Partnerships for Innovation (PFI)

PROGRAM SOLICITATION
NSF 19-506

REPLACES DOCUMENT(S):
NSF 18-511

National Science Foundation

Directorate for Technology, Innovation and Partnerships
   Translational Impacts

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

January 17, 2019

July 10, 2019

Second Wednesday in July, Annually Thereafter

January 08, 2020

Second Wednesday in January, Annually Thereafter

August 05, 2020

February 10, 2021

July 14, 2021

Second Wednesday in July, Annually Thereafter

January 12, 2022

Second Wednesday in January, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

1. The Partnerships for Innovation (PFI) Program funds technology translation and development based on prior NSF-funded research projects from all science and engineering disciplines supported by NSF.
2. PFI contains two separate tracks for submission: PFI-Technology Translation (PFI-TT) and PFI-Research Partnerships (PFI-RP).
3. The PFI-RP track requires the creation and implementation of new multidisciplinary, multi-organization partnerships between academia, industry and other public and private entities to pursue new innovative technology development projects.
4. PFI-TT projects will be funded for up to $250,000 for 18-24 months per award; approximately 40-50 awards are anticipated. PFI-RP projects will be funded for up to $550,000 for 36 months. Approximately 10-15 awards are anticipated.
5. Submission deadlines are now available in January and July.
6. The Program Description (Section II) has been updated to clarify a) the statutory mandate and the goals and requirements of the PFI program; b) the elements of a PFI proposal; c) the differences between PFI-TT and PFI-RP proposals; and c) the role of the Industrial Partner (which is encouraged in PFI-TT proposals and mandatory in PFI-RP proposals).
7. The limit on the number of proposals submitted by an eligible organization has been eliminated for the PFI-TT track. However, an organization may submit no more than one (1) proposal to the PFI-RP track per submission deadline.
8. The PFI program has an NSF Lineage Requirement under one of the following two paths: (1) NSF-supported research results or (2) NSF-supported customer discovery results through the NSF Innovation Corps (I-Corps^{TM}) Teams program. The NSF lineage requirement applies now to both proposal tracks PFI-TT and PFI-RP. The only allowed exception is for resubmission of PFI-RP proposals previously declined under solicitation NSF 18-511. An I-Corps Node award, training at an NSF I-Corps Site, or any I-Corps-related training imparted by federal agencies and organizations other than NSF do not meet the NSF Lineage Requirement.
9. The educational component of the PFI program has been clarified to a) emphasize the leadership in innovation and entrepreneurship training of student and postdoctoral team members; and b) include additional mandatory NSF I-Corps training for PFI awardees.
10. Proposals must include at least one (1) letter of support from potential commercialization partners (not associated with the proposal) that validates the claim of market potential and broader societal impact for the proposed technology.
11. Resubmission of significantly improved revisions of a previously declined PFI proposal is strongly encouraged. The PI must include the previous proposal number and a 1-2-page supplementary document that summarizes prior reviewer comments and the changes that have been made in response.
12. Guidance has been included for NSF-funded centers and consortia that plan to submit PFI proposals.
13. The Objectives Not Responsive to the Solicitation section (II.E) was updated to include clinical and drug development and low-risk or incremental projects. The list of non-research and development (R&D) activities not supported by the PFI program was also expanded.
14. The Reporting Requirements section (VII.C) has been updated to underscore PFI's goal to accelerate the development and transfer of technologies

from the laboratory to the marketplace.

Important Information

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in Important Notice No. 147. In support of these efforts, proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov and may not be prepared or submitted via FastLane.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Partnerships for Innovation (PFI)

Synopsis of Program:

The Partnerships for Innovation (PFI) Program within the Division of Industrial Innovation and Partnerships (IIP) offers researchers from all disciplines of science and engineering funded by NSF the opportunity to perform translational research and technology development, catalyze partnerships and accelerate the transition of discoveries from the laboratory to the marketplace for societal benefit.

PFI has five broad goals, as set forth by the American Innovation and Competitiveness Act of 2017 ("the Act", S.3084 — 114th Congress; Sec. 602. Translational Research Grants): (1) identifying and supporting NSF-sponsored research and technologies that have the potential for accelerated commercialization; (2) supporting prior or current NSF-sponsored investigators, institutions of higher education, and non-profit organizations that partner with an institution of higher education in undertaking proof-of-concept work, including the development of technology prototypes that are derived from NSF-sponsored research and have potential market value; (3) promoting sustainable partnerships between NSF-funded institutions, industry, and other organizations within academia and the private sector with the purpose of accelerating the transfer of technology; (4) developing multi-disciplinary innovation ecosystems which involve and are responsive to the specific needs of academia and industry; (5) providing professional development, mentoring, and advice in entrepreneurship, project management, and technology and business development to innovators.

In addition, PFI responds to the mandate set by Congress in Section 601(c)(3) of the Act (Follow-on Grants), to support prototype or proof-of-concept development work by participants, including I-Corps participants, with innovations that because of the early stage of development are not eligible to participate in a Small Business Innovation Research Program or a Small Business Technology Transfer Program.

Finally, PFI seeks to implement the mandate set by Congress in Section 102(c)(a) of the Act (Broader Impacts Review Criterion Update) by enhancing partnerships between academia and industry in the United States, and expanding the participation of women and individuals from underrepresented groups in innovation, technology translation, and entrepreneurship.

This solicitation offers two broad tracks for proposals in pursuit of the aforementioned goals:

The **Technology Translation (PFI-TT) track** offers the opportunity to translate prior NSF-funded research results in any field of science or engineering into technological innovations with promising commercial potential and societal impact. PFI-TT supports commercial potential demonstration projects for academic research outputs in any NSF-funded science and engineering discipline. This demonstration is achieved through proof-of-concept, prototyping, technology development and/or scale-up work. Concurrently, students and postdoctoral researchers who participate in PFI-TT projects receive education and leadership training in innovation and entrepreneurship. Successful PFI-TT projects generate technology-driven commercialization outcomes that address societal needs.

The **Research Partnerships (PFI-RP) track** seeks to achieve the same goals as the PFI-TT track by supporting instead complex, multi-faceted technology development projects that are typically beyond the scope of a single researcher or institution and require a multi-organizational, interdisciplinary, synergistic collaboration. A PFI-RP project requires the creation of partnerships between academic researchers and third-party organizations such as industry, non-academic research organizations, federal laboratories, public or non-profit technology transfer organizations or other universities. Such partnerships are needed to conduct applied research on a stand-alone larger project toward commercialization and societal impact. In the absence of such synergistic partnership, the project's likelihood for success would be minimal.

The intended outcomes of both PFI-TT and PFI-RP tracks are: a) the commercialization of new intellectual property derived from NSF-funded research outputs; b) the creation of new or broader collaborations with industry (including increased corporate sponsored research); c) the licensing of NSF-funded research outputs to third party corporations or to start-up companies funded by a PFI team; and d) the training of future innovation and entrepreneurship leaders.

WEBINARS: Webinars will be held to answer questions about the solicitation. Registration will be available on the NSF Partnerships for Innovation website (https://www.nsf.gov/PFI). Potential proposers and their partners are encouraged to attend.

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.

- Jesus V. Soriano, telephone: (703) 292-7795, email: jsoriano@nsf.gov

- Samir M. Iqbal, telephone: (703) 292-7529, email: smiqbal@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)
- 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 50 to 65

PFI-TT projects will be funded for up to $250,000 for 18-24 months per award; approximately 40-50 awards are anticipated. PFI-RP projects will be funded for up to $550,000 for 36 months. Approximately 10-15 awards are anticipated.

Anticipated Funding Amount: $20,000,000

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

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Academic / Research U.S. institutions; includes universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the United States, acting on behalf of their faculty members;
- Public or Non-profit, Non-academic U.S. organizations located in the United States that are directly associated with technology transfer activities ("Technology Transfer Organizations");
- Non-profit U.S. organizations located in the United States that partner with an institution of higher education; or
- A U.S. consortium of 2 or more of the organizations described above.

Technology Transfer Organizations interested in submitting proposals to PFI are strongly encouraged to partner with an Academic / Research U.S. institution to strengthen the technical component of their projects.

Who May Serve as PI:

The PI must have the technical skills required to lead and execute the proposed research project.

In addition to the PI, PFI-TT proposals must include a Senior Personnel or co-PI who brings technology commercialization experience in the targeted fields of application or industry sector. The technology commercialization expert must have an active role in the project.

PFI-RP proposals must include, without exception, a co-PI who is a member or employee of the required Industrial Partner organization. PFI-RP proposals without an Industrial Partner co-PI may be returned without review.

The technology commercialization expert cannot use NSF-funded time and effort to perform any "Objectives Not Responsive to this Solicitation" listed in Section II.E of this solicitation. However, the expert may participate in any mandatory I-Corps training that will be provided during the term of the PFI award. Additional collaborators or organizations that bring needed multidisciplinary expertise or commercialization experience may be involved as co-PI, Senior Personnel, Other Professional, subawardee, consultant, etc.

NSF Lineage Requirement: All proposals submitted to the PFI program must meet a lineage requirement under one of the following two paths: (1) NSF-supported research results, or (2) NSF-supported customer discovery results through the NSF I-Corps Teams Program. Please refer to "Additional Eligibility Information" under Section IV of this solicitation for details.

Limit on Number of Proposals per Organization:

There is no limit on the number of PFI-TT proposals an organization may submit to a deadline of this solicitation. However, an organization may not submit more than one (1) new or resubmitted PFI-RP proposal to a deadline of this solicitation. This eligibility constraint will be strictly enforced. If an organization exceeds this limit, the first PFI-RP proposal received will be accepted, and the remainder will be returned without review. An organization may not receive more than two (2) awards from a submission deadline of this solicitation.

Limit on Number of Proposals per PI or co-PI: 2

A PI or co-PI may submit up to two (2) proposals to each solicitation deadline. These could be two (2) proposals to PFI-TT or one (1) proposal each to PFI-TT and PFI-RP, subject to the organizational limits described above. A PI or co-PI will not receive more than one (1) award per solicitation deadline. PIs with currently active PFI awards are requested to complete their then-current project before submitting a new PFI proposal. Any duplicate, substantially similar or equivalent proposal submitted concurrently for review to the solicitation will be returned without review.

A PI or co-PI may resubmit a proposal that was previously declined under a previous PFI solicitation or under a previous submission deadline in this solicitation; however, the new proposal must be significantly improved and be responsive to the major comments or concerns resulting from the prior NSF review. A resubmission must include a supplemental document that includes the previous proposal number, a summary of the NSF reviewers' comments and the PI's response to those comments (see Section V.A.J. below). The revised proposal will be subject to a new NSF merit review.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposal Submission:** Not required

- **Full Proposals:**

  - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
  - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

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

  January 17, 2019

  July 10, 2019

  Second Wednesday in July, Annually Thereafter

  January 08, 2020

  Second Wednesday in January, Annually Thereafter

  August 05, 2020

  February 10, 2021

  July 14, 2021

  Second Wednesday in July, Annually Thereafter

  January 12, 2022

  Second Wednesday in January, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

TABLE OF CONTENTS

I. INTRODUCTION

The National Science Foundation (NSF) supports fundamental research and education in all fields of science and engineering to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense; and for other purposes. NSF-funded research supports discoveries in science and engineering that lay the foundation of knowledge for technological innovation.

To further increase the societal impact of fundamental research funded by NSF, the Division of Industrial Innovation and Partnerships (IIP) supports applied research that accelerates the translation of basic research results into marketable innovations - thus allowing research outcomes to benefit society through the commercialization of products, processes and services. In addition to PFI, other programs within IIP and NSF contribute to this mission: Grant Opportunities for Academic Liaison with Industry (GOALI), Non-Academic Research Internships for Graduate Students (INTERN), Industry-University Cooperative Research Centers (IUCRC), Innovation Corps (I-Corps) and the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program.

II. PROGRAM DESCRIPTION

A. GOALS OF THE PFI PROGRAM

PFI has five broad goals, as set forth by the American Innovation and Competitiveness Act of 2017 ("the Act", S.3084 — 114th Congress; Sec. 602. Translational Research Grants): (1) identifying and supporting NSF-sponsored research and technologies that have the potential for accelerated commercialization; (2) supporting prior or current NSF-sponsored investigators, institutions of higher education, and non-profit organizations that partner with an institution of higher education in undertaking proof-of-concept work, including the development of technology prototypes that are derived from NSF-sponsored research and have potential market value; (3) promoting sustainable partnerships between NSF-funded institutions, industry, and other organizations within academia and the private sector with the purpose of accelerating the transfer of technology; (4) developing multi-disciplinary innovation ecosystems which involve and are responsive to the specific needs of academia and industry; (5) providing professional development, mentoring, and advice in entrepreneurship, project management, and technology and business development to innovators.

In addition, PFI responds to the mandate set by Congress in Section 601(c)(3) of the Act (Follow-on Grants), to support prototype or proof-of-concept development work by participants, including I-Corps participants, with innovations that because of the early stage of development are not eligible to participate in a Small Business Innovation Research Program or a Small Business Technology Transfer Program.

Finally, PFI seeks to implement the mandate set by Congress in Section 102(c)(a) of the Act (Broader Impacts Review Criterion Update) by enhancing partnerships between academia and industry in the United States, and expanding the participation of women and individuals from underrepresented groups in innovation, technology translation, and entrepreneurship.

B. AVAILABLE TRACKS FOR SUBMISSION OF PFI PROPOSALS

This solicitation offers two broad tracks for proposals in pursuit of the aforementioned goals:

The **Technology Translation (PFI-TT) track** offers an NSF-funded researcher the opportunity to translate her or his prior NSF-funded research results in any field of science or engineering into technological innovations with promising commercial potential and societal impact. PFI-TT supports commercial potential demonstration projects for academic research outputs in any NSF-funded science and engineering discipline. This demonstration is achieved through proof-of-

concept, prototyping, technology development and/or scale-up work. Concurrently, students and postdoctoral researchers who participate in PFI-TT projects receive education and leadership training in innovation and entrepreneurship. Successful PFI-TT projects generate technology-driven commercialization outcomes that address societal needs.

The **Research Partnerships (PFI-RP) track** seeks to achieve the same goals as the PFI-TT track by supporting instead complex, multi-faceted technology development projects that are typically beyond the scope of a single researcher or institution and require a multi-organizational, interdisciplinary, synergistic collaboration. A PFI-RP project requires the creation of partnerships between academic researchers and third-party organizations such as industry, non-academic research organizations, federal laboratories, public or non-profit technology transfer organizations or other universities. Such partnerships are needed to conduct applied research on a stand-alone, larger project towards commercialization and societal impact. In the absence of such synergistic partnership the project's likelihood for success would be minimal.

The intended outcomes of both PFI-TT and PFI-RP tracks are: a) the development and commercialization of new intellectual property derived from NSF-funded research outputs; b) the creation of new or broader collaborations with industry (including increased corporate sponsored research); c) the licensing of NSF-funded research outputs to third party corporations or to start-up companies founded by a PFI team; and d) the training of future leaders in innovation and entrepreneurship.

C. ELEMENTS OF A PFI PROJECT

All PFI proposals must address the following five elements:

1. Technology Development

The translation of basic research outputs into products, services and new jobs that benefit people's lives is often depicted as a sequence of phases that range from basic research to proof-of-concept, prototype iteration and product development to commercialization. While this sequence of phases may not always occur in a linear fashion and each phase presents a unique set of challenges, the knowledge gained in each phase is necessary to move discoveries out of the lab and into the market. The PFI program is designed to advance knowledge along this continuum for NSF-funded basic research outputs in any field of science or engineering. The proposed applied research project should identify knowledge gap(s) that must be addressed to advance the technology toward commercialization. A successful PFI project will generate measurable outcomes such as a proof-of-concept or an early prototype to meet an identified market need and inform the next phase towards commercialization. At the end of the project, there should be new knowledge (Intellectual Merit) to solve a significant technical challenge and move the technology closer toward commercialization and societal benefit (Broader Impact).

2. Demonstration of Commercialization Potential

A successful PFI proposal will demonstrate an initial understanding of the commercial aspects of translating the innovation toward a market application, such as: market need, target industry sector, product-market fit, value proposition, the target customer, sales and distribution channels, supply-chain, preliminary intellectual property strategy (freedom to operate, patentability, copyright, trade secret, etc. as applicable), regulatory hurdles, etc. It is important to note that a successful proposal must demonstrate both initial research results and an initial understanding of the target market segment. The proposal must present evidence of prior NSF-funded research or customer discovery results and discuss how these prior results inform the proposed technology translation project, and how the applied research plan supports the ultimate commercialization goals. In addition, proposers whose NSF Lineage is not derived from the NSF I-Corps Teams program are strongly encouraged to participate in a customer discovery program to achieve a greater understanding of the market potential. The Industrial Partner's co-PI (in PFI-RP projects) and the technology commercialization expert (in PFI-TT projects) play a critical role in the demonstration of the commercial potential during proposal preparation and award execution.

NSF I-Corps Customer Discovery:

To foster an iterative customer discovery/technology development process, all teams without NSF I-Corps Teams lineage will participate in the NSF I-Corps Teams program (and the budget must allocate $50,000 to this effort). Please refer to Budget instructions in section V.A.G for more details.

Letters of Support:

Evidence of market potential must be substantiated by at least one, but not more than three, Letter(s) of Support from a potential commercialization partner (an entity interested in potentially partnering in the development, scale-up, manufacturing or sale of the future product or service) who is not a funded partner on the proposed project. The Letter(s) of Support must provide a specific discussion of the commercial potential and societal value of the proposed technology in a particular market segment and serves to provide a measure of external market validation of the proposed project. The Letter(s) of Support could also come from potential users (customers) of the proposed process, product or service.

3. Partnerships

Partnerships with third parties are a critical component of the PFI program and are intended to accelerate the proposed technology development towards its commercialization in the anticipated market segment, and the entrepreneurial education goals of the program. Collaborations with industrial partners are **mandatory for PFI-RP** projects and **strongly encouraged for PFI-TT** proposals; collaborations with academic or non-profit research partners, public or non-profit, non-academic organizations directly associated with technology transfer activities are strongly encouraged for both PFI-RP and PFI-TT proposals. Collaborators may include individuals/entities internal and/or external to the proposing organizations and may or may not be included in the budget.

Any substantial collaboration with individuals/entities not included in the budget should be described in the Facilities, Equipment and Other Resources section of the proposal (see PAPPG). In either case, whether or not the collaborator is included in the budget, a letter of collaboration from each named participating entity must be provided at the time of submission of the proposal (see Supplementary Documents). **PFI-RP proposals that lack an Industry Partner may be returned without review.**

4. Education and Leadership Development in Innovation and Entrepreneurship

The PFI program seeks to become a platform for education and leadership development in innovation and entrepreneurship of promising students and postdoctoral researchers who are committed to the commercialization of NSF-funded research in all disciplines of science and engineering. Students and postdoctoral researchers with great developmental potential should be selected to participate in the PFI program. They will receive training to become future leaders in innovation and entrepreneurship. It is expected that by the end of the project they should demonstrate an understanding of innovation, technology translation, commercialization and/or entrepreneurship, and be prepared to play a leadership role in a future NSF SBIR/STTR-funded company (https://seedfund.nsf.gov/); to effectively engage representatives from industry, investors, funding agencies or key opinion leaders; and/or to stand out as an innovator among peers during her/his future tenure track academic career.

Therefore, an educational/leadership development plan for PFI students/postdoctoral researchers must be proposed and contain learning objectives, outcomes

and an assessment plan. It should integrate the mandatory I-Corps training described above where the student/postdoctoral researcher will act as the Entrepreneurial Lead. Partnerships with Industrial Partners must be leveraged to support the innovation and entrepreneurial education goals of students and postdoctoral researchers. Graduate students can leverage industrial partnerships to gain experience in an industrial setting. In addition, after a PFI proposal is awarded, PIs are strongly encouraged to seek supplementary support under the Dear Colleague Letter: Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding. The Industrial Partner's co-PI (in PFI-RP projects) or the technology commercialization expert (in PFI-TT projects) are expected to serve as business mentors to the graduate students involved in the project.

To attract and retain the most promising entrepreneurial students and postdoctoral researchers, the research efforts of masters and PhD students must be fully dedicated to the PFI award, and postdoctoral researchers must dedicate at least one half of their non-teaching time to PFI. Personnel expenses for students and postdoctoral researchers should be allocated accordingly in the budget submitted to NSF.

5. Broadening Participation

PFI proposals should elaborate how the project will contribute to the broadening participation goals set forth by Section 102(c)(a) of the American Innovation and Competitiveness Act of 2017 ("expanding the participation of women and individuals from underrepresented groups in innovation, technology translation, and entrepreneurship").

D. SPECIFIC REQUIREMENTS FOR PFI-RP PROPOSALS

PFI-RP proposals consist of applied research and commercialization projects that specifically depend on highly collaborative partnerships between academic researchers and industrial partners. The proposed project should further scientific and engineering foundational outcomes to enable breakthrough technologies with the potential to address critical industrial and societal needs. Industry involvement assures that the technology development endeavor is industry-relevant. With input from their Industrial Partner(s), Principal Investigators are expected to design their applied research objectives to respond to the unmet market/societal needs. Interdisciplinary projects that enable researchers from different academic and non-academic organizations to interact with one or more industrial partners in industry-university groups or networks are encouraged. Proposals may include the participation of a non-profit organization that has research and technology translation experience. NSF funding can be used for university research/education activities and may support activities of faculty and their students and research associates in the industrial setting.

PFI-RP proposals should include one or more of the following partners:

Industrial Partner:

PFI-RP proposals require a minimum of one (1) Industrial Partner. This partner (i.e., either a for-profit or not- for-profit entity that fulfills the minimum requirement) must be U.S.-based and have an established record of commercial revenues that include sales, services, or licensing. Organizations that meet the definitions of Foreign Public Entity in 2 CFR § 200.46 or Foreign Organization in 2 CFR § 200.47 may not serve as an Industrial Partner. Grants and government contracts may contribute to its revenues but may not constitute the entirety of its revenues. It is essential that the minimally qualifying industrial partner has experience in bringing a product, process, or service to the marketplace in the industry sector of the proposed technology application to ensure that the proposal team incorporates a meaningful commercial and industrial perspective. Non-profit organizations involved in technology transfer may serve as primary industrial partners if they meet the commercial revenues requirement above. A PFI project may propose more than one Industrial Partner.

Note: With regard to industrial partners, subawards can only be allocated to businesses that meet the Small Business Innovation Research (SBIR) program eligibility requirements: (https://www.sbir.gov/faqs/eligibility-requirements) and in which the submitting organization or the participants in the proposed project hold no financial, ownership or controlling interest. Subawards are not intended to complement, circumvent or replace awards to small businesses under the SBIR/STTR program. An ideal Industrial Partner demonstrates a strategic commercial interest in the PFI-funded technology, is not expected to serve as a service provider in the project or, in the case of SBIR/STTR businesses, to receive a substantial subaward. **PFI-RP proposals without an Industry Partner may be returned without review.**

Research Partner:

Once a PFI-RP proposal meets the requirement of a minimum of one (1) Industrial Partner, other partners such as academic institutions, non-profit organizations including foundations, public sector organizations may be included as research partners. Research partners should be carefully chosen to expand the technical expertise of the lead academic team. The purpose of the research partner is to add a complementary skill set to the proposing organization so that technologies (which neither party could independently develop as well or as rapidly) are accelerated towards commercialization by the Industrial Partner. The proposal must clearly describe the role of the research partner(s), the skill set they add to the proposing organization and how this will help accelerate technology development and scale-up. A research partner may receive a subaward from the lead organization. Technology Transfer Organizations (as defined in the Eligibility section) are strongly encouraged to partner with an academic research partner.

Partners in a PFI-RP proposal must agree to the management of any intellectual property (IP) rights underlying or generated by the proposed work. An executed cooperative research agreement (CRA) between the submitting organization and each collaborating partner (or among all partners) must be provided to NSF before the proposal is awarded. An example of a potential CRA is available at https://www.nsf.gov/eng/iip/pfi/air/Sample_CRA_PFI_AIR.docx. The letters of collaboration should state that the CRA will be provided prior to award.

Guidance for NSF-funded centers: PFI proposers are strongly encouraged to leverage the research and education capabilities of NSF-funded centers or large, multi-year, multi-faculty alliances. However, the PFI is not intended to extend work that is currently funded, for instance, by NSF or Industry-University Collaborative Research Centers. Instead, centers and alliances can avoid any overlap or duplication of effort by using PFI to generate early proof-of-concept that will attract future corporate sponsorship, to spin-off technologies graduated from NSF centers, or to enable postdoctoral researchers, and students to conduct research and gain experience in an industrial setting.

E. OBJECTIVES NOT RESPONSIVE TO THIS SOLICITATION

Proposals that pursue the following activities are not responsive to this solicitation and may be returned without review: basic research projects that do not involve technology translation and development activity; clinical trials, clinical efficacy or safety studies, development or validation of pre-clinical or clinical-stage drug candidates, medical devices or information technologies, or activities performed for regulatory purposes; commercial activities such as marketing, sales, corporate or business development, fundraising, intellectual property or regulatory work; straightforward engineering work; incremental development of existing products; or evolutionary modifications to broaden the scope of existing products or applications.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: The budget for PFI-TT proposals is up to $250,000 for 18-24 months per award; approximately 40-50 awards are anticipated. The budget for PFI-RP proposals is up to $550,000 for 36 months. Approximately 10-15 awards are anticipated.

Anticipated Funding Amount: $20,000,000

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

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Academic / Research U.S. institutions; includes universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the United States, acting on behalf of their faculty members;
- Public or Non-profit, Non-academic U.S. organizations located in the United States that are directly associated with technology transfer activities ("Technology Transfer Organizations");
- Non-profit U.S. organizations located in the United States that partner with an institution of higher education; or
- A U.S. consortium of 2 or more of the organizations described above.

Technology Transfer Organizations interested in submitting proposals to PFI are strongly encouraged to partner with an Academic / Research U.S. institution to strengthen the technical component of their projects.

Who May Serve as PI:

The PI must have the technical skills required to lead and execute the proposed research project.

In addition to the PI, PFI-TT proposals must include a Senior Personnel or co-PI who brings technology commercialization experience in the targeted fields of application or industry sector. The technology commercialization expert must have an active role in the project.

PFI-RP proposals must include, without exception, a co-PI who is a member or employee of the required Industrial Partner organization. PFI-RP proposals without an Industrial Partner co-PI may be returned without review.

The technology commercialization expert cannot use NSF-funded time and effort to perform any "Objectives Not Responsive to this Solicitation" listed in Section II.E of this solicitation. However, the expert may participate in any mandatory I-Corps training that will be provided during the term of the PFI award. Additional collaborators or organizations that bring needed multidisciplinary expertise or commercialization experience may be involved as co-PI, Senior Personnel, Other Professional, subawardee, consultant, etc.

NSF Lineage Requirement: All proposals submitted to the PFI program must meet a lineage requirement under one of the following two paths: (1) NSF-supported research results, or (2) NSF-supported customer discovery results through the NSF I-Corps Teams Program. Please refer to "Additional Eligibility Information" under Section IV of this solicitation for details.

Limit on Number of Proposals per Organization:

There is no limit on the number of PFI-TT proposals an organization may submit to a deadline of this solicitation. However, an organization may not submit more than one (1) new or resubmitted PFI-RP proposal to a deadline of this solicitation. This eligibility constraint will be strictly enforced. If an organization exceeds this limit, the first PFI-RP proposal received will be accepted, and the remainder will be returned without review. An organization may not receive more than two (2) awards from a submission deadline of this solicitation.

Limit on Number of Proposals per PI or co-PI: 2

A PI or co-PI may submit up to two (2) proposals to each solicitation deadline. These could be two (2) proposals to PFI-TT or one (1) proposal each to PFI-TT and PFI-RP, subject to the organizational limits described above. A PI or co-PI will not receive more than one (1) award per solicitation deadline. PIs with currently active PFI awards are requested to complete their then-current project before submitting a new PFI proposal. Any duplicate, substantially similar or equivalent proposal submitted concurrently for review to the solicitation will be returned without review.

A PI or co-PI may resubmit a proposal that was previously declined under a previous PFI solicitation or under a previous submission deadline in this solicitation; however, the new proposal must be significantly improved and be responsive to the major comments or concerns resulting from the prior NSF review. A resubmission must include a supplemental document that includes the previous proposal number, a summary of the NSF reviewers' comments and the PI's response to those comments (see Section V.A.J. below). The revised proposal will be subject to a new NSF merit review.

Additional Eligibility Info:

NSF Lineage Requirement: All proposals submitted to the PFI program must meet a lineage requirement under one of the following two paths: (1) NSF-supported research results, or (2) NSF-supported customer discovery results through the NSF I-Corps Teams Program.

1. NSF-supported research results in all fields of science and engineering: Principal Investigator (PI) or a co-PI must have had an NSF award that ended no more than seven (7) years prior to the full proposal deadline date or be a current NSF award recipient. The proposed

technology development project must be derived from the research results and/or discoveries from this underlying NSF award.

OR

2. NSF-supported customer discovery results through the NSF I-Corps Teams Program. The Principal Investigator (PI) or a co-PI must have been a member of an award under the NSF I-Corps Teams Program (https://www.nsf.gov/news/special_reports/i-corps/teams.jsp). The PI or co-PI must have fully completed the training provided under the I-Corps Team award within the past four (4) years. The customer discovery activities performed under the NSF-funded I-Corps award must be based on the technology that is proposed to be translated within the PFI proposal.

The following programs do not meet the NSF Lineage Requirement: the I-Corps Nodes award, training at an NSF I-Corps Site, any I-Corps-related training imparted by federal agencies or organizations other than NSF, Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), the Graduate Research Fellowship Program (GRFP), SBIR/STTR, and any prior PFI award.

The NSF-Lineage Requirement does not apply to the resubmission of proposals that were previously submitted and declined under the PFI-RP track of the previous PFI solicitation NSF 18-511.

NSF 10 Big Ideas.

In 2016, NSF unveiled a set of "Big Ideas" -- 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (https://www.nsf.gov/news/special_reports/big_ideas/). The Big Ideas represent unique opportunities to position our Nation at the cutting edge -- indeed to define that cutting edge -- of global science and engineering leadership, and this will require collaborations among academe, industry, and public and private institutions. The PFI program strongly encourages projects with NSF Lineage aligned with one or more of the 10 Big Ideas.

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.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

The following instructions deviate from or supplement the requirements contained within the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) or NSF *Grants.gov Application Guide*. Where the solicitation specifications differ from the PAPPG, the guidance in the solicitation take precedence.

PFI proposals must address how the project will accomplish the goals described under the 5 Elements of a PFI Project described in Section II.C of this solicitation (Program Description):

1. **Technology Development**
2. **Demonstration of Commercialization Potential**
3. **Partnerships**
4. **Education and Leadership Development in Innovation and Entrepreneurship**
5. **Broadening Participation**

The proposal consists of the following parts:

A. Cover Sheet

B. Project Summary (one-page limit)

The Project Summary should be written in the third person and consists of an overview, a statement on the intellectual merit of the proposed activity, a statement on the broader impacts of the proposed activity and shall begin as follows: "This PFI-TT project ..." or "This PFI-RP project…". Do not include proprietary information in the summary.

The summary MUST clearly address the following items:

Overview: A summary paragraph that briefly discusses the societal need for the proposed technology, the areas of application, the key technological hurdles that need to be overcome, and the potential outcomes of the proposed activity. There should be information presented to help identify the areas of technical expertise in science and engineering that are to be considered in reviewing the proposal and the areas of application that are the initial target markets of the technologies to be developed. **Provide here the NSF award number and title that satisfies the lineage requirement. This can be an NSF research award, or an NSF I-Corps Team award as described in the lineage requirements.**

Intellectual Merit: A summary paragraph addressing the intellectual merits of the proposed activity; e.g., areas where the project will advance knowledge, goals of the proposed applied research, technical hurdles that will be addressed by the proposed research (which should be crucial for the success of the project).

Broader Impacts: A summary paragraph describes the expected broader societal, commercial and educational outcomes of the proposed project.

C. Table of Contents: The table of contents is automatically generated.

D. Project Description (cannot exceed 15 pages)

The project description must include the following sections in the order specified. The bullet points in each section are suggestions for the information to be discussed and are provided as a guide. Adjustments in exact content and length of each section (with the exception of the Executive Summary) are allowable as necessary for the PI to clearly present her/his ideas. **Please note that the instructions for this section of the proposal deviate from, and take precedence over, the guidance in the PAPPG.**

1. Executive Summary (no more than one page)

The executive summary should provide a brief overview of the entire project.

- The Societal Need and the Customer. Describe the societal need to be addressed through commercialization. Describe the expected customer for the innovation. What customer needs and market pain points are you addressing?
- The Value Proposition. Define the value proposition in 50 words or less: What is the potential societal value of your innovation? What are the benefits to the customer of your proposed innovation? What is the key differentiator of your organization or technology?
- The Innovation: Succinctly describe your innovation. This section can contain proprietary information that could not be discussed in the Project Summary. What aspects are original, unusual, novel, disruptive or transformative compared to the current state of the art?
- The Partnership (mandatory in PFI-RP proposals; not mandatory but highly recommended in PFI-TT proposals). Describe the nature and merits of the collaboration with your industrial and research partners.
- Training and Leadership Development in Innovation and Entrepreneurship. Briefly describe the educational plan designed for the graduate student(s) and/or postdoctoral researcher(s) who will participate in the PFI project.

2. From NSF Basic Research to Addressing a Market Opportunity (suggested length: 4 -5 pages)

- NSF Lineage: Describe the relevant data/results from the prior fundamental research results or customer discovery and how they derived from prior NSF research funding. Summarize the intellectual merit and broader impact of the prior NSF-funded research results. These results should provide the reviewers with evidence that the technology is ready to move beyond the fundamental research/discovery phase and that the translational research proposed has potential to be developed into technology and commercialized.
- Document the **NSF Lineage by including the NSF number(s) and title(s) of your NSF awards that meet the NSF Lineage Requirement** described in the solicitation.
- Describe the Intellectual Merit of the proposed product, process or service. Describe its broader impacts in terms of societal, economic and commercial benefit.
- What is the target market segment addressed by the proposed innovation? How is it informed by any preliminary market research or customer discovery? How will the innovation address the unmet market need?
- What are the existing competitive technologies, and what are their shortcomings? What are the key differentiators of the proposed technology vs. the current state of the art and other competing technologies? What proposed features will make it competitive? How is this beneficial to a potential customer / end user? What proposed features might keep potential competitors from circumventing the technology?
- Intellectual Property (IP). Discuss the IP landscape. Include elements such as results of a preliminary patent search, IP status (e.g. invention disclosure, preliminary patent application, patent granted, etc.), and the feasibility of obtaining needed licenses and/or sufficient protection for the IP developed. Discuss to the extent possible freedom to operate and blocking IP issues.

3. Technical Challenges and Applied Research Plan (suggested length: 5-7 pages)

- Describe the knowledge gaps and technical barriers that must be overcome to translate your technology into a product, process or service. What are the most challenging hurdles and why? Describe the envisioned next steps for successful development of the technology toward commercialization and societal use.
- Describe the applied research plan to address the knowledge gaps and technical barriers. What are the specific R&D objectives and tasks/activities that will need to be undertaken to close the knowledge and technical barriers gaps so that the proof-of-concept, prototype or technology scale-up can be demonstrated?
- Who will be assigned to the identified research tasks?
- Define the success metrics needed to assess the progress of the proposed project. Include a discussion of the choice and appropriateness of the stated success metrics.
- Provide a risk assessment and mitigation plan to address the failure of any of your R&D objectives, tasks or success metrics.
- Provide a milestone chart that identifies the critical milestones to be reached along a technology/product development timeline.

4. Achieving Societal Impact through the Realization of Commercial Potential (2-4 pages)

- Describe the overall future commercialization strategy and plans envisioned going beyond the duration of the proposed project. These will guide the sustainability of the commercialization efforts during, and especially after, the implementation of the research activities. The strategic plan should be aimed at identifying and securing strategic commercialization partners, investors, licensees, the creation and funding of spin-out companies, etc.
- Propose an assessment plan that will help gauge the success of the research partnership(s) and third-party collaboration(s) in more rapidly translating academic research and technologies into commercial use.

5. Project Team (suggested length: 1-2 pages)

- Describe the team members and the qualifications they bring to the project. Are there partners and/or collaborators outside of the proposing organization? If so, describe their role and the value they add to the project in the Partnerships section.
- Describe the qualifications and motivation of the masters, PhD student(s) or postdoctoral researchers selected for the project. If a student or postdoctoral researcher has not been identified, describe the selection process you will use to recruit her/him.
- Describe the role of the technology commercialization expert (in PFI-TT proposals) or the co-PI who is a member or employee of the Industrial Partner (for PFI-RP proposals). How will she/he help the team achieve the goals of the project?

6. Partnerships (suggested length: 1-2 pages)

This section is mandatory for PFI-RP proposals and may be applicable to PFI-TT proposals.

- Describe the partnership that is being assembled to pursue the applied research project. Discuss the capabilities of each of the partners and their roles in the project.
- How will the proposed partnership achieve the goals of the PFI project to a) catalyze and accelerate technology development toward commercialization; and b) contribute to the educational goals of the program?
- Provide an assessment plan that will help gauge the success of the research partnership(s) and third-party collaboration(s). Discuss your choice of the stated success metrics.
- If applicable, discuss the rationale for selecting a SBIR/STTR company as an Industrial Partner.

7. Training Future Leaders in Innovation and Entrepreneurship (suggested length: 1-2 pages)

- Describe the learning objectives and expected learning outcomes of the educational and leadership development plan for the graduate students and/or postdoctoral researcher participating in the project.
- Discuss intellectual merit and broader impacts of the educational plan. How will the proposed project activities enhance the knowledge and readiness of the student/postdoctoral researcher for innovation and technology commercialization beyond the usual research experience?
- Provide an assessment plan to evaluate the outcomes and impact of your training program.

8. Broadening Participation (suggested length: up to 1 page)

- Describe your plans to broaden participation of women, minorities, and persons with disabilities in the proposed activities.

9. Broader Impacts

- Pursuant to PAPPG Chapter II.C.2.d, the Project Description also must contain, as a separate section within the narrative, a section labeled "Broader Impacts". In PFI proposals, the Broader Impacts section should include only the following statement: "The Broader Impacts of this proposed PFI project are detailed in prior sections of the Project Description."

Marking Proprietary Information

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." Typically, proprietary information is marked in the text either with an asterisk at the beginning and end of the proprietary paragraph, underlining the proprietary sections, or choosing a different font type. An entire proposal should not be marked proprietary. The box for "Proprietary or Privileged Information" must be checked on the Cover Sheet when the proposal contains such information.

E. References Cited

Provide a list of relevant reference sources, including patent citations and publications of relevant NSF-funded research results. If there are no references cited in the proposal, include a statement to that effect in this module.

F. Biographical Sketches

See PAPPG Chapter II.C.2.f for guidelines and details.

G. Budgets and Subaward Budgets

Enter a Proposal Budget for each year of the proposed project. The system will automatically generate a cumulative budget for the entire project. A budget justification is required for each non-zero item in the budget; it should explicitly state why the funds are needed as well as how and where the requested funds will be spent.

- Subawards are allowed. The purpose of the proposed subaward(s) is to increase the technical capabilities of the submitting organization. In regard to subawards to industrial partners, subawards can only be allocated to businesses that meet the Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR) program eligibility requirements: (https://www.sbir.gov/faqs/eligibility-requirements) and in which the submitting organization or the participants in the proposed project hold no financial, ownership or controlling interest. Subawards are not intended to complement, circumvent or replace awards to small businesses under the SBIR/STTR program. Subawards are not intended for SBIR/STTR -funded companies or organizations that have already executed a license, or an option to license, the subject PFI technology from the awardee organization. An ideal Industrial Partner demonstrates a strategic commercial interest in the PFI-funded technology, is not expected to serve as a service provider in the project or, in the case of SBIR/STTR businesses, to receive a substantial subaward.
- If there is a subaward to an organization with which a PI or co-PI has a Conflict of Interest, the PI's Organization must submit the Conflict of Interest plan for that individual covering the proposed work before NSF funding will be released. Please refer to Chapter IX.A of the NSF PAPPG for Conflict of Interest Policies. (The Conflict of Interest plan is not required at the proposal stage, only as a condition for award.)
- Grantee Meeting: NSF may organize a PI grantee meeting, a reverse site visit, or a convening between PFI teams, investors and industry representatives. Proposers should budget travel for the PI and one student or postdoctoral researcher to attend (approximately $2,500 per person). Additional travel costs can be budgeted for a collaborators/partners on the project to travel for this same purpose.
- Participation in NSF I- Corps Teams training. The budget should include $50,000 for mandatory I-Corps Teams training if the NSF Lineage does not include an NSF I-Corps Teams award. I-Corps budget must cover travel for customer discovery, and Kick-Off and Lessons Learned meetings (for additional information, please visit https://www.nsf.gov/news/special_reports/i-corps/teams.jsp) and review the PFI Frequently Asked Questions (https://www.nsf.gov/PFI).

- Master and PhD students must fully dedicate their research efforts to the PFI award, and postdoctoral researchers must dedicate at least one half of their research efforts to PFI. Personnel expenses for students and postdoctoral researchers should be allocated accordingly.
- The following costs are non-allowable: clinical trials, clinical efficacy or safety studies, development or validation of pre-clinical or clinical-stage drug candidates, medical devices or information technologies, or activities performed for regulatory purposes; commercial activities such as marketing, sales, corporate or business development, fundraising, intellectual property or regulatory work.

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

H. Current and Pending Support

See PAPPG Chapter II.C.2.h for guidelines and details.

I. Facilities, Equipment, and Other Resources

Describe the availability of facilities, equipment, and other resources required for the proposed project. Describe the measures that will be taken to ensure compliance with applicable Environmental Health and Safety laws in the execution of the proposed work if awarded. This section of the proposal is used to assess the adequacy of the resources available to perform the effort proposed to satisfy the Intellectual Merit and Broader Impacts review criteria. Proposers should describe only those resources that are directly applicable. Proposers should include an aggregated description of the internal and external resources (both physical and personnel) that the organization and its collaborators will provide to the project, should it be funded. Such information must be provided in this section, in lieu of other parts of the proposal (e.g., Budget Justification, Project Description). The description should be narrative in nature and must not include any quantifiable financial information. Reviewers will evaluate the information during the merit review process and the cognizant NSF Program Officer will review it for programmatic and technical sufficiency. Although these resources are not considered voluntary committed cost sharing as defined in 2 CFR § 200.306, the Foundation does expect that the resources identified in the Facilities, Equipment and Other Resources section will be provided, or made available, should the proposal be funded.

J. Supplementary Documents

Proposals missing any of these supplementary documents may be returned without review.

J1: Letters of Support (No more than three letters): Letters of support act as an indication of preliminary third-party market validation for the proposed innovation and add significant credibility to the proposed effort. The letter should state the problem the technology will address and the need for/impact of that solution. The letter should be from third parties not funded in this proposal, such as potential customers or a potential manufacturing/development partner, who would be interested in a future partnership if the PFI project is successful. The letter(s) must contain affiliation and contact information for the signatory stakeholder. Letters and supporting documents from consultants and subcontractors (or any personnel identified in the Budget Justification) are NOT considered letters of support.

J2: Letters of Collaboration & Commitment for Cooperative Research Agreement: Collaborators are individuals or entities that work with the PI and her/his team to provide additional value to the project and may be paid or unpaid. Whether or not the collaborator is included in the budget, a letter of collaboration from each named participating entity must be provided at the time of submission of the proposal. Such letters must appear on the entity's letterhead and be signed by the appropriate representative of the entity/organization. The letter(s) must describe the nature of the collaboration and how the collaboration brings additional value to the project. It is the responsibility of the submitting organization to discuss the appropriate intellectual property policies, including patent disclosures and filings, with research partners. NSF is not responsible for the type of agreement reached between grantees and industrial/research partners. If applicable, include a statement that an executed cooperative research agreement (CRA; see example https://www.nsf.gov/eng/iip/pfi/air/Sample_CRA_PFI_AIR.docx) will be provided as a condition for recommendation of the proposal for award.

J3: Data Management Plan: A Data Management Plan is required for all proposals submitted to NSF. Consult the data management requirements in the PAPPG: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

J4: Postdoctoral Research Mentoring Plan (if applicable):If a proposal requests funding to support postdoctoral researchers, a Postdoctoral Mentoring Plan MUST be uploaded to the system. Describe only the mentoring activities that will be provided to all postdoctoral researchers supported by the project. Information on what to include in the postdoctoral research mentoring plan is available in the PAPPG: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

J5: Resubmission Change Description (if applicable;1-2-page maximum):A declined proposal may be resubmitted, but only after it has undergone substantial revision. A resubmitted proposal that has not clearly considered the major comments or concerns resulting from the prior NSF review may be returned without review. A resubmission must include a 1-2 page supplemental document that includes the previous proposal number, a summary of the NSF reviewers' comments and the PI's response to those comments. The revised proposal will be subject to a new NSF merit review.

J6. Human Subjects Documentation (if applicable):Projects involving research with human subjects must ensure that subjects are protected from research risks in conformance with the relevant Federal policy known as the Common Rule (Federal Policy for the Protection of Human Subjects, 45 CFR 690). All projects involving human subjects must either (1) have approval from an Institutional Review Board (IRB) before issuance of an NSF award; or, (2) must affirm that the IRB has declared the research exempt from IRB review, in accordance with the applicable subsection, as established in section 101(b) of the Common Rule. If certification of exemption is provided after submission of the proposal and before the award is issued, the exemption number corresponding to one or more of the exemption categories also must be included in the documentation provided to NSF. Please refer to the PAPPG for additional guidance (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg).

J7. Vertebrate Animals Documentation (if applicable):Any project proposing use of vertebrate animals for research or education shall comply with the Animal Welfare Act (7 USC 2131, et seq.) and the regulations promulgated thereunder by the Secretary of Agriculture (9 CFR 1.1-4.11) pertaining to the humane care, handling, and treatment of vertebrate animals held or used for research, teaching or other activities supported by Federal awards. In accordance with these requirements, proposed projects involving use of any vertebrate animal for research or education must be approved by the submitting organization's Institutional Animal Care and Use Committee (IACUC) before an award can be made. For this approval to be accepted by NSF, the organization must have a current Public Health Service (PHS) Approved Assurance. See the relevant PAPPG section (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg) for more information.

K. Single Copy Documents

Proposers are encouraged to supply an annotated list of suggested reviewers complete with contact information. Collaborators & Other Affiliations (COA) information specified in the PAPPG should be submitted using the instructions and spreadsheet template found at https://www.nsf.gov/bfa/dias/policy/coa.jsp.

Comparative Requirements of PFI-TT and PFI-RP Proposals

Proposal Item	PFI-TT	PFI-RP
Funding:	Up to $250,000 per award	Up to $550,000 per award
Award term	18-24 months	36 months
Who May Submit Proposals	All eligible organizations	All eligible organizations
Limit on Number of Proposals per Organization	None	One proposal per submission deadline
Limit on Number of Proposals per PI or Co-PI	2 PFI-TT, or 1 PFI-TT and 1 PFI-RP	1 PFI-RP, or 1 PFI-TT and 1 PFI-RP
NSF Lineage Requirement	Yes	Yes
Industrial Partner	Encouraged but not required	Required
Research Partner	Encouraged but not required	Strongly encouraged
Collaborative Research Agreement (CRA)	Submitting organization's AOR must determine whether a CRA is needed.	Required for Industrial Partner and Research Partners

B. Budgetary Information

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.

C. Due Dates

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

   January 17, 2019

   July 10, 2019

   Second Wednesday in July, Annually Thereafter

   January 08, 2020

   Second Wednesday in January, Annually Thereafter

   August 05, 2020

   February 10, 2021

   July 14, 2021

   Second Wednesday in July, Annually Thereafter

   January 12, 2022

   Second Wednesday in January, Annually Thereafter

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov 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.

For Proposals Submitted Via Grants.gov:

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

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application

to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

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

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

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

2. Merit Review Criteria

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

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

PAPPG Chapter II.C.2.d(i), prior to the review of a proposal.

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

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

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

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

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups 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.
- Distribution of technology or industry sectors served.

Additional Review Criteria:

- NSF Lineage Requirement: The merits of the prior research and/or customer discovery results. To what extent do they support the assertion that the technology is ready to move beyond the basic research phase, and that the translational research proposed has the potential to be successful?

- The strength of the discussion of the market/societal need and how the innovation has the potential to offer a competitive solution or competitive advantage. (Note: strong Letter(s) of Support can help substantiate this). The quality of the discussion about the Intellectual Property landscape.

- The demonstrated understanding of the technology barriers or knowledge gaps.

- The merits of the proposed translational research to overcome the identified technological hurdles and knowledge gaps.

- The quality of the strategy for a path toward commercialization.

- The team's capabilities to successfully complete the project, including the qualifications of the students/postdoctoral researchers and the technology commercialization expert.

- The intellectual merit and broader impacts of the education and leadership development plan for graduate students and/or postdoctoral researchers (evaluate the merits of the stated learning objectives and outcomes).

- The effectiveness of the assessment plan and the relevance of the proposer's metrics to the anticipated results.

- The reasonableness of the budget and budget justification that indicate how and where the requested funds will be spent. Note, if there is an insignificant research component (i.e., most of the work is to generate a business plan or to understand market need), the proposal may be returned without review.

- The merits of the broadening participation plan to foster the inclusion of women, minorities, and persons with disabilities in the proposed technology translation and in future commercialization endeavors.

Additional Review Criteria for Evaluating Partnerships:

- The merits and appropriateness of the proposed partnership, and its role in catalyzing the technical, commercialization and educational objectives of the project.
- The commitment of the proposed partners in reaching the stated goals of the proposal.
- The commitment of the Industrial Partner to the commercialization of the technology beyond the term of the PFI award.

B. Review and Selection Process

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

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's Build America, Buy America webpage.

Special Award Conditions:

1. During the course of the award, NSF may organize a PI grantee meeting, reverse site visits, or a convening between PFI teams, investors and industry representatives. Proposers should budget travel for the PI and one student or postdoctoral researcher to attend (approximately $2,500 per person).
2. Based on project progress, grantees in the PFI-RP track may be requested to present a project status update via a webinar format to the NSF program officer and other NSF staff between 12 and 18 months after the start of the award. Details would be provided after award.
3. To attract and retain the most promising entrepreneurial students and postdoctoral researchers, the research efforts of master and PhD students must be fully dedicated to the PFI award, and postdoctoral researchers must dedicate at least one half of their research efforts to PFI.
4. To foster an iterative customer discovery/technology development process, all teams without NSF I-Corps Teams lineage will participate in the I-Corps Teams program (and the budget must allocate $50,000 to this effort).
5. Executed Collaborative Research Agreement(s) with an Industrial Partner and subawardee Research Partners must be provided to NSF as a condition for award.
6. In order for NSF to comply with Federal environmental statutes, the proposer may be requested to submit supplemental post-proposal submission information to NSF in order that a reasonable and accurate assessment of environmental impacts by NSF may be made. In addition, if an award is

made, Principal Investigators must comply with all applicable statutory and regulatory requirements, including those related to Environment, Safety, and Health.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

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

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

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Additional Reporting Requirements for PFI: The annual and final reports must describe the concrete efforts made, and results obtained towards realizing the commercialization potential of the funded technology. The final report must describe progress in the following areas:

- Patent applications
- Patents granted and derived or both
- Licensing agreements
- Company formation
- Royalties realized
- SBIR/STTR proposal submission (with agency name and date submitted)
- For PFI-RP awards, outcomes of collaboration with Industrial Partners
- Third party financing
- Learning outcomes of entrepreneurial education training of students and postdoctoral researchers
- Enhancing career trajectories of team members
- Work conducted under the I-Corps Teams program, the progress and learning made by the team in the reporting period, the outcomes of the work, and the project's vision. It should articulate the customer segments explored, what pivots were made and how the team sees their value proposition and the rest of the business model.

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:

- Jesus V. Soriano, telephone: (703) 292-7795, email: jsoriano@nsf.gov

- Samir M. Iqbal, telephone: (703) 292-7529, email: smiqbal@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov.
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

> The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.
>
> To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at https://www.nsf.gov
>
> - **Location:**   2415 Eisenhower Avenue, Alexandria, VA 22314
>
> - **For General Information**   (703) 292-5111
>   (NSF Information Center)**:**
>
> - **TDD (for the hearing-impaired):**   (703) 292-5090
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> - **To Order Publications or Forms:**
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>   Send an e-mail to: nsfpubs@nsf.gov
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>   or telephone: (703) 292-8134
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> - **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 System of Record Notices, NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." 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
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Arlington, VA 22230

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