

# Partnerships for Innovation: Accelerating Innovation Research- Technology Translation (PFI: AIR-TT)

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## PROGRAM SOLICITATION NSF 13-575

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### REPLACES DOCUMENT(S): NSF 12-571

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National Science Foundation

Directorate for Engineering  
Industrial Innovation and Partnerships

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

October 07, 2013

March 13, 2014

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

November 13, 2013

May 01, 2014

## IMPORTANT INFORMATION AND REVISION NOTES

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A revised version of the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)*, [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in [NSF 13-1](#) apply to proposals submitted in response to this funding opportunity.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, [National Science Foundation's Merit Review Criteria: Review and Revisions](#). While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the [Grant Proposal Guide](#) and the [Award & Administration Guide](#).

*Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the [Grant Proposal Guide](#).*

The NSF 12-571 solicitation contained two options under one solicitation for the Partnerships for Innovation (PFI): Accelerating Innovation Research (AIR) program. They were the Technology Translation (TT) option and the Research Alliance (RA) option. This solicitation contains only the Technology Translation portion. In addition, the following notable changes have been made to the Technology Translation option from NSF 12-571. Minor changes also may be present; proposers are encouraged to read the full solicitation carefully.

1. At least one co-PI must have explicit business experience.
2. Up to \$200,000 may be requested per award.
3. Lineage to a previous NSF research grant may be up to six years prior to the due date of the solicitation.
4. Awardees proposing a prototype or a scale-up design/demonstration of the prototype must submit a technology demonstration plan within 12 months of award date.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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**Program Title:**

Partnerships for Innovation: Accelerating Innovation Research (AIR)

**Synopsis of Program:**

The NSF Partnerships for Innovation (PFI) program within the Division of Industrial Innovation and Partnerships (IIP) is an umbrella for two complementary subprograms, Accelerating Innovation Research (AIR) and Building

Innovation Capacity (BIC). In the final analysis, both programs are concerned with the movement of academic research discoveries into the marketplace although each focuses on different stages along the innovation spectrum. The subject of this solicitation is PFI: AIR Technology Translation (TT) only. The PFI: AIR-TT solicitation is intended to help bridge the funding gap between existing research discoveries that validate relevant science and engineering fundamentals and their translation through proof-of-concept, prototype, or scale-up along a path toward commercialization and engage faculty and students in entrepreneurial/innovative thinking.

**WEBINAR: A webinar will be held within 6 weeks of the release date of this solicitation to answer any questions about this solicitation. Details will be posted on the IIP website (<http://www.nsf.gov/eng/iip/pfi/index.jsp>) as they become available.**

**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.*

- Barbara H. Kenny, Program Director, telephone: (703) 292-4667, email: [bkenny@nsf.gov](mailto:bkenny@nsf.gov)
- Karlene A. Hoo, Program Director, telephone: (703) 292-4609, email: [khoo@nsf.gov](mailto:khoo@nsf.gov)

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

- 47.041 --- Engineering

## Award Information

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

**Estimated Number of Awards:** 35 to 40

The budget for the PFI: AIR Technology Translation is up to \$200,000 for 18 months per award; approximately 35 - 40 awards will be made.

**Anticipated Funding Amount:** \$8,000,000

Anticipated Funding Amount is subject to the availability of funds and the quality of proposals received.

## Eligibility Information

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**Organization Limit:**

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions. The lead (submitting) organization must be an academic institution.

**PI Limit:**

The proposal must have at least one and no more than four co-PIs.

One co-PI must have explicit business experience (for example, someone from the technology transfer office, the business school or a local/regional development office) and must have an active role that is explicitly described along with the specification of a time commitment on the project.

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

None Specified

**Limit on Number of Proposals per PI:** 1

## Proposal Preparation and Submission Instructions

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**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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide))

**B. Budgetary Information**

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

- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

### C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):
  - October 07, 2013
  - March 13, 2014
- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
  - November 13, 2013
  - May 01, 2014

## Proposal Review Information Criteria

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**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

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

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

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## I. INTRODUCTION

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The National Science Foundation (NSF) supports both fundamental research and education in science and engineering. NSF's dual role, unique among government agencies, results in new knowledge and tools as well as a capable, innovative workforce. These complementary building blocks of innovation (<http://www.nsf.gov/eng/iip/innovation.pdf>) have led to revolutionary technological advances and whole new industries. Through this initiative, NSF seeks to accelerate the translation of existing research discoveries along a path toward commercialization and market-valued solutions.

There are other federal programs that contribute to the goal of innovation. Internal to NSF there are the following programs: Partnerships for Innovation: Building Innovation Capacity (to be released at a later date), Partnerships for Innovation: Accelerating Innovation Research-Research Alliance (to be released at a later date), Innovation Corps (*I-Corps*), the Small Business Innovation Research/Small Business Technology Transfer (*SBIR/STTR*), and Grant Opportunities for Academic Liaison with Industry (*GOALI*). For more information on these programs, go to the Division of Industrial Innovation and Partnerships website:

## II. PROGRAM DESCRIPTION

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The Directorate for Engineering (ENG) of the National Science Foundation (NSF) invites requests for funding under the Partnerships for Innovation (PFI): Accelerating Innovation Research (AIR)- Technology Translation (TT) solicitation. The PFI: AIR-TT solicitation is designed to support innovative ideas in the translation of NSF-funded fundamental science and engineering discoveries into market-valued solutions. The program outcomes will be more research discoveries translated onto a path toward commercial reality and the engagement of faculty and students in entrepreneurial/innovative thinking.

The PFI: AIR-TT solicitation provides an opportunity for prior and/or current NSF-funded research investigators to complete the necessary research that could be any one of the following activities: proof-of-concept or prototype or scale-up of the prototype that addresses real-world constraints and has potential market-value.

- A proof-of-concept is the realization of a certain method or idea to ascertain its scientific or technological parameters. A proof-of-concept should be understood sufficiently so that potential application areas can be identified and a follow-on working prototype designed.
- A prototype is a functional demonstration of the proof-of-concept that addresses a relevant application. The prototype should be understood well enough to identify performance parameters, design criteria, and functional limitations for scalability in a potential application area.

If any one of proof-of-concept or prototype or scale-up of the prototype has been developed previously, and preparation of a viable commercialization plan is all that remains for the research activity, the proposal will not be accepted. That is, proposals requesting funding for only commercialization activities will be returned without review.

Awardees developing a prototype or a scale-up design/demonstration of the prototype must submit, no later than 12 months from the award date, a technology demonstration plan (a strategy to transition and transfer from the prototype or scale-up to a commercial reality) worthy of being presented at an NSF-organized technology showcase where potential industry scouts and other commercialization funding sources may be in attendance. Supplemental funds may be requested to attend the showcase; details will be provided after the award is made.

## III. AWARD INFORMATION

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Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

Full Proposals submitted on November 13, 2013 will have an approximate award start date of April 1, 2014

Full Proposals submitted on May 1, 2014 will have an approximate award start date of September 1, 2014

## IV. ELIGIBILITY INFORMATION

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### Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions. The lead (submitting) organization must be an academic institution.

### PI Limit:

The proposal must have at least one and no more than four co-PIs.

One co-PI must have explicit business experience (for example, someone from the technology transfer office, the business school or a local/regional development office) and must have an active role that is explicitly described along with the specification of a time commitment on the project.

### Limit on Number of Proposals per Organization:

None Specified

### Limit on Number of Proposals per PI: 1

### Additional Eligibility Info:

No collaborative proposals (defined as simultaneous proposal submissions for a joint project from different organizations, with each organization requesting a separate award) will be accepted.

The Principal Investigator (PI) or a co-PI must have had an NSF research award that ended no more than 6-years prior to this solicitation's due date, or be a current NSF research award recipient. Regardless, the PI must be a faculty member at a U.S. academic institution at the time of the award.

The proposed proof-of-concept, prototype, or scale-up must be derived from a research discovery project already conducted or initiated by the NSF.

If a business is participating, it is the responsibility of the award recipients to discuss the appropriate intellectual property policies, including patent disclosures and filings. NSF is not responsible for the type of agreement reached between grantees and the business entity. Submit with the proposal a letter stating that a [cooperative research agreement](#) (CRA; see sample) will be provided upon recommendation of an award. If an award is recommended, the submitting institution must follow-up by providing a signed, written CRA that has been negotiated with the business entity before NSF funding will be released.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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#### Letters of Intent (required):

Submission of a Letter of Intent (LOI) from the lead institution is mandatory. Letters of intent are to be submitted via FastLane which is available at <http://fastlane.nsf.gov/>. The LOI allows the NSF to examine the proposals with respect to the eligibility requirements, to identify correctable issues, and to categorize proposals in order to prepare for the proposal review process. The LOI will not be used to eliminate or deter full proposal submissions.

Enter the requested core Letter of Intent information as prompted by FastLane. The "synopsis" and the "other comments" data fields each can contain a maximum of 2,500 characters. Note that the LOIs are restricted as to the number of data fields and the number of characters in each of the "additional information" data fields that can be entered in FastLane.

Additionally, complete these data fields for the LOI:

**Scope of Work** (255 chars) - Identify the NSF lineage (connections to prior or existing NSF research award(s)) of the research discovery or technologies and provide a brief description of the scope of work.

**Statement of the Innovation** (255 chars) - Identify and discuss the output (any one of proof-of-concept or prototype or scale-up) that will result from the translation of an existing research discovery and the technology gap to be filled.

**List of Partner(s)** (255 chars) - Provide identification of business partner(s), *if appropriate*. If none, state NONE.

#### 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 1 and Maximum of 4 Other Senior Project Personnel are allowed
- A Minimum of 0 and Maximum of 4 Other Participating Organizations are allowed
- Scope of Work is required when submitting Letters of Intent
- Statement of the Innovation 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](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](mailto: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](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](mailto:nsfpubs@nsf.gov).

**Important Proposal Preparation Information:** FastLane will check for required sections of the proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

#### Guide to Submission of a Proposal:

*Note: the submission criteria outlined below are in addition to requirements contained within the NSF Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide.*

A well-constructed PFI: AIR-TT proposal should convey how the project will accomplish the following goals:

- Technical - proof-of-concept: demonstration and results; or prototype: development, demonstration and evaluation; or scale-up: development, demonstration and evaluation; and a strategy that lays out a path toward commercialization that continues beyond the duration of this award.
- Marketing - enhanced understanding of the identified market space, the market need, the competitive technologies; and the potential impact of the proposed competitive innovation/substitution technology
- Legal - anticipated intellectual property protection; current status of patent disclosures, filings, licensing opportunities; environmental health, safety, and other liabilities; and regulatory issues.

The proposal consists of the following parts:

#### **A. Cover Sheet**

The cover sheet is automatically generated by FastLane or Grants.gov based on information entered into the "Cover Sheet" module.

#### **B. Project Summary (one-page limit)**

The Project Summary should be written in the third person and shall begin as follows: "This Accelerating Innovation Technology Translation project ..."

The summary MUST clearly address the following items:

**Box 1: Overview, Key Words:** A summary paragraph. The key words/phrases should identify the areas of technical expertise in science and engineering, which are to be invoked in reviewing the proposal; and the areas of application that are the initial target markets of the technologies.

**Box 2: Intellectual Merit:** A summary paragraph addressing the intellectual merits of the proposed activity. No proprietary information should be included in the summary.

**Box 3: Broader Impact:** A summary paragraph. Include information on how the innovation will enhance scientific and technological understanding. Describe the potential societal, economic, and commercial impacts of the project.

The aggregate of the three text boxes cannot exceed 4,600 characters.

**C. Table of Contents** The table of contents is automatically generated by FastLane or Grants.gov.

#### **D. Project Description (cannot exceed 15 pages)**

The project description must include the following:

- A detailed description of the existing research discovery to be translated: any one of proof-of-concept or prototype or scale-up of the prototype. The technology gap(s) that need to be filled and the research methods to be used should be clearly identified and discussed.
- Explicit identification of the NSF lineage (include the NSF award number of the underlying awards(s)). Provide an overview of how the proposed proof-of-concept, prototype or scale-up is derived from the prior or existing NSF research award(s).
- A preliminary market research study to support the market potential of the existing research discovery. This section should include a detailed discussion of the market need addressed, the existing competitive technologies to meet the need and their shortcomings, and how the proof-of-concept, prototype or scale-up will provide a path to either a competitive solution or a competitive substitute.
- A preliminary patent search and accompanying discussion to support the feasibility of obtaining needed licenses and/or sufficient protection for the intellectual property developed. This section should include a discussion of any relevant background intellectual property held by the proposing institution, its availability for licensing, and an assessment of how another party might patent or practice around both background and anticipated intellectual property assets.
- A strategy or plan that lays out a path toward commercialization and continues beyond the duration of this award.
- A plan for involvement of undergraduate, graduate students and/or post-docs, incorporating an explanation of how the proposed effort will enhance the knowledge of innovation beyond the usual research experience.
- A description of the role of the small business partner (if there is a subaward to a small business).

Patentable ideas, trade secrets, privileged or confidential commercial or financial information, disclosure of which may harm the proposer, should be included in proposals only when such information is necessary to convey an understanding of the proposed project. Such information must be clearly marked in the proposal and be appropriately labeled with a legend such as, "The following is (proprietary or confidential) information that (name of proposing organization) requests not be released to persons outside the Government, except for purposes of review and evaluation." The box for "Proprietary or Privileged Information" must be checked on the Cover Sheet when the proposal contains such information.

**Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. You can decide where to include this section within the Project Description.**

#### **E. References Cited**

Provide a comprehensive listing of relevant reference sources, including patent citations. If there are no references cited in the proposal, include a statement to that effect in this module.

#### **F. Biographical Sketches**

Include short bios (two pages maximum) of the PI and co-PIs, highlighting their technical expertise and track records in successful technology and/or business development. Biographical sketches for non-academic participants need not follow the academic bio sketch format, but rather one appropriate to their respective backgrounds. Regardless, all participants listed as either "co-PIs or "Non co-PI/Senior Personnel" must submit a bio sketch of no more than two pages.

#### **G. Budgets and Sub-budgets**

The NSF Summary Proposal Budget is generated in FastLane or Grants.gov. Prepare a budget for each year. The system will automatically generate a cumulative budget for the entire project. A budget justification is required for each item in the budget; it should explicitly state how and where the requested funds will be spent. Note that costs of initial patent searches and marketing

studies also are allowable costs.

It is allowable to expend up to 50 percent of the total budget as a subaward to a small business, as defined by the Small Business Innovation Research (SBIR) program. Bear in mind that the NSF does not intend to fund industrial research and development; the proposed subaward should augment the research capabilities of the submitting academic institution. If there is any university/business collaboration in which funds are used to support activity of the business, this should be explained and justified clearly in the budget justification.

Funding requests will be evaluated relative to the scope and balance of the research planned.

If any one of proof-of-concept or a prototype or a scale-up of the prototype have been developed previously and a market study or preparation of a viable commercialization plan is all that remains for the research activity, the proposal will not be accepted. That is, proposals requesting funding for only commercialization activities will be returned without review.

#### **H. Current and Pending Support**

The proposal should provide information regarding all research to which the PI and other senior personnel either have committed time or have planned to commit time. If none, state NONE.

For all ongoing or proposed projects, the following information should be provided for the Principal Investigator and senior personnel:

- Name of sponsoring organization and award number;
- Title and performance period of the award/proposal; and
- Person-months/calendar months (per year) devoted to the project by the PI and each of the senior personnel.

**\*Current and Pending Support must be uploaded into the system. The proposal being submitted under this solicitation is considered "pending" and therefore MUST appear in the Current and Pending Support module.**

#### **I. Facilities, Equipment, and Other Resources**

Discuss requirements for and the availability of facilities, equipment, and other resources required for the proposed project.

#### **J. Supplementary Documents**

*Proposals missing any of these documents will be returned without review.*

- *Milestone chart.* A milestone chart with specific tasks and deliverables.
- *Letters of Commitment.* **If applicable**, letters of commitment from a business partner(s) must be provided at the time of submission of the proposal. Such letters must explicitly state the commitment type, appear on the organization's letterhead and be signed by the appropriate organizational representative.
- *Letters of Support (limit of three letters).* **If applicable**, letters of support act as an indication of market validation for the proposed innovation. Meaningful content may demonstrate that dialog has been initiated with relevant stakeholders (potential customers, strategic partners or investors) for the proposed innovation and that the potential for a business opportunity may exist should the technology prove feasible. The letter must contain affiliation and contact information for the signatory stakeholder.
- *Letter of Cooperative Research Agreement.* **If applicable**, a letter stating that a CRA(s) ([cooperative research agreement](#); see sample) will be provided upon recommendation of the award must be submitted with the proposal. If an award is recommended, the submitting institution must follow-up by providing a signed, written CRA(s) before NSF funding will be released.
- *Data Management Plan.* A Data Management Plan is required for all proposals submitted to NSF. Consult the data management requirements at this link: [http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg\\_2.jsp#dmp](http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_2.jsp#dmp).
- *Postdoctoral Research Mentoring Plan.* **If applicable**, a postdoctoral mentoring plan.
- *Other Supplementary Docs.* **If applicable**, letters regarding Use of Human subjects, e.g., Institutional Review Board or IACUC approval of animal use.

#### **K. Single Copy Documents**

Proposers are encouraged to supply an annotated list of suggested reviewers complete with contact information.

## **B. Budgetary Information**

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

#### **Other Budgetary Limitations:**

NSF will not provide salary support for personnel employed by Federal Agencies or Federally Funded Research and Development Centers.

Proposers may request up to \$200,000 from NSF for award durations of 18 months.

## **C. Due Dates**

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- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):
  - October 07, 2013
  - March 13, 2014
- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
  - November 13, 2013
  - May 01, 2014

## D. FastLane/Grants.gov Requirements

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- **For Proposals Submitted Via FastLane:**

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

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

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: [http://www07.grants.gov/applicants/app\\_help\\_reso.jsp](http://www07.grants.gov/applicants/app_help_reso.jsp). In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: [support@grants.gov](mailto:support@grants.gov). The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

**Submitting the Proposal:** Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

A comprehensive description of the Foundation's merit review process is available on the NSF website at: [http://nsf.gov/bfa/dias/policy/merit\\_review/](http://nsf.gov/bfa/dias/policy/merit_review/).

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years \(FY\) 2011-2016](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

### A. Merit Review Principles and Criteria

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The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

#### 1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend



proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

## 2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter II.C.2.d.i.](#) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including [GPG Chapter II.C.2.d.i.](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
  - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
  - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

### Additional Solicitation Specific Review Criteria

In making the final award decisions, NSF also may consider the following:

- Geographic distribution and diversity of academic institutions involved in the partnership
- Distribution of technology or industry sectors served

#### *Additional Review criteria:*

- The merit of the research plan to translate the existing research discovery to proof-of-concept, prototype or scale-up.
- The strength of the discussion of the technology gap(s) to be filled and how the proof-of-concept, prototype or scale-up has the potential to fill that gap(s).
- The lineage of the research discovery to relevant previous and/or current NSF research award(s).
- The quality of the preliminary market research study to support the market need of the research discovery to be translated.
- The quality of the strategy for a path toward commercialization.
- The quality of the preliminary patent search and accompanying discussion to support the feasibility of obtaining needed licenses and/or sufficient protection for intellectual property developed.
- The quality of the plan for involvement of undergraduate, graduate students and/or post-docs, incorporating an explanation of how the proposed effort will enhance their knowledge of innovation.
- The reasonableness of the budget and budget justification that indicate how and where the requested funds will be spent.

Note, if there is a minimal research component (i.e. most of the work is to generate a business plan), the proposal will not be accepted.

## B. Review and Selection Process

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

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

### B. Award Conditions

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An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); \* or Research Terms and Conditions \* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/awards/managing/award\\_conditions.jsp?org=NSF](http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov).

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=aag](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

#### Special Award Conditions:

Awardees developing a prototype or a scale-up design/demonstration of the prototype must submit, no later than 12 months from the award date, a technology demonstration plan (a strategy to transition and transfer from the prototype or scale-up to a commercial reality) worthy of being presented at an NSF-organized technology showcase where potential industry scouts and other commercialization funding sources may be in attendance. Supplemental funds may be requested to attend the showcase; details will be provided after the award is made.

### C. Reporting Requirements

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For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=aag](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

## VIII. AGENCY CONTACTS

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*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:

- Barbara H. Kenny, Program Director, telephone: (703) 292-4667, email: [bkenny@nsf.gov](mailto:bkenny@nsf.gov)
- Karlene A. Hoo, Program Director, telephone: (703) 292-4609, email: [khoo@nsf.gov](mailto:khoo@nsf.gov)

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

## IX. OTHER INFORMATION

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

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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:**
  - Send an e-mail to: [nsfpubs@nsf.gov](mailto: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  
Office of the General Counsel  
National Science Foundation  
Arlington, VA 22230

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