Macrosystems Biology and NEON-Enabled Science (MSB-NES)

Research on Biological Systems at Regional to Continental Scales

PROGRAM SOLICITATION
NSF 20-506

REPLACES DOCUMENT(S):
NSF 19-538

National Science Foundation

Directorate for Biological Sciences
Division of Environmental Biology

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

January 16, 2020

November 09, 2020

Second Monday in November, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

The Introduction and Program Description were revised for clarity, and the deadline dates were revised to allow for future submissions.

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 January 28, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Macrosystems Biology and NEON-Enabled Science (MSB-NES)
Research on Biological Systems at Regional to Continental Scales

Synopsis of Program:

The *Macrosystems Biology and NEON-Enabled Science (MSB-NES): Research on Biological Systems at Regional to Continental Scales* program will support quantitative, interdisciplinary, systems-oriented research on biosphere processes and their complex interactions with climate, land use, and changes in species distribution at regional to continental scales as well as training activities to broaden participation of researchers in Macrosystems Biology and NEON-Enabled Science.

Proposers are encouraged to use NEON resources, and proposals for substantive and innovative NEON-enabled research will be prioritized for funding. Substantive NEON-enabled projects rely on data and/or samples collected by NEON, co-locate research activities at NEON sites, and/or develop tools that will explicitly enhance the processing, use, and/or analysis of NEON data or collections within the context of Macrosystems Biology research questions.

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.

- Matthew D. Kane, telephone: (703) 292-7186, email: mkane@nsf.gov
- Diana Pilson, telephone: (703) 292-2592, email: dpilson@nsf.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 16 to 23

Award sizes are anticipated to average less than $700,000. The amount of funding is approximate, pending availability of funds.

Anticipated Funding Amount: $9,000,000 to $11,000,000

Categories of awards:

> **Macrosystems Research Awards (MRA).** Awards to advance Macrosystems Biology research broadly, including substantively NEON-enabled research, and innovative training to conduct this research. These awards may be up to 5 years in duration; 4 to 7 awards, averaging approximately $1,000,000, are anticipated.
>
> **Macrosystems Small Awards (MSA).** Awards employing targeted approaches to advance understanding of regional to continental-scale processes, or addressing a theoretical challenge such as scaling or teleconnections, and prioritizing the use or development of NEON data and/or infrastructure. Proposals from early career investigators remain a priority. These awards will be limited to $300,000 and up to 3 years in duration; 12 to 18 awards are anticipated.

Budget and duration should reflect the scope and complexity of the work proposed. Proposal budgets should be generated with attention to the amount of funding available and the expected number of awards.

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.

Who May Serve as PI:

There are no restrictions or limits for either MRA or MSA proposals.

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

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

  January 16, 2020

  November 09, 2020

  Second Monday in November, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

TABLE OF CONTENTS

Summary of Program Requirements

I. Introduction

II. Program Description

III. Award Information

IV. Eligibility Information

V. Proposal Preparation and Submission Instructions
- A. Proposal Preparation Instructions
- B. Budgetary Information
- C. Due Dates
- D. FastLane/Research.gov/Grants.gov Requirements

VI. NSF Proposal Processing and Review Procedures
- A. Merit Review Principles and Criteria
- B. Review and Selection Process

VII. Award Administration Information
- A. Notification of the Award
- B. Award Conditions
- C. Reporting Requirements

VIII. Agency Contacts

IX. Other Information

I. INTRODUCTION

The biosphere is changing more rapidly than at any time in human history. Global changes in climate, land use, biogeochemical cycles, and the translocation of species collectively affect living systems by altering the fundamental relationships between life and its sustaining, non-living environment. Local dynamics of populations, communities, and ecosystems are subject to changing environmental drivers operating across large temporal and spatial extents, with emergent impacts that lack historical analogs. General mechanisms of ecological change cannot be extrapolated with simple upscaling of disconnected studies from local

ecosystems over short observational periods, or inferred directly via downscaled, global satellite remote sensing. The environmental controls, responses, and feedbacks often interact non-linearly across regional to continental scales. Integration of high-frequency, fine-grained, precision data spanning local to continental scales, and assimilated and tested with distributed, standardized observations and experiments, process models, and new scaling algorithms will be essential for understanding and prediction of ecological change. at which they operate. The *Macrosystems Biology and NEON-Enabled Science: Research on Biological Systems at Regional to Continental Scales* program solicits proposals that develop new conceptual frameworks, empirical studies, syntheses, modeling approaches, and training programs that will enhance integrated research of the biosphere at regional to continental scales, develop predictions, and forecast ecological change.

Broadly distributed measurements and observations of multiple ecological variables are required to study continental-scale ecology because environmental changes occur across vast areas and broad environmental gradients. Until recently, assessment of ecological processes at a continental scale has been hindered by a lack of distributed ecological research infrastructure and high-resolution multi-sensor remote sensing to enable the research required to address these complex issues at large spatiotemporal scales. The National Ecological Observatory Network (NEON) is a continental-scale network of standardized field instruments, sensors, and biological sampling protocols that will enable this research. NEON is a major facility for studying the biosphere synoptically at regional to continental scales and for supporting ecological forecasts in North America. NEON collects and provides precise, high-quality, standardized data from 81 sites across the U.S. using instrument measurements, field sampling, and airborne remote sensing. NEON was designed to provide site-based, scaled data across the continent as a range of data products that reflect changes in the nation's ecological populations, communities, ecosystems, and biomes through space and time, and that can be applied to expand our knowledge of regional and continental-scale biology. The sites are strategically located to represent variation in regional vegetation, aquatic systems, landforms, climate, ecosystem function, and environmental gradients. NEON data, protocols, documentation, and online tutorials for data access and analysis are available through the NEON Data Portal and its Application Programming Interface (API). NEON-collected specimens and samples are available from the NEON Biorepository and can be requested for research purposes.

This solicitation prioritizes use of NEON instrumental and observational data for Macrosystems Biology research and supports broader emulation of NEON data standards in the development and use of complementary public ecological data infrastructure.

II. PROGRAM DESCRIPTION

The National Science Foundation invites proposals from individual investigators or interdisciplinary teams of scientists to conduct innovative, integrated, mechanistic, systems-oriented macroscale biology ("Macrosystems Biology") research to detect, explain, and forecast the regional to continental scale consequences of changing climate, land-use, biogeochemical cycles, and biological invasions. Proposals should identify the scales where the ecological research challenges are the greatest and where research has the greatest potential to transform the fields of ecology and environmental biology by harnessing the tools of large-scale biological infrastructure for ecological research. Projects should be well grounded in theory and use novel, mechanistic, and quantitative approaches that develop a more predictive understanding of ecological dynamics at multiple scales and their contributions to the structure, function, and transformation of the biosphere.

Proposals should include quantitative research approaches such as advanced dynamical, statistical, or computational models; numerical simulations; artificial intelligence techniques; visualization; and/or development of databases and pipelines. Proposals for the development and/or integration of macrosystems models (e.g., data-assimilation, biological, ecological, environmental, forecasting) that connect and cross local, regional, and continental scales are encouraged. These models should address key problems linking ecological and/or evolutionary processes and environmental change over a multiple spatial and temporal scales. Projects should develop theoretical foundations that will be useful for modeling based on either existing data and/or data collected by environmental observatories. Quantitative, statistical process models and computational approaches should include reproducible descriptions of data sources and appropriate estimates of uncertainty, and experimental designs should include assessments of power and precision.

The study of regional to continental scale dynamics may involve in-situ and/or remote sensing research at multiple sites, locations, ecosystems, or scales. Proposals must be explicit about how these proposed designs will elucidate and integrate regional- to continental-scale theory. Proposals that lack a regional or continental scale framework (i.e., proposals that are inter-site comparisons or multi-site analyses of general ecosystem concepts or theories) will not be considered and will be returned without review.

The Macrosystems Biology and NEON-Enabled Science program supports research that may include natural, managed, and disturbed ecosystems, including those in terrestrial, freshwater, wetland, coastal (including salt marsh and mangrove), and human-dominated environments. For proposals with marine (deep ocean) study sites, the PI should contact a Macrosystems Biology and NEON-Enabled Science Program Officer prior to submission to determine whether it should be referred to the Biological Oceanography Program in the Division of Ocean Sciences.

Proposal Categories

The program welcomes proposals for **Macrosystems Research Awards (MRA)** to explore ambitious, synthetic, integrative, and interdisciplinary science to advance Macrosystems Biology broadly. Proposals that use or leverage NEON data and/or NEON samples/specimens, or propose focused workshops to address innovative approaches to continental-scale questions, will receive priority consideration for funding. In addition to use of NEON data or facilitating the development of NEON data applications, proposals may leverage other NSF-supported data networks, centers, and other scientific infrastructure. Proposals that develop analytic or computational tools that enhance the use and value of NEON data while addressing fundamental research questions at regional to continental scales are also encouraged. Proposals that do not use NEON will be considered if NEON integration is not available or not applicable to advancing Macrosystems Biology questions (e.g., international, tropical systems). These awards are expected to average approximately $1,000,000 for up to 5 years in duration.

Macrosystems Small Awards (MSA) have two purposes. The first is to encourage directed exploration of novel ideas that require observations and measurements across broad environmental gradients, or to target long-unsolved ecological research questions that the growing capacity of NEON data and infrastructure can uniquely solve. The second is to broaden participation in regional to continental-scale ecological science by increasing the number of awards to investigators that use NEON and other public resources. Proposals may use targeted, disciplinary approaches to advance theory (e.g., scaling) and/or empirical understanding of macrosystems phenomena (e.g., cross-scale interactions, teleconnections). Proposals with substantive use or development of NEON data and/or infrastructure are prioritized, and proposals from early career investigators remain a priority. These awards will be limited to a maximum of $300,000 over 3 years.

Proposals should describe innovative approaches to develop the capabilities of people and/or tools needed to advance these areas of research in the future, so that the next generation of researchers will learn to work in diverse teams across disciplinary boundaries and use advanced sensing and monitoring, communication, and information technologies to work across multiple scales of time and space. As such, the program welcomes proposals that prioritize training and human resource development for advanced, reproducible, macrosystems science. Proposals strictly for tool or model development or for tools/models that

are only indirectly applicable to NEON may be more appropriate for core programs in the Division of Biological Infrastructure that support informatics research and cyberinfrastructure development.

Proposals that plan to use NEON resources that are not generally available in the public NEON data catalogue, such as NEON assignable assets, on-site sampling or experiments, access to specimens or samples, or other work outside the standard, available NEON data must include a letter of collaboration from the NEON Project management organization that attests to the anticipated availability of the resources. See http://www.neonscience.org/resources/information-researchers for further instructions on obtaining this letter.

The Macrosystems Biology and NEON-Enabled Science program focuses on regional- to continental-scale ecological research. Macrosystems Small Awards (MSA) will focus on singular research questions, data types, or experimental approaches that are best addressed on a regional to continental scale using precisely monitored environmental gradients across geographically distributed localities, such as those provided by NEON. For research at sub-regional scales, i.e., at a single or several NEON sites within one NEON domain, or which may emphasize other new data collection, alternative programs within NSF may be more appropriate. For example, the core program solicitation for the Division of Environmental Biology (NSF 18-587) encourages the use of NEON resources in disciplinary proposals. Environmental science programs in other directorates also should be consulted.

Use of NSF-supported data networks, centers, and other scientific infrastructure.

Proposals that use current or planned data, samples, or assignable assets from NSF-supported activities, or those that enhance broader scientific infrastructure, are especially encouraged. Users should acknowledge and cite the use of NEON data products as specified in published data policies. Other than NEON, these resources include but are not limited to the following: database networks and archival resources such as the Environmental Data Initiative (EDI), the Hydrologic Information System of the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI), the General Social Survey (GSS), the Panel Study of Income Dynamics (PSID), and the Federal Statistical Research Data Centers (FSRDCs); research networks such as the Long Term Ecological Research (LTER) network; research observatories such as the Ocean Observing Initiative (OOI); research sites such as Critical Zone Observatories (CZOs); community models and data sets developed and maintained by the National Center for Atmospheric Research (NCAR); field stations; synthesis centers; and ongoing and proposed academic and federal programs.

The MSB-NES program will review proposals to establish Research Coordination Networks for new collaborations and to enhance current cooperation among NEON-enabled science research communities. Information on the scope of RCN projects and the format of those proposals can be found at (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17594). Such RCN proposals should be submitted under the RCN solicitation by the MSB-NES deadline.

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 16 to 23

Award sizes are anticipated to average less than $700,000. The amount of funding is approximate, pending availability of funds.

Anticipated Funding Amount: $9,000,000 to $11,000,000, annually

Categories of awards:

> **Macrosystems Research Awards (MRA).** Awards to advance Macrosystems Biology research broadly, including substantively NEON-enabled research, and innovative training to conduct this research. These awards may be up to 5 years in duration; 4 to 7 awards, averaging approximately $1,000,000, are anticipated.
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> **Macrosystems Small Awards (MSA).** Awards employing targeted approaches to advance understanding of regional to continental-scale processes, or addressing a theoretical challenge such as scaling or teleconnections, and prioritizing the use or development of NEON data and/or infrastructure. Proposals from early career investigators remain a priority. These awards will be limited to $300,000 and up to 3 years in duration; 12 to 18 awards are anticipated.

Budget and duration should reflect the scope and complexity of the work proposed. Proposal budgets should be generated with attention to the amount of funding available and the expected number of awards.

Estimated program budget, number of awards and average award size/duration 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.
> - 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.

Who May Serve as PI:

There are no restrictions or limits for either MRA or MSA proposals.

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 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.

NOTE THAT THE FOLLOWING SECTIONS DESCRIBE MSB-NES ADDITIONS TO THE PAPPG OR NSF GRANTS.GOV APPLICATION GUIDE INSTRUCTIONS

Proposal Cover Sheet. The proposal title must start with "MRA:" or "MSA:", respectively, for Macrosystems Research Awards and Macrosystems Small Awards. For Collaborative Proposals arranged as separate submissions from multiple organizations, the project title must begin with "Collaborative Research:" followed by "MRA:" or "MSA:" as appropriate.

NOTE: For all proposals submitted to the January 2020 deadline, use or apply a starting date of July 1 or later. For those submitted to the November deadlines, use or apply a starting date of June 1 or later.

Project Description. Results of Prior NSF Support must be included in the Project Description and must follow the format described in the PAPPG (Chapter II.C.2.d.iii) for this section. In addition to the requirements described by the PAPPG, details of how data from previously funded projects were made publicly accessible must be included, including citations to the relevant Digital Object Identifiers (doi) or Digital Package Identifier. This information is required for publications and data sets listed as products of prior NSF support.

Biographical Sketches. Each proposal must include biographical sketches for all senior investigators and principal foreign collaborators. All biographical sketches must adhere to the format given in the PAPPG.

Project Budget. Budgets for each type of award should reflect the scope and complexity of the work proposed, although attention should be paid to the total program budget and the number of anticipated awards. Budgets for MSA proposals must not exceed $300,000, including indirect costs. Both MRA and MSA proposals including budgets for NEON assignable assets (e.g., requesting non-standard sampling by NEON staff or NEON equipment use) should consult with both NEON personnel and NSF program officers for guidance on budgeting these costs. For undergraduate and graduate student participants and postdoctoral associates, include a breakdown of costs by types of participants. Funds to cover the cost of attendance of the PI at a three-day annual awardee meeting in Alexandria, VA should be requested.

Proposals Involving Collaborators at Foreign Organizations. Please note that although eligibility for this competition is restricted to U.S. organizations, collaborations with foreign organizations may be considered. However, support for foreign partners should come from relevant non-NSF sources as detailed in the PAPPG (Chapter I.E.6). Proposers are reminded they must provide biographical sketches of all senior project personnel, including those at foreign organizations.

Projects with international activities should include: a) details on the complementary expertise of the U.S. and foreign partners; b) a description of the proposed contributions and division of labor among participating researchers and institutions; and c) plans for involving US students and junior researchers.

Supplementary Documents

1. Data Management and Access Plan (up to 3 pages commensurate with complexity of project)

All NSF proposals must describe plans for data management and sharing of the products of research. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management and Access Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. The Directorate for Biological Sciences guidance for data management plans is available at: https://www.nsf.gov/bio/biodmp.jsp. See Chapter II.C.2.j of the PAPPG for further information about the implementation of this requirement.

While many Macrosystems Biology and NEON-Enabled Science projects will rely on existing data resources, some may involve significant data collection, harvesting, integration, assimilation, and modeling among large collaborations. Therefore, the Macrosystems Biology and NEON-Enabled Science data management and access plan must contain detailed descriptions of the data sets that will be collected or collated. Include data sources and plans for interpretation or analysis; for preservation, documentation, and sharing of data, samples, and physical collections; and for their final disposition, including names of public repositories and the relevant digital object identifiers (doi) or digital package identifier systems. Particular attention should be paid to the long-term sustainability and durability of data archiving and availability. The data management and access plan should also include brief descriptions of any public data sources, with calibration and validation information if applicable. It should not contain an elaboration of model theory, equations, or algorithms that belong in the Project Description. The NSF encourages appointment of a data management coordinator where appropriate.

As the Data Management and Access Plan can exceed the normal 2-page limit, upload the document as Other Supplementary Documentation. This supplementary document must be labeled " **Data Management and Access Plan.**" Also, upload a document into "Data Management Plan" that states "See Data Management and Access Plan in Other Supplementary Documentation."

2. Project Management Plan (up to 3 pages for MRA proposals and 1 page for MSA proposals, commensurate with the complexity of the project)

All projects must provide, as a supplementary document, a description of the management plan for coordinating activities, particularly those projects involving multiple investigators and multiple institutions. This supplementary document must be labeled "**Project Management Plan**". This description should include plans for internal communication, coordination of data and information management, evaluation and assessment of progress, allocation of funds and personnel, and other specific issues relevant to the proposed activities.

A table summarizing the role of each investigator is required including PI, co-PIs, other senior personnel, and paid consultants at all organizations involved.

Coordination and how the project will be managed within and across organizations and disciplines should be clearly defined, including identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration (e.g., regular meetings or teleconferencing, yearly workshops, graduate student exchange, project meetings at conferences, videoconferences, etc.).

A timetable with yearly goals should be provided that includes benchmarks for the major anticipated project milestones and deliverables, expected dates for their release, and an assessment plan to evaluate success at intervals.

3. Postdoctoral Researcher Mentoring Plan (1-page maximum)

Each proposal that includes funding for one or more postdoctoral researcher must include a mentoring plan that explicitly states the roles of the postdoctoral researcher as well as how they will interact with the other project personnel. We strongly urge proposers to refer to the various published guidelines for these plans, including but not limited to documents from the National Postdoctoral Association, the US National Academy of Sciences and Engineering, the Federation of American Societies for Experimental Biology, etc. For all awards we encourage expansion of NSF's required postdoctoral mentoring plan to provide innovative training of the next generation of scientists. Proposals involving postdoctoral researchers must offer an innovative and forward-thinking plan for postdoctoral training that extends beyond the mentoring that would normally occur as part of a research project at a single site or in a single lab. Training opportunities could include short courses, workshops, collaborations, lab exchanges, or other related activities (national or international). Sample topics might include leadership, large project management, application of statistical methods for integrating data across scales, analytical methods useful for macro-scale studies, or computational techniques for dealing with large, regional, or continental datasets. See PAPPG, Chapter II.C.2.j for additional information on postdoctoral researcher mentoring plans. This supplementary document must be uploaded under "Mentoring Plan" and labeled "**Postdoctoral Researcher Mentoring Plan**".

4. Research Experiences for Undergraduates (REU) (if applicable)

Funds to support REUs should be included in the original proposal. A very limited number of post-award supplements may be available if such activities were unforeseen at the time of submission and the request broadens participation in STEM fields.

REU Submission Guidance. The descriptions of proposed REU activities should be included in the Supplementary Documents. For REUs, follow the guidelines for "REU supplement requests as part of a proposal" in the REU solicitation: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13542. REU projects must involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU student. If the intent is to engage students as technicians, then an REU is not the appropriate support mechanism; instead, salary support should be entered on the Undergraduate Students line of the proposal budget. The description of these activities is limited to 3 pages. If multiple institutions on a collaborative proposal are requesting funds for REUs, all REU activities should be included in one 3-page supplementary document. Enter student costs under Participant Support Costs on the budget (Indirect costs [F&A] are not allowed on Participant Support Costs in REU Supplement budgets). As part of the Budget Justification, provide a separate explanation of the REU Supplement request, with the proposed student costs itemized and justified and a total given for the items plus associated indirect costs. Materials and supplies costs should be included under section G1 of the budget. A detailed breakdown of the budget must be included in the budget justification. Budgets for REUs are generally $6,000-8,000 per student. Funds requested for REU educational supplements can be in addition to the $300,000 funding limit for Macrosystems Small Award projects.

5. Letters of Collaboration

Proposals in any category that plan to use NEON resources that are not part of the standard data stream must include a letter of collaboration from the NEON Project management organization, submitted as a supplementary document, that attests to the anticipated availability of these resources. Note that NEON does not own the sites but can assist in the coordination with site owners for access, planning, or new sampling requested of NEON as assignable assets. See http://www.neonscience.org/resources/information-researchers for further instructions on obtaining this letter. This letter need not conform to the format for general letters of collaboration as described below.

Supplementary Documents may also include letters of collaboration from other 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 should focus solely on affirming that the individual or organization is willing to collaborate on the project as specified in the project description. No endorsements of the potential value or significance of the project may be included. The template that **must** be used for the preparation of letters of collaboration, other than those from the NEON Project management organization, is provided in the PAPPG Chapter II.C.2.j.

Single Copy Documents

Collaborators & Other Affiliations (COA) Information. As detailed in the PAPPG (II.C.1.e), information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. If you have correctly added biographical sketches for all persons, there should be a separate space within Single Copy Documents to upload each individual's file. The COA information must be provided through use of the COA template https://www.nsf.gov/bfa/dias/policy/coa.jsp.

Suggested Reviewers. PIs are encouraged to provide a list of suggested reviewers, including the individuals' names, institutions, and areas of expertise, email addresses, and URLs if available. Please ensure no one on this list has a conflict with the proposal.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Please see the full text of this solicitation for further information.

C. Due Dates

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

  January 16, 2020

  November 09, 2020

  Second Monday in November, Annually Thereafter

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

In addition to responding to the standard NSF review criteria, reviewers will be asked to place emphasis on the extent to which:

- The proposal is well grounded in theory, includes novel approaches that will result in a theoretical framework for a predictive understanding of macroscale biology, and shows great promise for enhancing basic theoretical understandings.
- The proposal makes substantive use of NEON data or resources, i.e. relies on data and/or samples collected by NEON, co-locates field sites at NEON sites, and/or develops tools that will explicitly enhance the processing, use, and/or analysis of NEON data or collections within the context of Macrosystems Biology research questions. Such substantive use of NEON infrastructure is prioritized but not required for both MRA and MSA proposal categories, particularly if NEON resource use is not feasible or value-added within the scope of a Macrosystems Biology project (e.g., international localities, estuarine ecosystems, etc.).
- The project promotes the development of collaborative partnerships with other research platforms, observatories, research centers, or networks. MRA proposals in particular will integrate across relevant biological, atmospheric, geological, social, mathematical, or engineering disciplines. Interdisciplinary research should be reflected in the Principal Investigators involved in the project.
- The proposal addresses the inherent complexity and highly connected nature of the biosphere, includes multi-scale perspectives, is focused on understanding processes at regional to continental scales, and places a high priority on scaling and integrating the results from observations at one scale to understand processes and dynamics better at other scales.
- The proposal includes quantitative approaches, advanced conceptual models, data assimilation, or other modeling approaches to study the systems chosen for investigation.

In accordance with the NSF Proposal & Award Policies & Procedures Guide, all proposals submitted in response to this solicitation must explicitly address the Broader Impacts criterion. Although proposed Broader Impacts activities in any of the identified categories are acceptable, investigators are especially encouraged to undertake activities that effectively address goals and challenges associated with one or more of the following key areas:

- recruitment, education, and training of the future scientific, engineering, technical, and policy workforce and leadership needed to pursue basic research on regional to continental scale biology, especially by leveraging NEON resources;
- innovative and collaborative post-doctoral experience with project management, leadership, technological and collaborative training and opportunities;
- tools and infrastructure to provide government and industry policymakers with current knowledge on issues related to regional to continental scale processes affecting the biosphere and associated biological feedbacks, to better inform decisions on adaptation and mitigation;
- improved public awareness and understanding of the interconnections between the biosphere, climate change, and sustainability and their impacts, and technical strategies for adaptation and mitigation;
- opportunities to engage a diverse community of learners and educators in regional to continental scale research and the use of NEON.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by 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.

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:

- Matthew D. Kane, telephone: (703) 292-7186, email: mkane@nsf.gov
- Diana Pilson, telephone: (703) 292-2592, email: dpilson@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) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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