IUSE / Professional Formation of Engineers: Revolutionizing Engineering Departments (IUSE/PFE: RED)

PROGRAM SOLICITATION
NSF 19-614

REPLACES DOCUMENT(S):
NSF 19-513

National Science Foundation

Directorate for Engineering
Engineering Education and Centers
Division of Electrical, Communications and Cyber Systems
Division of Chemical, Bioengineering, Environmental and Transport Systems
Division of Civil, Mechanical and Manufacturing Innovation
Industrial Innovation and Partnerships

Directorate for Education and Human Resources
Division of Undergraduate Education

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

February 07, 2020

IMPORTANT INFORMATION AND REVISION NOTES

The FY 2020 deadline of February 07, 2020 has been added. In addition, the RED A&I track introduced in FY 2019 continues to be available in this FY 2020 opportunity.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1), which is effective for proposals submitted, or due, on or after February 25, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

IUSE/Professional Formation of Engineers: Revolutionizing Engineering Departments (IUSE/PFE: RED)

Synopsis of Program:

Revolutionizing Engineering Departments (hereinafter referred to as RED) is designed to build upon previous efforts in engineering education research. Specifically, previous and ongoing evaluations of the NSF Engineering Education and Centers Division program and its predecessors, as well as those related programs in the Directorate of Education and Human Resources, have shown that prior investments have significantly improved the first year of engineering students' experiences, incorporating engineering material, active learning approaches, design instruction, and a broad introduction to professional skills and a sense of professional practice – giving students an idea of what it means to become an engineer. Similarly, the senior year has seen notable change through capstone design experiences, which ask students to synthesize the technical knowledge, skills, and abilities they have gained with professional capacities, using reflective judgment to make decisions and communicate these effectively. However, this ideal of the senior year has not yet been fully realized, because many of the competencies required in capstone design, or required of professional engineers, are only partially introduced in the first year and not carried forward with significant emphasis through the sophomore and junior years.

The Directorates for Engineering (ENG), Education and Human Resources (EHR), and Computer and Information Science and Engineering (CISE) have funded projects as part of the RED program, in alignment with the Improving Undergraduate STEM Education (IUSE) framework and Professional Formation of Engineers (PFE) initiative. These projects are designing revolutionary new approaches to engineering and computer science education, ranging from changing the canon of engineering to fundamentally altering the way courses are structured to creating new departmental structures and educational collaborations with industry. A common thread across these projects is a focus on organizational and cultural change within the departments, involving students, faculty, staff, and industry in rethinking what it means to provide an engineering program.

In order to continue to catalyze revolutionary approaches, while expanding the reach of those that have proved efficacious in particular contexts, the RED program supports two tracks: RED Innovation and RED Adaptation and Implementation (RED-A&I). RED Innovation projects will develop new, revolutionary approaches and change strategies that enable the transformation of undergraduate engineering education. RED Adaptation and Implementation projects will adapt and implement evidence-based organizational change strategies and actions to the local context, which helps propagate this transformation of undergraduate engineering education. Projects in both tracks will include consideration of the cultural, organizational, structural, and pedagogical changes needed to transform the department to one in which students are engaged, develop their technical and professional skills, and establish identities as professional engineers. The focus of projects in both tracks should be on the department's disciplinary courses and program.

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.

- Jumoke Ladeji-Osias, telephone: (703) 292-7708, email: jladejio@nsf.gov
- Heather Watson, telephone: (703) 292-7091, email: hwatson@nsf.gov

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

- 47.041 --- Engineering
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 4 to 6

2-3 RED Innovation awards and 2-3 RED-A&I awards depending on funding availability and quality of proposals received.

Anticipated Funding Amount: $4,000,000 to $8,000,000

Estimated program budget and number of awards are subject to the availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

Who May Serve as PI:

For both tracks, the Principal Investigator must be a department chair/head (or equivalent) to provide leadership for the change process. Additionally, there must be a RED team that includes (at a minimum) an expert in engineering education research who can provide guidance on evidence-based practices, and an organizational change expert who can advise on strategies for developing a culture of change and on strategies for creating meaningful collective ownership of the effort among faculty, students, and staff. The engineering education and organizational change experts may be at different institutions from the proposing institution. Funding for these experts at other institutions may be supported as consultants, through a sub-award, or through a separately submitted collaborative proposal.

Limit on Number of Proposals per Organization: 2

An eligible institution may submit a maximum of two proposals (i.e. 2 Innovation Track, 2 A&I Track, or 1 Innovation and 1 A&I).

Limit on Number of Proposals per PI or Co-PI: 1

An individual may be the PI or Co-PI for only one proposal.

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 FastLane: *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 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):

  February 07, 2020

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:

Standard NSF award conditions apply.

Reporting Requirements:

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

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I. INTRODUCTION

The goal of the RED program is to catalyze revolutionary, not incrementally reformist, changes to the education of the next generation of engineers. Revolutionary means radically, suddenly, or completely new; producing fundamental, structural change; or going outside of or beyond existing norms and principles. The complex problems facing society in the 21st Century demand changes to the way engineers are educated. For example, solving the National Academy of Engineering (NAE) Grand Challenges will require engineers who not only have deep technical knowledge, but also an understanding of the societal and global contexts in which those problems occur [1]. Obstacles to change that have been cited include underlying departmental and curricular structures, faculty reward systems, and faculty development. Among the common challenges facing engineering departments are how to weave both technical and professional skills throughout the curriculum, including skills defined by the ABET outcomes; how to promote and incentivize faculty engagement in the change process; and how to create cultures of inclusion that are welcoming to students and faculty of all types. Revolutionary change is needed in the structure of departments and the way students are educated to meet these challenges.

The RED program is intended to address the holistic formation of engineers. Engineering has many unique aspects that differ from other STEM disciplines. Engineering undergraduate programs prepare students for professional practice; in engineering, the BS degree provides eligibility to qualify for the Professional Engineer license [2]. Furthermore, in the high-tech environment upon which the global economy is based, the perennial debate about workforce shortages of engineers requires a more precise understanding of dynamic industry needs and of the abilities of departments to address them. Therefore, NSF is taking a holistic look at how engineers are being prepared for lifelong careers in technical and socio-technical professions. The RED program seeks to respond to the call from different stakeholders (e.g., industry, the public, government, and the profession itself) for professional formation of engineers with a broad set of professional abilities. It seeks to address the fact that the percentages of persons from underrepresented groups entering into - and remaining in - the practice of engineering are still unacceptably low, impacting the future health of the national workforce.

Professional Formation of Engineers (PFE) refers to the formal and informal processes and value systems through which people become engineers. This includes the ethical responsibility of practicing engineers to sustain and grow the profession in order to improve quality of life for all people. Professional formation includes, but is not limited, to:

- Introductions to the profession at any age;
- Acquisition of deep technical and professional skills, knowledge, and abilities in both formal and informal settings/domains;
- Development of outlooks, perspectives, ways of thinking, knowing, and doing;
- Development of identity as a responsibly technical professional; and
- Acculturation to the profession, its standards, and norms.

[1] See NAE Grand Challenges for Engineering, http://www.engineeringchallenges.org/.

[2] See the National Council of Examiners for Engineering and Surveying, Professional Engineers exam, http://ncees.org/engineering/pe/.

II. PROGRAM DESCRIPTION

Overview

While previous efforts have made pedagogical changes to the way engineers are educated, RED projects must consider the cultural, organizational, structural, and pedagogical changes needed to transform the department to one in which students are engaged, develop their technical and professional skills, and establish identities as professional engineers. In recent years there has been a growing recognition of the need to create and support an innovative and inclusive engineering profession for the 21st Century. Doing so requires understanding of how engineers are formed and how to inculcate them with the technical and professional skills needed to solve the complex problems facing society. While some innovation has been adopted in the freshman and senior years, the middle two years remain largely untouched [3]. Educating the next generation requires that coherent technical and professional threads be developed and woven across all four years. The RED program is focusing on the middle two years because of the lack of attention this period has received in the past. Further, the RED program focuses on structural and cultural change because past attempts have shown that curricular and pedagogical change does not take hold if underlying structures remain the same. RED projects should create a seamless educational experience for students in their disciplinary degree programs, bridging the foundational science and engineering courses and capstone projects. The result will be students who are prepared to be professionals in their chosen paths after graduation. Specific activities supported by the RED solicitation may include, but are not limited to:

- Establishing convergent technical and professional threads that must be woven across the four years, especially in core technical courses of the middle two years, in internship opportunities in the private and public sectors, and in research opportunities with faculty;
- Exploring strategies for institutional, systemic, and cultural change, including new approaches to faculty governance or department structures and to restructuring faculty incentive or reward systems;
- Exploring collaborative arrangements with industry and other stakeholders who are mutually interested in developing the best possible professional formation environment and opportunities for students;
- Exploring strategies to bridge the engineering education research-to-practice gap, primarily through faculty development and adoption of best practices in the professional formation of engineers; and
- Exploring revolutionary means of recruiting and retaining students and faculty reflective of the modern and swiftly changing demographics of the United States.

RED Innovation track: The RED Innovation track supports projects that involve radically, suddenly, or completely new approaches and action; producing fundamental, structural change; and that go outside of or beyond existing norms and principles. This track has two goals:

- Generate new knowledge on best practices for meaningfully and thoughtfully incorporating into the middle two years and technical core of the engineering curriculum oft-neglected “professional skills” (i.e. 21st Century skills, design, communication, teamwork, historical and contemporary social context, lifelong learning, and ethics). Changes in the middle two years need to be integrated with freshman and senior experiences in order to form an unbroken sequenced thread through the curriculum so that the process of professional formation deepens and strengthens as students move through engineering programs.

- Generate new knowledge on how to transform the departmental cultures to be environments that are inclusive, innovative, equitable and supportive of faculty, faculty development to support cultural change, and build new department structures and cultures through innovative practices and policies that support significant holistic professional formation.

Strategies should be developed with impact on the student as the focus. Proposed efforts must be grounded in sound educational theory and work to enable a

continuous progression of professional formation through the four-year experience. Efforts should address 21st Century T-shaped skills (i.e., cross-disciplinary breadth), and they should be aligned with stakeholder expectations.

RED A&I Track: The RED A&I track support projects that use evidence-based and evidence-generating change strategy approaches and actions that are adapted to the local context. The goal of this track is to:

- Generate new knowledge related to the adaptation of proven change strategies and actions in a new context.

Strategies should be developed with impact on the student as the focus. Proposed efforts must be grounded in sound educational theory and work to enable a continuous progression of professional formation through the four-year experience. Efforts should address 21st Century T-shaped skills (i.e., cross-disciplinary breadth), and they should be aligned with stakeholder expectations.

[3] For a review of the literature on the middle two years, see Lord, S.M. and Chen, J.C. “Curriculum Design in the Middle Years,” *Cambridge Handbook of Engineering Education Research*, Johri and Olds, eds. New York: Cambridge University Press, 2014.

Note: The RED program is offered in alignment with the NSF-wide undergraduate Science, Technology, Engineering and Mathematics (STEM) education initiative, *Improving Undergraduate STEM Education (IUSE)*. The National Science Foundation's IUSE Initiative is a Foundation-wide effort to accelerate improvements in the quality and effectiveness of undergraduate education in all STEM fields[1]. Undergraduate STEM education is critical for preparing both a diverse STEM workforce and a STEM-literate public that is ready to support and benefit from the progress of science[2]. The IUSE initiative provides a Foundation-wide framework of investments to support the agency's commitment to the highest caliber undergraduate STEM education. By improving the quality and effectiveness of undergraduate education in all STEM fields, IUSE investments enable NSF to lead national progress toward a diverse and innovative workforce and a STEM-literate public.

Through the IUSE framework, NSF coordinates its investments in undergraduate programs and undergraduate STEM education to maximize impact, and to use shared metrics and appropriate program evaluation approaches. These investments are made across all directorates and address both STEM education in general and specific disciplinary needs. IUSE investments support a variety of activities including the inclusion of inquiry-based and active learning approaches in undergraduate STEM instruction, efforts to increase undergraduate STEM research experiences and courses, and research on the persistence and graduation of students in STEM programs. In addition, specific emerging cross-disciplinary needs include data science preparation for students in all majors, recruitment and retention of women and of students from underrepresented groups in STEM degree programs, incorporation of undergraduate research in STEM fields for STEM majors and non-majors, and re-envisioning of introductory courses in light of new research findings and theories. IUSE also seeks to broaden participation in STEM fields from all sectors and groups in society, and proposers are encouraged to establish linkages, as appropriate, with components of the national network of NSF INCLUDES projects[3].

Prospective PIs are encouraged to consider the IUSE: EHR program for projects that are outside the scope of RED A&I (see https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505082). Specifically, the IUSE:EHR Institutional and Community Transformation (ICT) track promotes innovative approaches to using research to catalyze change that addresses challenges across and within institutions (institutional transformation), as well as within and across specific disciplines (community transformation). **Prospective PIs are not allowed to submit identical or substantively similar proposals to RED and IUSE:EHR**.

1 - All the STEM fields supported by NSF are supported by the IUSE program including the learning, social, behavioral, and economic sciences.

2 - *Building the Future Investing in Innovation and Discovery: NSF Strategic Plan 2018-2022*. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf18045

3 - https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 2-3 RED Innovation awards are anticipated; the budget for RED Innovation proposals is between $1,000,00-$2,000,000 for a duration of up to 5 years. 2-3 RED-A&I awards are anticipated; the budget for RED A&I proposals has a maximum of $1,000,000 for a duration of up to 5 years.

Anticipated Funding Amount: $4,000,000 - $8,000,000

Anticipated Funding Amount and number of awards are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

Who May Serve as PI:

For both tracks, the Principal Investigator must be a department chair/head (or equivalent) to provide leadership for the change process. Additionally, there must be a RED team that includes (at a minimum) an expert in engineering education research who can provide guidance on evidence-based practices, and an organizational change expert who can advise on strategies for developing a culture of change and on strategies for creating meaningful collective ownership of the effort among faculty, students, and staff. The engineering education and organizational change experts may be at different institutions from the proposing institution. Funding for these experts at other institutions may be supported as consultants, through a sub-award, or through a separately submitted collaborative proposal.

Limit on Number of Proposals per Organization: 2

An eligible institution may submit a maximum of two proposals (i.e. 2 Innovation Track, 2 A&I Track, or 1 Innovation and 1 A&I).

Limit on Number of Proposals per PI or Co-PI: 1

An individual may be the PI or Co-PI for only one proposal.

Additional Eligibility Info:

Proposals may only be submitted by the following: US IHEs with baccalaureate engineering programs located and accredited in the U.S. are eligible to apply. However, partnerships are encouraged with local two-year colleges to ensure that the impacts of departmental changes on two-year colleges (and especially the two-to-four year pathway through engineering) are properly considered.

Institutions that have previously received a RED award are not eligible to receive an award under the RED Innovation track of this solicitation.

Institutions may only receive one RED Innovation award under this solicitation.

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 FastLane, Research.gov, or Grants.gov.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & 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. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full Proposals submitted via 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.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

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.

All standard sections of the proposal are required (i.e., the Cover Sheet, Project Summary, Table of Contents, Project Description, References Cited, Biographical Sketch, Budget, Budget Justification, Current and Pending Support, Facilities, Equipment and Other Resources, and Supplementary Documentation).

Proposers are encouraged to prepare their proposals with consideration for the purpose, justification, design features, and expected outcomes of Foundational Research and/or Early-stage or Exploratory Research as outlined in the *Common Guidelines for Education Research and Development* (NSF 13-126).

RED Innovation proposals

The title of the proposal must begin with IUSE/PFE:RED Innovation.

The proposal should include the following information in the Project Description.

Vision for Revolutionizing the Engineering Department – Describe the department and the student professional formation experience “after the revolution”. Provide a concise answer to the question, “What will be different?”

Project Plan – Informed by the department’s vision for revolution, provide:

Goals and Objectives: Project goals and objectives should address the cultural, organizational, structural, and pedagogical changes needed to achieve the stated vision. The goals and objectives should provide the outcomes and targets that will move the department toward the vision.

Specific Actions: Describe the activities that will allow achievement of the goals and objectives. Activities should be based on evidence from the literature that supports their use in the department's context. Activities should also be aligned with a theory of change that shows why and how these specific activities are expected to result in the desired change.

Barriers: Identify the anticipated barriers in carrying out the project plans and achieving the vision. Describe how these barriers will be addressed and any contingency plans that will allow achievement of the vision in the face of these barriers.

External Advisory Board (Required): There must be an external advisory board comprised of stakeholders who can provide guidance on the conduct and direction of the project. Provide a clear description of who will be included, what they bring to the project, and how they will contribute.

Research Plan: RED Innovation projects must have a research plan that will add to the knowledge base about creating change at the department level. The research plan should have clear research questions informed by an appropriate educational or sociological theory and a research design that includes sampling, data collection, and data analysis methods. These measures can be qualitative or quantitative as appropriate to the question and theoretical orientation.

Evaluation Plan: All proposals must have an independent project evaluation plan that matches the scope of the proposed work. Evaluation refers to monitoring of the activities to ensure that the project stays on track and that the desired outputs and impacts are achieved. The evaluation plan should be designed to provide guidance to the project and contribute to the literature on which changes worked, why, and in what contexts. The evaluation plan should include both formative and summative components. An evaluator external to the PIs’ organization is not required, but the evaluator should not be an individual who is involved in the other activities of the project. Provide a logic model that links inputs and activities to specific outputs and short-, medium-, and long-term outcomes that will allow you to determine if the project has an impact. Based on the theory of change and the desirable outcomes of the proposed revolution, enumerate appropriate indicators of success related to accomplishing the goals and objectives and a timeframe to seek measurable change. Describe the data collection and analysis plan that will allow the success of the project to be evaluated.

Mentoring Plans: Explain how faculty will be mentored over the course of this project; what faculty development opportunities will be provided; and how they will be incentivized. Explain how graduate and undergraduate students will be involved in the project and how they will be mentored as part of the proposed departmental vision for revolution. Note that if funds are requested to support postdoctoral researcher(s), per PAPPG Chapter II.C.2.j, a separate mentoring plan must be uploaded as a supplementary document.

Roadmap for Scaling and Adaptation: RED Innovation projects should seek to influence other departments, both within the department’s institution and at other institutions. Describe a roadmap for how this project will make an impact both locally and regionally/nationally by supporting revolutionary change in other departments. Dissemination plans need to go beyond traditional approaches to ensure long-term impact.

RED A&I proposals

The title of the proposal must begin with IUSE/PFE:RED A&I.

The proposal should include the following information in the Project Description.

Vision for Change - Describe the department and the student professional formation experience “after the revolution”. Provide a concise answer to the question, “What will be different?”

Project Plan – Informed by the department’s vision for revolution, provide:

Rationale and Context: Explain why change is needed in the current department and the particular approaches on which the project is basing the change. Compare the contexts of the original implementation and the current department, describing how the original implementation is being adapted to fit the new context.

Goals and Objectives: Project goals and objectives should address the cultural, organizational, structural, and pedagogical changes needed to achieve the stated vision. The goals and objectives should provide the outcomes and targets that will move the department toward the vision.

Specific Actions: Describe the activities that will allow achievement of the goals and objectives. Activities should be adapted from successful implementation in other contexts and based on evidence from the literature that supports their use in the new context. Explain how these activities are being adapted to be successful in the new context. Activities should also be aligned with a theory of change that shows why and how you expect these specific activities to result in the desired change.

Barriers: Identify the anticipated barriers in carrying out the project plans and achieving the vision. Describe how these barriers will be addressed and any contingency plans that will allow achievement of the vision in the face of these barriers.

External Advisory Board (Required): There must be an external advisory board comprised of stakeholders who can provide guidance on the conduct and direction of the project. Provide a clear description of who will be included, what they bring to the project, and how they will contribute.

Mentoring Plans: Explain how faculty will be mentored over the course of this project; what faculty development opportunities will be provided; and how they will be incentivized. Explain how graduate and undergraduate students will be involved in the project and how they will be mentored as part of the proposed departmental vision. Note that if funds are requested to support postdoctoral researcher(s), per PAPPG Chapter II.C.2.j, a separate mentoring plan must be uploaded as a supplementary document.

Evaluation Plan: All proposals must have an independent project evaluation plan that focuses on the implementation of the proven strategies in the local context. Evaluation refers to monitoring of the activities to ensure that the project stays on track and that the desired outputs and impacts are achieved. The evaluation plan should be designed to provide guidance to the project and contribute to the literature on which changes worked, why, and in what contexts. The evaluation plan should include both formative and summative components. An evaluator external to the PIs’ organization is not required, but the evaluator should not be an

individual who is involved in the other activities of the project. Provide a logic model that links inputs and activities to specific outputs and short-, medium-, and long-term outcomes that will allow you to determine if the project has an impact. Enumerate appropriate indicators of success related to accomplishing the goals and objectives and a timeframe to seek measurable change. Describe the data collection and analysis plan that will allow the success of the project to be evaluated.

Dissemination Plan: Provide a plan for actively disseminating the new knowledge generated from this adaptation to other departments and institutions, including challenges and strategies to adaptation in the project's context. Dissemination plans should include contributions to the literature and need to go beyond traditional approaches to ensure long-term impact.

Supplementary Documentation for both tracks

Letter(s) from Institutional Leadership

Provide letters of commitment from the Dean, Provost, and/or President (as appropriate for the project) to ensure support and feasibility in the short and long term. The letter(s) should be no more than 2 pages in length, and it must include the individual's name and title below the signature. Note that this guidance on letters of commitment deviates from the requirements of the PAPPG.

Letter(s) from Other Partners

Provide letters of collaboration from other partners as appropriate. The letter(s) should be no more than 1 page in length, and should include a clear description of how the partner will participate in the project. General letters of support are not allowed and the proposal may be returned without review if such letters are included.

Only the items listed above, the required Data Management Plan, and the required Postdoctoral Researcher Mentoring Plan (if applicable) may be included as Supplementary Documents. Any additional information needed to evaluate the proposal must be part of the Project Description.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

RED Innovation proposal budgets must be between $1,000,000 and $2,000,000 total for a duration of up to 5 years. RED-A&I proposal budgets may request a maximum of $1,000,000 total for a duration of up to 5 years. Proposals that fall outside of these limits will be returned without review.

Budget Preparation Instructions:

A Budget Justification prepared in accordance with the guidance in the PAPPG must be included. PI Meeting Attendance: Include travel funds in the budget for (required) team attendance at an annual PI meeting at NSF.

C. Due Dates

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

  February 07, 2020

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. 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 FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. 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 FastLane or 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 *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. 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 underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

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

Additional Solicitation Specific Review Criteria

- **Vision:** How revolutionary is the vision in light of a well-grounded understanding of the history, context, and culture of the department? Revolutionary means radically, suddenly, or completely new; producing fundamental, structural change; or going outside of or beyond existing norms and principles.
- **PI Team:** Is the RED team complete, with all required expertise? Is each member fully qualified to perform the proposed work?
- **Institutional Commitment:** Do the letter(s) of commitment provide evidence of support for the project sufficient to achieve the goals and objectives?
- **Connection to Professional Practice:** Is there a sufficient connection in the proposed project to professional practice? For example, what is the extent of involvement of the external advisory board, and how has the department involved professors of practice, a professional master's program, or other elements that bridge the gap between education and professional practice?
- **Faculty Development Plan:** Is faculty development well planned and properly incentivized to build department cultures that support the holistic professional formation of engineers?
- **Potential for Success and Sustainability:** How achievable and significant are the proposed changes in the middle two years of the technical core? How responsive are the changes to the call to focus on professional skills? Reviewers will take into account justification of the research plan or the adaptation using the literature, comprehensiveness of the plan, institutional leadership commitments, sustainability of change (including leadership changes and financial sustainability). For RED Innovation projects, reviewers will take into account the justification for the theory of change and the propagation roadmap/transferability of change strategies. For RED-A&I, reviewers will take into account the appropriateness and reach of the dissemination plan.
- **Connection to Research on Engineering Education**: How well-informed are the vision and execution plan by the literature and prior attempts, if applicable, to implement change? Is the expectation of success well justified?
- **Adaptation and Scaling:** How likely is the new knowledge generated about changing department culture to be received and utilized by others? How well-conceived are the plans for accomplishing this goal?

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

B. Award Conditions

An NSF award consists of: (1) the award 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.

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

As part of the annual report, PIs should also include discussion of department dynamics and obstacles or progress in establishing a culture supportive of holistic professional formation of engineers. Awardees are required to interact and participate with the RED program's evaluative activities. Site visits may also be conducted during the project.

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:

- Jumoke Ladeji-Osias, telephone: (703) 292-7708, email: jladejio@nsf.gov
- Heather Watson, telephone: (703) 292-7091, email: hwatson@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** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

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

  or telephone: (703) 292-8134
- **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:

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Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314