

Competition for the Management of Operations and Maintenance of the National Ecological Observatory Network (NEON)

PROGRAM SOLICITATION NSF 20-530



National Science Foundation

Directorate for Biological Sciences
Division of Biological Infrastructure

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

February 21, 2020

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

September 17, 2021

IMPORTANT INFORMATION AND REVISION NOTES

Full Proposals submitted in response to this solicitation must be submitted in accordance with the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG), [NSF 20-1](#), which is effective for proposals submitted, or due, on or after June 1, 2020. Additionally, proposals and supporting cost estimates must be prepared and submitted in accordance with Sections 3.5.1 and 4.2 of the NSF Major Facilities Guide (MFG), [NSF 19-068](#), dated September 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Competition for the Management of Operations and Maintenance of the National Ecological Observatory Network (NEON)

Synopsis of Program:

NSF solicits proposals to manage the operations and maintenance of the National Ecological Observatory Network (NEON), an NSF-funded major facility project. NEON comprises terrestrial, aquatic, atmospheric, and remote sensing measurement infrastructure and cyberinfrastructure that deliver standardized, calibrated data to the scientific community through a single, openly accessible data portal. NEON infrastructure is geographically distributed across the United States, including Alaska, Hawaii and Puerto Rico, and will generate data for ecological research over a 30-year period. NEON is designed to enable the research community to ask and address their own questions on a regional to continental scale around the environmental challenges identified as relevant to understanding the effects of climate change, land-use change and invasive species patterns on the biosphere. The NSF NEON program, which is part of the Centers and Cooperative Agreements Cluster in the Division of Biological Infrastructure, manages the NEON award in collaboration with the NSF Large Facilities Office and the NSF Division of Acquisition and Cooperative Support.

The managing organization will work closely with NSF and the scientific community to ensure that NEON capabilities support and advance ecology and related sciences. In cooperation with NSF and within available resources, the awardee will plan and execute a viable, coherent, and inclusive program to support multi-user research and education, consistent with advice of the scientific community and NSF oversight.

A single award will be made as a cooperative agreement with a duration of five years. NSF may renew the award for an additional five-years, subject to availability of funds, the Awardee's satisfactory performance, and review of a cost proposal for the second 5-year period. NSF's decision will be informed by the National Science Board Statement on Recompetition of Major Facilities ([NSB 2015-45](#) or successor)

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.

- Roland Roberts, Cognizant Program Officer, telephone: (703) 292-7884, email: neon-bot@nsf.gov
- Montona Futrell-Griggs, Project Manager, telephone: (703) 292-7162, email: neon-bot@nsf.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: \$65,000,000

For planning purposes, proposers can assume a base budget of approximately \$65 million during the first year of the award, beginning November 2021 and should plan for no more than a 3% budget increase in each of the subsequent years. All budget amounts given herein are tentative and for initial planning purposes only. Actual annual funding increments will be determined on the basis of the detailed cost estimate required per Section V.B below and an Annual Program Operating Plan that is submitted by the awardee to and approved by NSF. Funding increments are also subject annually to the availability of funds and will be contingent on the performance of the awardee. Escalation factors used for cost estimating should be articulated in the Cost Estimating Plan.

If needed, additional funding of up to \$1,000,000 may be requested to support a transition period of up to 6 months in duration. The request of funding for a transition period should be made within the Transition Plan and should not be included in the formal cost estimate or proposed budget for the initial 5-year period but must conform to the same requirements. If this amount is not sufficient for the proposed transition, please contact the NEON program for additional guidance.

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:

The Principal Investigator (PI) must be an employee of the proposing organization.

Limit on Number of Proposals per Organization: 1

An organization may only submit 1 proposal as the lead. There is no limit on the number of proposals on which an organization can be included as a subawardee.

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

Since the PI must be an employee of the managing organization, which can only submit one proposal, a PI can only submit one proposal. However, there is no limit on the number of proposals on which an individual can be included as a subaward PI.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not 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 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

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

February 21, 2020

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

September 17, 2021

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

Authorized by the National Science Foundation Act of 1950, as amended, NSF initiates and supports basic and applied research and programs to strengthen scientific research potential. To achieve these goals, NSF supports centers, major facilities, and other infrastructure that provide research capabilities in various scientific disciplines. One such facility, the National Ecological Observatory Network (NEON), provides services and infrastructure to support research and education in the Biological Sciences.

The biosphere has changed more in the last 50 years than during any time in human history. Climate change, land use change, and the introduction of invasive species act alone or in concert to affect living systems by altering the fundamental relationships between life and the non-living environment that sustains it. Understanding the causes and consequences of changes to the biosphere is one of the major challenges confronting scientists and society now and in the coming decades. Meeting this challenge requires the availability of high-quality data collected using standardized protocols at strategically selected sites distributed at a continental scale.

NEON was designed as a continental-scale platform for understanding and forecasting the ecological impacts of climate change, land use change and invasive species on the biosphere. More than a decade of planning by the scientific community and NSF resulted in the design and construction of a robust observatory

that is providing standardized data on a comprehensive suite of 180 data products at 81 sites distributed in 20 eco-climatic domains across the United States. These data reflect atmospheric processes; biogeochemistry; ecophysiology; biological organisms, populations, and communities; land use and land cover change across the Network. All NEON data are served freely to the scientific community and the public. NEON is expected to be in operations for 30 years.

Provisional NEON data from sites and airborne observations, along with protocols (<https://www.neonscience.org/data-collection/protocols-standardized-methods>) and documentation, are now available on the NEON Data Portal. In addition, NEON-collected specimens and samples are available and can be requested for research purposes.

NSF invites proposals from qualified organizations to manage the operation and maintenance of NEON for the next five years beginning November 2021. Proposals should address the full suite of activities including, but not limited to, data collection, processing, curation, and access; sample collection, storage, and archiving; engagement of the scientific community; refining NEON protocols and operations; promotion of and training in the use of NEON data; maintenance of all physical infrastructure and equipment; and education and outreach.

NSF intends for NEON to proceed largely as designed, constructed, and currently operated. NSF does not intend to drastically change either the overarching design of the network or the data products that are produced and distributed. Proposals that include large-scale changes to the infrastructure or composition of the network, beyond incremental modifications such as those that result due to technological advances or efficiencies found, will be deemed non-responsive to this solicitation.

Additionally, NSF expects that proposing organizations are able to demonstrate through their proposal both the organization's prior experience and current capabilities to operate a scientific endeavor on the scale of NEON. For example, organizations are expected to demonstrate their ability to manage, through a federally-funded cooperative agreement with NSF, a large-scale network consisting of: 81 sites geographically dispersed across the United States with human resources management systems in place to handle the needs of approximately 500 employees, a large number of which are hired seasonally; the permitting and compliance needs of the Observatory; 180 data products and the associated data services and cyberinfrastructure; the logistics and engineering capabilities to support the upgrade, repair, calibration, validation, and distribution of thousands of sensors; the award, subaward, and contract management based on the regulatory requirements of the [Uniform Administrative Requirements at 2 CFR 200](#) and NSF-specific terms and conditions; and mature IT systems, processes, and procedures for support functions such as financial management, property, and procurement.

II. PROGRAM DESCRIPTION

A. Description of the National Ecological Observatory Network (NEON)

Data is collected at sites in geographically distributed terrestrial and aquatic ecosystems across 20 eco-climatic domains in the United States and its territories, including Alaska, Hawaii and Puerto Rico using a combination of automated instrument measurements, airborne remote sensing surveys, and observational sampling. The following nine sections provide a broad outline of the current structure of NEON:

1. NEON Headquarters

The activities of the NEON project are currently organized and managed at the project's headquarters in Boulder, Colorado. The managing organization is expected to assume the administration of the project including the supervision of approximately 500 permanent and seasonal employees distributed across the NEON infrastructure. In addition, NEON headquarters provides support services that are critical for data collection and data quality across the Observatory. An Assembly and Repair Lab supports the activities needed to keep the instrument systems operational. This lab performs routine service including assisting the Calibration and Validation Lab with the refurbishment of sensors, maintenance documentation upkeep, and consultation on routine site activities. Parts and equipment sourcing are also the responsibility of the Repair Lab, including maintaining a working systems inventory to support both preventative and corrective maintenance. Also located at headquarters is the Calibration and Validation Lab. This arm of the NEON project ensures the collection and delivery of quality data by assuring and maintaining standards across the Observatory. Routine calibration of sensors is necessary to ensure that measurements meet standard community requirements. This lab performs annual calibrations on sensors and provides the expertise necessary to convert raw data collected from the sensor infrastructure at each Observatory site to the calibrated data products. The calibration is associated with each Level 1 data product as metadata information.

2. Domain Support Facilities (DSFs)

Field operations staff conduct operational collections and maintenance of the NEON field infrastructure and are located at eighteen Domain Support Facilities (DSFs) distributed across the U.S. DSFs typically include sample and specimen processing laboratory, instrumentation repair space, equipment rinse and storage area, office areas, meeting and field preparation space, general storage, and network infrastructure space. The activities at the DSFs are overseen by a resident Domain Manager and several permanent and seasonal staff members.

3. Terrestrial Systems

The terrestrial observation and instrument systems (TOS and TIS) are designed to collect data about weather and climate, seasonally changing biological processes, and biogeochemical processes that are important drivers and indicators of terrestrial ecosystem function. The NEON project collects data at 47 terrestrial field sites across the United States. When possible, terrestrial sites are located near (co-located with) NEON's aquatic sites. These terrestrial field sites are representative of ecosystem features and habitats across the United States. Twenty of the terrestrial sites are expected to collect data for the 30-year lifetime of the observatory ("core sites"). The other 27 terrestrial sites may move throughout the lifetime of the observatory ("relocatable sites"). There is no difference in the design and construction between "core" and "relocatable" sites, and there is no current plan to relocate any of the sites within the 5-year period of this solicitation. The labels "core and relocatable" refer to the original scientific intent across the network. At each of these sites the NEON project collects data to understand changes in climate, surface-atmosphere interactions, biogeochemical processes, organismal populations, and habitat structure. Data are collected using automated instruments, observational sampling, and airborne remote sensing (described below).

4. Aquatic Systems

The NEON project collects data at 34 freshwater aquatic field sites located across the United States. These include 24 wadeable streams, 7 lakes, and 3 non-wadeable rivers. Aquatic field site locations are representative of aquatic features and habitats typical of regions across the United States within each NEON domain (except for D20: Hawaii). NEON's aquatic sites are usually co-located with NEON terrestrial field sites whenever feasible. Twenty of the aquatic sites are intended to collect data for the 30-year lifetime of the observatory, i.e. they are designated as "core sites." The other 14 sites

may move throughout the lifetime of the observatory and are classified as “relocatable sites”. There are no current plans to relocate any aquatic sites within the 5-year period covered by this solicitation. At each aquatic field site, the NEON project collects data to understand changes in climate, hydrology, biogeochemical processes, organismal populations, and habitat structure. Three data collection systems are employed at each aquatic site; automated instruments associated with the aquatic instrument systems (AIS), observational sampling through the aquatic observational systems (AOS), and airborne remote sensing surveys. The data collected through these three systems can be integrated because they are gathered in close proximity at a site. Also, the implementation of standardized protocols across the NEON project allows for comparisons across the 34 NEON aquatic field sites. Thus, researchers can study connections and patterns across ecosystems and develop models to forecast environmental change locally, regionally and at a continental scale.

5. Airborne Observation Platform (AOP)

NEON's AOP is an array of instruments that collect high resolution remote sensing data including lidar, hyperspectral, and images, at low altitude and are installed on light aircraft, which are currently leased by the managing organization. Each AOP is equipped with a Full Waveform and Discrete Return Lidar, a Hyperspectral Imaging Spectrometer, and a High Resolution RGB Camera. NEON currently has two AOPs that are part of the standard data collection protocols across the Observatory. Airborne remote sensing surveys are conducted over NEON field sites during peak greenness to collect quantitative information of each field site on land cover and changes to ecological structure and chemistry, including the presence and effects of invasive species across landscapes. AOP data collection is synchronized with field sampling and automated instrument measurements on the ground at each site.

6. Assignable Assets Program

NEON's management also involves the running of the Assignable Assets Program. These are components and services that are provided to the research community on a cost recovery basis. They include, an AOP (this is a third AOP, in addition to the two listed above), five Mobile Deployment Platforms (MDPs, equipped with a subset of aquatic and terrestrial sensors for fast deployment), access to sensor infrastructure, and access to observational sampling resources. Following issuance of an award, the managing organization is expected to develop and implement a plan, including pricing, for providing these assets to the research community. Further details concerning the MDPs will be provided in the Resource Library associated with this solicitation.

7. Collections and Laboratory Analysis

Each year, thousands of specimens and samples that complement the field observations and automated measurements collected at NEON sites are gathered and archived. These samples represent a rich resource and are available upon request to support research. The majority of NEON samples are housed in the primary NEON Biorepository at Arizona State University (<https://biorepo.neonscience.org/portal/index.php>). Other samples are archived at and available from various curation facilities across the United States. See neonscience.org for more information. A list of these facilities will be provided in the Resource Library. Some terrestrial and aquatic field-collected samples are sent to externally contracted laboratories for analyses, including chemical, isotopic, infectious disease characterization, and genetic. It is estimated that more than 100,000 samples will be sent for laboratory analyses each year. Because NEON does not presently maintain in-house laboratory assets to complete all of the laboratory analyses, considerable contracting effort in operations is needed, currently involving approximately 30 contracts for a wide array of aquatic and terrestrial physical, chemical, and biological analyses. The quality of the contracted laboratories is monitored through regular documentation, site visits, and analysis audits to verify that the laboratories are able to meet NEON's requirements. A list and relevant information about these contracts will be provided in the Resource Library.

8. Cyberinfrastructure and Data Delivery

Providing standardized, quality-assured data products is essential to NEON's mission of providing open data to support greater understanding of complex ecological processes at local, regional and continental scales. NEON Data Services are responsible for the full life cycle of data management, from capturing raw observations, instrumentation data streams, analytical data from external laboratory facilities, and remote sensing data, to providing NEON data to users. Available NEON data; supporting metadata; and science design, data collection and data processing documentation are accessible through the NEON Data Portal. A subset of NEON data products will be disseminated by cyberinfrastructure for publication by external host repositories. Four examples of external hosts are: Barcode of Life (BOLD <http://www.boldsystems.org/index.php/Login/page>) Metagenomics Analysis Server (MG-RAST <http://metagenomics.anl.gov/>) Aerosol Robotic Network (AERONET <http://aeronet.gsfc.nasa.gov/>) PhenoCam Gallery (<http://phenocam.sr.unh.edu>) The managing organization is expected to articulate a plan to meet the above requirements and ensure that data standards and quality are met through the calibration of NEON's instruments and sensors. Additionally, accounting for the latency associated with delivery of some data products, the managing organization is expected to propose a reasonable plan for the delivery of data to the research and education community. For more information about the data products to be delivered by NEON operations, see the NEON Data Products Catalog (<https://data.neonscience.org/data-product-catalog>).

9. Education, Training and Outreach

NEON is expected to play a role in supporting the NSF strategic objective to foster the growth of a more capable and diverse research workforce and advance the scientific and innovation skills of the Nation, both in the staff of the managing organization and in the broader scientific community. Therefore, the managing organization is expected to propose a plan to support/foster a vigorous program of training, outreach and user community development activities that includes collaborations with academic institutions, workshops and tutorials to increase access to NEON data and promote the use of NEON data in research, and resources for educators. The plan should also present a strategy for creating and maintaining NEON science and engineering highlights via the NEON website, disseminating education and outreach materials through the NEON website and social media, providing PI support on proposals, and outreach to stakeholders at local, regional and national levels.

B. NEON Operations and Maintenance Requirements

Proposing organizations are expected to present a convincing strategy to manage NEON's geographically distributed infrastructure to ensure success of the scientific goal to generate data for ecological research over the lifespan of the Observatory. Plans for the operations and maintenance of the components of NEON must also be clearly articulated. While the overall NEON observatory became fully operational in May 2019, the 81 sites vary in age from nearly new to as much as 5 years old due to the phased transition to operations. The decision-making capabilities in terms of logistics and maintenance strategies will be paramount to the success of NEON throughout the solicited period. Proposals should directly address the organization's maintenance plan and capabilities for NEON.

Associated with the operations and maintenance of the above components of NEON are the permitting and compliance requirements. The managing organization is expected to work to maintain updated permitting, build relationships with site owners, and ensure that NEON is compliant with local, state and federal regulations. A full list of current permits and land use agreements will be made available in the Resource Library.

Additionally, a list of current physical facility details (for example, location, purpose, size, lease status, etc.) will be made available to proposing organizations through the Resource Library.

C. Description of the Responsibilities of the Managing Organization

The NSF expects proposing organizations to meet the following expectations to ensure the successful operations and maintenance of the NEON facility.

1. Core Expectations

As the NEON managing organization, the Awardee will work closely with NSF to ensure that, within available resources, NEON supports, sustains, and advances frontier science. The managing organization will be accountable for fulfilling NEON's mission through a visionary strategy outlined in NSF-approved annual program plans and one which capitalizes on the financial investment to serve the scientific community and promote world-class research and education.

The managing organization will be responsible for the overall management and performance of NEON, including the infrastructure, instrumentation and staff. In discharging these responsibilities, the managing organization will ensure that NEON maintains its character as a multidisciplinary and multi-user facility that primarily enables first-rate, transformative research.

In cooperation with NSF and within available resources, the organization managing NEON will plan and execute a viable and inclusive program of research support via data delivery, education, and training, consistent with the objectives and priorities of its scientific community. The Awardee will manage facilities and equipment to fulfill the proposed programmatic scope and will develop and maintain a diverse and inclusive team of experts and technical personnel to manage NEON as a scientifically competitive research and training facility.

The Awardee will be expected to meet the highest standards for service and data delivery to the scientific community, and to demonstrate a proactive and effective approach to performance management. The Awardee will ensure that NEON operates with integrity and transparency, maintaining quality and responsiveness in administration and management.

2. Specific Duties

The managing organization will, within the financial resources made available under the award:

- o Staff, manage, operate, maintain, and optimize NEON on a day-to-day basis.
- o Provide written interim and annual progress reports, budgets, and program plans for review and approval by the NSF.
- o Provide, through its staff and the facilities of the Observatory, scientific, technical, managerial, and other support necessary for the conduct of research in the ecological sciences.
- o Maintain a staff with sufficient scientific and technical expertise to enable the accomplishment of Observatory goals for the delivery of science capability.
- o Evaluate new techniques and instruments for data collection, processing, and utilization as new tools, techniques and research interests evolve.
- o Promote the utilization of knowledge in ecology and related fields, and engage in education, public outreach, and training programs.
- o Disseminate and publish scientific information developed in the course of the work.
- o Cooperate in the integration of NEON's data into the overall efforts in the biological sciences and related fields.
- o Develop appropriate metrics for assessing the Observatory's performance with regard to:
 1. the effective use of resources for data collection in support of the scientific mission of NEON;
 2. the quality and impact of science conducted using NEON data and infrastructure; and
 3. the impact of training and outreach activities to increase access to, and use of NEON data.
- o Secure NSF approval of these metrics and implement them. Provide for such NSF participation in their implementation, as these procedures require.
- o Conduct such other Observatory-related activities as NSF and the Awardee may agree in writing to support.
- o Work closely with NSF in a cooperative effort to inform the public about the Observatory and its programs and accomplishments.

3. Management

The managing organization will define and implement an organizational structure for NEON that will provide governance, vision, leadership and scientific advice to effectively manage the Observatory as a vibrant, community-based, scientific support facility. Models and approaches for observatory management should be consistent with NSF goals, the needs of the Observatory, and the requirements described in this solicitation. The managing organization will establish processes within a structured framework for planning, review and performance management, including the development and use of appropriate mechanisms to aid the Awardee both in assessing performance and identifying areas for improvement.

4. Operations

The managing organization will be responsible for staffing and managing NEON to ensure that all infrastructure, instruments, and data products are able to operate in response to high-priority scientific research informed by the ecological community. To this end, the managing organization will articulate a strategic plan for maintaining a viable scope of Observatory operations and will employ mechanisms for reviewing and scheduling user access to NEON's Assignable Assets through an open process that meets science community needs.

Proposing organizations will provide a data management plan that describes the acquisition, processing, archiving and accessibility of all data, including the definition of proprietary periods (associated with data collected through the use of the assignable assets program) and appropriate cyberinfrastructure and cybersecurity to protect data integrity and science community needs.

5. Maintenance

NEON infrastructure will be maintained to enable program objectives and for the safety and security of staff and visitors. The managing organization will be responsible for budgeting, scheduling and tracking a comprehensive safety, environmental compliance, and maintenance plan for NEON infrastructure. All regular maintenance activities, repair, and refurbishment of NEON infrastructure are considered to be part of this cooperative agreement.

6. Science

The managing organization will prepare an Annual Report and Program Plan for NEON that demonstrates responsiveness to Observatory needs and

objectives, a well-defined scope of high-priority activities, and a credible plan for allocating the necessary resources to support the proposed suite of activities. In addition, the managing organization will develop and annually update the NEON Operations & Maintenance Plan that outlines the strategic vision for NEON over a time span of at least five years and considers the Observatory's role in supporting the research community in the context of the continually evolving scientific and technological landscapes. The managing organization shall develop mechanisms for securing external advice from the science community.

As defined by these proposed plans, the managing organization will ensure that NEON has sufficient internal or external expertise to (1) support data collection, (2) develop and maintain data acquisition and data processing software, (3) develop and implement policies and strategies for validating data quality, providing data accessibility and data archiving, (4) help guide decisions relating to current and future instrumentation and sampling designs and protocols, (5) enable responsiveness to the user community.

7. Staffing

The managing organization will recruit, retain and develop an expert scientific, engineering, technical and administrative staff, consistent with the NSF strategic goal of cultivating a world-class, broadly inclusive science and engineering workforce. Thus, proposing organizations should include a staffing plan that identifies the roles and responsibilities of lead personnel and delineates the organizational structure, including full-time equivalent estimates, position titles, and location, that support them.

8. Diversity

NEON offers significant potential to enable the participation of traditionally underrepresented and underserved communities in the research and education mission of the Observatory and to strengthen the strategic growth of a scientific and technically trained workforce. The managing organization will demonstrate leadership in employing best practices for broadening participation in science and engineering at all levels within the Observatory's activities. These practices and the proposing organization's experiences and capability in this area should be described in the proposal.

9. Education and Outreach

The broad range of the NEON data and scientific infrastructure also offers potential to engage in a vibrant program of education, outreach and workforce development. These activities must be strategic in nature, with clear goals, and be integrated with NEON's scientific objectives. They should actively support the NSF's efforts to prepare a diverse, globally engaged science, technology, engineering, and mathematics workforce. In order to do this, the managing organization is also expected to develop collaborative partnerships, including with minority-serving institutions; networks for early-career faculty; educational products, including tutorial videos and curricula in coordination with the broader community; and appropriate evaluation mechanisms to demonstrate the impact of NEON's education and outreach efforts on the biological sciences and related research communities. Proposing organizations are expected to articulate their plan for education, training, and outreach around NEON.

The managing organization is expected to maintain, explore and establish collaborations with external stakeholders in the interest of effective management of NEON and the delivery of data and services to the user community. These include, but are not limited to data serving organizations, federal and state agencies, site hosts, land managers, community groups, and organizations that set data standards. The managing organization must demonstrate appropriate engagement of these stakeholders by proposing and carrying out activities that incorporate a wide variety of perspectives and needs. Any activities that are conducted as collaborations between NEON and other organizations must be consistent with the NEON mission and complement and enhance activities funded and approved by the NSF.

D. General Information

Following the submission of LOIs by eligible organizations, all pertinent information associated with this competition will be made available in the Resource Library. Password-protected access to the Resource Library will be provided by the Cognizant Program Officer, or a designee, to LOI submitting eligible organizations. The following list is representative of the materials which are likely to be made available in the Resource Library, and is subject to change and redaction as appropriate:

- Frequently Asked Questions (FAQs)
- Example Cooperative Agreement (CA) and Cooperative Support Agreement (CSA)
- High-level Staffing Plan
- Support Infrastructure Facility Information
- Scientific Infrastructure Facility Information
- Property and Equipment List
- Contracts Information
- List of Special Use Permits; Land Use Agreements; User Agreements/Rights of Way
- Collection and Research Permits
- Interim Report Template
- Annual Report Template

In addition, in order to more fully describe the scope of activities, the resource library will likely contain pertinent excerpts with possible redactions from documents and plans such as:

- NEON Operations & Maintenance Plan
- Property Management Plan
- NEON Safety Plan
- NEON Quality Plan
- NEON Engagement and Outreach Plan
- NEON Cybersecurity Plan
- NEON Cyberinfrastructure Plan

Any additional materials and information relating to this competition, including updated NSF responses to all pertinent proposer questions, will also be made available through the Resource Library or Frequently Asked Questions, as appropriate.

Informational Site Visits

NSF intends to organize site visits to the NEON facilities in (1) Boulder, Colorado, (2) to a terrestrial, and (3) an aquatic site for representatives of proposing organizations. The visits are expected to take place in June 2021, following the submission of Letters of Intent, and will be guided and managed by NSF staff. This will be an opportunity to view the Observatory's facilities and to acquire information relevant to the development of a proposal. Attendees will be responsible

for their own expenses.

Eligible Organizations that have submitted LOIs and wish to send representatives to the site visits should indicate so in the LOI and email confirmation to the Cognizant Program Officer (neon-bot@nsf.gov) by February 24, 2020.

III. AWARD INFORMATION

For planning purposes, proposers can assume a base budget of approximately \$65 million during the first year of the award, beginning November 2021 and should plan for no more than a 3% budget increase in each of the subsequent years. All budget amounts given herein are tentative and for initial planning purposes only. Actual annual funding increments will be determined on the basis of the detailed cost estimate required per Section V.B below and an Annual Program Operating Plan that is submitted by the awardee to and approved by NSF. Funding increments are also subject annually to the availability of funds and will be contingent on the performance of the awardee. Escalation factors used for cost estimating should be articulated in the Cost Estimating Plan

If needed, additional funding of up to \$1,000,000 may be requested to support a transition period of up to 6 months in duration. The request of funding for a transition period should be made within the Transition Plan and should not be included in the formal cost estimate or proposed budget for the initial 5-year period but must conform to the same requirements. If this amount is not sufficient for the proposed transition, please contact the NEON program for additional guidance.

Relevant transition activities include interviewing and hiring personnel, assigning subcontracts, transferring data and property, and obtaining permits and licenses. Should a transition period be necessary, the incumbent will retain responsibility for management of NEON and the new Awardee will have the appropriate level of access to incumbent personnel and facilities associated with the NEON project as determined by NSF.

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:

The Principal Investigator (PI) must be an employee of the proposing organization.

Limit on Number of Proposals per Organization: 1

An organization may only submit 1 proposal as the lead. There is no limit on the number of proposals on which an organization can be included as a subawardee.

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

Since the PI must be an employee of the managing organization, which can only submit one proposal, a PI can only submit one proposal. However, there is no limit on the number of proposals on which an individual can be included as a subaward PI.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (required):

Each eligible proposing organization must submit a Letter of Intent (LOI) through FastLane; full proposals may be submitted only by organizations that have submitted a LOI by the indicated due date.

LOIs will be used by NSF to ensure that the appropriate expertise is available for participation in the review and selection process, to foresee potential conflicts of interest, to identify any potential gaps in the capabilities being proposed, and to anticipate special award conditions that may be necessary to accommodate the proposed organizational and governance structure. The LOI is a good-faith statement of a proposer's preliminary plans for proposal submission. The senior personnel, collaborating or partnering organizations, and proposed plans are allowed to change between submission of the Letter of Intent and submission of the Full Proposal.

Letter of Intent Preparation Instructions:

Complete submission of a LOI requires two separate components that must each be submitted prior to the indicated due date.

FastLane LOI Component

Submit the following LOI information via FastLane:

- Project Title
- Synopsis (a brief abstract of maximum 2,500 characters of plain text)
- Point of Contact for NSF Inquiries
- Project PI Information
- Participating Organizations

Submission of this component via FastLane will produce a **FastLane LOI ID** that must be included in the PDF LOI Component described below.

PDF LOI Component

Via an email to the Cognizant Program Officer named herein, submit a document of no more than 5 pages in length in Portable Document Format (PDF) that addresses the following:

- A description of the proposer's strategic vision and proposed management concept for the operations and maintenance of NEON;
- A description of the envisioned organizational and governance structure to support NEON, including the identification of any collaborating and partnering institutions and their roles;
- A list that identifies full names and affiliations of proposed Key Personnel, including the PI, any co-PIs, and senior personnel for the award and potential subawards; and
- A brief synopsis of the proposer's organizational expertise in operating large scientific facilities.

The PDF document should include the **FastLane LOI ID** in a running header and must be consistent with NSF PAPPG Section II.B formatting guidelines.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Submission by an Authorized Organizational Representative (AOR) is required when submitting Letters of Intent.
- A Minimum of 0 and Maximum of 4 Other Participating Organizations are permitted
- Additional Participating Organizations is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not permitted

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

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

Full Proposals submitted in response to this solicitation must be submitted in accordance with the Proposal & Award Policies & Procedures Guide (PAPPG), [NSF 19-1](#), dated February 25, 2019. Additionally, proposals and supporting cost estimates must be prepared and submitted in accordance with Sections 3.5.1 and 4.2 of the NSF Major Facilities Guide (MFG), [NSF 19-068](#), dated September 2019.

Collaborative Proposals: Separately submitted collaborative proposals are not permitted. Each proposal must be submitted by one organization serving as the lead with all other organizations participating as subawardees.

Proposers are reminded to review procedures under "Proprietary or Privileged Information" in Chapter II.D.1 of the PAPPG and to mark only such information, including patentable ideas, trade secrets, privileged or confidential commercial or financial information, disclosure of which might harm the proposer, with the appropriate legend such as, "The following is (proprietary or confidential) information that (name of proposing organization) requests not be released to persons outside the Government, except for purposes of review and evaluation." Please also see the section entitled "Privacy Act and Public Burden Statements" below.

The following information is required for the Full Proposal:

1. **PI/Co-PI Information:** This should follow the standard PAPPG or NSF Grants.gov Application Guide guidelines.
2. **Cover Sheet:** A cover sheet must be submitted and electronically signed by an Authorized Organizational Representative for all full proposals. Proposers should select "Center/Research Infrastructure" for the Type of Proposal.
3. **Project Summary:** This section should provide a summary of the key points of the proposal and should be understandable to a scientifically or technically literate lay reader. This section must follow the standard PAPPG or NSF Grants.gov Application Guide guidelines. Proposals that do not

include an overview and separate statements on intellectual merit and broader impacts within the Project Summary will not be accepted by FastLane or will be returned without review.

4. **Project Description (up to 75 pages):** The Project Description section of each proposal should address the capabilities of the proposing organization to manage the operations and maintenance of NEON with respect to the areas described in Section II C of this solicitation. The content of the Project Description should map to the following items 4a-4e, should address the Additional Solicitation Specific Review Criteria in Section 6, and shall be limited to no more than 75 pages, not including the Budget and Supplementary Documentation described below (Collaborative Arrangements, Work Breakdown Structure Dictionary, Cost Estimating Proposal, and Transition Plan), which should be submitted as Appendices.

The Project Description shall include the following components:

a. **Management Capability** - Clearly present the management structure, capability, experience, and qualifications of the primary proposing organization and supporting organizations necessary to carry out the proposed scope. Include an aggregated description of the internal and external resources (both physical and personnel) necessary to support the proposed scope. Explain the roles, responsibilities, and lines of authority of each entity (including Key Personnel), the basis for inclusion such as the competencies they provide, and how they contribute to accomplishing NEON's objectives. Describe plans for recruiting and developing an expert scientific, engineering, technical and administrative staff and best practices for broadening participation in science, engineering and education at all levels within the Observatory's activities. Discuss how any pending international partnership agreements, as evidenced by formal memoranda/letters of agreement or intent, are likely to enhance the science goals and management of NEON operations and maintenance.

b. **Education, Training, and Community Engagement** - Discuss in detail how the proposing organization will establish and maintain interactions with advisory bodies external to its organization. Describe the proposed training and outreach efforts to increase the knowledge of NEON activities and data and increase the use of NEON data. Describe and rationalize the proposed training and outreach approaches and identify the targeted audiences. Explain how these efforts will enhance knowledge and use of NEON data by underrepresented groups. Identify the roles of any external partners or international collaborators in these activities.

c. **Operations Management and Data Delivery** - Thoroughly describe the approach to performing the proposed scope of work, especially Operations Management and Data Delivery. For the Operations Management description, discuss the approach for developing robust Annual Program Plans to manage NEON operations and maintenance. Describe strategies to be followed that will align with NSF's estimated annual funding threshold for NEON operations. Describe the approach to providing and overseeing safe and reliable long-term operation of NEON that will effectively respond to the needs of the associated scientific community. Discuss any special qualifications or organizational experience relevant to NEON operations and maintenance, cyberinfrastructure, and data delivery and how this will help to successfully perform the prospective Cooperative Agreement.

Provide a plan and detailed description of the organizational elements and procedures for any subaward and contracting establishment and management that ensures effective and efficient performance as well as responsiveness to NSF's collaboration. Describe how the proposer will use its internal management/advisory structure to help resolve disputes and decisions with and among its proposed governing framework.

d. **Operations Management, Refurbishment, and Cyberinfrastructure** - Discuss how all NEON infrastructure assets, including hardware, software, and technical data will be tracked and maintained. Discuss the plan and facilities for refurbishing or upgrading active infrastructure for deployment and cyberinfrastructure for data delivery and a plan for warehousing/storing/reusing inactive infrastructure, if any, to be removed from active operations. Discuss the approach to decision-making with respect to replacing operating infrastructure damage or losses in light of scientific priorities and budgetary limitations.

e. **Measures of Performance** - Describe how the proposing organization will assure success relative to measures of performance applicable to operation and maintenance of NEON and related training and other outreach activities. Include a discussion of how performance metrics and user statistics will be used to (a) assess how well NEON is achieving its science objectives and training and outreach goals (b) improve facility performance, and (c) verify consistent completion of activities defined by Annual Program Plans within budget and schedule.

Please note that all information relevant to determining the quality of the proposed work must be included as part of the Project Description, unless otherwise directed in this solicitation.

5. **References Cited:** This section should follow the standard PAPPG or NSF Grants.gov Application Guide guidelines.
6. **Biographical Sketches:** A resume, limited to 2 pages, must be provided for the PI, each co-PI, all Key Personnel, and any other senior personnel as required in PAPPG Chapter II.C.2.f.
7. **Budget:** See the instructions in Section B, below.
8. **Current and Pending Support:** This section should follow the standard PAPPG or NSF Grants.gov Application Guide guidelines.
9. **Supplementary Documentation:** Except as specified in this item or in the NSF PAPPG (see Chapter II.C.2.j), special information relevant to determining the quality of the proposed work must be included either as part of the Project Description or as part of the budget justification.
 - **Documentation of collaborative arrangements of significance to the proposal:** Proposers should document with formal memoranda/letters of collaboration any collaborative arrangements of significance in performing the proposed work. Letters of support are not permitted under this solicitation, and proposals containing such letters may be returned without review. Please see the NSF PAPPG Chapter II.C.2.d (iv) for further details.
 - **Work Breakdown Structure (WBS) and WBS Dictionary (text-searchable PDF up to 20 pages in length):** Proposers will develop a document that provides detailed information about each element in the WBS, such as a brief definition of the scope of work, deliverables, budget justification and schedule estimates, assessment measures, and milestones. See Figure 4.2.4-1 of the Major Facilities Guide for an example WBS.
 - **Cost Model and Cost Estimating Plan (CEP):** See Section 4.2.2.1 of the Major Facilities Guide and Section B of this solicitation below.
 - **Transition Plan:** Proposing organizations, other than the incumbent, may be funded for an additional transition period of up to six (6) months preceding the transfer of operating authority. If a new Awardee is selected to manage the operations and maintenance of NEON, the incumbent will cooperate with the successor to the extent necessary to facilitate uninterrupted support for NEON during any transition period, and will provide transfer of the relevant federally-funded property and equipment permits and other agreements. NSF will support appropriate transition costs incurred by the successor Awardee in an amount up to \$1,000,000.

A detailed transition plan and budget, not to exceed 15 pages for a transition period of up to 6 months following the new award must be provided. The transition plan must include at a minimum:

- A proposed duration and schedule for the transition period.
- Estimated resources needs for the transition period.
- Plans for personnel recruiting, orientation, and training.
- Plans for changes to staffing, facilities, or operational modes.
- A plan to acquire office infrastructure and manage the transfer of assets, inventory, commitments, plans, and documents.
- Identification of assumptions that underlie the transition plan.
- A detailed budget for the transition period, presented in accordance with instructions given in Section V.B. This budget should be presented within this Transition Plan for information only, and should not be included in the official overall proposal and cost estimate for the 5-year award period.

10. **Single Copy Documents:** Information for the items below should be entered via the Single Copy Documents section in FastLane.

- a. Collaborators and Other Affiliations Information: For the PI, any co-PIs, named senior personnel, and/or contractors (including for subawardees), provide the names of all persons, participants and affiliates with potential conflicts of interest, with format as specified in Chapter II.C.1.e of the NSF PAPPG. For each person, be sure to include information for all collaborators and other affiliations as specified in Chapter II.C.1.e of the NSF PAPPG, as well as for all known individuals who would act as advisory body members for NEON (external to the proposing organization); and all subawardees and contractors who would receive funds through the award.
- b. Additional Single Copy Document - Project Personnel: Provide the full names, affiliations, educational background, and specific role for Key Personnel for whom support is sought, including the PIs, any co-PIs, named senior personnel, and/or contractors (including for subawardees).
- c. Additional Single Copy Document - Copy of Letter of Intent. Proposers must submit a single PDF document that combines both the FastLane LOI component and the PDF LOI component described in Section V.A. Proposals lacking this combined document may be returned without review.

General Information:

A Proposer's Conference may be announced by NSF prior to the full proposal deadline, if requested by organizations that have submitted a Letter of Intent.

For additional information on this competition, NSF practices and policies, and/or access to the Resource Library that provides further detail, proposing organizations should contact the Cognizant Program Officer. The following publicly available documents will be informative:

- [Building the Future - Investing in Discovery and Innovation: NSF Strategic Plan for 2018-2022](#)
- https://www.neonscience.org/sites/default/files/document-files/2015-03-23.SCA_Report.pdf NEON Science Capability Assessment, April 2015
- Major Facility Manuals and Guidelines
 - [Major Facilities Guide \(MFG\)](#), NSF 19-68, September 2019
 - [National Science Foundation, Office of Budget, Finance, and Award Management, BUSINESS SYSTEMS REVIEW \(BSR\) GUIDE](#), Final Version 4, March 27, 2013 Note: An updated version of the BSR Guide is anticipated to be available prior to the proposal deadline of this solicitation. Once official, it will be made available on the NSF website and in the Resource Library.
- [GAO Cost Estimating Guide and Assessment Guide](#), March 2009
- <https://trustedci.org/guide> Trusted CI Guide to Developing Cybersecurity Programs for NSF Science and Engineering Projects

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Funds from this program may not support independent, individual research projects of the participants; nor are they to be used as a mechanism for a mini-grant awarding program.

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

Budget Preparation Instructions:

The budget request must be supported by cost estimates that are developed in accordance with section 4.2 of the NSF Major Facilities Guide (MFG), Government Accountability Office (GAO) Cost Estimating and Assessment Guide (GAO-09-3SP) and 2 CFR §200 of the Uniform Guidance, Subpart E, Cost Principles. A uniformly-applied Cost Estimating Plan (CEP), an activities-based Work Breakdown Structure (WBS), and a Cost Model supported by a detailed Basis of Estimate (BOE) must be provided as separate documents and submitted under supplementary documents. Deliverables-based work packages may be included for major up-upgrades or other significant acquisitions. Each identified WBS element of cost must be traceable to detailed BOEs and to each NSF budget category of the prime and each proposed subaward. To be deemed reasonable, the estimate must be developed in accordance with the steps of the GAO Cost Guide to meet the four characteristics of a high-quality estimate of well-documented, comprehensive, accurate, and credible. The escalation factors used should be described in the CEP. The CEP and BOE must articulate the assumptions made to modify the level of effort or science support capabilities, for expected efficiency gains, or for other adjustments if used to offset escalation.

Known costs resulting from routine operational risks as understood by the proposing organization should typically be included in the BOE as allowances. However, cost risks should also be addressed through the sensitivity and risk/uncertainty analysis (see Section 4.2.2.3 of the MFG). The following must be summarized in the Project Description and supported by the required detailed supplementary documents: (1) key assumptions, sensitivities, risks, uncertainties, or other elements driving estimated costs, scope, and schedule, (2) the associated potential impacts to science, and (3) plans on how to routinely reassess cost drivers and actual costs and make adjustments at least annually.

The proposal must identify all staffing and budgetary information necessary to describe how the organization will fulfill the expectations in Section I, Introduction, and Section II, Program Description, of this solicitation. Requested budget amounts for each year of the proposal should reflect the level considered necessary to perform the NSF-funded activities described in the WBS Dictionary. Proposers also should be cognizant of budget constraints implied by the estimated funding levels provided under Section III, Award Information.

Enter the anticipated total level of subrecipient support on line G5, Subawards, of the FastLane budget or line F5 of the R&R Budget Form in Grants.gov. Proposals require the inclusion of separate budgets for subawards, with a budget justification and detailed explanation of the proposing organization's cost estimate. Examples include budgeted months and salaries for personnel, quotations to support budgeted equipment, itemized listing of material and supplies with support quotations. Additional information such as pre-award review may be requested, including but not limited to, verification of risk assessment

performed and monitoring plans for each subrecipient.

Proposing organizations may include a fee in their proposed budget. The fee must be clearly identified as such in the budget justification. If submitting through FastLane, fee is entered on line "K Fee" of the NSF budget form. Fee may not be burdened with indirect rate or any other costs. Fees will be evaluated for reasonableness by NSF using a structured approach as prescribed in Agency procedures.

NSF will provide guidelines for recipients that receive fee to encourage the utmost discretion and appropriate consideration in the use of fee, to include examples of inappropriate uses of fee (e.g., including but not limited to not using fee on alcoholic beverages or lobbying as set forth at 2 CFR § 200.450 and 48 CFR 31.205-22). NSF will reserve the authority to review a recipient's actual use of fee. Accordingly, recipients must separately track and account for uses of fee provided under NSF awards. The terms and conditions of the award will specify any fee arrangement including the basis for incremental fee payments. NSF will consider reductions in future fee if a recipient's actual use of fee is in contravention with the guidelines on inappropriate uses.

Organizations that have not previously received NSF awards should review the NSF Prospective New Awardee Guide (NSF 18-033) and current NSF Major Facilities Guide (NSF 19-068) for additional guidance in preparing their budget submission.

C. Due Dates

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

February 21, 2020

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

September 17, 2021

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

Review criteria will also include assessment of the quality and extent to which the Proposal Deliverables described in Section V address the following:

1. Management Capability

- Ability of the proposing organization's organizational/governance structure, experience, qualifications and past history to manage NEON operations and maintenance and support the ecological sciences community.
- Suitability of the proposed internal and external resources (both physical and personnel) that the organization and its collaborators, if any, will provide to NEON, including the proposed internal governance structure.
- Adequacy and completeness of the definition of roles and responsibilities of any participating organization(s) and Key Personnel, including competencies to perform their roles.
- Enhancements to the scientific benefits and cost-effectiveness of NEON resulting from any proposed collaborations/partnerships.
- Ability to efficiently procure and/or provide services, equipment, and material necessary for management of NEON operations and maintenance during performance of the prospective CA.
- Sufficiency of the proposed approach to tracking and maintaining current NEON infrastructure assets, including hardware, software, and technical data.

2. Statement of Work Tasks

a. Operations Management

- Understanding of essential Operations Management activities such as those related to subaward and subcontract formation and administration, asset tracking and management, environmental, safety and health issues, reporting, budgeting, and project controls.
- Approach to obtaining the necessary resources and for implementation of and to effectively plan and execute Operations Management for the AIS, TIS, AOS, TOS, AOP components of NEON.
- Approach to developing Annual Program Plans that meet budgetary guidance as detailed in the Budgetary Preparation Instructions and documents referenced in that section, broken out by major elements for a comprehensive, proposed work breakdown structure.
- Approach to engaging the science and user community to provide confidence in the data produced by NEON and to maximizing the scientific return on the investment in NEON construction and operations.

b. Refurbishment

- Understanding of efforts necessary to refurbish and upgrade components of NEON.
- Reasonableness and effectiveness of approach to refurbish instruments and equipment within NEON components, including the capability to engage necessary suppliers and other contractors.

c. Cyberinfrastructure and Data Delivery

- Understanding of the scope of NEON Data Management, Delivery and Quality Control activities necessary to provide and sustain delivery of high quality, publicly available data/metadata from widely distributed instruments via the internet.
- Approach to maintaining and refining the interface between NEON Components and the cyberinfrastructure.
- Level of cyberinfrastructure experience of the proposer's organization and quality of past performance of analogous activities.
- Approach to establishing and maintaining information security for the NEON program.
- Approach to maintaining an accessible NEON data archive.

d. Education, Training, and Community Engagement

- Feasibility and appropriateness of approach to establishing any proposed external advisory body or bodies and developing, as appropriate, internal scientific leadership and governance.
- Extent and quality of the proposed education, training and outreach activities and their potential for success.
- Effectiveness of the proposed education and outreach activities to engage the scientific community and stakeholders in use of NEON data and assets, especially the extent to which the activities will be used to strengthen awareness of NEON data and operational activities and support the scientific users of NEON data and assets.

3. Measures of Performance

- Proposed approach to identifying and implementing discrete measures of performance (metrics) for NEON.
- Credibility of approach to interpreting performance metrics and statistics to improve the facility with respect to science objectives and community and NSF expectations.

4. Proposed Budget

- Reasonableness and sufficiency of the estimated costs and justification for each WBS element of NEON operations and maintenance during the performance period.
- Alignment of proposed budget with the required cost categories and the reasonableness of estimates therein.
- Reasonableness of the approach to achieving operation and maintenance of NEON within the funding threshold, while accounting for cost drivers such as operational risks and inflation.

5. Supplementary Documentation

- Advantages of any proposed collaborative arrangements to management of NEON operations and maintenance.
- Adequacy of proposed Work Breakdown Structure Dictionary in defining activities related to NEON operations and maintenance.
- Proposed approach for transition of management of NEON operations and maintenance as applicable, with respect to personnel resources, physical and intellectual property, and subaward/contractual commitments.

B. Review and Selection Process

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

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, and may be subject to a reverse site visit with specialist reviewers, as a prerequisite to the awarding of funds.

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants and Agreements Officer in the Division of Acquisition and Cooperative Support. 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 for Major Facilities, the Modifications and Supplemental Financial & Administrative Terms and Conditions for Major Multi-User Research Facility Projects and Federally Funded Research and Development Centers. Finally, the award will contain any applicable Programmatic Terms and Conditions and Special Award Specific 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=papppg.

Special Award Conditions:

The award associated with this solicitation will be a cooperative agreement, not a standard grant, continuing grant or a contract. Individual cooperative support agreements may be issued under the terms and conditions of the overall governing cooperative agreement. Any special requirements not stated herein will be negotiated at time of award.

News releases and other similar items prepared by the Awardee and/or its subcontractors/employees that describe NEON activities or research results will be submitted for NSF review at least five days prior to proposed publication and will acknowledge the sponsorship of the NSF. Public information brochures, and other similar NEON-related material prepared by the Awardee, will be sent to the NSF before being made available to the public.

The Awardee will follow [NSF LOGO AND VISUAL IDENTITY GUIDELINES: STANDARDS, INFORMATION AND USAGE](#) including but not limited to acknowledgement of the support of the NSF on any signs identifying NEON at its various locations. An acknowledgement of NSF support and disclaimer must appear in any publication of any material based upon or developed under this award in substantially the following terms:

"The National Ecological Observatory Network is sponsored by the National Science Foundation. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation." (The preceding sentence may be omitted from scientific articles or papers published in scientific journals.) Also, support of other agencies or international contributors shall be acknowledged as appropriate.

Programmatic Terms and Conditions:

The cooperative agreement(s) awarded as a result of this competition will be administered by the cognizant NSF Program in cooperation with the submitting organization. The following measures will be employed in providing oversight for the cooperative agreement:

- Review of annual reports, program plans and performance metrics;
- Review of research and education activities and management performance approximately midway through the five-year award;
- Site visits annually, or as necessary;
- Such other NSF substantial involvement as determined appropriate.

Financial and Administrative Terms and Conditions:

Costs incurred are to be in accordance with Subpart E of 2 CFR 200 – Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards, or Federal Acquisition Regulation (FAR) Part 31, as applicable to the award recipient type.

The recipient will be required to submit to a Business Systems Review at least once during the five-year award period. Further information may be obtained here: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13100

Standard cooperative agreement terms and conditions, including Modifications and Supplemental terms for Major Multi-User Research Facilities and FFRDC's are available at: https://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF. Specific terms and conditions will be negotiated at time of award.

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.

Content and schedule for additional required deliverables will be specifically defined in the Cooperative Agreement.

In addition to the Annual Project Report, Final Project Report, and Project Outcomes Report, the Awardee will provide the following:

A Draft Annual Program Plan (APP) for the coming project year a minimum of 60 days prior to the end of the current fiscal year that establishes the technical approach to fulfilling NSF goals and requirements and cost targets for expenditures for the next program operational year. The APP will cover the upcoming operational year and will address, but not be limited to, Programmatic Goals, Metrics and Milestones, Field Activities, Staffing and Organization Plans, Project Budgets, Major Planning Activities, and Insurance, Permitting and Environmental Considerations. APP contents will reflect the schedules, funding levels, guidelines and formats approved by the NSF Program Officer, with detailed budgets for each Work Breakdown Structure Element. The draft approved Annual Program Plans will serve to guide management of NEON operations and maintenance or each respective year during the Cooperative Agreement period of performance. The draft APP will be refined and submitted to the NSF Program Officer for approval a minimum of 60 days prior to the start of the new program operational year. Significant changes, apparent to the Awardee or identified by the NSF Program Officer, in objectives or activities described in the Annual Program Plan, must be approved by the NSF Grants and Agreements Officer prior to implementation. The impacts and reasons for the proposed changes must be explained. The changes may or may not require modification of the approved budget. Awardee shall provide NSF Program Officials with copies of all significant revisions to documentation, upon request, substantiating all changes to the APP, whether or not NSF approval is required.

Weekly Activity Report summarizing ongoing Awardee efforts.

Bimonthly Report summarizing program accomplishments, status and issues.

Quarterly Report linked to Annual Program Plan including:

- Budget report summarizing expenditures during the current reporting period; and
- Milestone schedule status report including a list and description of milestones and activities completed, replanned via change control or missed.

Annual Performance Report submitted once per year, no later than one month prior to a regular performance review of the NEON Project Team. This report will provide a comprehensive analysis of the NEON Project over the reporting period for external review of NEON operations. The Annual Performance Report may be submitted separately or as a separate section within the Annual Project Report.

Regular Informal Reports including communication with the Cognizant NSF Program Officer.

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:

- Roland Roberts, Cognizant Program Officer, telephone: (703) 292-7884, email: neon-bot@nsf.gov
- Montona Futrell-Griggs, Project Manager, telephone: (703) 292-7162, email: neon-bot@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 (FASSED) 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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