

Plant Biotic Interactions

PROGRAM SOLICITATION

NSF 20-576

REPLACES DOCUMENT(S):

NSF 18-590



National Science Foundation

Directorate for Biological Sciences
Division of Integrative Organismal Systems



National Institute of Food and Agriculture

Full Proposal Deadline(s):

Proposals Accepted Anytime

IMPORTANT INFORMATION AND REVISION NOTES

Collaborative proposals may now be submitted by either method described in PAPPG Chapter II.D.3: as a single proposal, in which a single award is being requested (with subawards administered by the lead organization); or by simultaneous submission of proposals from different organizations, with each organization requesting a separate award.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) ([NSF 20-1](#)), which is effective for proposals submitted, or due, on or after June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Plant Biotic Interactions

Synopsis of Program:

The Plant Biotic Interactions (PBI) program supports research on the processes that mediate beneficial and antagonistic interactions between plants and their viral, bacterial, oomycete, fungal, plant, and invertebrate symbionts, pathogens and pests. This joint NSF/NIFA program supports projects focused on current and emerging model and non-model systems, and agriculturally relevant plants. The program's scope extends from fundamental mechanisms to translational efforts, with the latter seeking to put into agricultural practice insights gained from basic research on the mechanisms that govern plant biotic interactions. Projects must be strongly justified in terms of fundamental biological processes and/or relevance to agriculture and may be purely fundamental or applied or include aspects of both perspectives. All types of symbiosis are appropriate, including commensalism, mutualism, parasitism, and host-pathogen interactions. Research may focus on the biology of the plant host, its pathogens, pests or symbionts, interactions among these, or on the function of plant-associated microbiomes. The program welcomes proposals on the dynamics of initiation, transmission, maintenance and outcome of these complex associations, including studies of metabolic interactions, immune recognition and signaling, host-symbiont regulation, reciprocal responses among interacting species and mechanisms associated with self/non-self recognition such as those in pollen-pistil interactions. Explanatory frameworks should include molecular, genomic, metabolic, cellular, network and organismal processes, with projects guided by hypothesis and/or discovery driven experimental approaches. Strictly ecological projects that do not address underlying mechanisms are not appropriate for this program. Quantitative modeling in concert with experimental work is encouraged. Overall, the program seeks to support research that will deepen our understanding of the fundamental processes that mediate interactions between plants and the organisms with which they intimately associate and advance the application of that knowledge to benefit agriculture.

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.

- Michael L. Mishkind, Program Director, E12332, telephone: (703) 292-7190, email: mmishkin@nsf.gov
- Ann Lichens-Park, USDA/NIFA National Program Leader, telephone: (202) 445-5483, email: ann.park@usda.gov

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

- 10.310 --- USDA-NIFA Agriculture and Food Research Initiative
- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 25 to 30

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 25 to 30 awards per year, pending availability of funds

Anticipated Funding Amount: \$18,500,000

Approximate Funding Amount: \$18,500,000 depending on availability of funds

\$10.5M from NSF for new standard or continuing grant awards, and approximately \$8M from USDA/NIFA for new awards. Both estimates depend on availability of appropriations. USDA/NIFA will support projects for up to four years in duration. Although there are no formal upper or lower limits to award amounts, they typically range from \$50,000 to \$300,000 per year, with durations of two to four years (and five years for CAREER awards). Enactment of additional continuing resolutions or an appropriations act may affect the availability or level of funding for this program.

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.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- USDA/NIFA Eligible applicants include: (1) State agricultural experiment stations; (2) colleges and universities (including community colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nationals, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

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.
- o 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.
- o 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:**

For awards made by NSF, Proposal and Award Policies and Procedures Guide (PAPPG) guidelines apply.

For awards made by USDA/NIFA, Section 1462(a) and (c) of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (NARETPA) limits indirect costs for the overall award to 30 percent of Total Federal Funds Awarded (TFFA) under a research, education, or extension grant. The maximum indirect cost rate allowed under the award is determined by calculating the amount of indirect costs using:

1. the sum of an institution's negotiated indirect cost rate and the indirect cost rate charged by subawardees, if any; or
2. 30 percent of TFFA (TFFA = Field K., Total Costs and Fee, on SF-424 R&R Budget).

The maximum allowable indirect cost rate under the award, including the indirect costs charged by the subawardee(s), if any, is the lesser of the two rates.

See Part V section 7.9 of the NIFA Grants.gov Application Guide for further indirect cost information. See webpage at <http://nifa.usda.gov/indirect-costs> for indirect cost options.

- **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):**

Proposals Accepted Anytime

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

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.

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I. INTRODUCTION

The Plant Biotic Interactions (PBI) program supports basic research projects aimed at improved understanding of the interactions between plants, microbes and invertebrates, and applied research projects that translate new knowledge into novel methods of sustainably increasing crop yields. Agricultural production systems are increasingly facing challenges from limited availability of resources, such as water and fertilizer, to extreme weather conditions. At the same time, demand for agricultural products is increasing as the global population increases. Production of enough food to meet the demands of the growing world population will require novel approaches to increase crop yields in a sustainable manner. A deeper understanding of the fundamental, complex interactions between plants and their associated microbes and invertebrates is expected to lead to novel cropping systems that support plants with improved capacities to extract nutrients from their environments, ward off diseases and thrive in the face of extreme environmental conditions.

The last three decades have seen enormous growth in our understanding of the molecular mechanisms that mediate the interaction of plants with their symbionts, pests and pathogens. As a result, a sophisticated and fertile conceptual framework now guides research in this field. Deepening mechanistic understanding, combined with rapidly expanding technical capacity to apply what has been learned to crop plants, points to the need to facilitate synergies between basic and applied research in the effort to improve agricultural practice. The PBI program supports basic and translational research as well as projects across this continuum. Previous organizational structures and priorities at NSF/BIO and USDA/NIFA impeded fluid development of practical applications of fundamental knowledge and insights. PBI was created to establish a programmatic environment that encourages intensive pursuit of fundamental understanding while also supporting the translation of the results of basic research to agricultural practice. Combining the expertise and experience of long-standing grant programs at the NSF and USDA/NIFA, PBI supports the best fundamental and applied research in plant biotic interactions. In addition, proposals will be considered that include both basic and translational aspects. Thus PIs need not tailor aims or experimental systems to the specific mission of one or the other agency.

II. PROGRAM DESCRIPTION

The PBI program seeks to support important fundamental and translational research on the mechanisms and principles that mediate the interaction of plants with their biotic partners. All types of symbiosis are considered, including pathogenic, commensal and mutualistic relationships. Modes of inquiry include genetic, genomic, biochemical, metabolic and imaging-based approaches at molecular, cellular, organismal, population and community levels. Synergies are sought between modeling and experimental approaches and between exploration of fundamental principles and the deployment of insights gained by these approaches in agricultural settings. Experimental systems should be employed as appropriate to the questions asked, with feasibility of the work an important consideration in merit review. Proposals that apply novel fundamental knowledge to agriculturally relevant systems should include information about the agricultural importance of the system (e.g. economic information) if available.

Central to the program's interests are the mechanisms involved in recognition between plants and their biotic partners and the downstream physiological consequences of that recognition. Approaches include inquiries into genetic and genomic responses, cellular signaling (and, more broadly, signaling architecture), and effects on nutritional, metabolic and developmental processes. In addition to classical systems such as the rhizobia-legume symbiosis, the program supports inquiries into recognition and signaling between pathogenic plants and their hosts, and also the recognition and downstream processes involved in pollen-pistil interactions. The PBI program supports research on immune function, including the role of pattern- and effector-driven immunity; the role of epigenetic processes in regulating immune responses and virulence strategies (including trans-generational inheritance of immune states); circadian regulation of immunity; the role of reactive oxygen species; immune priming and systemic acquired resistance.

In addition to focused inquiries into particular host-microbe or host-invertebrate relationships, questions concerning complex symbioses such as multipartite interactions between viruses, bacteria, fungi and/or host plants, as well as community level processes such as the rules that govern the assembly and function of rhizosphere and phyllosphere microbiomes are also relevant to this program.

Much remains to be learned about the components involved in recognition and signaling between plants and their biotic partners. Discovery-based efforts can be useful in this context. However, in order for a proposal to be competitive for funding it is essential that project aims calling for such efforts be thoroughly integrated into a larger project plan focused on gaining insights into mechanisms of general importance or to developing solutions to agriculturally important problems. Similarly, lateral expansion of knowledge gained in the study of model systems is also appropriate, but again, the rationale for such efforts must include an important biological question or a potential translational application in an agricultural setting.

Sponsoring Agency Mission Specific Research

The Plant Biotic Interactions program supports USDA Strategic Goals (www.usda.gov/our-agency/about-usda/strategic-goals), especially Goal 2 – Maximize the ability of American agricultural producers to prosper by feeding and clothing the world; Goal 5 – Strengthen the stewardship of private lands through technology and research; Goal 6 – Foster productive and sustainable use of our National Forest System Lands and Goal 7 – Provide all Americans access to a safe, nutritious and secure food supply. The Plant Biotic Interactions program directly aligns with the USDA Research, Education, and Economics Action Plan (https://www.ree.usda.gov/sites/default/files/2017-08/2016USDA_%20REEProgressReportR2.pdf) and specifically addresses: Goal 1 – Local and Global Food Supply and Security, Sub goals 1A, 1B, and 1C (which focus on Crop Production, Health, Genetics, Genomics, Genetic Resources, and Biotechnology); and Goal 2 - Responding to Climate and Energy Needs, Sub goals 2A and 2B (which focus on Climate Variability, Bioenergy/Biofuels and Bio based Products) by developing and extending approaches to enhance local and global food supply and security, while also responding to climate and energy.

SUBMISSIONS TO OTHER SOLICITATIONS THAT ARE REVIEWED BY PBI

Research in Undergraduate Institution (RUI) Proposals

PBI will accept Research in Undergraduate Institution (RUI) proposals. Information on the scope of RUI projects and the format of these proposals can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5518&from=fund.

Research Coordination Network (RCN) Proposals

PBI will accept Research Coordination Network (RCN) Proposals. Information on the scope of RCN projects and the format of these proposals can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=11691.

ADDITIONAL FUNDING OPPORTUNITIES

Conference Proposals and Supplemental Funding: Please contact a PBI/NIFA and/or PBI/NSF program director for advice on applying for conference or supplementary support.

EARly-concept Grants for Exploratory Research and Grants for **RAPID** Response Research: EAGERs and RAPIDs on topics relevant to PBI should be submitted following the standard guidelines by selecting "Proposal and Award Policies and Procedures Guide" on the proposal coversheet and then selecting the applicable type from the pull-down menu.

CAREER Proposals: Although not covered by this solicitation, CAREER proposals submitted on topics relevant to PBI will be reviewed along with those submitted in response to this solicitation. Additional CAREER proposal information can be found here: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214.

Supplemental Funding Requests

Please note that supplemental funding is intended for unanticipated opportunities only and should be justified on this basis. Requests for support of planned Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), Research Assistantships for High School Students (RAHSS), and Research Opportunity Awards (ROA) activities should be included in the proposal budget. See https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&org=IOS for additional guidance on budget preparation.

International Activities

NSF and USDA/NIFA are interested in promoting international cooperation that links scientist and engineers from a range of disciplines and organizations to solve significant global agricultural challenges. Proposals including international collaboration are encouraged when those efforts enhance the merit of the proposed work by incorporating unique resources, expertise, facilities or sites of international partners. The U.S. team's international counterparts generally should have support or obtain funding through other non-NSF sources.

Investigators may also request [supplemental funding](#) for projects already supported by NSF. Investigators should consult early in the application process with both the disciplinary program manager and the [International Science and Engineering](#) (ISE) country program manager. ISE works with all NSF areas to co-fund new awards and supplements that meet these criteria. Information about additional international funding opportunities and links to ISE country program manager contacts may be found at <https://www.nsf.gov/od/iaa/ise/index.jsp>. PBI proposals may also participate in funding through the U.S.-Israel Binational Science Foundation (BSF, https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17120).

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 25-30 awards per year, pending availability of funds

Anticipated Funding Amount: The estimated funding includes approximately \$10.5M from NSF for new standard or continuing awards, and approximately \$8M from USDA for new awards. Both estimates depend on availability of funds. USDA/NIFA will support projects for up to four years in duration. Although there are no formal upper or lower limits to award amounts, they typically range from \$50,000 to \$300,000 per year, with durations of two to four years (and five years for CAREER awards).

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.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- USDA/NIFA Eligible applicants include: (1) State agricultural experiment stations; (2) colleges and universities (including community colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions

and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nationals, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

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 FastLane or Research.gov. 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.

Results from Prior Support. Proposals must include results from prior NIFA support as well as prior NSF support as described in the NSF PAPPG (Chapter II. C. 2. d. (iii)).

Research Experiences for Undergraduates. Projects anticipating the inclusion of undergraduate research experiences should include those as part of the research proposal itself, rather than as a subsequent supplemental request. See the REU solicitation (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13542) for additional information.

Collaborators & Other Affiliations Information. Information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in the proposal using the NSF [COA template](#) as specified in Chapter II.C.1.e of the PAPPG. Note: Collaborations involving junior authorship on a multi-authored papers (>5 authors) may be limited to the senior author.

Letters of Collaboration. Supplementary Documents may include letters of collaboration from individuals or organizations that are integral to the proposed project but are neither senior personnel nor supported by subawards. This may include subsidiary involvement in some aspect of the project, cooperation on outreach efforts, or documentation of permission to access materials or data. Letters of collaboration must focus solely on affirming that the individual or organization is willing to collaborate on the project as specified in the Project Description or Facilities, Equipment and Other Resources section of the proposal.

Note: No endorsements of the potential value or significance of the project may be included. Letters of general support are not allowed. Inclusion of extra description of collaborative activities is not allowed.

Each letter of collaboration must be signed by the designated collaborator. Requests to collaborators for letters of collaboration should be made by the PI well in advance of the proposal submission deadline, because they must be included at the time of the proposal submission.

The recommended template for letters of collaboration is provided below. No additional text may be included.

If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment and Other Resources section of the proposal.

Signed:

Organization:

Date:

Research Coordination Network proposals. These proposals should begin the title with "RCN:" Follow the proposal preparation instructions in the RCN solicitation (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=11691&org=BIO&from=home).

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Indirect Cost (F&A) Limitations:

For awards made by NSF, Proposal and Award Policies and Procedures Guide (PAPPG) guidelines apply.

For awards made by USDA/NIFA, Section 1462(a) and (c) of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (NARETPA) limits indirect costs for the overall award to 30 percent of Total Federal Funds Awarded (TFFA) under a research, education, or extension grant. The maximum indirect cost rate allowed under the award is determined by calculating the amount of indirect costs using:

1. the sum of an institution's negotiated indirect cost rate and the indirect cost rate charged by subawardees, if any; or
2. 30 percent of TFFA (TFFA = Field K., Total Costs and Fee, on SF-424 R&RBudget).

The maximum allowable indirect cost rate under the award, including the indirect costs charged by the subawardee(s), if any, is the lesser of the two rates.

See Part V section 7.9 of the NIFA Grants.gov Application Guide for further indirect cost information. See webpage at <http://nifa.usda.gov/indirect-costs> for indirect cost options.

Other Budgetary Limitations:

Subawards: In accordance with the applicable award terms and conditions, proposers are reminded of their responsibilities with regard to subawardees. Should an award be made, the prime awardee is responsible for flowing down the appropriate terms and conditions to, as well as management and oversight of, any subawardees on the project, including any foreign subawardees.

USDA/NIFA Requirements: See Part V., Section 4.12. of the NIFA Grants.gov Application Guide (Field 12 on the Form) for instructions regarding Felony Convictions or Tax Delinquent Status.

C. Due Dates

- **Full Proposal Deadline(s):**

Proposals Accepted Anytime

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.

B. Review and Selection Process

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

NSF will manage the review of proposals in consultation with USDA/NIFA.

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.

NSF Process: Those proposals selected for funding by NSF will be handled in accordance with standard NSF procedures. 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.

USDA/NIFA Process: USDA/NIFA will make funding decisions based on the results of the peer review process. For proposals selected for funding by USDA/NIFA, the applicant will need to reformat the proposal and resubmit it directly to NIFA for award processing. Subsequent submission and grant administration procedures will be in accordance with NIFA policies. Applications resubmitted to NIFA will be forwarded to the USDA/NIFA Awards Management Division for award processing in accordance with the USDA/NIFA procedures. Proposals selected for funding by USDA/NIFA will be limited to 30 percent indirect cost rate. Therefore, the recovery of indirect costs on awards made by NIFA under this program area may not exceed the lesser of

the institution's official negotiated indirect cost rate or the equivalent of 30 percent of total Federal funds awarded. If the limitation of indirect costs changes, the applicant will be notified.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

NSF Awards: 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.)

USDA/NIFA Awards: Notification of the award is made to the submitting organization by NIFA's Award Management Division.

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.

Special Award Conditions:

Proposals funded by USDA/NIFA:

Within the limit of funds available for such purpose, the NIFA awarding official shall make grants to those responsible, eligible applicants whose applications are judged most meritorious under the procedures set forth in this solicitation. The date specified by the NIFA awarding official as the effective date of the grant shall be no later than September 30 of the federal fiscal year in which the project is approved for support and funds are appropriated for such purpose, unless otherwise permitted by law. The project need not be initiated on the grant effective date, but as soon thereafter as practical so that project goals may be attained within the funded project period. All funds granted by NIFA under this solicitation may be used only for the purpose for which they are granted in accordance with the approved application and budget, regulations, terms and conditions of the award, applicable federal cost principles, USDA assistance regulations, and NIFA General Awards Administration Provisions at 7 CFR part 3430, subparts A through E.

The Automated Standard Applications for Payment System (ASAP), operated by the Department of Treasury's Bureau of the Fiscal Service, is the designated payment system for awards from NIFA resulting from this joint-solicitation. For more information see <https://nifa.usda.gov/grant-payments>.

Other Requirements Use of Funds Changes

Unless the terms and conditions of the grant state otherwise, the grantee may not, in whole or in part, delegate or transfer to another person, institution, or organization the responsibility for use or expenditure of grant funds.

Changes in Budget or Project Plans

The awardee will be subject to the terms and conditions identified in the award. See <https://www.nifa.usda.gov/business/awards/awardterms.html> for information about NIFA award terms.

Several federal statutes and regulations apply to grant applications considered for review and to project grants awarded under this program. These may include, but are not limited to, the ones listed on the NIFA web page - <http://nifa.usda.gov/federal-regulations>.

NIFA Federal Assistance Policy Guide - a compendium of basic NIFA policies and procedures that apply to all NIFA awards, unless there are statutory, regulatory, or award-specific requirements to the contrary is available at <http://nifa.usda.gov/policy-guide>.

Responsible and Ethical Conduct of Research

In accordance with sections 2, 3, and 8 of 2 CFR Part 422, institutions that conduct USDA-funded extramural research must foster an atmosphere conducive to research integrity, bear primary responsibility for prevention and detection of research misconduct, and maintain and effectively communicate and train their staff regarding policies and procedures. In the event an application to NIFA results in an award, the Authorized Representative (AR) assures, through acceptance of the award that the institution will comply with the above requirements. Award recipients shall, upon request, make available to NIFA the policies, procedures, and documentation to support the conduct of the training.

For information about NIFA's implementation of Responsible and Ethical Conduct of Research requirements, see <http://nifa.usda.gov/responsible-and-ethical-conduct-research>.

Attribution or support in publications must acknowledge the joint program, as well as the funding organization and award number by including the phrase, "as part of the NSF/USDA-NIFA Plant Biotic Interactions Program."

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.

Reporting on USDA/NIFA Awards:

Expected Program Outputs and Reporting Requirements

The output and reporting requirements are included in the award terms and conditions (see <https://www.nifa.usda.gov/business/awards/awardterms.html> for information about NIFA award terms). If there are any program or award-specific award terms, those, if any, will be identified in the award.

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:

- Michael L. Mishkind, Program Director, E12332, telephone: (703) 292-7190, email: mmishkin@nsf.gov
- Ann Lichens-Park, USDA/NIFA National Program Leader, telephone: (202) 445-5483, email: ann.park@usda.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 provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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

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

About the National Institute of Food and Agriculture

The National Institute of Food and Agriculture (NIFA) is an agency within the U.S. Department of Agriculture (USDA), part of the executive branch of the Federal Government. Congress created NIFA through the Food, Conservation, and Energy Act of 2008. NIFA replaced the former Cooperative State Research, Education, and Extension Service (CSREES), which had been in existence since 1994. NIFA's unique mission is to advance knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations. NIFA doesn't perform actual research, education, and extension but rather helps fund it at the state and local level and provides program leadership in these areas. Through grants offered by NIFA, the USDA enables researchers throughout the United States to solve problems critical to our farmers, consumers, and communities. NIFA is the USDA's major extramural research agency, funding individuals, institutions, and public, private, and non-profit organizations. NIFA's education programs supports and promotes teaching excellence, enhances academic quality, and develops tomorrow's scientific and professional workforce. In cooperation with public institutions, private sector partners, and the Land-Grant University System, NIFA provides national leadership to address critical educational issues. NIFA's extension projects deliver science-based knowledge and informal educational programs to people, enabling them to make practical decisions.

NIFA Web site:

<http://www.nifa.usda.gov/>

Phone: (202) 720-4423

Street Address:

National Institute of Food and Agriculture
Waterfront Centre
800 9th St. SW., Washington, DC 20024

Mailing Address:

United States Department of Agriculture
National Institute of Food and Agriculture
1400 Independence Avenue SW., Stop 2201
Washington, DC 20250-2201

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) 292-8569
- **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
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314

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