Small-Business/ ERC Collaborative Opportunity: (SECO)

Funded by the ERC Translational Research Fund and the SBIR Program

PROGRAM SOLICITATION
NSF 12-543

REPLACES DOCUMENT(S):
NSF 10-617

National Science Foundation

Directorate for Engineering
Division of Engineering Education and Centers
Division of Industrial Innovation and Partnerships

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

March 30, 2012

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

May 30, 2012

IMPORTANT INFORMATION AND REVISION NOTES

IMPORTANT REVISIONS:

OPTION 1:

- Proposal submission is from the small business partner instead of the ERC PI, therefore subaward is to ERC instead of to small business partner.
- Award type is a Continuing Grant Increment instead of a Standard Grant.
- ERC lineage of proposed innovation must be documented.

OPTION 2:

- Award type is a Supplement to an active NSF SBIR/STTR Phase II base award instead of a Standard Grant.

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. Proposers who opt to submit prior to January 18, 2011, must also follow the guidelines contained in NSF 11-1.

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:

Small-Business/ ERC Collaborative Opportunity (SECO)
Funded by the ERC Translational Research Fund and the SBIR Program

Synopsis of Program:

This opportunity aims to facilitate the translation of NSF's technology investments in Engineering Research Centers and in Small Business Innovation Research and Small Business Technology Transfer projects into the market place. Furthermore, in instances where an ERC is funded with a mission to support the public good through the implementation of critical public engineering systems, this includes facilitating implementations that realize the intended public benefit.

The specific goals of this opportunity are to:

1. Speed the translation of ERC-generated research and technology advances to the marketplace or its implementation into critical public engineering systems and engage undergraduate and graduate students more directly in the innovation process through collaboration between an ERC and a small business firm, (OPTION 1) and
2. Strengthen the research capacity of active NSF SBIR/STTR Phase II awardees to speed the entry of their innovations into the marketplace and broaden its portfolio of marketable products through collaboration with an ERC (OPTION 2).

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.

- Deborah J. Jackson, EEC Program Director for ERC PIs, telephone: (703) 292-7499, email: djackson@nsf.gov
- Rathindra DasGupta, IIP Program Officer for NSF- Supported SBIR/STTR Firms, telephone: (703) 292-8353, email: rdasgupt@nsf.gov

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

- 47.041 --- Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15

Anticipated Funding Amount: $3,000,000

Each partnership consists of one small business lead collaborating with an active or self-sustaining, graduated ERC as a sub-contractor. The combined total award would be up to $200,000 with a duration of one or two years.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- The following definitions are applicable in this section.

  A small Business firm is a legally established entity that meets the SBA program definition of a small business.

  An active ERC awardee is defined as an awardee with an NSF ERC award which has not yet expired.

  A self-sustaining, graduated ERC is defined as an ERC whose 10-year award period has expired, but which is financially self-sustaining and still retain ERC key features. Self-sustaining ERCs are from the Classes of 1990 or later.

  A non-ERC small business is a small business that is not a member of an ERC Industrial Advisory Board.

  An active SBIR/STTR awardee is one with an NSF Phase II award, which has not yet expired.

  An ERC participant includes the ERC's Director, Deputy Director, and other faculty from the lead and partner universities of the ERC who are carrying out research supported by the ERC's funds must annually disclose their conflicts with firms that are engaged with the ERC. These firms include Industry/Practitioner member firms, small firms spun out from the ERC's research base, and small non-member firms engaged in translational research with the ERC.

  An ERC participant also includes all Industrial Liaison Officers (ILO) and ERC Executive Management personnel who must annually disclose their conflicts with firms that are engaged with the ERC. These firms include Industry/Practitioner member firms, small firms spun out from the ERC's research base, and small non-member firms engaged in translational research with the ERC.

  When conflicts are disclosed for either of the above two categories of personnel, the university impacted must develop a conflict management plan for each disclosure..

  If an ERC participant has significant financial interests in the submitting firm or other entities affected by the proposed project, it is a conflict of interest (COI) that must be managed by the participant's home university. The following situations define conflicting relationships that must be managed:

- INCOME received by the ERC participant from the submitting firm, including, but not limited to, salary, consulting fees, honoraria, travel reimbursement, and income related to intellectual property rights and interests (patents, copyrights).
- EQUITY in the submitting firm received by the ERC participant, including, but not limited to, stock, stock options, stock purchase plan, incentive stock options, phantom stock, and stock appreciation rights.
- POSITIONS in the submitting firm or in other entities affected by the proposed project, including, but not limited to, employee, consultant, founder, partner, board of directors, officer, trustee, Chief Executive Officer, Chief Technology Officer, Scientific Advisory Board.
- Financial interests in the submitting firm held by spouses and dependent children of the ERC participants.

Given these definitions, proposals may only be submitted by the following:

- **Option 1:** Any *small business firm* proposing to either speed the translation of ERC generated technology into the marketplace or speed its implementation into a critical public works engineering system. (In Fastlane, submit the proposal to the EEC Division ERC program). To be eligible for this award, the *small business firm* must partner with either an *active ERC awardee* or a *self-sustaining, graduated ERC* which participates in the collaborative research project and is a subawardee. In addition, the proposing firm must have obtained a license from the appropriate university for the ERC intellectual property associated with the proposed project before an award can be made.
- **Option 2:** Active NSF SBIR/STTR Phase II awardees proposing to leverage ERC developed technology or know-how to strengthen the research capacity of the small business partner in the collaboration. (**Submit the proposal, via FastLane, as a supplement to the original Phase II award).** The objective is to speed the entry of the SBIR/STTR's innovation into the marketplace. Only *active NSF SBIR/STTR* Phase II awardees are eligible to directly apply to this solicitation under Option 2. In addition, the company is only eligible to apply, when an *active or self-sustaining, graduated* ERC, participates in the collaborative research project and is a subawardee.

A list of self-sustaining, graduated ERCs meeting these criteria is provided in the Appendix in Section X. Note that graduated ERCs operating on brief no-cost extensions of the original award are classified as self-supporting. A potential list of active SBIR/STTR awardees can be viewed using the NSF award search tool at http://www.nsf.gov/awardsearch/tab.do?dispatch=4 and confining the search to Element Code 5373 or 1591 for awards. Details about the award and PI are viewable by clicking on the award number.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 3

Limit on Number of Proposals per PI: 2

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. 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: Option 2:** Budgets for supplemental funding request must not exceed the hourly rate of salary/wage for each budgeted employee, the rate of fringe benefits, the rate of indirect costs and the rate of fee cannot exceed those in the final budget of the current Phase II award.
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

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

  March 30, 2012

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

  May 30, 2012

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

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I. INTRODUCTION

This opportunity is aimed at enhancing the innovation impact of NSF's investments in Engineering Research Centers (ERCs). The first two generations of ERCs were designed to function through sustained partnerships with their industry and government practitioners. These ERC member organizations brought knowledge of industrial and professional practices and needs to academe, and streamlined the translation of academic research into useful products, processes, and services. However, there were still a large number of discoveries and inventions developed within the ERCs that never reached their full innovation or commercial potential, because the ERC member firms lacked the resources or will to develop them.

As a result, the Generation Three (Gen-3) ERC Program was mandated in the 2008 competition to actively seek additional small business partnerships aimed specifically at spinning out center developed technology that was not licensed by the ERC member partners. This new mandate broadens the role of the ERC to include creating and nurturing an innovation ecosystem intended to support and sustain the Center beyond NSF funding. Generally, an innovation ecosystem includes the people, institutions, policies, and resources that promote the translation of new ideas into products and processes and services. Similarly, the innovation ecosystem of Gen-3 ERCs is achieved through a symbiotic relationship between the center researchers, small businesses, large industrial and practitioner partners, and other partner organizations devoted to stimulating entrepreneurship and innovation. As such, the Gen-3 ERC's will continue nurturing the sustained partnerships of the original ERC model, while also proactively seeking ways to translate ERC technology developments to the market that are not being developed by the ERC's industry/practitioner partners.

This solicitation has two mechanisms that are designed to help NSF leverage its earlier technology investments via technology translation: (i) supporting the translation of ERC technologies that undergird strategically identified **platform technologies**, and (ii) pairing ERCs with active **NSF Phase II SBIR/STTR** awardees. Preference will be given to proposals incorporating one of these mechanisms.

Platform technologies are important to ERCs because they create an environment that offers longer term opportunities for reinvigorating the Center's research agenda. A platform technology is defined as a set of technologies that:

- Are related;
- Are common to different businesses and product families;
- Are distinctive and can provide competitive advantage;
- Enable and accelerate a broad range product development (tools, methods, etc.)

In the business world, platform technologies are important because they provide a framework for reusing an initial investment in

technological know-how in different markets and businesses in order to gain a competitive advantage. "A platform may include physical components, tools and rules to facilitate development, a collection of technical standards to support interoperability, or any combination of these things. Serving as a stable nexus or foundation, a platform can organize the technical development of interchangeable, complementary components[5] and permit them to interact with one another." http://kevinboudreau.com/PAPER%20Open%20Platform%20Complement%20Draft.pdf . Computers are one of the most familiar examples of a technology platform that beautifully illustrates how physical components can be designed with hardware and software interface standards that make them interoperable.

Platform technologies can also be used to open up new frontiers of research. An example of such a platform technology is the Polymeraize Chain Reaction (PCR). PCR, which was initially developed as a molecular genetics analysis technique, is now utilized in a broader array of applications such as tissue typing for organ transplants, mutation therapy for oncogenes, detection of infectious diseases (e.g. HIV, tuberculosis), and genetic fingerprinting in forensics. More significantly, PCR is still heavily utilized in many areas of molecular genetic research for DNA sequencing, DNA cloning, sequence-tagging sites, genetic mapping, and the study of gene-expression patterns, among others. The PCR platform demonstrates the value of a strategically developed core capability that has potential to evolve into new research directions.

Active **NSF Phase II SBIR/STTR** recipients are the elite subset of firms who have a demonstrated track record of successfully implementing innovative research. The Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs are designed to stimulate technological innovation in the private sector by strengthening the role of small business concerns in meeting federal research and development needs, increasing the commercial application of federally supported research results, and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

II. PROGRAM DESCRIPTION

This program seeks to combine the innovations arising from NSF's investment in strategically planned, multi-disciplinary Engineering Research Center's (ERC) with the technology translation and business acumen developed from NSF's investment in Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs and other small R&D firms.

The National Science Foundation-sponsored ERCs are interdisciplinary, multi-university centers located at universities all across the United States, each in close partnership with industry and government practitioners. Each ERC provides an environment in which academe and industry collaborate in pursuing strategic advances in complex engineered systems and enabling systems-level technologies that have the potential to spawn whole new industries or to radically transform the product lines, processing technologies, or service delivery methodologies of current industries. Activity within ERCs lies at the interface between the discovery-driven culture of science and the innovation-driven culture of engineering and industry. The centers provide the intellectual foundation for industry to collaborate with faculty and students on resolving generic, long-range challenges, producing the knowledge needed for steady advances in technology and their speedy transition to the marketplace.

The SBIR/STTR program stimulates entrepreneurship in this country through government support for research in small businesses. These small business firms often need additional research to commercialize their products and/or services. One method of providing this needed research is by enabling small businesses to collaborate with an ERC.

The proposed funding request must be centered on research that is mutually beneficial to the ERC and the proposing small business firm. In particular, the small business should define a role that will align with ERC's technology translation goal. Funding preference will be given to the proposing small business which will be translating technology that defines or demonstrates elements of a platform technology. By definition, the platform technology should be strategically aligned to benefit the evolution of the ERC's engineered system.

Alternatively, if the small business firm is an active NSF SBIR/STTR Phase II awardee, the proposed research may also be aimed at leveraging ERC technology to help improve the competitive position of the proposing SBIR/STTR firm. Thus, the solicitation serves the following dual purposes:

1. Speed the translation of ERC-generated research and technology advances to the marketplace (or its implementation into a critical public service delivery system) and engage undergraduate and graduate students more directly in the innovation process though collaboration between an ERC and a small business firm;
2. Strengthen the research capacity of the proposing active NSF SBIR/STTR Phase II awardee to speed the entry of its innovation into the marketplace thereby improving the awardee's competitive position, and broadening its portfolio of marketable products through collaboration with an ERC.

In both instances, the intent is to facilitate the translation of the knowledge gained from NSF's earlier technology investments into useful applications. The chosen mechanism is through the creation of a mutually beneficial research and commercialization platform that joins ERCs and small business companies in this effort and establishes a model upon which the ERC and the firm can collaborate in the future.

Prospective small R&D firms and active NSF SBIR/STTR Phase II awardees should contact an ERC of interest, defined in the Appendix in Section X, to learn more about that center's scope of research, its membership agreement, the members of its Industrial Advisory Board (IAB) and the research areas of interest of the center's researchers, and whether there is intellectual property is available for translational research. Current information on ERCs can be found at http://www.erc-assoc.org.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 15

Anticipated Funding Amount: $3,000,000

Each partnership consists of one small business lead collaborating with an active or self-sustaining, graduated ERC as a sub-contractor. The combined total award would be up to $200,000 with a duration of one or two years.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- The following definitions are applicable in this section.

  A small Business firm is a legally established entity that meets the SBA program definition of a small business.

  An active ERC awardee is defined as an awardee with an NSF ERC award which has not yet expired.

  A self-sustaining, graduated ERC is defined as an ERC whose 10-year award period has expired, but which is financially self-sustaining and still retain ERC key features. Self-sustaining ERCs are from the Classes of 1990 or later.

  A non-ERC small business is a small business that is not a member of an ERC Industrial Advisory Board.

  An active SBIR/STTR awardee is one with an NSF Phase II award, which has not yet expired.

  An ERC participant includes the ERC's Director, Deputy Director, and other faculty from the lead and partner universities of the ERC who are carrying out research supported by the ERC's funds must annually disclose their conflicts with firms that are engaged with the ERC. These firms include Industry/Practitioner member firms, small firms spun out from the ERC's research base, and small non-member firms engaged in translational research with the ERC.

  An ERC participant also includes all Industrial Liaison Officers (ILO) and ERC Executive Management personnel who must annually disclose their conflicts with firms that are engaged with the ERC. These firms include Industry/Practitioner member firms, small firms spun out from the ERC's research base, and small non-member firms engaged in translational research with the ERC.

  When conflicts are disclosed for either of the above two categories of personnel, the university impacted must develop a conflict management plan for each disclosure..

  If an ERC participant has significant financial interests in the submitting firm or other entities affected by the proposed project, it is a conflict of interest (COI) that must be managed by the participant's home university. The following situations define conflicting relationships that must be managed:

  - INCOME received by the ERC participant from the submitting firm, including, but not limited to, salary, consulting fees, honoraria, travel reimbursement, and income related to intellectual property rights and interests (patents, copyrights).
  - EQUITY in the submitting firm received by the ERC participant, including, but not limited to, stock, stock options, stock purchase plan, incentive stock options, phantom stock, and stock appreciation rights.
  - POSITIONS in the submitting firm or in other entities affected by the proposed project, including, but not limited to, employee, consultant, founder, partner, board of directors, officer, trustee, Chief Executive Officer, Chief Technology Officer, Scientific Advisory Board.
  - Financial interests in the submitting firm held by spouses and dependent children of the ERC participants.

  Given these definitions, proposals may only be submitted by the following:

  - **Option 1:** Any *small business firm* proposing to either speed the translation of ERC generated technology into the marketplace or speed its implementation into a critical public works engineering system. (In Fastlane, submit the proposal to the EEC Division ERC program). To be eligible for this award, the *small business firm* must partner with either an *active ERC awardee* or a *self-sustaining, graduated ERC* which participates in the collaborative research project and is a subawardee. In addition, the proposing firm must have obtained a license from the appropriate university for the ERC intellectual property associated with the proposed project before an award can be made.
  - **Option 2:** Active NSF SBIR/STTR Phase II awardees proposing to leverage ERC developed technology or know-how to strengthen the research capacity of the small business partner in the collaboration. (**Submit the proposal, via FastLane, as a supplement to the original Phase II award).** The objective is to speed the entry of the SBIR/STTR's innovation into the marketplace. Only *active NSF SBIR/STTR* Phase II awardees are eligible to directly apply to this solicitation under Option 2. In addition, the company is only eligible to apply, when an *active or self-sustaining, graduated* ERC, participates in the collaborative research project and is a subawardee.

  A list of self-sustaining, graduated ERCs meeting these criteria is provided in the Appendix in Section X. Note that graduated ERCs operating on brief no-cost extensions of the original award are classified as self-supporting. A potential list of active SBIR/STTR awardees can be viewed using the NSF award search tool at http://www.nsf.gov/awardsearch/tab.do?dispatch=4 and confining the search to Element Code 5373 or 1591 for awards. Details about the award and PI are viewable by clicking on the award number.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 3

Limit on Number of Proposals per PI: 2

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent*(required):*

A Letter of Intent (LOI) is required to facilitate the NSF review process. The letter should be submitted via FastLane no later than the LOI deadline specified in this solicitation. The LOI allows NSF to screen the proposals with respect to eligibility requirements, to categorize the proposals, and to identify conflicts-of-interest to prepare for the proposal review processes. Follow these steps for the LOI preparation and submission:

Submit information for your LOI through Fast Lane under these categories **only (note the character limits, which include spaces, as stated below):**

- Project Title: The Project Title should begin with "Small-Business ERC Collaborative Opportunity..." and should reflect the focus of the proposed collaboration.
- Synopsis: (maximum of 2,500 characters in this section): Provide brief statements of the vision and goals of the proposed collaboration at a sufficient level of detail to understand the proposed collaboration.
- Participants (maximum of 255 characters in this section): Identify the key ERC participants including their ERC institutional affiliations.
- Small Business Project PI contact Information
- ERC Faculty subawardee contact information
- Participating Organizations: Include names and addresses (city, state, country) for the ERC and Industry Partners

Special Letter of Intent Preparation Instruction:

- Submission of multiple Letters of Intent is allowed.
- Participants and Participating Organizations are required when submitting Letters of Intent.

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 1 and Maximum of 5 Other Participating Organizations are allowed
- Submission of multiple Letters of Intent is 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/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 nsfpubs@nsf.gov.

Option 1: The small business lead will submit a single proposal that details the research responsibilities of both the small business firm and the ERC collaborator. (In Fastlane, submit the proposal to the EEC ERC program element 1480). The ERC collaborator will be a subcontractor. The subawardee budget to the ERC collaborator must be a minimum of 30% or a maximum of 60% of the total award amount. The title of the proposal must start with "Small Business - ERC Collaborative Opportunity...:" The proposal must state if the ERC partner is an active or graduated awardee. When submitting an Option 1 proposal the small business lead must check the Continuing Grant Increment (CGI) Option in Fastlane.

The 15-page narrative of the proposal will contain the following sections:

1. Vision and goals of the project. If the proposed project is aimed at supporting the demonstration of a portion of a **platform technology** framework that aligns with the ERC's long term strategic plan, the stated project goals should indicate as much.

2. Justification of the proposed project: Does the proposed project simultaneously derive from research carried out under the umbrella of the ERC's strategic plan during its NSF-supported phase? (Note that the research may have been supported by (i) direct funding provided through the ERC's budget to the PI or (ii) by sponsored project funds directed through the ERC.) Does the proposed project also strengthen the capacity of the small business firm to broaden its portfolio of marketable products? If the proposed project is in support of a critical public service delivery system, the emphasis of the narrative should be on the anticipated impact of implementing the technology in the public delivery system, not on commercialization impact.

3. Research plan describing the testbeds, how the project will be structured and executed, and specifying the roles of the small business and ERC participants. In addition, barriers to commercialization should be identified and a proposed strategy for overcoming them should be discussed. This section should also discuss the role of the project in training students at the graduate and/or undergraduate levels.

4. Expected deliverables at the completion of the project should be specified and a milestone chart should be included depicting the timing of how the technological barriers will be addressed.

5. Management Plan, team, commercialization potential (do not write a full business plan) or expected impact of implementing the technology in support of the critical public engineering projects (see section on additional review criteria).

6. Each partner organization must submit its own detailed budget and *all* line items in the budget must be justified. Because this is a continuing grant increment and the funds are aportioned between two performance periods, each partner organization must submit a separate budget for each increment. Half of the award funding will be released initially and the remainder will be released after the NSF program director receives a satisfactory report on the first period of performance (see Section VII.C Reporting Requirements). The budget should include travel for the small firm's PI and the ERC collaborator to attend a one-day workshop to be held in the Arlington, VA area.

7. **Platform technology** framework only**:** justification of how the proposed project fits within the ERC's long term strategic plans aligning with a platform technology.

Supplementary Documents required for Option 1: The following must be included with the proposal as supplementary documentation:

- Letter of endorsement from the company president or the CEO that indicates the value of the research partnership to the small business and also describes how the small business will contribute to the ERC.
- Letter of endorsement from the ERC Center Director that describes the value of the research partnership to the ERC and
    - ***for general proposals:*** indicates whether the partnership facilitates any part of the ERC's longer term strategic plan;
    - ***for platform technology proposals only:*** indicates how the proposed project fits within the ERCs strategic plan to develop a framework for a platform technology. The letter should also reference the pages in the ERC strategic plan that describes the platform framework.
- **Platform technology proposals only** should provide a copy of the referenced ERC strategic plan;
- Documentation establishing ERC lineage of proposed innovation.
- Biographies of the NSF SBIR/STTR or small R&D firm PI and senior staff (not to exceed 2 pages total)
- Organization chart of the NSF SBIR/STTR firm or the small R&D firm
- Biographies of the ERC PI and co-PI (not to exceed 2 pages total)

- For each of the ERC participants in the proposal, a current copy of the participant's statement that there are no conflicts must be submitted.

- If an ERC participant has significant financial interests in the submitting firm or other entities affected by the proposed project, a current copy of the COI management plan for the affected participant's that addresses these significant financial interests must be submitted

- Post-doc mentoring plan (if post-docs are proposed)

Proposals not following these instructions will be returned without review. Proposals will be peer reviewed by a panel of experts or by mail reviews.

Option 2: The active NSF SBIR/STTR Phase II company will submit a single proposal as a supplement to the original Phase II award via FastLane. The ERC grantee will be a subcontractor. If the grantee is an active NSF STTR Phase II company, the subawardee budget to the ERC must be a minimum of 30% or a maximum of 60% of the total award amount. If the grantee is an active NSF SBIR Phase II company, the subawardee budget to the ERC must not exceed 50% of the total award amount. The title of the proposal must start with "ERC - Small Business:" The proposal must state if the ERC is an active or a graduated awardee. When submitting an Option 2 proposal, the small business lead must check the Standard Grant option in Fastlane.

Supplement Proposal Format and Page Limits (Project Description not to exceed 10 pages):

1. Project Summary including the Intellectual Merit and Broader Impact (one page limit);

2. Description of the innovation and objectives, and how the partnership will achieve one or both of the outcomes defined above;

3. Rationale for collaboration including tasks to be performed;

4. Plan for student involvement;

5. Expected deliverables; and

6. Management Plan, team, milestone chart, future commercialization plan (see section on additional review criteria).

7. Each partner organization must submit its own detailed budget and *all* line items in the budget must be justified. The budget should include travel for the small firm's PI and the ERC collaborator to attend a one-day workshop to be held in the Arlington, VA area.

Supplementary Documents required for Option 2: The following must be included with the proposal as supplementary documentation:

- Letter of endorsement from the company president or the CEO that indicates the value of the research partnership to the small business and also describes how the small business will contribute to the ERC.
- Letter of endorsement from the ERC Center Director that describes the value of the research partnership to the ERC and indicates whether the partnership facilitates any part of the ERC's longer term strategic plan;
- Biographies of the NSF SBIR/STTR or small R&D firm PI and senior staff (not to exceed 2 pages total)
- Organization chart of the NSF SBIR/STTR firm or the small R&D firm
- Biographies of the ERC PI and co-PI (not to exceed 2 pages total)
- Post-doc mentoring plan (if post-docs are proposed)

Proposals not following these instructions will be returned without review. Proposals will be peer reviewed by a panel of experts or by mail review.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Indirect Cost (F&A) Limitations: Option 2: Budgets for supplemental funding request must not exceed the hourly rate of salary/wage for each budgeted employee, the rate of fringe benefits, the rate of indirect costs and the rate of fee cannot exceed those in the final budget of the current Phase II award.

C. Due Dates

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

  March 30, 2012

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

  May 30, 2012

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 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.

Additional Solicitation Specific Review Criteria

For Option 1 and Option 2 Proposals. Given the solicitation goals to help translate ERC generated advancements via the commercial marketplace, the implementation into public engineered systems, or speed the commercialization of NSF supported SBIR/STTR innovations to the marketplace, the additional review criteria emphasize those aspects of the standard NSF intellectual merit and broader impact criteria that are related to translation of knowledge rather than to scientific discovery. In addition to the standard NSF review criteria, the following review criteria will be used:
Option 1: Potential for Commercialization or for High Impact Improvement on the Performance of Public Service Delivery Systems

- The extent to which the proposer understands and has evaluated the potential market for the proposed technology to be transferred or the ability of the innovation to advance a public service delivery system;
- The extent to which the proposer benchmarked the innovation versus existing products that meet the same market needs. This may include innovations aimed at implementing important public service delivery systems;
- The degree to which the proposal demonstrates an effective strategy for translating/speeding the technology innovation to the marketplace. This may include innovations aimed at implementing important public infrastructure needs;
- The degree to which the innovation presents a compelling value proposition i.e. strong need or market-pull, breadth of potential commercial impact for the innovation or its compelling need in support of critical public infrastructure projects;
- The degree to which the intellectual property issues are effectively addressed vis-a-vis the firm and university involved and there is sufficient protection to move the product to market and attain at least a temporal competitive advantage; and
- For platform technology proposals only:
    - The degree to which the proposed project advances the ERC's strategic plan for implementing a platform technology;
    - The degree to which the platform technology supports a range of new processes or technologies;
    - Is there a commitment from a third party investor?

Option 2: Commercialization Potential

- The extent to which the proposer understands and has evaluated the potential market for the proposed technology to be transferred;
- The extent to which the proposer benchmarked the innovation versus existing products that meet the same market needs;
- The extent to which the proposed activity positions the firm to attract further funding from SBIR and/or non-SBIR sources once the project ends;
- The degree to which the proposal demonstrates an effective strategy for translating/speeding the technology innovation to the marketplace;
- The degree to which the innovation presents a compelling value proposition i.e. strong need or market-pull and breadth of potential commercial impact for the innovation; and
- The degree to which the intellectual property issues are effectively addressed vis-a-vis the firm and university involved, and there is sufficient protection to move the product to market and attain at least a temporal competitive advantage.

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.

Option 1. To ensure strong coordination between the small business firm and the ERC collaborator, initially, only half of the award funding will be allocated to the small business firm. As the recipient of a continuing grant increment, to receive the remaining funding, the small business PI must submit an integrated progress report, limited to 10 pages, that encompasses contributions by both the small business firm and the ERC research collaborators

- at the end of six months, for 12 month awards;
- at the end of 12 months for 24 month awards.

This report must be submitted, via email, to the ERC faculty collaborator and the NSF ERC Program Director. If the progress report is satisfactory to both the ERC faculty collaborator and the NSF ERC PD, the remaining funds will be awarded. In addition, the ERC faculty collaborator will submit the reports received from the small business PI for inclusion in Volume II of the ERC's annual report. The small business PI should note that submission of this report is *in addition to, not in lieu of* the standard NSF requirement that an annual and final report be submitted into Fastlane.

The final report must summarize the contributions by both the small business and ERC researchers over the award period.

Option 2. Plans for monitoring and assessment may include such elements as:

- Semi-annual reports from NSF SBIR/STTR Phase II firms;
- Annual Grantee Conference
- Post-award monitoring through site visits to NSF PhaseII firms;
- External evaluation

The final report must summarize the contributions by both the small business and ERC researchers over the award period.

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:

- Deborah J. Jackson, EEC Program Director for ERC PIs, telephone: (703) 292-7499, email: djackson@nsf.gov
- Rathindra DasGupta, IIP Program Officer for NSF- Supported SBIR/STTR Firms, telephone: (703) 292-8353, email: rdasgupt@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: 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.

Please contact the above individuals only for further information about this opportunity.

When using FastLane, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov for user support. The FastLane Help Desk answers general technical questions related to the use of the FastLane system.

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.

Please visit the Engineering Research Center Association at
http://www.erc-assoc.org/centers.htm for a list of active participating ERCs, and
http://www.erc-assoc.org/graduated_centers.htm for a list of graduated participating ERCs

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

NSF receives approximately 40,000 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:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

X. APPENDIX

Biotechnology and Health Care

Ongoing NSF-supported ERCs

- **Synthetic Biology ERC**, University of California, Berkeley in partnership with Harvard University, the Massachusetts Institute of Technology, Prairie View A&M University (HBCU), and the University of California, San Francisco, Class of 2006
- **Quality of Life ERC**, Carnegie Mellon University in partnership with the University of Pittsburgh, Class of 2006
- **ERC for Revolutionizing Metallic Biomaterials**, North Carolina A&T State University (HBCU) in partnership with the University of Cincinnati and the University of Pittsburgh, Class of 2008
- **ERC for Structured Organic Particulate Systems,** Rutgers University in partnership with New Jersey Institute of Technology, Purdue University, and the University of Puerto Rico-Mayaguez (MSI)**,** Class of 2006
- **Biomimetic MicroElectronic Systems ERC,** University of Southern California in partnership with Caltech and the University of California, Santa Cruz, Class of 2003

Self-sustaining ERCs

- **Engineering of Living Tissues,** Georgia Tech and Emory University 1998 to 2008 (self-sustaining)
- **Computer-Integrated Surgical Systems and Technology,** Johns Hopkins University -, 1998 to 2008 (self-sustaining)
- **Biotechnology Process Engineering,** MIT. 1985 and 1995 to 2005 (self-sustaining)
- **Biofilm Engineering,** Montana State University, 1990 to 2001 (self-sustaining)

- **Bioengineering Educational Technologies,** Vanderbilt University, 1999 to 2007 (self-sustaining)
- **Engineered Biomaterials,** University of Washington, 1996 to 2007 (self-sustaining)

Design and Manufacturing

Self-sustaining ERCs

- **Environmentally Benign Semiconductor Manufacturing,** University of Arizona, 1996 to 2006 (self-sustaining)
- **Advanced Engineering of Fibers and Films,** Clemson University -1998 to 2008 (self-sustaining)
- **Particle Engineering,** University of Florida, 1994 to 2006 (self-sustaining)
- **Systems Research,** University of Maryland, 1985 & 1994 to 1997 (self-sustaining)
- **Reconfigurable Manufacturing Systems,** University of Michigan, 1996 to 2007 (self-sustaining)

Energy, Sustainability, and Infrastructure

Ongoing NSF-supported ERCs

- **ERC for Biorenewable Chemicals**, Iowa State University in partnership with Rice University, the University of California, Irvine, the University of New Mexico (MSI), the University of Virginia, and the University of Wisconsin-Madison, Class of 2008
- **ERC for Compact and Efficient Fluid Power,** University of Minnesota in partnership with Georgia Institute of Technology, Purdue University, the University of Illinois at Urbana-Champaign, and Vanderbilt university**,** Class of 2006
- **ERC for Future Renewable Electric Energy Delivery and Management,** North Carolina State University in partnership with Arizona State University, Florida State University. Florida A&M University (HBCU), Missouri University of Science and Technology, Class of 2008
- **Smart Lighting ERC,** Rensselaer Polytechnic Institute in partnership with Boston University and the University of New Mexico (MSI), Class of 2008

Self-sustaining ERCs

- **Multidisciplinary Center for Earthquake Engineering Research** University at Buffalo, 1997 to 2007 (self-sustaining)
- **Pacific Earthquake Engineering Research Center,** University of California at Berkeley, 1997 to 2007 (self-sustaining)
- **Mid-America Earthquake Engineering Research,** University of Illinois at Urbana-Champaign, 1997 to 2007 (self-sustaining)

Micro/Optoelectronics, Sensing, and IT

Ongoing NSF-supported ERCs

- **ERC for Integrated Access Networks,** University of Arizona in partnership with the California Institute of Technology, Norfolk State University (HBCU), Stanford University, Tuskegee University (HBCU), the Universities of California at Berkeley, San Diego, and Los Angeles, and the University of Southern California, Class of 2008
- **ERC for Extreme Ultraviolet Science and Technology,** Colorado State University in partnership with the University of Colorado, Boulder and the University of California, Berkeley, Class of 2003
- **ERC for Collaborative Adaptive Sensing of the Atmosphere**, the University of Massachusetts-Amherst in partnership with Colorado State University, the University of Oklahoma, and the University of Puerto Rico-Mayaguez (MSI), Class of 2003
- **ERC on Mid-Infrared Technologies for Health and the Environment,** Princeton University in partnership with the City University of New York, Johns Hopkins University, Rice University, Texas A & M University, and the University of Maryland - Baltimore County, Class of 2006

Self-sustaining ERCs

- **Neuromorphic Systems Engineering,** California Institute of Technology, 1995 to 2005 (self-sustaining)
- **Data Storage Systems,** Carnegie Mellon, 1990 to 2001 (self-sustaining)
- **Microelectronics Packaging,** Georgia Tech, 1995 to 2005 (self-sustaining)
- **Computational Field Simulation, Mississippi State University,** 1990 to 2001 (self-sustaining)
- **Subsurface Sensing and Imaging Systems,** Northeastern University, 2000 - 2010 (self-sustaining)
- **Wireless Integrated MicroSystems,** University of Michigan, 2000 - 2010 (self-sustaining)
- **Integrated Media Systems,** University of Southern California, 1996 to 2006 (self-sustaining)
- **Power Electronics Systems,** Virginia Polytechnic Institute, 1998 to 2008 (self-sustaining)