST Centers & HBCU-RISE. Please see the full text of this solicitation for further information.

- **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.
  - 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)

B. Budgetary Information

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

- **Indirect Cost (F&A) Limitations:** Not Applicable

- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. proposer's local time)*:*

    February 24, 2012

       CREST Centers and HBCU-RISE

- **Supplement Due Date(s)** (due by 5 p.m. proposer's local time)**:**

    March 19, 2012

       SBIR/STTR Diversity Collaborative Supplements (Spring Request)

    October 17, 2012

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

    April 23, 2012

       CREST Centers, CREST Partnership Supplements, HBCU-RISE, CREST-BPR

Proposal Review Information Criteria

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

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

Centers of Research Excellence in Science and Technology (CREST) is a program in the Division of Human Resource Development (HRD), which is part of the Directorate for Education and Human Resources (EHR) of the National Science Foundation.

The National Science Foundation (NSF) supports research at the frontiers of knowledge, across all fields of science, technology, engineering, and mathematics (STEM) and all levels of STEM education. The NSF enables innovation and discovery in science, technology, engineering, and mathematics by educating and preparing a diverse and able STEM workforce who are motivated and prepared 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 (EHR)

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 (HRD) 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. HRD envisions a well-prepared and competitive U.S. workforce of scientists, technologists, engineers, mathematicians, and educators that reflects the diversity of the U.S. population. HRD's mission is to grow the innovative and competitive U.S. STEM workforce that is vital for sustaining and advancing the nation's prosperity by supporting the broader participation and success of individuals currently underrepresented in STEM and the institutions that serve them.

HRD has three strategic goals:

- **Knowledge Building:** The creation of new knowledge, innovations, and models for broadening participation in the STEM enterprise.
- **Knowledge Utilization:** The translation of knowledge, innovations, and models for broadening participation in STEM for use by stakeholders.
- **Expand Opportunities:** The expansion of stakeholder capacity to support and engage diverse populations in high quality STEM education and research programs.

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 historically underrepresented groups in STEM will result in a diverse, highly capable STEM workforce that can lead innovation and sustain U.S. competitiveness in the science and engineering enterprise. Therefore, HRD has an overall goal to increase the successful participation of underrepresented minorities, women and girls, and persons with disabilities in STEM. This is done through 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 adoption or scale-up of effective strategies.

Centers of Research Excellence in Science and Technology (CREST) Program

CREST and HBCU-RISE support efforts to strengthen the science and engineering research and education capacity at institutions with strong track records of producing STEM graduates from underrepresented populations. In doing so, these programs help to fulfill an important outcome goal of the NSF Strategic Plan: to cultivate a world-class, broadly inclusive science and engineering workforce and expand scientific literacy of all citizens. They comprise an important element within the HRD Theory of Change framework, in that the capability of minority-serving institutions to be engaged in the global research enterprise and in the highest levels of scholarly achievement will be more fully enabled. In addition to enhancing research capacity, CREST and RISE projects also further the NSF goal of preparing tomorrow's innovation workforce that is enriched by the assets of diverse participants from a range of groups and communities. This STEM workforce will engage diverse teams that can offer new ways to solve problems and provide unique perspectives to improve performance and outcomes.

CREST and HBCU-RISE promote faculty being engaged in research activities at the highest level. An educational environment

based on discovery will be vibrant, with both undergraduate and graduate students engaged in the process of discovery and innovation through modern and relevant curricula, courses, and research experiences. Students will have opportunities to become significant participants in the broader community of scholarship in their respective fields. Minority-serving institutions offer an opportunity to engage student and faculty populations from underrepresented groups in numbers that can have a significant impact, consistent with the NSF goal to broaden participation and with the NSF mission: to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense and to ensure that research is fully integrated with education so that today's revolutionary work will also be training tomorrow's top scientists and engineers.

In alignment with the goals of the Directorate for Education and Human Resources and the Division of Human Resource Development, the CREST Program is particularly interested in building knowledge in areas related to the following research questions, which are critical for the development of research capacity at minority serving institutions and for the ultimate benefit of student and faculty populations from underrepresented groups that are served by those institutions:

- What are the underlying issues affecting the differential participation and success rates in STEM disciplines of students, postdoctoral researchers and faculty from underrepresented groups?
- What are the obstacles faced in promoting graduate study in STEM for students at minority-serving institutions and how may these effectively be overcome?
- How does the presence of enhanced research capacity and active, leading-edge scholarly enterprise transform minority-serving institutions?
- How do minority-serving institutions contribute to a diverse STEM graduate student body, postdoctoral trainee population, and faculty to impact STEM innovation and productivity?
- How does leading-edge research activity influence the knowledge, skills, and behaviors of undergraduates who are in STEM fields and who may be considering STEM fields for their educational experiences?

CREST Centers and HBCU-RISE award activities should be informed by the body of knowledge that surrounds these (and other) important educational research questions; and they will in turn add to that knowledge base for fundamental investigations into these topics, including the Broadening Participation Research proposal track that is part of the present solicitation.

NSF expects that awards made under the CREST program will serve to provide an institutional transformation in terms of the development of research capabilities, commensurate with the institution's mission and long term goals, and that the institutions will evaluate the impact of the award in effecting this transformation. Demonstrated leadership in the involvement of groups traditionally underrepresented in STEM is expected at all levels - students, postdoctoral researchers and faculty. The research activities supported by CREST are expected to enable full participation of faculty, graduate students and undergraduates in a nationally competitive research enterprise. Outcomes and activities - such as publications, involvement in regional, national and international research forums, patents and commercial dissemination of research results, professional development of postdoctoral research associates, training of doctoral and master's students, and involvement of undergraduates in research activities - should all occur in ways that establish the potential for national leadership. The ability of CREST and RISE awards to leverage funding from federal, state and local agencies, as well as to foster industrial and academic collaborations, as part of a sustainable research enterprise, is an important outcome. At the same time, the projects will promote synergy between education and research; develop outreach activities for pre-college students, K-12 educators, and the general public; and serve as a model for research scholarship throughout the institution. A key feature of projects will be a program strategy and plan for recruitment, mentoring, retention, and graduation of U.S. students (U.S. citizens, nationals, and permanent residents) in NSF-supported STEM fields, with specific efforts aimed at members of groups underrepresented in science and engineering.

II. PROGRAM DESCRIPTION

This solicitation requests proposals for: (1) CREST Center awards; (2) partnership supplements applied to existing CREST awards; (3) HBCU Research Infrastructure for Science & Engineering (HBCU-RISE) awards; (4) CREST Broadening Participation Research awards and supplements; and (5) supplements to existing Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) Phase IIA awards (administered by the NSF Directorate for Engineering) to provide diversity collaboration with existing CREST and HBCU-RISE awards.

1. **CREST Centers.** CREST Center awards seek to integrate education and research in an effective manner. In particular, CREST promotes the development of new knowledge, enhances faculty research productivity, and increases diversity in STEM disciplines. CREST provides multi-year support for eligible minority-serving institutions that demonstrate a strong research and education base, a compelling vision for research infrastructure improvement, and a comprehensive plan with the necessary elements to achieve and sustain national competitiveness in a clearly defined and focused area of science or engineering research. The Center Director must provide the leadership to develop and lead a diverse team, inclusive of women and men, underrepresented minorities, and persons with disabilities, who are U.S. citizens, nationals, or permanent residents, to fulfill the vision of the Center. CREST Centers will engage U.S. students, postdoctoral researchers, and faculty populations from underrepresented groups in numbers that can have a significant impact on an increasingly diverse advanced STEM workforce. CREST Center awards are typically 60-month Continuing Grants of up to $5 million. These funds are used to support science and technology infrastructure improvements identified by the institution as being critical to its future research and development competitiveness.

Proposal Structure: CREST proposals consist of the Center proposal (the Project Description) and its associated research Subproject Narratives. The Center proposal includes discussion of the applicant's overall plan for improving the status of science and engineering research and training and for broadening participation in science and engineering by a diverse student population, as codified by the Center's unifying theme or focus. This Center overview should present a clear explanation of the proposed improvement plan from a scientific, educational and administrative or fiscal point of view. The proposal Project Summary will provide an overview of the proposed activities and will clearly delineate the National Science Board criteria of Intellectual Merit and Broader Impacts. More detailed information is provided in Section V of this solicitation.

Research Subprojects:

The Project Summary also describes the synergy anticipated by the choice of 3 or4 subprojects that are consistent with the unifying theme of the Center. Each proposed subproject may involve a subset of Center investigators, but should have a single subproject leader. The Subproject Narratives, prepared separately from the Project Description, will contain the elements of an abbreviated NSF research proposal, but will also contain a copy of the Center Project Summary described above. In addition, each Subproject Narrative will contain a one-page Subproject Relevancy Statement summarizing the subproject's importance to the overall proposal plan, including synergy with the other subprojects, and showing how it supports the overall goals and objectives of the Center proposal. The Subproject Narratives will be independently evaluated following the standard NSF merit review process. Prospective PIs should refer to Section V of this solicitation for more detailed proposal preparation instructions, including specific instructions for preparing and submitting the Subproject Narratives.

Expectations for CREST Proposals and Awardees: The Project Description should include an Evaluation Plan to track progress and strengthen cooperative efforts. General information on project evaluation has been provided at the end of Section II of this solicitation. In addition to progress reports required annually via the NSF FastLane system, awardees will be expected to contribute reports on project participants, publications, outreach efforts, patents, proposals, leveraged funding efforts and similar data to the CREST data collection system. Awardees may also expect site visits and reverse site visits by NSF-appointed evaluators per the particular terms and conditions established in the award documentation. Midpoint (30th- to 48th-month) reviews of awardees' progress are also typical. CREST personnel will be expected to participate in annual convocations of HRD activities such as the HRD Joint Annual Meeting. CREST awardees should also be prepared to serve as a resource center for increasing the research competitiveness of scientists and engineers affiliated with the center.

Consistent with the CREST objectives to broaden the participation of populations that are underrepresented in STEM fields, who are U.S. citizens, nationals, or permanent residents, the proposal should describe clearly the diversity objectives of the Center and outline strategies for achieving them. The contribution/role of partner institutions in the diversity plans should also be described. Proposed activities should be presented in sufficient detail to allow assessment of their intrinsic merit and potential effectiveness. The Evaluation Plan should explain how progress will be measured and how strategies will be adapted. Proposers should demonstrate specifically how the project will integrate the research, education and outreach activities of the Center with measurable outcomes of increasing the participation at the post-baccalaureate level U.S. citizens, nationals, and permanent residents, especially those from the underrepresented student populations that they serve.

Each Center shall convene, at least annually, an external advisory group or committee (EAC). The advisors must include representatives from those served by the center (e.g., academic institutions, industry, state and local agencies, national laboratories) and reflect the diversity of participants inherent in the citizenry of the United States. The function of the EAC is to provide guidance and advice to the center as well as to ensure that the Center's activities are consistent with its vision, goals and objectives. Persons with a financial, institutional, or collaborative connection to the Center may not serve as members of the EAC. Each Center shall also have an Internal Steering Committee to include the PI, co-PIs and other applicable stakeholders.

CREST Centers may be organized around the development of individual scientists or engineers, one or more science or engineering departments or equivalent units, or interdisciplinary and multidisciplinary research areas. Multiple-investigator projects are encouraged. Collaborative efforts involving industry, other research universities, federally funded laboratories, or other national, state, or regional research and development institutions are encouraged. Sub-awards to such collaborating institutions are permitted, subject to restrictions outlined in the Grant Proposal Guide. It is expected that CREST funding will add substantial, measurable value to the existing science and technology research capability in areas of high institutional priority. The research team will develop a strong potential to achieve national research competitiveness and to generate sustained non-CREST funding from federal, state, or private-sector sources.

Support may be requested for activities that positively impact the quality of research training and the research preparedness of U.S. graduate students, particularly those who are women, persons with disabilities, or from underrepresented minority groups, in science and engineering, as well as their professional development for a wide variety of STEM careers. Projects should be designed to enable awardee institutions to enhance the integration of education and research. The proposal should include a component that outlines a strategy for the creative integration of NSF-funded awards at the institution that are related to the proposed project's goals and scope. In identifying the members of the research team, the proposing institution should strongly encourage participation by underrepresented minorities, women, and persons with disabilities, who are U.s. citizens, nationals, or permanent residents, in all organizational levels of Center activities. Whether the proposed activity is considered competitive will be determined by merit review of the appropriateness and relevance of the improvement strategies to CREST program goals, as articulated in Section I of this solicitation.

Special Considerations for CREST Phase II Proposals: A CREST Center nearing the completion of its initial five years of funding may submit a competing renewal proposal for an additional five years of support. The renewal proposal will undergo merit review alongside proposals for new CREST Centers. Accordingly, the achievements and future plans of existing centers will be evaluated comprehensively relative to progress and direction and weighed against the competition for available program funds. The results from the Phase I broadening participation strategy consistent with the CREST goal to develop a diverse, advanced STEM workforce should be articulated clearly in parallel with the institutional transformation arising from the research accomplishments of the first 5 years. The Project Description for a Phase II award should demonstrate a clear vision for a synergistic team of investigators that should be positioned within the second five years of support to achieve a major national recognition for their accomplishments, including research that has the potential to be transformative. The Project Description as well as the Subproject Narratives should provide a systematic articulation of the research, educational, and outreach accomplishments of the Phase I project and how these will drive the future activities of the Center, especially in terms of a new vision and organization. The Phase II Center should be particularly well positioned to demonstrate a transformation of the institutional capacity for engaging U.S. citizens, nationals and permanent residents, who are from populations of women, persons with disabilities and underrepresented minorities, in the advanced STEM workforce. A simple continuation of the Phase I CREST Center, even if the scientific merits of the various research activities are strong, will not yield a competitive proposal.

A recommendation for a Phase II CREST Center award will be subject to availability of funds in the program, as well as the demonstrated potential that funding as a CREST Phase II Center will lead to institutional, programmatic, and STEM workforce transformation that the CREST Program is trying to achieve. Renewed centers will continue to be monitored by NSF at least every 18 months. Centers that are not meeting the exceptional expectations of a Phase II Center may have their level of funding reduced or may be terminated.

2. **CREST Partnership Supplements.** CREST partnership supplements support the establishment or strengthening of partnerships and collaborations between CREST Centers and nationally or internationally recognized research centers in areas of mutual research interest and high priority for the CREST institution. As with CREST Center proposals, CREST partnership supplements are designed to facilitate self-improvement. Support may be requested for activities that have a direct positive influence on the competitiveness of participating scientists and engineers and the quality of the institution's research and training. Supportable activities may include, but are not limited to: exploratory research projects; acquisition of materials, supplies, research equipment and instrumentation; hiring nationally competitive scientists and/or engineers; visiting scientists and engineers as short- or long-term consultants; faculty attendance at professional meetings and seminars; faculty sabbaticals and exchange programs; education activities directed toward development of a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and citizens well-prepared for a broad set of career paths; undergraduate and graduate research activities; development of outreach and other enhancement programs with neighboring institutions; and strengthening technical support personnel. The benefits to both parties in the proposed collaboration as a logical or necessary augmentation of the existing CREST activities must be clearly articulated.

3. **Historically Black Colleges and Universities Research Infrastructure for Science and Engineering (HBCU-RISE).** HBCU-RISE proposals support the development of research capability at HBCUs that offer doctoral degrees in science and engineering disciplines. Activities supported by RISE include, but are not limited to: faculty release time, technical support for

research, faculty professional development, acquisition or upgrading of research equipment, development of new advanced level curricula or courses, collaborative research efforts with partner universities and national laboratories. Career development opportunities, provision for developing professional and personal skills, fostering an international perspective, instruction in ethics and the responsible conduct of research, and training in communication of the substance and importance of research to nonscientist audiences may be part of the proposed activities. Supported projects must have a unifying research focus in one of the research areas supported by NSF, a direct connection to the long-term plans of the host department(s) and the institutional mission, and plans for expanding institutional research capacity as well as increasing the production of doctoral students, especially those from underrepresented groups, who are U.S. citizens, nationals or permanent residents. The proposal should include a component that outlines a strategy for the creative integration of NSF-funded awards at the institution, which are related to the proposed project's goals and scope. HBCU-RISE funding may, for example, be used to support competitive levels of start-up funding for outstanding new faculty hires with research interests related to the project or to acquire key equipment and instruments, including high-performance computing and networking capabilities.

HBCU-RISE projects must offer considerably more to an institution's capacity to carry out doctoral level research than is afforded by traditional single- or multi-investigator research proposals. In this way, HBCU-RISE support should not replace other available federal, state, or institutional resources and should add significant value to the existing institutional strategic plan. Reviewers will be asked to consider the unique goals of the HBCU-RISE program in developing doctoral program capacity, in additional to simply supporting research activities. Each HBCU-RISE project should describe an evaluation plan to track progress and strengthen cooperative efforts. In addition, each project will be required to participate in a program-level evaluation to assess outcomes and the program's contributions to advancing the science and engineering research and education capabilities of minority-serving institutions, with special attention to increasing doctoral degree attainment among U.S. citizens, nationals, and permanent residents at those institutions.

It is not necessary for each HBCU-RISE project to convene meetings of an external advisory group or committee. However, each project shall identify an Internal Steering Committee to include the PI, co-PIs and other applicable stakeholders to review the results of the evaluation process and to ensure that the progress is consistent with departmental and institutional goals. HBCU-RISE personnel will be expected to participate in annual convocations of HRD activities such as the HRD Joint Annual Meeting.

4. **Small Business Innovation Research and Small Business Technology Transfer** (**SBIR/STTR**) **supplemental funding for diversity collaborations.** SBIR/STTR supplements seek to promote partnerships between academe and the small-business community. In particular, SBIR/STTR Phase II grantees may partner with CREST/HBCU-RISE institutions with the intent of developing the scientific or engineering underpinnings of the SBIR Phase II technology. As such, it is not important that the SBIR/STTR supplemental project be related to the research areas for which the institution is receiving CREST/HBCU-RISE support. Inquiries and proposals to this track are not submitted to CREST but directly to SBIR/STTR in the Directorate for Engineering. See, for example, NSF 10-055 **Dear Colleague Letter: Supplemental Opportunity for SBIR/STTR for CREST/HBCU-RISE Collaborations - Phase IIA.** Information on SBIR/STTR programs may be obtained from the following link: SBIR/STTR.

5. **CREST Broadening Participation Research Awards (CREST - BPR):** Up to 3-year, investigator-initiated empirical research projects at minority-serving institutions. Research projects of shorter duration, including supplements to existing CREST or HBCU-RISE awards, are welcome as part of this track. The goal is to advance the understanding of how enhanced research capacity at MSIs affects the differential participation and success of graduate students, postdoctoral fellows, and faculty from groups underrepresented in STEM. The relationship of these issues to the development of research capacity and to the conduct of a nationally competitive scholarly research enterprise will be at the core of these projects.

The Broadening Participation Research in STEM Education track exists across several NSF diversity programs with different focus populations 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); Tribal Colleges and Universities Program (TCUP); and Alliances for Graduate Education and the Professoriate (AGEP). Additionally the Research and Evaluation on Education in Science and Engineering (REESE) program in the Division of Research and Learning may be appropriate. Priorities and restrictions on study populations and awardee institutions may apply depending on the HRD program to which the proposal is submitted. The goal of this track across programs in the Division of Human Resource Development is to enhance our understanding of the underlying issues affecting the differential participation and success of students, postdoctoral researchers, and faculty from underrepresented groups in STEM.

BPR projects must be rigorous social science studies that are grounded in theory. Behavioral, cognitive, affective, learning, and social differences may be investigated using methods of sociology, psychology, anthropology, economics, statistics, and other social and behavioral science and education disciplines. They should advance scholarship in these areas consistent with studies suggested by the SBE Science of Broadening Participation Dear Colleague Letter (NSF 11-023) and other related NSF programs.

Race and ethnicity should be the major variables in the analysis, with gender, disability, and economic status as potential interactional variables. Proposals should be driven by the fundamental programmatic research questions posed in Section I of this solicitation, or they may pose their own research questions motivated by the goals of the CREST Program.

CREST-BPR proposals may be jointly reviewed as appropriate with other NSF education and social science research programs. Proposals from individual researchers as well as collaborative proposals with multiple research partners are encouraged. However, the lead institution for awards funded through the CREST-BPR track must meet the organizational eligibility criteria cited elsewhere in this solicitation.

6. Other Funding Opportunities

CREST also funds Conferences, Symposia, and Workshops; EAGER and RAPID grants; and Grant Supplements for existing awards. Such proposals may be submitted as described in the Grant Proposal Guide (GPG, NSF 11-001), which is available at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.

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 at NSF 10-019.

For funding opportunities through the NSF-Wide Science, Engineering Education for Sustainability (SEES), see the following link: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707

For funding opportunities in CyberLearning, see NSF 11-587, also accessible through the following link: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503581

For funding opportunities under the Dear Colleague Letter: Introducing Science Across Virtual Institutes (SAVI), please refer to NSF 11-08

Project Evaluation:

All proposals should include an evaluation section that describes how the project evaluator /evaluation team will determine the accomplishment of project goals and the impact of the project. Evaluation should be based on benchmarks, indicators, or expected outcomes related to project goals and activities. The information in these paragraphs is intended to serve as a general guide for developing evaluation processes. However, each project should develop an appropriate plan for the proposed activities. Not every element of an evaluation may be needed for each proposed project.

Evaluation plans should be based on a Logic Model or other tool that relates project goals to activities and to outputs, outcomes, and impact (immediate, short-term, and intermediate-term expected changes). Most evaluations are based on evaluation questions that relate to program and project goals. Evaluation plans should be appropriate to the scope of the project; this usually includes both formative and summative evaluations. Formative evaluation plans outline methods for documenting progress toward project goals and should include a feedback feature that allows for continuous improvement of the project activities. In some cases, formative evaluation may be internal to the project. Summative evaluation focuses on the influence of the project on the targeted expected outputs and outcomes, and overall impact of the project. Some projects will utilize experimental or quasi-experimental designs as the basis for their summative evaluation plans.

Evaluations are expected to include both qualitative and quantitative methodology. Expected project outputs, outcomes and impact should be included in the evaluation plan and should, when possible, rely on measures that are valid and reliable with the targeted participants. Outputs are the numbers related to project activities such as the number of faculty in pedagogical workshops, the number of students who completed Ph.D. programs in STEM, or the number of peer-reviewed publications attributed to the project. Outcomes are defined as the results of participation in project activities. Strategic impacts are lasting outcomes attributable to the project. The demonstration of project impact is the result of the overall influence of the project on the goal of the program. An example of impact is increased graduation rates of students who participated in a specific model compared to baseline or a control/comparison group.

Evaluation for research projects is expected to be appropriate for research. Evaluation plans for research projects could include activities related to project integrity and usefulness / utilization / and dissemination of findings. Evaluation activities could include such activities as documenting and describing the operation of the project through all phases and oversight related to appropriate selection of participants, fidelity, and integrity of research design and measures (formative); and assessing the extent to which findings contribute to the knowledge base in the field and are disseminated to those researchers and practitioners who will utilize the findings (summative).

The budget MUST include adequate resources for project evaluation. Project evaluation should be led by an expert independent evaluation team. Evaluators are expected to adhere to the Guiding Principles for Evaluators http://www.eval.org/GPTraining and project evaluations are expected to be consistent with standards established by the Joint Committee on Standards for Educational Evaluation (http://www.jcsee.org/).

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

- *Mixed Methods User-Friendly Handbook: http://www.westat.com/Westat/pdf/news/UFHB.pdf*
- *Framework for Impact of BP Projects: http://www.nsf.gov/od/broadeningparticipation/framework-evaluating-impacts-broadening-participation-projects_1101.pdf*
- *Framework for Impact of ISE Projects: http://caise.insci.org/uploads/docs/Eval_Framework.pdf*
- *AAAS Measuring Diversity Report: http://www.nsfagep.org/files/2011/04/MeasuringDiversity-EvalGuide.pdf*
- *Evidence: An Essential Tool Report: http://www.nsf.gov/pubs/2005/nsf0531/nsf0531.pdf*
- *Indigenous Evaluation Framework Report: http://portal3.aihec.org/sites/Indigeval/Documents/0-Intro_Contents.pdf*
- *Evaluation e-library of the American Evaluation Association Resource Library http://www.eval.org/*

III. AWARD INFORMATION

CREST award instruments, duration, and amounts vary among the CREST program components.

- Up to 3 **CREST Center** awards (new centers and competitive renewals (Phase II) with their respective research subprojects) are anticipated in the current review cycle. CREST Center awards are for 60 months at up to $1,000,000 annually (i.e., a maximum of $5,000,000). Center awards are made as Continuing Grants. The progress and plans of each center will be reviewed by NSF annually, prior to approving continued NSF support. Phase II CREST Centers will continue to be monitored by NSF at least every 18 months. Centers that are not meeting the exceptional expectations of a Phase II Center may have their level of funding reduced or may be terminated. Individual centers may not receive more than 10 years of CREST support. An institution may have only one active CREST center award.

- Up to 5 **CREST partnership supplements** will be made for a maximum amount of $100,000 per supplement, in amounts that vary with need and are subject to the availability of funds. A supplement will be an amendment to an existing award.

- Up to 2 **HBCU-RISE awards** will be made during this award cycle. Awards will not exceed $1,000,000 during a three-year period. HBCU-RISE awards will be managed through standard grants. An institution may only have one active HBCU-RISE award.

- Up to 4 **CREST SBIR/STTR diversity collaborative supplements** will be made during this award cycle. These supplemental awards will be made to eligible SBIR/STTR Phase II awardees in partnership with CREST and HBCU-RISE institutions, as described in Section II.4. These supplemental awards will not exceed $100,000 in NSF support.

- Up to 2 **CREST Broadening Participation Research** awards will be made during this award cycle. Awards will not exceed $300,000 during a three-year period. Projects involving studies of shorter duration or for smaller award size, including supplements to existing CREST or HBCU-RISE awards, are welcome.

The estimated CREST, HBCU-RISE, SBIR/STTR, and CREST-BPR budgets, number of awards and award size and duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

- **CREST** Center proposals are invited from minority-serving institutions of higher education in the United States. This denotes institutions that have undergraduate enrollments of 50% or more (based on total student enrollment) of members of minority groups underrepresented among those holding advanced degrees in science and engineering fields: African Americans, Alaska Natives, American Indians, Hispanic Americans, and Native Pacific Islanders. Eligibility as a minority-serving institution will be determined by reference to the Integrated Postsecondary Education Data System (IPEDS) of the US Department of Education National Center for Education Statistics (http://nces.ed.gov/ipeds/). Proposals are also invited from institutions of higher education that primarily serve populations of students with disabilities (http://www.nsf.gov/od/broadeningparticipation/nsf_frameworkforaction_0808.pdf).

  Preference will be given to institutions with demonstrated strengths in NSF-supported fields, as evidenced by a developing capacity to offer doctoral degrees in one or more science (including social, behavioral, and economic science), technology, engineering, or mathematics disciplines. Institutions must also demonstrate a willingness and capacity to serve as a resource center in one or more of the proposed research areas, must possess a demonstrated commitment and track record in enrolling and graduating scientists and engineers from underrepresented groups, and must have the ability to establish strong collaborations in the proposed fields of research. Priority consideration will be given to science and engineering disciplines or research areas in which minorities are significantly underrepresented.

- **HBCU-RISE** proposals are invited from Historically Black Colleges and Universities that offer doctoral degrees in science (including social, behavioral, and economic science), technology, engineering and mathematics disciplines.

- **SBIR /STTR** diversity collaborative supplement proposals are invited from current SBIR/STTR Phase IIA grantees and their CREST or HBCU-RISE institution partners.

- **CREST - BPR** proposals are invited from institutions meeting the organizational eligibility for CREST or HBCU - RISE proposals.

PI Limit:

Principal Investigators for CREST, HBCU-RISE, and SBIR/STTR awards must be employed by a CREST, HBCU-RISE, or SBIR/STTR-eligible institution, respectively.

Limit on Number of Proposals per Organization:

Only one CREST Center proposal may be submitted per eligible institution. An institution may have only one active CREST award, irrespective of focus area. Centers that have completed two prior, consecutive 5-year CREST awards may not recompete. However, new research teams from former awardee institutions may submit proposals in disciplinary areas that are significantly different from those of the previous award(s).

Only one HBCU-RISE proposal may be submitted per eligible institution. An institution may have only one active HBCU-RISE award.

There is no limit to the number of proposals that may be submitted to the CREST-BPR track. Eligible institutions may submit a proposal along the BPR track to other programs in the HRD Division, which offer that track.

Limit on Number of Proposals per PI:

Eligible individuals may be listed as the principal investigator or co-principal investigator on only one CREST or HBCU-RISE proposal.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required)***:**

Letters of intent are **required for CREST Center and HBCU-RISE full proposals** but not for CREST partnership supplement proposals or for CREST Broadening Participation Research proposals. CREST partnership supplements are expected to abide fully with the information required by FastLane for supplemental proposals. SBIR/STTR diversity collaboration supplement proposals are submitted directly to the SBIR/STTR program following the guidelines of that program solicitation.

Letters of Intent must include a statement certifying that the submitting institution is in compliance with the organizational limits stipulated in this solicitation (Section IV: *Eligibility Information***).**

CREST/HBCU-RISE letters of intent should not be considered draft proposals or pre-proposals. CREST program staff will not provide feedback on the appropriateness or quality of proposals or encourage full proposals on the basis of the letter of intent. The letter of intent should be submitted via the Letters of Intent Module in FastLane. It should specify clearly whether the proposal will be for a CREST or HBCU-RISE award and contain as much of the content of the FastLane letter of intent template as applicable. Further, the letter of intent should indicate the lead institution and principals of the proposed work, including self certification that the lead institution complies with the program's conditions for PI and institutional eligibility detailed in the Eligibility Information section of this solicitation. The letter of intent should contain sufficient details for each research subproject (discipline, subdiscipline, specialty or focus area) to permit identification of appropriate technical reviewers, but it should not be a lengthy description of the research, education and operational plans of the proposed center. The letter of intent may also include two suggested reviewers and contact

information for each research sub-project.

Eligible parties intending to submit a full proposal to CREST or HBCU-RISE for FY2012 are strongly encouraged to participate in Webinars that will be webcast after the release of this solicitation. Several Webinars will be offered. Contact the CREST staff listed in this solicitation to register your attendance in one or more of these Webinars.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is required when submitting Letters of Intent
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are allowed
- A Minimum of 0 and Maximum of 4 Other Participating Organizations are allowed
- Research Areas: 3 or 4 (preferable) and up to 5 is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

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. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf). 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 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 the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

Proper Institutional Review Board (IRB) documentation or certification on the use of human subjects, vertebrate and invertebrate animals, and outcomes of prior NSF support, as applicable, by the principals of the proposed center should be included with the proposal at the time of submission, or the absence of such documentation explained. Failure to self-declare in this manner my result in the proposal's decline or return without review.

It may be helpful to proposers to note that research protocols involving human subjects are subject to review (Internal Review Board) to minimize risks and to ensure appropriate informed consent by the subject. However, there are a number of research activities involving human subjects that may be exempt from IRB review including research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of, or the comparison among instructional techniques, curricula, or classroom management methods. Whether the research involving human subjects is designated as exempt from IRB review should be determined by the appropriate institutional official who in a number of cases is the chair of the IRB. [adapted from NSF Human Subjects Guidance.]

For CREST Centers:

The narrative of the Center Project Description is limited to 15 pages. Individual Subproject Narratives are limited to a total of 9 pages, as follows: The first page should be the Center Project Summary; the second page will be the Subproject Relevancy Statement; the remainder of the Subproject Narrative is limited to 7 pages. A list of applicable references may be appended to each Subproject Narrative. The Subproject Narratives and their reference lists are to be inserted, successively, at the beginning of the Special Information and Supplementary Documents section of the proposal. (For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form.) Other supporting documents, such as letters of commitment from collaborators or from the institutional administration, should be inserted after the Subproject Narratives. **The Center proposal cover sheet, budgets, biographical information, and other supporting documentation should be provided for the proposal as a whole and not for each individual Subproject Narrative.**

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Budget Preparation Instructions: Financial support may be provided to student participants under CREST projects. However, financial support may only be provided to students that are U.S. citizens, nationals, or permanent residents.

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. proposer's local time)*:*

    February 24, 2012

CREST Centers and HBCU-RISE

- **Supplement Due Date(s)** (due by 5 p.m. proposer's local time)**:**

  March 19, 2012

  SBIR/STTR Diversity Collaborative Supplements (Spring Request)

  October 17, 2012

  SBIR/STTR Diversity Collaborative Supplements (Fall Request)

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

  April 23, 2012

  CREST Centers, CREST Partnership Supplements, HBCU-RISE, CREST-BPR

D. FastLane/Grants.gov Requirements

- **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. 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. 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. 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

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

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 judgments.

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.

Additional Solicitation Specific Review Criteria

For CREST centers, reviewers will be asked to consider the integrative nature of the proposed center. Questions to be considered include:

- Are the research, education, and diversity efforts strategically embedded and integrated in the proposed Center?
- Are the subprojects and participants meaningfully integrated into a diverse Center that is more than just the sum of the parts?
- Does the proposal include a vision and plan for leadership in broadening participation of underrepresented groups and does it articulate a credible commitment to diversity as a means of achieving its overall goals?
- Are the educational activities innovative and do they contribute to the unifying mission of the proposed Center?
- Does the proposed Center management have the vision, experience, and capacity to manage a complex and innovative enterprise that integrates research, education, and diversity?
- Are the institutional and other commitments appropriate to carry out the proposed research?
- Are the research activities in STEM fields that are supported by the National Science Foundation?

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

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

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 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. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 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 *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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 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.

More comprehensive information on NSF Reporting Requirements 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.

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:

- Victor A. Santiago, telephone: (703) 292-4673, email: vsantiag@nsf.gov

- Claudia Rankins, Program Director, 810, telephone: (703) 292-8109, fax: (703) 292-9018, email: crankins@nsf.gov

- Juan E. Figueroa, Program Officer, ENG/IIP, SBIR/STTR, telephone: (703) 292-7054, fax: (703) 292-9057, email: jfiguero@nsf.gov

- Toni Edquist, Program Specialist, EHR/HRD, telephone: (703) 292-4649, fax: (703) 292-9018, email: tedquist@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

- Victor A. Santiago, telephone: (703) 292-4673, email: vsantiag@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, 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.

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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 provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 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 http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **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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  or telephone: (703) 292-7827
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The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the

information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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