

# Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS)

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## PROGRAM SOLICITATION NSF 22-503

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### REPLACES DOCUMENT(S): NSF 21-570

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#### National Science Foundation

Directorate for Mathematical and Physical Sciences  
Division of Astronomical Sciences  
Division of Chemistry  
Division of Materials Research  
Division of Mathematical Sciences  
Division of Physics

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

January 07, 2022

## IMPORTANT INFORMATION AND REVISION NOTES

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The deadline has been moved to earlier in the year from June to January.

Proposals submitted in response to this solicitation are submitted directly to the appropriate program in one of the five MPS Divisions. The list of cognizant Program Officers is updated.

The Program Introduction has been updated, and highlights the importance of the LEAPS-Impact statement, and clarifies two objectives to address diversity both in institutional support to institutions that do not traditionally receive significant amounts of NSF-MPS funding, and in support to new investigators. Clarification that the term underrepresented refers to Blacks and African Americans, Hispanics, Latinos, Native Americans, Alaska Natives, Native Hawaiians, and other Native Pacific Islanders.

The LEAPS-MPS Impact Statement has been moved to within the 15 page narrative. The importance of this section is emphasized. Its length is specified as 2-3 pages.

Results from prior NSF awards with research components are added to the narrative. Very brief comment on non-NSF current and pending support is added.

The Chair's letter must endorse the tenure track or equivalent status of the PI.

Emphasis is added that allowable prior PI activity on instrumentation proposals refers to instrumentation infrastructure proposals. Research Opportunity Awards (ROA) is added to the list of allowable prior activity. Clarification is added that eligibility is restricted to those on the tenure-track or in tenure-track equivalent positions. Definition of tenure-track equivalency is provided. Other eligibility restrictions on prior activity as a Principal Investigator (PI) or co-Principal Investigator (co-PI) remain.

The additional review criteria have been updated to align better with the objectives of the program and the required LEAPS-MPS Impact Statement.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS)

#### Synopsis of Program:

The Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS) call has an emphasis to help launch the careers of pre-tenure faculty in Mathematical and Physical Sciences (MPS) fields at institutions that do not traditionally receive significant amounts of NSF-MPS funding,

such as some minority-serving institutions (MSIs), predominantly undergraduate institutions (PUIs), and Carnegie Research 2 (R2) universities. LEAPS-MPS has the additional goal of achieving excellence through diversity and aims to broaden participation to include members from groups underrepresented in the Mathematical and Physical Sciences, including Blacks and African Americans, Hispanics, Latinos, Native Americans, Alaska Natives, Native Hawaiians, and other Native Pacific Islanders.

These grants are intended to support MPS principal investigators, particularly at the aforementioned institutions, for whom LEAPS funding would enable the PI to submit a subsequent successful proposal to a traditional, already-existing NSF funding opportunity, such as individual investigator programs, CAREER competitions, etc. By providing this funding opportunity, MPS intends to help initiate viable independent research programs for researchers attempting to launch their research careers such that LEAPS-MPS awards are followed by competitive grant submissions that build upon the research launched through this mechanism. This LEAPS-MPS solicitation welcomes proposals from principal investigators who share NSF's commitment to diversity.

Awards are for 24 months and are up to \$250,000 total costs (direct plus indirect). Principal Investigators must be U.S. citizens or lawfully admitted U.S. permanent residents at the time of proposal submission; other visa-holders are not eligible.

Proposals in response to this solicitation must be submitted for consideration to the appropriate program in one of the five MPS Divisions.

**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.*

- Sarah Higdon (AST), telephone: (703) 292-2541, email: [shigdon@nsf.gov](mailto:shigdon@nsf.gov)
- Rebecca Peebles (CHE), telephone: (703) 292-8809, email: [rpeebles@nsf.gov](mailto:rpeebles@nsf.gov)
- Souleymane O. Diallo (DMR), telephone: (703) 292-8302, email: [somardia@nsf.gov](mailto:somardia@nsf.gov)
- Yuliya Gorb (DMS), telephone: (703) 292-2113, email: [ygorb@nsf.gov](mailto:ygorb@nsf.gov)
- Kathleen V. McCloud (PHY), telephone: (703) 292-8236, email: [kmcccloud@nsf.gov](mailto:kmcccloud@nsf.gov)
- Michelle Bushey (OMA), telephone: (703) 292-4938, email: [mbushey@nsf.gov](mailto:mbushey@nsf.gov)

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

- 47.049 --- Mathematical and Physical Sciences

## Award Information

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**Anticipated Type of Award:** Standard Grant

**Estimated Number of Awards:** 20 to 40

**Anticipated Funding Amount:** \$5,000,000 to \$10,000,000

Estimated program budget and number of awards are subject to the availability of funds and receipt of competitive proposals.

## Eligibility Information

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**Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

**Who May Serve as PI:**

Co-investigators are not permitted, but collaborations with other scientists and/or visiting scientist status in other laboratories are permitted. Principal investigators must be U.S. citizens or permanent residents.

**Limit on Number of Proposals per Organization:**

There are no restrictions or limits.

**Limit on Number of Proposals per PI or co-PI: 1**

## Proposal Preparation and Submission Instructions

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**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](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](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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)).

**B. Budgetary Information**

● **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

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

Not Applicable

● **Other Budgetary Limitations:**

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

**C. Due Dates**

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

January 07, 2022

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## Proposal Review Information Criteria

**Merit Review Criteria:**

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

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## 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

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To address the need for initiating competitive research programs across an array of institutions and to enhance diversity in its programs, the Directorate for Mathematical and Physical Sciences (MPS) offers Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS) grants.

One objective of the LEAPS-MPS awards is to increase funding to institutions that do not traditionally receive significant amounts of NSF-MPS funding, such as some MSI, PUI, and R2 institutions. Another objective is to provide funding for PIs for whom LEAPS funding would enable the PI to submit a subsequent successful proposal in a traditional already-existing grant competition, such as individual investigator award programs, CAREER competitions, etc.. The intent of these LEAPS-MPS awards is to initiate the research careers of pre-tenure faculty in tenure-track positions, particularly those at MSI, PUI, and R2 institutions, while also promoting the participation of scientists from all segments of the MPS scientific community, including those from underrepresented groups (Blacks and African Americans, Hispanics, Latinos, Native Americans, Alaska Natives, Native Hawaiians, and other Native Pacific Islanders).

A goal of this solicitation is that awards funded through the LEAPS program will in turn increase the number of proposals to MPS from targeted institutions, both to the regular research programs and to the CAREER program, and provides early federal funding to help launch the academic careers of individuals. Another critical goal is to support innovative plans for recruiting and retaining a broad representation of researchers in research programs supported by these grants.

The LEAPS-MPS Impact Statement is a critical part of the proposal. It allows an opportunity to provide reviewers with information on the potential impact of the project on i) the institutional research environment, especially in terms of enhancing research capabilities, ii) the career of the faculty participant, and iii) the ability of the involved department to better prepare students for entry into advanced-degree programs and/or careers in science and engineering, including any provisions that will increase the participation of groups underrepresented (including Blacks and African Americans, Hispanics, Latinos, Native Americans, Alaska Natives, Native Hawaiians, and other Native Pacific Islanders) in science and engineering.

## II. PROGRAM DESCRIPTION

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LEAPS-MPS awards are for beginning investigators (see Additional Eligibility Information below) to undertake research activities that will improve the competitiveness of their future grant applications to NSF programs. These research activities might include the acquisition of preliminary data or other research results, or the development of collaborations for research. Another goal of the LEAPS-MPS award is to broaden the participation of and to increase opportunities for all scientists including those from groups underrepresented in MPS fields (Blacks and African Americans, Hispanics, Latinos, Native Americans, Alaska Natives, Native Hawaiians, and other Native Pacific Islanders), in order to encourage individuals to become actively and competitively engaged in research as independent investigators.

LEAPS-MPS awards are designed to help launch the research career of these early-career PIs, and in this way make MPS programs more inclusive.

Proposals to this program must demonstrate the context of the work within or across disciplines supported by MPS, which includes the Divisions of Astronomical Sciences (AST), Chemistry (CHE), Materials Research (DMR), Mathematical Sciences (DMS), and Physics (PHY). There may be proposals that are most appropriate for consideration by NSF programs outside of MPS or by other federal agencies. Please contact the program officer identified below for the appropriate division if you have any questions about the suitability of your proposal for the LEAPS-MPS program.

## III. AWARD INFORMATION

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MPS expects to invest up to \$10,000,000 in FY 2022. The duration for these awards is 24 months. They are for up to \$250,000 in total (direct plus indirect) costs.

Estimated program budget and number of awards are subject to the availability of funds and receipt of competitive proposals.

## IV. ELIGIBILITY INFORMATION

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### Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

### Who May Serve as PI:

Co-investigators are not permitted, but collaborations with other scientists and/or visiting scientist status in other laboratories are permitted. Principal investigators must be U.S. citizens or permanent residents.

### Limit on Number of Proposals per Organization:

There are no restrictions or limits.

### Limit on Number of Proposals per PI or co-PI: 1

### Additional Eligibility Info:

You are eligible to serve as PI under this program solicitation only if you

- are a citizen, national or legally admitted permanent resident of the United States AND
- hold a doctoral degree in the typical disciplines of the fundamental research areas supported by the Divisions of the Directorate for Mathematical and Physical Sciences AND
- present a plan that shows how the proposed activities will increase (1) the participation of scientists from underrepresented groups and (2) the numbers of such individuals that serve as role models for the scientific workforce of the future AND
- are a new investigator, *i.e.*, in the pre-tenure period, at the time of submission, as a tenure-track (or tenure-track equivalent) faculty member in a U.S. IHE eligible to receive NSF support AND
- have not previously served as Principal Investigator or co-Principal Investigator on an NSF research grant, with the exceptions of Fellowship, Conference/Workshop, Equipment, Travel, Instrumentation infrastructure, and Research Opportunity Award (ROA) grants.

R2 institutions as defined in the [Carnegie Classification of Institutions of Higher Education](#) and Minority-Serving Institutions (MSIs), including Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and Asian American and Native American/Pacific Islander-Serving Institutions (AANAPISIs) are especially encouraged to apply.

Tenure-track equivalency - For a position to be considered a tenure-track-equivalent position, it must meet all of the following requirements: (1) the employee has a continuing appointment that is expected to last the duration of a LEAPS-MPS grant; (2) the appointment has substantial research *and* educational responsibilities; and (3) the proposed project relates to the employee's career goals and job responsibilities as well as to the mission of the department or organization.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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**Full Proposal Preparation Instructions:** Proposers may opt to submit proposals in response to this Program Solicitation via FastLane, Research.gov, or Grants.gov.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=pappg](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](mailto:nsfpubs@nsf.gov). Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=pappg](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](mailto:nsfpubs@nsf.gov). The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](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](mailto: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.

In addition to following the general format contained in the PAPPG, LEAPS-MPS proposals submitted in response to this program solicitation must also adhere to the following special instructions.

Proposals responding to this solicitation must be submitted for consideration to the appropriate Division and program within the Directorate of Mathematical and Physical Sciences (MPS). One of the following must be chosen:

AST: 1219 Education and Special Programs

CHE: 7487 Broadening Participation

DMR: 7222 XC-Crosscutting Activities Program

DMS: 7335 Workforce in the Mathematical Sciences

PHY: 9134 Integrative Activities in Physics.

"LEAPS-MPS:" should precede the title of your research project in the title section of the NSF cover sheet.

Co-investigators are not permitted on LEAPS-MPS proposals, but collaborations with and/or visiting scientist status in other laboratories are permitted.

Project Description. This narrative description, not to exceed 15 pages (including tables, figures, and other visual supplements), is the principal part of the proposal. It is a detailed statement of the work to be undertaken and will be the basis for evaluation of the intellectual merit and broader impacts of the proposal. The scope of the work should be appropriate for a 24-month award. The narrative should contain:

- A brief description of the overall research goals.
- A detailed description of the proposed activities, including any preliminary data already available or a description of data that the PI plans to obtain.
- The relationship of the proposed activities to the PI's projected longer term research goals.
- A discussion of how those activities will facilitate development of a subsequent research proposal.
- A specific plan that shows how the proposed activities will increase (1) the participation of scientists from underrepresented groups in the areas of the mathematical and physical sciences supported by MPS, and (2) the numbers of such individuals that serve as role models for the scientific workforce of the future.
- A LEAPS-MPS Impact Statement, described below\*, within the 15 page narrative that is no less than two (2) pages and does not exceed three (3) pages. The section must be indicated with the heading "Impact Statement."  
\*The section must be indicated with the heading "Impact Statement." The statement is an opportunity to provide information that will help a reviewer assess i) the likely impact of the proposed project on the institutional research environment, especially in terms of enhancing research capabilities, ii) the impact on the career of the faculty participant, and iii) the impact on the ability of the involved department to better prepare students for entry into advanced-degree programs and/or careers in science and engineering, including any provisions that will increase the participation of groups underrepresented in science and engineering. The impact of a potential award on the PI and the institution are critical parts of a LEAPS-MPS program. PIs are advised to carefully consider this section. Failure to include this section will result in a proposal being returned without review.
- Results from Prior Support. Suggested maximum of 2 pages, describing intellectual merit and broader impacts of prior NSF funding with research components (if any). See PAPPG (Section II.C.2.d.iii) for guidance. Only report on those awards with research components, such as Fellowships (for example Graduate Research Fellowship Program ( GRFP) or Alliances for Graduate Education and the Professoriate – Graduate Research Supplements ( AGEP-GRS)) or ROAs. If more than one award with a research component has been received, report on only the one most closely related to this proposal.
- Support from NSF as well as other agencies and foundations should be listed in the current and pending support section. For non-NSF awards and support, the PI should very briefly explain in the project description, the purpose of any listed awards and their role in the project. In particular, clarify if the award is primarily to support research, instrumentation, educational efforts, etc.

Budget (see below for limitations and consult the PAPPG for instructions on budget preparation). All proposals should include funds in the budget for travel to the Washington, DC area for a one-and-a-half-day meeting of awardees.

- Budget Justification (not to exceed 5 pages). A budget justification should be attached, explaining each line item for which funds are requested. Major cost items or unusual situations should be explained.

**Special Information and Supplementary Documentation:** The following document requirements supplement the NSF PAPPG:

- A letter from the department chair or dean endorsing the eligibility of the PI in terms of an early career level status in a tenure-track or a non-tenure-track equivalent position, and addresses the availability of facilities and support for the research and proposed activities. If the PI is not in a tenure-track appointment, the institution must state its contractual agreement with the PI if the appointment period and requested grant award dates are not congruent.
- Letters describing collaborative arrangements and commitments, if any, should also be submitted in the "Supplementary Documents" section. These letters of collaboration should follow the PAPPG-recommended format in Chapter II.2.C.j; they should be limited to stating the intent to collaborate and should not contain endorsements or evaluation of the proposed project.
- With the exception of a Data Management Plan and Postdoctoral Mentoring Plan (if appropriate), no other supplemental documents are permitted in LEAPS-MPS proposals.

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## B. Budgetary Information

### Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

### Other Budgetary Limitations:

LEAPS-MPS awards are for up to \$250,000 in total (direct and indirect) costs for a period of 24 months.

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## C. Due Dates

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

January 07, 2022

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

### For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>.  
To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: <https://www.research.gov/research->

[portal/appmanager/base/desktop?\\_nfpb=true&\\_pageLabel=research\\_node\\_display&\\_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html](portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html). For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail [fastlane@nsf.gov](mailto:fastlane@nsf.gov) or [rgov@nsf.gov](mailto:rgov@nsf.gov). The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

#### For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <https://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: [support@grants.gov](mailto:support@grants.gov). The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

**Submitting the Proposal:** Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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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/](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

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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 other underrepresented groups 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

Additional merit review considerations apply. For Launching Early-Career Academic Pathways proposals, both the scientific merit of the proposed research and the extent to which the proposed activities will broaden participation of individuals from underrepresented groups in the areas of the mathematical and physical sciences supported by MPS are of paramount importance. Special reviewer instructions are supplied with the request for review, which ask the reviewers to consider the potential of the research initiation activities to position the PI for a competitive CAREER or individual-investigator research proposal. Reviewers must evaluate the LEAPS-MPS Impact Statement and specifically i) the likely impact of the proposed project on the institutional research environment, especially in terms of enhancing research capabilities, ii) the impact on the career of the faculty participant, and iii) impact on the ability of the involved department to better prepare students for entry into advanced-degree programs and/or careers in science and engineering, including any provisions that will increase the participation of groups underrepresented in science and engineering.

## B. Review and Selection Process

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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.

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## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

### B. Award Conditions

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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](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](mailto: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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg).

#### Special Award Conditions:

Because LEAPS-MPS awards have an upper budgetary limit, they cannot be supplemented.

### C. Reporting Requirements

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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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg).

For LEAPS-MPS awards, the Accomplishments section of the Final Report should include:

- An explanation of how the award contributed to broadening participation in the scientific workforce, particularly in the areas of the mathematical and physical sciences supported by MPS.
- A description of how the results of the award will contribute to the submission of a future NSF research proposal.

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## VIII. AGENCY CONTACTS

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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:

- Sarah Higdon (AST), telephone: (703) 292-2541, email: [shigdon@nsf.gov](mailto:shigdon@nsf.gov)
- Rebecca Peebles (CHE), telephone: (703) 292-8809, email: [rpeebles@nsf.gov](mailto:rpeebles@nsf.gov)
- Souleymane O. Diallo (DMR), telephone: (703) 292-8302, email: [somardia@nsf.gov](mailto:somardia@nsf.gov)
- Yuliya Gorb (DMS), telephone: (703) 292-2113, email: [ygorb@nsf.gov](mailto:ygorb@nsf.gov)
- Kathleen V. McCloud (PHY), telephone: (703) 292-8236, email: [kmcccloud@nsf.gov](mailto:kmcccloud@nsf.gov)
- Michelle Bushey (OMA), telephone: (703) 292-4938, email: [mbushey@nsf.gov](mailto:mbushey@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](mailto:fastlane@nsf.gov).
- Research.gov Help Desk e-mail: [rgov@nsf.gov](mailto: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](mailto:support@grants.gov).

## IX. OTHER INFORMATION

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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

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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](mailto:nsfpubs@nsf.gov)
  - or telephone: (703) 292-8143
- **To Locate NSF Employees:** (703) 292-5111

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton  
 Reports Clearance Officer  
 Policy Office, Division of Institution and Award Support  
 Office of Budget, Finance, and Award Management  
 National Science Foundation  
 Alexandria, VA 22314

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