

Atmospheric and Geospace Sciences Postdoctoral Research Fellowships (AGS-PRF)

PROGRAM SOLICITATION NSF 19-574

REPLACES DOCUMENT(S):
NSF 14-509



National Science Foundation
Directorate for Geosciences
Division of Atmospheric and Geospace Sciences

Full Proposal Deadline(s):

Proposals Accepted Anytime

IMPORTANT INFORMATION AND REVISION NOTES

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:

Atmospheric and Geospace Sciences Postdoctoral Research Fellowships (AGS-PRF)

Synopsis of Program:

The Division of Atmospheric and Geospace Sciences (AGS) awards Postdoctoral Research Fellowships (PRF) to highly qualified early career investigators to carry out an independent research program. The research plan of each Fellowship must address scientific questions within the scope of AGS disciplines. The program supports researchers for a period of up to 2 years with Fellowships that can be taken to the institution of their choice. The program is intended to recognize beginning investigators of significant potential and provide them with experience in research that will broaden perspectives, facilitate interdisciplinary interactions and help establish them in leadership positions within the Atmospheric and Geospace Sciences community. 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.

- Ilia I. Roussev, Geospace Science Track, telephone: (703) 292-8519, email: geospaceprf@nsf.gov
- Sylvia A. Edgerton, Atmosphere Science Track, telephone: (703) 292-8522, email: sedgerto@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: 5 to 8

Five to eight fellowships each year contingent upon availability of funds.

Anticipated Funding Amount: \$1,500,000

The expected annual budget for the AGS-PRF program is \$1.5 M, for up to 8 awards per year, subject to availability of funds.

Award budgets will be \$94,000 in year one of the award and increase to \$96,000 in year two.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- AGS Postdoctoral Research Fellowships are awards to individuals; proposals are submitted directly by the fellowship candidate to NSF. Each candidate must identify one or more sponsoring scientist(s) and host institution(s) in the proposal. Activities supported by the AGS Fellowship program may be conducted at any appropriate U.S. host institution as defined in the Program Description.

Who May Serve as PI:

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

- Be U.S. citizens (or nationals) or legally admitted permanent residents of the United States (i.e., have a "green card") at the time the proposal is submitted;
- Present research and professional development plans that fall within the purview of the Division of Atmospheric and Geospace Sciences at NSF (<https://www.nsf.gov/div/index.jsp?div=ags>);
- Not have submitted an identical proposal concurrently to another NSF program or to a similar program in another Federal agency (e.g., NOAA, NASA);
- Meet one of the following criteria:
 - currently a graduate student;
 - have held a PhD degree in a scientific or engineering field for no more than 2 years at time of submission;
 - have had no more than 18 months full time employment between degree being conferred and proposal submission. If more than 2 years have elapsed since the PhD degree was conferred, but the proposer has less than the equivalent of 18 months full time employment at time of submission, then the proposer must include specific language in the Biographical Sketch affirming their eligibility.
- 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 and/or department who is a new collaborator with the proposer.

If an applicant fails to meet any eligibility criterion, their proposal will be returned without review. Applicants uncertain about the eligibility requirements are strongly encouraged to contact a cognizant NSF program officer listed in this solicitation.

Awardees must begin the fellowship within 6 months of notification of an award.

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 at a time.

An applicant may not submit more than 2 proposals (lifetime limit) to the AGS-PRF solicitation. (Note: These proposals do not allow for co-PIs.)

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 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):**

Proposals Accepted Anytime

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 Atmospheric and Geospace Sciences (AGS) offers 2-year Postdoctoral Research Fellowships (PRF) to provide opportunities for scientists early in their careers to obtain training beyond their graduate education. The AGS-PRF is intended to recognize beginning investigators of significant potential and provide them with research experiences that will broaden perspectives, facilitate interdisciplinary interactions and establish them in positions of leadership within the scientific community.

During the tenure of the Fellowships, participants must conduct research on topics supported by AGS. 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. Appropriateness for AGS priorities

Any research plan whose focus falls within the scope of any of the AGS disciplines is eligible for support. AGS supports research to add new understanding of the behavior of Earth's atmosphere and its interactions with the Sun. The research must fit within one of the two AGS tracks:

Geospace Track: Science that aligns with the Aeronomy, Magnetospheric Physics or Solar Terrestrial Physics program

- The Aeronomy Program supports research on the phenomena of ionization, recombination, chemical reaction, photo emission, and energy and momentum transport within and between Earth's mesosphere, thermosphere, and ionosphere. The program also supports research into the coupling of the global system to the stratosphere below and magnetosphere above, and the plasma physics of phenomena manifested in the coupled ionosphere-magnetosphere system.
- The Magnetospheric Physics Program supports research on the magnetized plasma envelope of Earth's outer atmosphere, including coupling with the ionosphere below and the heliosphere above.
- The Solar-Terrestrial Program supports research on the processes by which energy is generated by the Sun, transported to the Earth, and ultimately deposited in the terrestrial environment.

Atmospheric Track: Science that aligns with the Atmospheric Chemistry, Physical and Dynamic Meteorology, Climate and Large-Scale Dynamics or Paleoclimate program.

- The Atmospheric Chemistry program supports research on gases and aerosols in the atmosphere, including their concentration, distribution, sources/sinks, transport, and reactivity.
- The Physical and Dynamic Meteorology program supports research on sub-synoptic meteorological phenomena, including severe and hazardous weather, cloud physics, atmospheric electricity, and boundary layer research.
- The Paleoclimate program supports research on the natural evolution of Earth's climate with the goal of providing a baseline for present variability and future trends through improved understanding of the physical, chemical, and biological processes that influence climate over the long-term.
- The Climate and Large-scale Dynamics program supports research to advance knowledge about the processes that force and regulate the atmosphere's synoptic and planetary circulation, weather, and climate.

Applicants are strongly encouraged to contact the Program Director in their area of science (see <https://www.nsf.gov/div/index.jsp?div=ags>) to discuss the appropriateness of their research for funding.

B. Location of Work

- **Geospace Track:** Research and education activities supported by the AGS Fellowship Program may be conducted at any appropriate U.S. host institution. Appropriate institutions include colleges and universities, private nonprofit institutes and museums, government installations and laboratories. The justification of the choice of institution must be made clearly and compellingly in the proposal. The applicant may propose to take the Fellowship to more than one host institution. Normally changes of institution would be sequential, moving from one institution to another during the duration of the Fellowship, but holding the Fellowship at two institutions simultaneously, for example at a national lab and a nearby university, is also possible.
- **Atmospheric Track:** Research and education activities supported by the AGS Fellowship Program may be conducted at any appropriate U.S. host institution. Appropriate institutions include colleges and universities, and private nonprofit institutes. The justification of the choice of institution must be made clearly and compellingly in the proposal. The applicant may propose to take the Fellowship to more than one host institution. Normally changes of institution would be sequential, moving from one institution to another during the duration of the Fellowship, but holding the Fellowship at two institutions simultaneously, for example two nearby universities, is also possible. *National centers, facilities or institutes funded by other federal agencies, such as NASA, NOAA, EPA or the U.S. Department of Energy, are ineligible as host institutions for the Atmospheric Science Track.*
- **Both Tracks:** The National Center for Atmospheric Research (NCAR) is ineligible as a host institution. Individuals wishing to be hosted at NCAR should apply directly to NCAR as part of the AGS-funded Advanced Study Program (ASP).

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 sponsoring scientist(s) and host institution(s).

C. The Scientific Mentor(s)

The Fellow must affiliate with a host institution(s) at all times during the entire tenure of the Fellowship and select a sponsoring scientist(s) who will provide mentoring and guidance with the research and education activities. In addition, the sponsoring scientist must design a mentoring plan for the Fellow.

The applicant is responsible for making prior arrangements with the host institution and sponsoring scientist(s). If more than one sponsor is proposed, one must be named lead sponsor and the roles of the other sponsors must be clearly stated in the project description. An important basis for judging the suitability of the host institution is the degree to which the institutional letter of collaboration describes and offers a research, education, and mentoring plan that could not be provided without Fellowship support.

(See Section V.A. Proposal Preparation Instructions for additional information about the institutional letter of collaboration.)

III. AWARD INFORMATION

A. Duration and Tenure:

Up to 24 full-time-equivalent months of support may be requested. Awardees must begin the Fellowship within 6 months of notification of an award and tenure begins on the first of the month.

Interruptions in tenure or extensions without additional cost to NSF are permitted only for extenuating circumstances and require NSF approval.

Within the fellowship period, two total months 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. A no-cost extension may be requested to extend the Fellowship award in order to complete the goals of the Fellowship plans but no supplemental funds will be provided for this purpose.

Fellowships are not renewable.

Those applicants 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 applicants who have not completed the PhD at the time of application must provide certification of the 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. If a Fellow chooses to accept employment (i.e. a tenure-track position) during a Fellowship year, the Fellow stipend will be terminated upon the start of the new position and a prorated portion of the fellowship allowance must be returned to NSF.

B. Stipend and Allowances:

The total fellowship amount is \$94,000 in year one and \$96,000 in year two consisting of two components:

1. A stipend of \$65,000 in year one and \$67,000 in year two will be available to the Fellow to draw down in monthly increments;
2. An annual fellowship allowance of \$29,000 per year is paid as a lump sum to the Fellow at the beginning of the first and second years of the Fellowship to support Fellowship activities such as:
 - o expenses directly related to the conduct of the proposed research and broadening participation activities, including but not limited to materials and supplies, use or purchase of equipment, computing resources, publication charges, subscription fees, and travel;
 - o expenses in support of the Fellow, such as office space, general purpose supplies and use of equipment, facilities and other institutional resources;
 - o expenses in support of fringe benefits, including health insurance provided through either a group plan offered by the host organization or an individual plan secured by the Fellow, dental and/or vision insurance, disability insurance, retirement, dependent care, and moving expenses; and
 - o Fellows are required to budget \$1,500 of the allowance for travel to attend an AGS PRF PI meeting each year.

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 except in rare circumstances and with the permission of the Program Officer.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- AGS Postdoctoral Research Fellowships are awards to individuals; proposals are submitted directly by the fellowship candidate to NSF. Each candidate must identify one or more sponsoring scientist(s) and host institution(s) in the proposal. Activities supported by the AGS Fellowship program may be conducted at any appropriate U.S. host institution as defined in the Program Description.

Who May Serve as PI:

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

- Be U.S. citizens (or nationals) or legally admitted permanent residents of the United States (i.e., have a "green card") at the time the proposal is submitted;
- Present research and professional development plans that fall within the purview of the Division of Atmospheric and Geospace Sciences at NSF (<https://www.nsf.gov/div/index.jsp?div=ags>);
- Not have submitted an identical proposal concurrently to another NSF program or to a similar program in another Federal agency (e.g., NOAA, NASA);
- Meet one of the following criteria:
 - currently a graduate student;
 - have held a PhD degree in a scientific or engineering field for no more than 2 years at time of submission;
 - have had no more than 18 months full time employment between degree being conferred and proposal submission. If more than 2 years have elapsed since the PhD degree was conferred, but the proposer has less than the equivalent of 18 months full time employment at time of submission, then the proposer must include specific language in the Biographical Sketch affirming their eligibility.
- 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 and/or department who is a new collaborator with the proposer.

If an applicant fails to meet any eligibility criterion, their proposal will be returned without review. Applicants uncertain about the eligibility requirements are strongly encouraged to contact a cognizant NSF program officer listed in this solicitation.

Awardees must begin the fellowship within 6 months of notification of an award.

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 at a time.

An applicant may not submit more than 2 proposals (lifetime limit) to the AGS-PRF solicitation. (Note: These proposals do not allow for co-PIs.)

Additional Eligibility Info:

Proposals may only be submitted by the following:

- Proposals must be submitted by individuals. NSF postdoctoral fellowships are awards to individuals not to institutions.

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) 292-7827 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) 292-7827 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.

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. 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.

A full proposal consists of many parts and requires input from the Fellowship applicant, the proposed sponsoring scientist(s), and the proposed host institution(s). Partially completed proposals may be saved in FastLane or Grants.gov for future completion and submission.

Proposals must include all of the following items. In cases where requirements given in this document differ from those given in the PAPPG or NSF Grants.gov Application Guide, this solicitation takes precedence.

- NSF Cover Sheet. Select the AGS-PRF program solicitation number shown at the beginning of this solicitation from the drop-down menu. Select at least one specific disciplinary program from the drop-down list in FastLane as the unit of consideration. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. The project title must begin with AGS-PRF and follow with an informational title. No co-PIs are permitted.
- Information about Principal Investigator (Applicant).
- Table of Contents. This form will be automatically generated by FastLane or Grants.gov.
- Project Summary: Limited to one page, the summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. The summary must separately address both NSF merit review criteria, intellectual merit and broader impacts; see the PAPPG for instructions. If the overview or either merit review criteria is not included in the summary, the proposal will not be accepted or will be returned without review. The summary must also identify the proposed sponsoring scientist(s) and the proposed host institution(s).
- Project Description, not to exceed ten (10) single-spaced pages (including figures, pictures, and tables), which must include the following information: (1) a detailed plan for research activities; (2) a detailed justification for the choice of the host institution(s) and sponsoring scientist(s), identifying collaborating scientist(s), relating the proposed work to current research and educational efforts at the host institution(s), and describing available facilities and resources; (3) a description of the applicant's long-term career goals and the role of this postdoctoral experience in achieving them.
- References Cited. See the PAPPG or NSF Grants.gov Application Guide for format.
- Biographical Sketch, not to exceed five (5) pages. See the PAPPG or NSF Grants.gov Application Guide for format. The Biographical Sketch must clearly include all information necessary to certify the applicant's eligibility, as well as all components described in the PAPPG. 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 AGS-PRF 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.
- NSF Budget. The stipend and fellowship allowance should be entered in Participant Support Costs (Section F on the FastLane budget and Field E on the Grants.gov budget). Enter the stipend in F.1 (FastLane) or E.2 (Grants.gov) and the fellowship allowance in F.4 (FastLane) or E.5 (Grants.gov). A budget justification of no more than five pages should document and justify the estimated costs as organized in the budget components described above. **FastLane users:** 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. Additional information is available on the FastLane website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.
- Current and Pending Support. Include current and planned proposals/applications to other research or fellowship programs.
- Facilities and Equipment: Please note that this section is a required part of the proposal. The applicant should enter "See the Project Description" in the Facilities, Equipment, and Other Resources section of the proposal.
- Data Management Plan: *All proposals must include a supplementary document of no more than two pages labeled "Data Management Plan".* Describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. General guidance for AGS Data Management Plans can be found at: <https://www.nsf.gov/geo/geo-data-policies/ags/index.jsp>
- The letter of collaboration from the proposed scientific mentor(s) (one letter per institution), as described below, should be submitted as a supplementary document: **This letter of collaboration from the institution should not be written as a letter of recommendation.**
 1. The letter of collaboration from the prospective host institution must be signed by both the department chair (or equivalent) and the proposed sponsoring scientist (scientific mentor);
 2. The letter must certify that the applicant's proposal has been read and approved by the proposed scientific mentor;
 3. The letter must certify that adequate facilities and support will be provided for the Fellow, specifying access to things such as an office, a phone line, library access, email account, etc.;
 4. The letter must include a mentoring plan (limit one page) that discusses the role the proposed scientific mentor 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.
 5. Should the applicant 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.
 6. Should the applicant propose multiple mentors that are in different departments at the same institution, both mentors should provide a separate letter.
- 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 and the proposed mentor(s) should submit their collaborator information under "Collaborators & Other Affiliations (COA)" specified in the PAPPG using [the instructions and spreadsheet template](#);
- 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.

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):**

Proposals Accepted Anytime

Proposals are accepted at any time. However, different programs may have preferred target windows so please contact the relevant program director early in the planning process for submission.

D. FastLane/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.

Proposers that submitted via FastLane 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 applicant may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

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

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

In addition to 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;
- Prospective benefits to the proposer and the scientific discipline; and
- 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 design 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 *applicant* by a Grants Officer in the Division of Grants and Agreements. Applicants 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 applicant. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 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 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 AGS Data Policy available on the AGS website (<https://www.nsf.gov/geo/geo-data-policies/ags/index.jsp>).

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 AGS Data Policy is available on the AGS website (<https://www.nsf.gov/geo/geo-data-policies/ags/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:

- Iliia I. Roussev, Geospace Science Track, telephone: (703) 292-8519, email: geospaceprf@nsf.gov
- Sylvia A. Edgerton, Atmosphere Science Track, telephone: (703) 292-8522, email: sedgerto@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 <http://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 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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