NSF 25-521: Materials Innovation Platforms (MIP)

Program Solicitation

Document Information

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U.S. National Science Foundation
Directorate for Mathematical and Physical Sciences
Division of Materials Research

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

May 15, 2025

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Important Information And Revision Notes

The third MIP competition, in 2025, will accept proposals on alloys, amorphous, and composite materials. Proposals mainly on biomaterials and polymer research will not be considered in the third MIP competition because the second MIP competition in 2019 included an emphasis on these topics.

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) that is in effect at the time the proposal is submitted. The NSF PAPPG is regularly revised and it is the responsibility of the proposer to ensure that the proposal meets the requirements specified in this solicitation and the applicable version of the PAPPG.

Summary Of Program Requirements

General Information

Program Title:

Materials Innovation Platforms (MIP)

Synopsis of Program:

Materials Innovation Platforms (MIP) is a mid-scale infrastructure program in the Division of Materials Research (DMR) designed to accelerate advances in materials research. MIPs respond to the increasing complexity of materials research that requires close collaboration of interdisciplinary and transdisciplinary teams and access to cutting edge tools. These tools in a user facility benefit both a user program and in-house research, which focus on addressing grand challenges of fundamental science and meet national needs. MIPs embrace the paradigm set forth by the Materials Genome Initiative (MGI), which strives to "discover, manufacture, and deploy advanced materials twice as fast, at a fraction of the cost," and conduct research through iterative "closed-loop" efforts among the areas of materials synthesis/processing, materials characterization, and theory/modeling/simulation. In addition, they are expected to engage the emerging field of data science in materials research. Each MIP is a scientific ecosystem, which includes in-house research scientists, external users and other scientists who, collectively, form a community of practitioners and share tools, codes, samples, data and know-how. The knowledge sharing is designed to strengthen collaborations among scientists and enable them to work in new ways, fostering new modalities of research and training, for the purpose of accelerating discovery and development of new materials and novel materials phenomena/properties, as well as fostering their eventual deployment.

The scientific focus of the MIP program is subject to change from competition to competition. Information about the existing MIPs, from two previous competitions in 2015 and 2019, can be found at https://mip.org/. **The third MIP competition, in 2025, will accept proposals on alloys, amorphous, and composite materials.** Given that the second MIP competition included an emphasis on biomaterials

and polymer research, proposals mainly on these topics will not be considered in the third MIP competition.

Broadening Participation In STEM

NSF recognizes the unique lived experiences of individuals from communities that are underrepresented and/or underserved in science, technology, engineering, and mathematics (STEM) and the barriers to inclusion and access to STEM education and careers. NSF highly encourages the leadership, partnership, and contributions in all NSF opportunities of individuals who are members of such communities supported by NSF. This includes leading and designing STEM research and education proposals for funding; serving as peer reviewers, advisory committee members, and/or committee of visitor members; and serving as NSF leadership, program, and/or administrative staff. NSF also highly encourages demographically diverse institutions of higher education (IHEs) to lead, partner, and contribute to NSF opportunities on behalf of their research and education communities. NSF expects that all individuals, including those who are members of groups that are underrepresented and/or underserved in STEM, are treated equitably and inclusively in the Foundation's proposal and award process.

NSF encourages IHEs that enroll, educate, graduate, and employ individuals who are members of groups underrepresented and/or underserved in STEM education programs and careers to lead, partner, and contribute to NSF opportunities, including leading and designing STEM research and education proposals for funding. Such IHEs include, but may not be limited to, community colleges and two-year institutions, mission-based institutions such as Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), women's colleges, and institutions that primarily serve persons with disabilities, as well as institutions defined by enrollment such as Predominantly Undergraduate Institutions (PUIs), Minority-Serving Institutions (MSIs), and Hispanic Serving Institutions (HSIs).

"Broadening participation in STEM" is the comprehensive phrase used by NSF to refer to the Foundation's goal of increasing the representation and diversity of individuals, organizations, and geographic regions that contribute to STEM teaching, research, and innovation. To broaden participation in STEM, it is necessary to address issues of equity, inclusion, and access in STEM education, training, and careers. Whereas all NSF programs might support broadening participation components, some programs primarily focus on supporting broadening participation research and projects. Examples can be found on the NSF Broadening Participation in STEM website.

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.

- Z. Charles Ying, Lead MIP Program Director, telephone: (703) 292-8428, email: cying@nsf.gov
- Debasis Majumdar, MIP Program Director, telephone: (703) 292-4709, email: dmajumda@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1 to 3

The number of awards will depend on the availability of funds and the quality of the proposals.

Anticipated Funding Amount: $16,000,000

The proposed budget should be between $18,000,000 to $30,000,000 over a six-year period, must be commensurate with the project's scope, and thoroughly justified in the proposal. MIP funding is provided yearly. Pending the availability of funds, it is anticipated that $16,000,000 will be available in Fiscal Year 2026.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.

Who May Serve as PI:

Each proposed project must be directed by a team of at least three Senior/Key Personnel with complementary expertise on materials synthesis/processing, characterization, theory/modeling/simulation, *etc*.

Limit on Number of Proposals per Organization: 1

One (1) per organization as lead institution.

The institutions that were awarded a MIP in the 2019 competition as the lead institution are not eligible to submit a MIP proposal as a lead institution in the 2025 competition.

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

Individuals may be designated as Senior/Key Personnel (Principal Investigator/Project Director, co-PI, and other faculty or equivalent) on only one MIP proposal.

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

  Not Applicable

C. Due Dates

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

  May 15, 2025

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

I. Introduction

Recognizing the ever-increasing complexity of materials research that requires the close collaboration of interdisciplinary and transdisciplinary teams with access to cutting-edge tools, the Division of Materials Research (DMR) established the Materials Innovation Platforms (MIP) Program in 2015. These Platforms seek to substantially increase the rate at which new materials and novel materials phenomena/properties are discovered, understood, and developed.

Materials Innovation Platforms are neither typical research centers nor traditional user facilities. MIPs employ a highly convergent approach, across multiple dimensions:

- Use an integrated approach to meet the critical needs for research, training, and research infrastructure;
- Foster a culture of knowledge sharing among in-house research scientists, external users, and other scientists who, for example, benefit from publicly available codes and data without being users of a MIP user project;
- Enable iterative, closed-loop efforts across materials synthesis/processing, materials characterization, and theory/modeling/simulation; and
- Empower the merging of ideas, approaches and technologies from widely diverse fields of knowledge (including the domain science fields relevant to the proposed MIP, as well as data science and informatics) for the purpose of accelerating discovery and development of novel materials, as well as fostering their eventual deployment.

These are 4 pillars of MIP convergence, which are designed to stimulate and accelerate discovery and innovation in a new paradigm and also distinguish MIPs from other programs.

The major activities of a MIP include:

- Develop next-generation experimental and computational tools, as well as advancing the capabilities of the current state-of-the-art tools;
- Conduct in-house research by a transdisciplinary team in a focused topic designed to address a grand challenge of fundamental science and meet a national need;
- Operate a user facility that provides unique materials research tools, samples, data, and technical services open to a diverse community of external researchers at various institutions; and
- Serve as an educational focal point for training the next generation of tool developers and users.

In this manner, a MIP will build and nurture a scientific ecosystem, which includes in-house research scientists, external users and other scientists who share tools, codes, samples, data, and know-how in order to strengthen collaboration

among the scientists and enable them to work together in a new modality. MIPs, collectively, contribute to the creation of a new culture for future scientific endeavor.

II. Program Description

Materials Innovation Platforms (MIP) is a mid-scale infrastructure program in DMR that supports transdisciplinary research and training, cutting-edge tools, and knowledge sharing in key enabling areas of national priority.

A 2014 NSF Mathematical and Physical Sciences (MPS) Advisory Subcommittee study, *Closing the Loop: Materials Instrumentation*, points out the opportunity to advance materials science through targeted, shared, mid-scale infrastructure investments. The MIP Program is designed to fill this need.

The MIP Program aligns with the Materials Genome Initiative (MGI), which strives to "discover, manufacture, and deploy advanced materials twice as fast, at a fraction of the cost." In the MGI Strategic Plan published in 2021, three major goals were identified. They are unify the materials innovation infrastructure; harness the power of materials data; and educate, train, connect the materials R&D workforce. The MIP program, established in 2015, has made major contributions to each of the three major goals.

Fiscal Year 2025 MIP Competition

As highlighted in the Closing the Loop: Materials Instrumentation report, advancing the field of materials synthesis represents a unique opportunity to reclaim US leadership in this domain which could lead to the next generation of breakthroughs in materials science and engineering. As an example, the report states, "Complexity offers a second ripe direction for both soft and hard materials synthesis. The best understood materials are the simplest, where structure, composition and purity can be controlled reliably to produce targeted science or technology outcomes. Increased complexity, however, is a basic requirement for increased functionality."

Studying materials, as well combinations of materials, with increasing functionalities dovetails with MGI Challenges: 1) Protecting and improving human health, 2) Delivering sustainable and resilient energy, 3) Thriving in extreme environments, 4) Enhancing structural performance, 5) Protecting the environment, 6) Propelling the information and communications technology revolution, and 7) Advancing Critical and Emerging Technology.

The topic of the second MIP competition, the convergence of materials research with biological sciences for developing new materials, was selected with the recognition of growing areas of soft and bio-inspired materials for exploring rich new horizons of complexity and functionality that require their own set of innovative synthesis techniques. **This third MIP competition focuses on a different set of complex materials: alloys, amorphous, and composite materials.** Proposals mainly on biomaterials and polymer research will not be considered in the third MIP competition because the second MIP competition in 2019 included an emphasis on these topics.

A successful MIP must be transformational, focus on a grand challenge or challenges of fundamental research, and align with national priorities. Some grand challenges are identified in, as examples:

- Materials Genome Initiative (MGI) Strategic Plan
- Frontiers of Materials Research: A Decadal Survey
- Closing the Loop: Materials Instrumentation

A common theme in these reports is that many of these grand challenges will not be overcome by one discipline alone and must be addressed through a transdisciplinary approach that utilizes expertise in materials science, physics, chemistry, engineering, biology, mathematics, and/or computer science. A convergence of ideas, approaches and technologies from diverse fields of knowledge will stimulate innovation and discovery. A highly successful MIP builds a new Platform for complex materials through convergence of expertise from various fields that have different perspectives to address a common grand challenge of multiple disciplines.

Additional Information for MIP

The complexity and challenge of activities addressed by this program require a transformative approach to discovering and developing new materials, predicting and optimizing properties of these materials, and informing the design of materials systems. MIPs are driven by the MGI approach with materials synthesis/processing, materials characterization, and theory/modeling/simulation applied iteratively to realize targeted outcomes. Accordingly, the proposed activities must close-the-loop, i.e., be a collaborative and iterative process wherein, for example, theory guides computational simulation, computational simulation guides experiments, and experiments further inform theory. It should be noted that the loop can be entered from any point, not just from theory, and can be bidirectional (e.g., experimental results improve simulation). Through this tightly connected iterative process, new discoveries are anticipated to occur at a faster rate than conventional modes of collaboration. Advances in each of the three areas (synthesis/processing, characterization, and theory/modeling/simulation) are expected for MIPs. The interactive, closed-loop process is required for in-house research and is expected for the user program as a whole, but not required for individual user projects.

MIPs are expected to offer state-of-the-art materials synthesis/processing tools. Advancement in characterization methodologies and theory/modeling/simulation approaches that benefit the research endeavor is also expected. While all instruments needed for world-class research facilities will be considered, a high priority for the MIP Program is to support instruments with unique capabilities. Acquisition of instruments readily available at universities in the United States is a lower priority. In addition, MIPs are expected to be at the forefront of the intelligent deployment of artificial intelligence/machine learning (AI/ML) techniques and the implementation of autonomous experimentation. Acquisition and development of fully or partially autonomous equipment, as well as developing autonomous workflow, is highly encouraged. However, this solicitation does not limit the requested equipment to autonomous ones.

MIPs provide access to existing and new instrumentation, techniques, samples, software, modeling and simulation tools, data, databases and other resources to the broad scientific community. MIPs go beyond traditional user facilities that provide access to instrumentation; they create and nurture scientific ecosystems by bringing together the scientific and technical expertise of in-house researchers, users, and other scientists through knowledge and data sharing. Specifically, the tools supported by NSF MIP funding are for shared use by users and for in-house research; each MIP also develops and uses mechanisms to share codes, samples, data, and know-how among a community of practitioners (in-house researchers, users, and other scientists). A MIP is also expected to leverage the emerging field of data science as part of the integration and iteration of experiment and computational efforts. and, as appropriate, to utilize cloud resources for data storage and sharing. Because of these efforts and a transdisciplinary team, each MIP is a scientific ecosystem that promotes cross-fertilization of ideas and enables new science that cannot be accomplished otherwise.

MIPs must support broad accessibility to a rich national user base at universities, national laboratories, and industry. They operate user facilities that are open to a diverse community of external and internal researchers at various institutions. To promote broad usage of their facilities, major equipment acquired through the MIP funding (MIP equipment) must devote at least 50% of the instrument operational time to external users (defined as those who are neither MIP participants nor affiliated with the institutions where MIP user facilities are located). MIPs do not charge academic users in the United States for reasonable time with experts, technicians, or use of equipment acquired through the MIP award. However, users may be charged for (i) extended use of time of the MIP equipment; (ii) use of MIP equipment with similar equipment readily available at other universities in the United States; (iii) use of non-MIP equipment at the institution that hosts a MIP; and (iv) non-routine and/or expensive consumables and supplies. Full cost recovery is applied to proprietary research.

Platforms reside at academic institutions where the appropriate infrastructure, including laboratory, common space and sharing of equipment, already exists to assist in the proposed research and add value to the MIP user facility. MIPs are also funded for acquisition and development of new equipment, tools, and supporting technologies that will position and maintain the facility at the frontier of the proposed materials research area. Tools (or suite of tools) acquired or developed through a MIP award are novel and/or unique and go beyond the scope and scale of those tools that are acquired through other NSF modes of support, such as the Major Research Instrumentation (MRI) program.

The MIP Program will support acquisition and development of instruments, software and databases; service contracts on purchased equipment; professional staffing including support for the principal investigators, other senior/key personnel and technicians; and a limited number of students and postdoctoral researchers. Six-year awards totaling $18,000,000 to

$30,000,000 for the award period are anticipated. Approximately 50% of the MIP funds provided by NSF, after subtracting instrument acquisition and development costs, should be devoted to the user facility operation.

The MIP program will NOT support requests for any of the following:

- Construction, renovation or modernization of rooms, buildings or research facilities;
- General purpose and supporting equipment. Supporting equipment refers to basic, durable components of a research facility that are integral to its operation (e.g., fume hoods, elevators, laboratory casework, cryogen storage systems, general-purpose computational or data storage systems);
- Sustaining infrastructure and/or building systems. This category includes (but is not limited to) the installation of or upgrades to infrastructure related to the supply of power, ventilation, water or research gases, routine multi-purpose computer networks, standard safety features, and other general purpose systems (e.g., toxic waste removal systems, and telecommunications equipment); or
- General purpose platforms or environment. This category includes (but is not limited to) general purpose fixed or non-fixed structures, vehicles, and vehicle charging stations.

MIPs engage in a limited number of training and outreach activities that integrate strategically with the research goals, further the training mission, and increase the broader impacts. Training should focus on next-generation tool developers, users, and in-house research participants. Outreach activities are designed to attract users, especially external users, from diverse communities and levels of expertise. MIPs are expected to demonstrate a significant commitment to the involvement of the full spectrum of diverse talent that society has to offer, which includes member of groups from underrepresented and under-served communities, as MIP participants and as users.

An institution that submits a proposal is expected to have extensive materials research capabilities so that it is in a strong position to engage external users and build a scientific ecosystem. Each proposed project must be directed by a team of at least three Senior/Key Personnel with complementary expertise on materials synthesis/processing, characterization, theory/modeling/simulation, etc. The whole MIP team also includes Senior/Key Personnel and technical staff with expertise in tool development, data and knowledge sharing, and user facility operation. NSF expects that, in addition to scientific and technical staff, each MIP includes a Managing Director and a User Facility Coordinator. The main responsibilities of the Managing Director include, for example, ongoing operations, staffing, financial management oversight, reporting as well as coordination between the different components of the MIP on a daily basis. The User Facility Coordinator engages the user community, facilitates instrument time/resource allocation, and may also manage the user proposal submission, review and selection process, safety, and/or user training.

DMR manages the MIPs through the division's National Facilities and Instrumentation program. MIPs are awarded as cooperative agreements with an initial commitment of six years (Phase 1). A high priority of Phase 1 is to establish infrastructure and mechanisms necessary for a successful MIP. Instrument acquisition and development are expected to be mainly in the first few years. User facility operation may begin in year 2, ramps up over time, and is expected to reach a steady state by year 4. In-house research and knowledge sharing activities are expected to have a ramp-up period as well. A MIP is expected to demonstrate measurable success of the user program, in-house research, and knowledge sharing activities by year 5, one year before the end of Phase 1. Based on a rigorous and favorable review by NSF in years 5-6 of the initial award period, the MIP funding may be continued for four additional years, as phase 2. This second phase of MIP funding is focused on supporting the operation and growth of the MIP, while also supporting development of a long-term plan when the funding from the MIP program ends. For a MIP with a credible long-term plan, the MIP program may provide some support in Phase 3. The MIP funding in Phase 3, at a reduced level, will be for a maximum of 2 years to allow the MIP to have a smooth transition from a mode of primary funding from the MIP program to multiple funding sources. This third and final phase is designed to aid the MIP in its transition to independence from the MIP program funding after 12 years.

III. Award Information

Anticipated Type of Award: Cooperative Agreement.

The number of awards will depend on the availability of funds and the quality of the proposals.

The proposed budget should be between $18,000,000 to $30,000,000 over a six-year period, must be commensurate with the project's scope, and thoroughly justified in the proposal. MIP funding is provided yearly. Pending the availability of funds, it is anticipated that $16,000,000 will be available in Fiscal Year 2026.

IV. Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.

Who May Serve as PI:

Each proposed project must be directed by a team of at least three Senior/Key Personnel with complementary expertise on materials synthesis/processing, characterization, theory/modeling/simulation, *etc*.

Limit on Number of Proposals per Organization: 1

One (1) per organization as lead institution.

The institutions that were awarded a MIP in the 2019 competition as the lead institution are not eligible to submit a MIP proposal as a lead institution in the 2025 competition.

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

Individuals may be designated as Senior/Key Personnel (Principal Investigator/Project Director, co-PI, and other faculty or equivalent) on only one MIP proposal.

Additional Eligibility Info:

Proposals submitted in response to this solicitation may not duplicate or be substantially similar to other proposals funded or concurrently under consideration by NSF or to proposals previously declined by NSF and not substantially revised. Proposals not satisfying this condition will be returned without review.

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 Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application

Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

Proposal Title. The proposal title must begin with "**Research Infrastructure: MIP:**" followed by an informative project title.

Collaborative Proposals. Only the single proposal method, submitted by the lead institution with sub-awards to other institutions if any, should be used. Submission of a collaborative proposal from multiple organizations is not allowed.

Project Description (No more than 40 pages. A proposal with a Project Description longer than 40 pages will be returned without review):

The Project Description must include the following sections and section headers (including a separate header for Broader impacts between Sections 7 and 8):

1. Senior/Key Participant List. Provide a list of participating Senior/Key Personnel (university faculty and equivalent) by full name, organizational and departmental affiliation, and major roles in the proposed MIP (e.g., in-house research, tool development, user facility operation, knowledge sharing, and/or training). Describe briefly the team's expertise with respect to the proposed in-house research, tool development, user facility operation, knowledge sharing, and training. (It will be helpful to boldface the name of each Senior/Key Personnel wherever it occurs throughout the whole Project Description.) **Suggested length: 0.5-1.5 pages**.

2. Results from Prior NSF Support. This section should be prepared in accordance with the guidance in the PAPPG and is required for any PI or co-PI identified on the proposal. Descriptions of collaborative research, tool development, user facility operation, and knowledge sharing should be an emphasis of this section. **Suggested length: 2-4 pages**.

3. Vision, Goals, and Rationale. Suggested length: 2-4 pages.

(i) Provide a vision statement for the proposed entire Platform.

(ii) In separate paragraphs or bullets, state the major goals of knowledge sharing, in-house research, tool development, user facility operation, training, and diversity of the proposed Platform.

(iii) Discuss the critical needs of the proposed MIP for (a) addressing a grand challenge or challenges of fundamental research and advancing relevant NSF or national priorities, (b) a transdisciplinary team to address the grand challenge(s), (c) new experimental and computational tools as well as technique development, (d) fostering new modalities of research through knowledge sharing, and (e) education/training of next-generation instrument developers and users.

4. Knowledge Sharing. MIPs are designed to foster new modalities of research and education, through sharing of tools, codes, samples, data and know-how. In addition, MIPs are expected to incorporate the emerging fields of data science, including artificial intelligence and/or machine learning, as appropriate, in materials research. In this section, identify likely challenges in creating a culture of knowledge sharing and describe strategies to overcome these challenges. Describe goals and proposed mechanisms for knowledge sharing, the anticipated results, and the expected outcome and impacts. Include mechanisms for knowledge sharing within the in-house research team; among external users; and for the whole community of practitioners that the proposed MIP represents (in-house research scientists, external users, and other scientists). Different mechanisms could be needed, depending on type of tools, codes, samples, data (including meta data) and know-how to be shared. The mechanisms should balance between the need for confidentiality and creation of a culture of knowledge sharing, as well as be consistent with relevant NSF policies (see, for example, PAPPG Chapter XI.D) and FAIR data principles. (The Data Management and Sharing Plan can be used to provide additional details

for data access and sharing, as well as discussing other issues such as types and format of data and meta data, data archiving, data security, etc., as appropriate). **Suggested length: 5-7 pages**

5. In-House Research. Describe the scope and targeted scientific outcome of the MIP and specific in-house research activities. The scope of in-house research should be focused, smaller than the scope covered by the whole MIP, and synergistic to the user program. This section must also discuss how the proposed in-house research closes the loop among materials synthesis/processing, materials characterization, and theory/modeling/ simulation such that it is iterative and synergistic and utilizes a transdisciplinary approach to enhance the scientific impact above and beyond what can be accomplished using conventional approaches. If more than one institution is involved in the in-house research, effective mechanisms to prevent the negative impact of distance on the collaborative, interactive "closed loop" nature of the MIP must be clearly described. **Suggested length: 5-8 pages**.

6. Infrastructure. Describe the experimental and computational capabilities needed for both the user program and in-house research of the proposed MIP. Discuss how the MIP engages and leverages the existing infrastructure and instruments, a detailed description of which is expected in Facilities, Equipment and Other Resources. Provide justification (in terms of critical needs in science and/or uniqueness in the United States) for new instrument development and acquisition. For tool development, describe the potential technical challenges and bottlenecks, a plan to overcome them, and a timeline for development and commissioning. If instruments are located at more than one institution, effective mechanisms to minimize the negative impact of distance on user service must be clearly described. List the major instruments (existing and new) that will be available to external users. The major new instruments acquired through the MIP funding must devote at least 50% of the instrument operational time to external users. **Suggested length: 5-8 pages (including the table)**.

Table of Major Instruments that Will be Available to External Users.

Item	Acquisition, Development, or Existing	When Available to External Users	Fraction of Operational Time Available to External Users	Approximate Cost **($K)** for Acquisition or Development

7. User Facility Operation. Describe the proposed user access modes (e.g., independent, collaboration, fee for service, sample request, and/or remote access) by users and for the in-house research team, the user proposal submission, review and selection process, staffing, instrument time/resource allocation method, user training, safety, and user fee structure. **Suggested length: 2-3 pages**.

BROADER IMPACTS (*Please note: The Project Description must include a separate section header labeled Broader Impacts and the heading must be on its own line with no other text on that line.*)

8. Training. Describe a limited number of well-chosen training activities that integrate strategically with the scientific goals and advance the educational experiences for users, as well as graduate and undergraduate students, postdoctoral researchers, and others associated with the MIP as a unique national resource. Training of users, especially external users, must be the top priority of the proposed training activities. Potential activities such as hands-on workshops, summer/winter schools, short courses, webinars, and/or online resources such as tutorials may be considered. Include outreach plans designed to increase the external user base, to attract users from diverse communities and expertise (from experts to entrants to the field), and to reach potential users in industry, whose work could inform or benefit from instrumentation and technique development activities. **Suggested length: 3-5 pages**.

9. Broadening Participation. Describe the MIP's strategic plan of broadening participation at all levels, the metrics that will be used to measure progress, and the desired outcome for the 6-year award period. MIPs are expected to demonstrate a significant commitment to the involvement of the full spectrum of diverse talent that society has to offer,

which includes member of groups from underrepresented and under-served communities, as MIP participants (faculty, scientific experts, technicians, postdoctoral researchers, and students) and as users. MIP are also expected to reach users from a broad range of academic institutions in the United States (e.g., R1 and non-R1 institutions, institutions from EPSCoR jurisdictions, and institutions described in the section "Broadening Participation in STEM" above). **Suggested length: 2-3 pages**.

10. Collaboration with industry, national laboratories, and others. Describe plans for intellectual and resource exchanges, cooperation, and partnerships with other organizations that may involve industry, national laboratories, non-profit organizations, and others, as appropriate. MIPs are encouraged to make progress towards translation, which may include the generation of new intellectual property, creation of new or broader collaboration with industry, licensing of NSF-funded research, creation of new technology and/or processes adopted by the public and/or philanthropic sector, and the training of future innovation and entrepreneurship leaders. **Suggested length: 1-3 pages**.

11. Management Plan. Suggested length: 2-4 pages (including the table).

- Organizational Chart: Show all critical components of the governance structure of the proposed MIP.
- Describe functions of key leadership positions and major committees: the executive committee, the user proposal review committee, the user committee, the external advisory committee (EAC), etc. An EAC is required for all MIPs. However, **potential EAC members should not be approached or identified until the MIP is funded**.
- Describe the procedures and criteria used to select, administer, and evaluate in-house research projects. (The procedures for user projects are described in Section 7.)
- Highlight the major resources that the organization(s) will provide to the proposed MIP, should it be funded. A detailed description is expected in **Facilities, Equipment and Other Resources.** Do not given as dollar equivalents.
- In a tabular form, enter the NSF budget request (in $K) for each of the major MIP activities. For each entry in the table, include both direct and indirect costs. Equipment acquisition and development is expected to be mainly in the first few years. User facility operation may begin in year 2, ramp up over time and is expected to reach a steady state by year 4. In-house research and knowledge sharing activities are expected to have a ramp-up period as well. Approximately 50% of the MIP funds provided by NSF, after subtracting instrument acquisition and development costs, should be devoted to the user facility operation when the user facility operation reaches a steady state. Student support is typically not under training, and should be included under appropriate categories depending on what they will do.

Table of NSF Funding Request **(in $K).**

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Years 1-6
Instrument acquisition and development							
User facility operation							
In-house research							

Training							
Knowledge sharing							
Collaboration with Industry, etc.							
Administration							
Others, if any (please specify)							
Total							

Budget and Budget Justification: Provide a budget for each of the six years. **Important information for Grants.gov users**: Grants.gov supports proposal budgets for up to five years. After the proposal is submitted to NSF via Grants.gov and successfully transferred to NSF for processing, Grants.gov applicants should use the Proposal File Update feature in Research.gov to enter the proposal budget for the 6th year.

Facilities, Equipment and Other Resources: (a) Provide a synopsis of organizational resources that will be available to the proposed MIP (dedicated space, access to existing facilities and instrumentation, new capital equipment, faculty and staff positions, faculty release time, access to programs that assist with technology development, or support of education and training activities, and/or others). Note that inclusion of voluntary committed cost sharing is prohibited; Do not given as dollar equivalents. (b) If existing facilities and instrumentation and/or new capital equipment will be available to users, provide a technical description.

Supplementary Documents:

(a) No letters of collaboration or support from anticipated users are allowed. (b) Include only official letter(s) from each of the participating organization(s). Such letter(s) should confirm participation, highlight major resources to be provided (no dollar amount), but cannot contain endorsements or evaluation of the proposed project. Details about work to be done under this project should be included within the Project Description, not in the letter(s) of collaboration. **Limit: 5 pages (with no more than one letter per page).**

Required Additional Information:

Immediately after submission of the full proposal, please send an e-mail to mip@nsf.gov:

A Microsoft Excel file with the filename: proposal #_institution_MIP_participants. A spreadsheet of participants designated as Senior/Key Personnel (Principal Investigator/MIP Director, co-PI(s), and other faculty or equivalent). The spreadsheet must have 6 columns. Major MIP roles include in-house research, tool development, user facility operation, training, knowledge sharing, etc.

	Last Name	First Name	Institution	Department	Major MIP Role(s)

PI/MIP Director					
coPI					
coPI					
Sr/Key Personnel					
Sr/Key Personnel					
Sr/Key Personnel					

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Budget Preparation Instructions:

Important information for Grants.gov users: Grants.gov supports proposal budgets for up to five years. After the proposal is submitted to NSF via Grants.gov and successfully transferred to NSF for processing, Grants.gov applicants should use the Proposal File Update feature in Research.gov to enter the proposal budget for the 6th year.

C. Due Dates

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

  May 15, 2025

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

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/ProposalPreparationa For Research.gov user support, call the Research.gov Help Desk at 1-800-381-1532 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov 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.

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 web page: https://www.grants.gov/applicants. In addition, the NSF Grants.gov

Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

The NSF Grants.gov Proposal Processing in Research.gov informational page provides submission guidance to applicants and links to helpful resources including the NSF Grants.gov Application Guide, Grants.gov Proposal Processing in Research.gov how-to guide, and Grants.gov Submitted Proposals Frequently Asked Questions. Grants.gov proposals must pass all NSF pre-check and post-check validations in order to be accepted by Research.gov at NSF.

When submitting via Grants.gov, NSF strongly recommends applicants initiate proposal submission at least five business days in advance of a deadline to allow adequate time to address NSF compliance errors and resubmissions by 5:00 p.m. submitting organization's local time on the deadline. Please note that some errors cannot be corrected in Grants.gov. Once a proposal passes pre-checks but fails any post-check, an applicant can only correct and submit the in-progress proposal in Research.gov.

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

VI. NSF Proposal Processing And Review Procedures

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgment 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 *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. 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.D.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.D.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 and Sharing Plan and the Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

- **Vision/Motivation:** How well is the proposal motivated by addressing a grand challenge or challenges of fundamental science aligned with national priorities? To what extent will the vision, if realized, have a transformative impact?
- **Knowledge Sharing:** To what extent will the proposed MIP substantially accelerate materials discovery and development beyond current approaches, through sharing of knowledge (tools, codes, samples, data and know-how)? How effective will the knowledge sharing mechanisms likely be? Does the MIP have a sound plan to take advantage of opportunities that the emerging data science provides?

- **In-House Research:** How well is the proposed in-house research focused and targeted to addressing a critical scientific challenge? How well does the proposed research use a tightly closed collaborative loop process with accelerated, iterative feedback among materials synthesis/processing, materials characterization, and theory/modeling/simulation?
- **Infrastructure:** To what extent does the proposed MIP meet a critical infrastructure need for the materials community? What is the degree of uniqueness of the proposed key instruments for materials synthesis/processing and materials characterization in the national context? Do the proposed instruments enable new ways of synthesis/processing of complex materials? Are the plans and timelines for equipment acquisition, development, and commissioning well thought out? For tool development, does the proposal have a comprehensive and realistic analysis of risks and a sound mechanism to address the risks?
- **User Facility Operation:** How well-conceived are the plans for the user facility operation (e.g., access modes, user proposal review and selection process, staffing, instrument time/resource allocation, user training, and safety)?
- **Training:** To what extent will the proposed platform serve as an educational focal point for training the next generation of instrument developers and users?
- **Broadening Participation:** To what extent is the plan strategic and likely to meet the stated goals for participation by a diverse group of users and from a broad range of academic institutions in the United States?
- **Collaboration with industry, national laboratories, and others:** To what extent does the proposal include industrial involvement through, for example, sharing instruments, samples and expertise, for commercialization of new instruments; preparation of future innovation and entrepreneurship leaders; and deployment of novel materials?
- (Evaluate during the reverse site visit) **Management:** Are the proposed roles of key leadership positions and major committees appropriate? Are the proposed MIP operation procedures appropriate?

B. Review and Selection Process

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

Proposals submitted in response to this program solicitation will be reviewed by panels, supplemented with ad hoc review as needed. Finalists will be invited for a reverse site visit at NSF. At the reverse site visit, finalists will make oral presentations to a second panel and NSF staff and engage in a question and answer session. NSF reserves the option to conduct a site visit prior to making an award.

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 proposers whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new recipients 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 or the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A

Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

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

VII. Award Administration Information

A. Notification of the Award

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

B. Award Conditions

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

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

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

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for infrastructure projects under an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's Build America, Buy America web page

Special Award Conditions:

Special award conditions for MIPs will be within the cooperative agreement.

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 annual project report, and a project outcomes report for the general public.

Failure to provide the required annual or final annual 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 annual 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.

Program specific annual and final report guidelines will be provided.

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:

- Z. Charles Ying, Lead MIP Program Director, telephone: (703) 292-8428, email: cying@nsf.gov
- Debasis Majumdar, MIP Program Director, telephone: (703) 292-4709, email: dmajumda@nsf.gov

For questions related to the use of NSF systems contact:

- NSF Help Desk: 1-800-381-1532
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. Other Information

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at https://www.grants.gov.

About The National Science Foundation

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.F.7 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.
To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at https://www.nsf.gov.

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
  - Send an e-mail to: nsfpubs@nsf.gov
  - or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

Privacy Act And Public Burden Statements

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by proposers 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/recipients 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 proposers 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