

NSF Earth Sciences Postdoctoral Fellowships (EAR-PF)

PROGRAM SOLICITATION

NSF 18-565

REPLACES DOCUMENT(S):

NSF 17-583



National Science Foundation

Directorate for Geosciences
Division of Earth Sciences

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

September 19, 2018

September 12, 2019

Second Wednesday in September, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

This solicitation has been edited to clarify eligibility requirements, submission of supplementary documentation, and available areas of research. The due date for submission of proposals has also changed.

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

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

EAR Postdoctoral Fellowships (EAR-PF)

Synopsis of Program:

The Division of Earth Sciences (EAR) awards Postdoctoral Fellowships to recent recipients of doctoral degrees to conduct an integrated program of independent research and professional development. Fellowship proposals must address scientific questions within the scope of EAR disciplinary programs and must align with the overall theme for the postdoctoral program. The program supports researchers for a period of up to two years with fellowships that can be taken to the institution of their choice (including institutions abroad). The program is intended to recognize beginning investigators of significant potential, and provide them with research experience, mentorship, and training that will establish them in leadership positions in the Earth Sciences community. Because the fellowships are offered only to postdoctoral scientists early in their career, doctoral advisors are encouraged to discuss the availability of EAR postdoctoral fellowships with their graduate students early in their doctoral programs. Fellowships are awards to individuals, not institutions, and are administered by the Fellows.

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.

- Aisha R. Morris, telephone: (703) 292-7081, email: earpf@nsf.gov
- Jennifer Wenner, telephone: (703) 292-8550, email: jwenner@nsf.gov

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

- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Fellowship

Estimated Number of Awards: 8 to 10

Eight to ten fellowships per year contingent upon availability of funds.

Anticipated Funding Amount: \$1,740,000

The expected annual budget for the EAR-PF program is \$1.74 M, for up to 10 awards per year (\$87,000 per year per fellowship).

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Proposals must be submitted by individuals. NSF postdoctoral fellowships are awards to individuals not to institutions. However, the individuals must affiliate with an institution (e.g. institutions of higher education, privately-sponsored nonprofit institutes and museums, government agencies and laboratories) anywhere in the world.

Who May Serve as PI:

An individual (also referred to as proposer) is eligible to submit a proposal to the NSF EAR Postdoctoral Fellowship program if all the following criteria are met:

- Be U.S. citizens (or nationals) or permanent residents of the United States (i.e., have a "green card") at the time of proposal submission;
- Either currently be a graduate student or, at the deadline date, have served in a position requiring the doctoral degree for no more than 18 full-time-equivalent months since earning the degree. If more than 18 months have elapsed between conferral of the doctoral degree and the deadline date, the candidate must include specific language in their Biographical Sketch (discussed below) affirming that they meet this eligibility requirement;
- Must present a research plan that falls within the theme of the solicitation and within research areas supported by the Division of Earth Sciences disciplinary programs at NSF (<https://www.nsf.gov/div/index.jsp?div=EAR>);
- Proposers are encouraged to expand the network of collaborators and implement the fellowship at an institution new to the proposer. However, proposers who choose to carry out the postdoctoral fellowship at the institution where they received their PhD or their current institution at the time of submission must meet these three conditions: (1) have been at this institution for at least 12 months at the time of submission; (2) present a strong justification and clearly explain the benefits of this choice to their research and professional development goals; and (3) have two scientific mentors, one at the hosting institution and a second mentor at a different institution who is a new collaborator with the proposer;
- The research plan must be original and not have been a component of a proposal previously submitted to the Division of Earth Sciences;
- The same project must not have been submitted concurrently to another NSF program.

Limit on Number of Proposals per Organization:

Only individuals may submit proposals. There is no limit on the number of fellows that an institution may host.

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

Individuals may submit only one fellowship proposal to EAR per year.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
 - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
 - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

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

Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

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

September 19, 2018

September 12, 2019

Second Wednesday in September, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

The Division of Earth Sciences (EAR) offers two-year postdoctoral fellowships to provide opportunities for scientists early in their careers to obtain training beyond their graduate education. The postdoctoral fellowship program is intended to recognize beginning investigators of significant potential, and provide them with experience that will establish them in positions of leadership in the scientific community. Projects that are innovative and lead to new areas for development are encouraged. During the tenure of the fellowships, participants will be conducting research on topics supported by EAR disciplinary programs that align with the **research theme** for this solicitation and implement a professional development plan. Projects may employ any combination of field, laboratory, and computational studies with observational, theoretical, or experimental approaches. Fellows must affiliate with appropriate research institutions and are expected to devote themselves full time to the fellowship activities during its term.

II. PROGRAM DESCRIPTION

A. Research theme and professional development plan

The EAR Postdoctoral Fellows are expected to propose a strong, coherent research program in or across any area of Earth Science within the scope of the Division of Earth Sciences (EAR) disciplinary programs. The Division of Earth Sciences supports proposals for research geared toward improving the understanding of the structure, composition, and evolution of the Earth, evolutionary history of the life it supports, and the processes that govern the formation and behavior of Earth materials. The NSF EAR web site lists [EAR disciplinary programs](#). Candidates are encouraged to approach the fellowships as opportunities to broaden their experience with research that moves beyond their previous research focus, and that takes a broad view of integrating disciplines, extending technical approaches to problems, or expanding collaborations.

The theme of this solicitation is "issues relating to scale." Earth Science research addresses processes that operate at different scales (e.g. spatial, temporal, numerical), but many communities are just now starting to study processes across different scales, or how processes operating at one scale translate to another. EAR Postdoctoral Fellowship proposals must address scale dependence of processes, i.e., can the principles of interest be applied across several scales or dimensions such as local to global, lab to field, macro to micro; what is the duration or occurrence of processes over time such as deep past to present. Fellows may ask whether there are scaling limits to results, scalability limits to the data acquired, or whether there are interactions across or within various levels of scale that provide new insights into the problem at hand. Proposers are encouraged to be integrative across areas supported by EAR, and innovative in their approaches.

In addition, fellowship proposers are expected to include a coherent program of professional development activities as part of their proposal. Such activities may include training or experiences important for careers in academia, government, industry, or other career paths. As a rough guideline, fellows should plan on their professional development activities taking no less than 10% and no more than 25% of their time. Proposers are encouraged to discuss the proposed professional development activities with their proposed host prior to proposal submission so that the professional development activities can be incorporated into the mentoring plan.

B. Appropriateness for EAR priorities

A research plan aligned with the theme of the solicitation and within the scope of any EAR disciplinary program is eligible for support. EAR focuses on improving our understanding of the Earth's structure, composition, evolution, and the interaction with the Earth's biosphere, atmosphere, and hydrosphere. Programs include Geobiology and Low Temperature Geochemistry, Geomorphology and Land Use Dynamics, Geophysics, Hydrologic Sciences, Petrology and Geochemistry, Sedimentary Geology and Paleobiology, and Tectonics. If you are uncertain of whether your research topic is within the purview of EAR disciplinary programs, you are strongly encouraged to contact the cognizant NSF program officer for this solicitation to discuss the appropriateness of the research. Proposals that address research topics outside the purview of EAR programs will be returned without review.

C. Location of Work

Research and professional development activities supported by this fellowship program may be conducted at any appropriate U.S. or foreign host institution. Appropriate institutions include institutions of higher education, private nonprofit institutes and museums, government agencies and laboratories. Fellows are expected to be fully integrated into the research and relevant activities of their host institution. The justification of the choice of institutions must be made clearly and compellingly in the proposal.

Because the objectives of the fellowships include broadening the perspectives and experiences of the Fellows and promoting interdisciplinary research careers, careful consideration should be given to the selection of the scientific mentor(s) and host institution(s). In general, NSF expects that the fellowship will support work at an institution(s) other than the fellow's graduate institution or organization of current affiliation. Consequently, candidates proposing to be hosted by their graduate/current institution must meet the following three conditions: (1) have been at this institution for at least 12 months at the time of submission; (2) present a strong justification and clearly explain the benefits of this choice to their research and educational goals; and (3) have two scientific mentors, one at the hosting institution and a second mentor at a different institution who is a new collaborator with the proposer.

D. The Scientific Mentor(s)

The Fellow must affiliate with a host institution(s) at all times during the entire tenure of the fellowship. The proposer is responsible for making prior arrangements with the host institution(s) and scientific mentor(s). If the location of work is the PhD granting institution or current institution at time of submission, the fellow must list **two scientific mentors**: a host mentor and an external mentor. The host mentor, at the location of work, will provide mentoring and guidance with research and professional development activities. The external mentor and new collaborator, at a different institution, is expected to also provide guidance with the activities and to facilitate the amplification of scientific perspectives of the fellow beyond those provided by the host mentor. An important basis for judging the suitability of the host institution(s) is the degree to which the institution letter(s) describes and offers a research, professional development, and mentoring plan that could not be provided without fellowship support. (See Section V.A. Proposal Preparation Instructions for additional information about the institution letter.)

III. AWARD INFORMATION

A. Duration and Tenure:

Up to 24 full-time-equivalent months of support may be requested. Fellowship tenures must begin within 12 months of notification of the award, and start on the first of the month.

Interruptions in tenure or extensions without additional cost to NSF are permitted only for circumstances beyond the control of the fellow and require NSF approval.

Within the fellowship period, one month per year of fellowship duration may be used for paid leave, including parental or family leave. The paid leave

cannot be used to increase the level of NSF support beyond the duration of the fellowship. NSF enables [career-life balance](#) through a variety of mechanisms.

Successful proposers will be notified within six months after the proposal submission deadline. Those proposers selected to receive fellowships will be contacted by NSF and asked to provide additional information, such as completing acceptance forms and starting certificates, before starting their fellowships. Successful proposers who have not completed their PhD at the time of proposal submission must provide certification of receipt of the PhD before receiving their fellowship award. Normally fellowships will be held at institutions specified in the proposal, but under certain circumstances, and with suitable justification, Fellows may transfer during the tenure of the fellowship to a new institution upon approval by NSF.

Fellowships are not renewable.

During the tenure of the fellowship, no additional appointment or fellowship may be held without permission of the cognizant NSF program officer.

B. Stipend and Allowances:

The total fellowship amount is \$87,000 per year consisting of two components:

- o A stipend is \$62,000 per year paid directly to the Fellow on a monthly schedule;
- o An annual fellowship allowance of \$25,000 paid directly to the Fellow and intended to cover costs of the fellowship including:
 - expenses directly related to the conduct of the proposed research and professional development activities, including but not limited to materials and supplies, equipment, computing resources, access to databases, training courses, travel, publication charges, and subscription fees;
 - expenses in support of the Fellow, such as office space, general purpose supplies and use of equipment, facilities and other institutional resources; and
 - expenses in support of fringe benefits, including but not limited to individual or family health insurance provided through a group or individual plan, dental and/or vision insurance, disability insurance, retirement savings, dependent care, and moving expenses.

No additional appointment or fellowship may be held during the period of the fellowship. No other remuneration from any source may be accepted during the period of the fellowship without permission of the cognizant NSF program officer.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- o Proposals must be submitted by individuals. NSF postdoctoral fellowships are awards to individuals not to institutions. However, the individuals must affiliate with an institution (e.g. institutions of higher education, privately-sponsored nonprofit institutes and museums, government agencies and laboratories) anywhere in the world.

Who May Serve as PI:

An individual (also referred to as proposer) is eligible to submit a proposal to the NSF EAR Postdoctoral Fellowship program if all the following criteria are met:

- o Be U.S. citizens (or nationals) or permanent residents of the United States (i.e., have a "green card") at the time of proposal submission;
- o Either currently be a graduate student or, at the deadline date, have served in a position requiring the doctoral degree for no more than 18 full-time-equivalent months since earning the degree. If more than 18 months have elapsed between conferral of the doctoral degree and the deadline date, the candidate must include specific language in their Biographical Sketch (discussed below) affirming that they meet this eligibility requirement;
- o Must present a research plan that falls within the theme of the solicitation and within research areas supported by the Division of Earth Sciences disciplinary programs at NSF (<https://www.nsf.gov/div/index.jsp?div=EAR>);
- o Proposers are encouraged to expand the network of collaborators and implement the fellowship at an institution new to the proposer. However, proposers who choose to carry out the postdoctoral fellowship at the institution where they received their PhD or their current institution at the time of submission must meet these three conditions: (1) have been at this institution for at least 12 months at the time of submission; (2) present a strong justification and clearly explain the benefits of this choice to their research and professional development goals; and (3) have two scientific mentors, one at the hosting institution and a second mentor at a different institution who is a new collaborator with the proposer;
- o The research plan must be original and not have been a component of a proposal previously submitted to the Division of Earth Sciences;
- o The same project must not have been submitted concurrently to another NSF program.

Limit on Number of Proposals per Organization:

Only individuals may submit proposals. There is no limit on the number of fellows that an institution may host.

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

Individuals may submit only one fellowship proposal to EAR per year.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

- 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.

Proposal Preparation Instructions for Fellowships

A full proposal consists of many parts. Proposers are advised to begin the proposal well in advance of the submission deadline and to submit as early as possible. Partially completed proposals may be saved for future completion and submission. The submission of incomplete or late proposals is not permitted. Submission through NSF FastLane is strongly recommended because these are Fellowships with unique requirements. If the proposer elects to submit through Grants.gov, notification that ALL required documents have been successfully uploaded into FastLane by the deadline date must be affirmed. Otherwise this will be considered an incomplete or late proposal and will be returned without review.

Before starting proposal preparation, the proposer must be registered as an individual. Proposers must register as a [new individual in Research.gov](#) and/or as a [new individual in Grants.gov](#). **Fellowship proposals must be submitted by the Fellowship proposer, not by the proposer's current or proposed organizational Sponsored Projects Office (SPO).** The proposer serves as his/her own SPO and Authorized Organizational Representative (AOR) for the purposes of any research administration functions in FastLane or Grants.gov.

Proposals must include all of the following items. In cases where requirements given in this document differ from those given in the NSF Proposal and Award Policies and Procedures Guide (PAPPG) or the NSF Grants.gov Proposer Guide, this solicitation takes precedence.

- NSF Cover Sheet: FastLane Users: Select the EAR-PF program solicitation number shown at the beginning of this solicitation from the drop-down menu. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Proposer Cover Sheet. The title must start with the acronym "EAR-PF", followed by the descriptive title of the research. If the project will involve international partners, check the "International Cooperative Activities" box and identify the country/countries involved.
- Information about Principal Investigators/Project Directors.
- Table of Contents. This form will be automatically generated.
- Project Summary: not more than one page in length that includes an overview of the project and separate statements that clearly address the intellectual merit and broader impacts. In addition, the Project Summary must also identify (in the overview section):
 - Proposed scientific mentor(s)
 - Proposed host organization(s)
 - EAR disciplinary program that aligns with research topic
 - Alignment with the research theme of this solicitation
- Project Description, not to exceed ten (10) single-spaced pages (including figures, pictures, and tables), which must include the following information: (1) detailed plans for research and professional development activities; and (2) a detailed justification for the choice of the host institution(s) and scientific mentor(s), identifying collaborating scientist(s), and relating the proposed work to current research and educational efforts at the host institution(s). Note items in Section II. Program Description, topics A-D above.
- References Cited. See the PAPPG for format.
- Biographical Sketch of the proposer, not to exceed two (2) pages. See the PAPPG for format. The Biographical Sketch must include identification of U.S. citizenship or permanent resident status, and the month and year when PhD was (or is expected to be) received. If more than 18 months have elapsed between the date that the doctoral degree was conferred and the EAR-PF proposal deadline, the Biographical sketch must include the following statement: "I affirm that I have not worked for more than 18 full-time-equivalent months in positions for which the doctoral degree was a requirement." Other components of biographical sketches described in the PAPPG must be included as well. Only the proposer's Biographical Sketch should be uploaded in this section. List of Collaborators for the proposer should be included in the 'Collaborators and Other Affiliations' under Single Copy Documents. List of Collaborators for the PhD advisor and scientific mentor(s) must be included in the "Additional Single Copy Documents section". Both should be in the format noted in the PAPPG.
- NSF Budget. The stipend and activities allowance should be entered in, **Participant Support Costs** (Section F on the FastLane budget and Field E on the Grants.gov budget). Enter the \$62,000 stipend in F.1 (FastLane) or E.2 (Grants.gov) and the \$25,000 activities allowance in F.4 (FastLane) or E.5 (Grants.gov). Enter (1) as the total number of participants. No other budget lines should be used for fellowship proposals. An annual budget must be submitted for each of the two years of the fellowship support and be identical. A budget justification of no more than two pages should document and justify the estimated costs as organized in the budget components described above.

In FastLane: Since no person months and no salary are being requested for senior personnel, the PI (fellow) should be removed from section A of the budget.

This can be done by clicking "Add/Delete Senior Personnel", then "Check to remove" by the name, on the budget form. [Additional information is available on the FastLane website.](#)

- Current and Pending Support. Include current support for research and training. Under pending support, include this proposal, as well as pending and planned proposals to other fellowship or research programs.
- Facilities, Equipment and Other Resources, as applicable. Insert text or upload a document that states "See Letter(s) of Commitment from the prospective host organization(s)."

Supplementary Documentation:

- Data Management Plan, not to exceed two (2) pages, to be submitted as Supplementary Documentation. All proposals must include a supplementary document labeled "Data Management Plan" that describes plans for data management and sharing of the physical and virtual products of research, or asserts the absence of the need for such plans. See the Proposal and Award Policies and Procedures Guide and the [EAR data policy](#) on the web.
- The letter of commitment from the proposed scientific mentor(s) (one letter per institution), as described below, should be submitted as a supplementary document:
 - The letter(s) of commitment from the prospective scientific mentor(s) should be signed by both the department chair (or equivalent) and the proposed scientific mentor(s);
 - The letter(s) should certify that the proposer's proposal has been read and approved by the proposed scientific mentor(s);
 - That adequate facilities and support will be provided for the fellow;
 - The letter should include a mentoring plan that discusses the role the proposed scientific mentor(s) will play in the professional development of the fellow, and of the opportunities for training and research at the host institution that will be of particular benefit to the fellow;
 - Should the proposer propose to hold the fellowship at more than one institution through the 2-year tenure, letters of commitment must be provided for all institutions involved;
 - Since this program relies on reviewed proposals rather than applications, letters of recommendation will not be considered. Thus the letter of commitment from the institution should not constitute a letter of recommendation.
- Other letters of collaboration should follow the guidance in the PAPPG and adhere to the language allowed by the PAPPG, noted below.

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

Single Copy Documents:

- The proposer should submit their collaborator information under "Collaborators & Other Affiliations (COA)" specified in the PAPPG using [the instructions and spreadsheet template](#);
- List of collaborators of the PhD advisor and proposed scientific mentor(s) should be submitted under "Additional Single Copy documents" using the same spreadsheet template as noted above;
- List of suggested reviewers (optional);
- Some proposals may require other documentation before the final decision can be made, e.g., government permits. Their existence should be noted in the project description but they should not be included in the proposal. NSF may request them later.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

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

C. Due Dates

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

September 19, 2018

September 12, 2019

Second Wednesday in September, Annually Thereafter

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

For Proposals Submitted Via FastLane:

Before starting proposal preparation, the proposer must register as a new individual in Research.gov: <https://www.research.gov/accountmgmt/assets/welcomeunaffiliated.html>. Detailed instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submitting the Proposal: Fellowship proposals must be submitted by the individual, not by the individual's current or proposed organizational Sponsored Projects Office (SPO). The individual serves as his/her own SPO and Authorized Organizational Representative (AOR) for the purposes of any research administration functions in FastLane. As such, the proposer, serving as the SPO/AOR must electronically sign and submit the proposal using the Sign and

Submit button in FastLane. The individual is signing on his/her own behalf and by signing the proposal NSF is in no way inferring that the individual has assumed organizational status. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

For Proposals Submitted Via Grants.gov:

Before starting proposal preparation, the proposer must register as a new individual in Research.gov and Grants.gov. To register as a new individual in Research.gov go to: <https://www.research.gov/accountmgmt/assets/welcomeunaffiliated.html> and to register in Grants.gov go to: <https://www.grants.gov/web/grants/applicants/registration.html>. Once registered, the proposer can then apply for grant opportunities which indicate "Individual" eligibility 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 provides additional technical guidance regarding 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: Fellowship proposals must be submitted by the individual, not by the individual's current or proposed organizational Sponsored Projects Office (SPO). Once all documents have been completed, the individual must submit the proposal to Grants.gov and verify the desired funding opportunity and agency to which the proposal is submitted. The individual must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

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

2. Merit Review Criteria

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

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

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

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

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

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

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

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

Additional Solicitation Specific Review Criteria

In addition to the above criteria, the following factors will be used in the evaluation process:

- Qualifications of the proposer and his/her potential for continued professional growth and leadership in the field. Leadership in the field would be assessed based on: (1) how the proposed project expands the scientific expertise of the proposer; (2) placement of the proposed project within the context of what is known on the subject; and (3) science communication track record;
- Qualifications and suitability of the proposed host institution and the scientific and educational collaborations proposed;
- Relevance of the research proposed to the theme for this solicitation;
- Prospective benefits to the proposer, the scientific discipline, and the activities of the host institution;
- If a second scientific mentor is included, the proposed plan for interactions among the proposer, host mentor and second scientific mentor will be evaluated based on its clarity and designed to promote the professional development of the fellow.

B. Review and Selection Process

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

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

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to the *individual* by a Grants Officer in the Division of Grants and Agreements. Individuals 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 individual. (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. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the individual via e-mail.

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

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

Special Award Conditions:

The fellowship award is made to the individual, not the institution. Payments are made to the individual. Awards cannot be extended without prior NSF approval.

Candidates selected to receive fellowships will be contacted by NSF and asked to provide additional information, such as acceptance forms and starting certificates, before starting their fellowships. Successful candidates who have not completed their doctoral degrees at the time of proposal submission must provide certifications of the receipt of the PhD before receiving a fellowship award.

Normally fellowships will be held at the host institution(s) specified in the proposal; however, under certain circumstances and with suitable justification, fellowships may be transferred to a new organization upon approval by NSF.

No additional appointment or fellowship may be held during the period of the fellowship. No other remuneration from any source may be accepted during the period of the fellowship without permission of the cognizant NSF program officer.

Candidates are encouraged to discuss institutional policies on intellectual property rights with the scientific mentor(s) before submitting the proposal. Candidates should also discuss the policies of the scientific mentor(s) regarding which materials will remain with the host organization(s) and which can be released to the Fellow at the conclusion of the fellowship.

Fellows are required to adhere to the EAR Data Policy available on the EAR website (<https://www.nsf.gov/geo/geo-data-policies/ear/index.jsp>). Final reports for all awards should include a statement describing how the data policy requirements have been met.

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.

In addition to annual and final reports, Fellows must file:

1. an interim report 90 days after the start of the fellowship. This report must include a letter signed by the postdoctoral fellow and the host mentor on the expectations for the fellowship and the deliverables that must be produced at the end of the fellowship;
2. a termination certificate at the end of the fellowship.

Final reports for all awards should include a statement describing how the data policy requirements have been met. Information on the EAR Data Policy is available on the EAR website (<https://www.nsf.gov/geo/geo-data-policies/ear/index.jsp>).

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:

- Aisha R. Morris, telephone: (703) 292-7081, email: earpf@nsf.gov
- Jennifer Wenner, telephone: (703) 292-8550, email: jwenner@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.

For questions about the EAR Postdoctoral Fellowship program, please send a message to: earpf@nsf.gov. For questions about the EAR Postdoctoral Fellowship program, please check the FAQs at [NSF 17-122](#), and if your question is not answered there, please send a message to earpf@nsf.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) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, [NSF-50](#), "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and [NSF-51](#), "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). 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 3145-0023. Public reporting burden for this collection of information is estimated to average 12 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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