NATIONAL SCIENCE FOUNDATION
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NSF 15-046

Frequently Asked Questions (FAQs) for Materials Innovation Platforms (MIP)

GENERAL

1. What is a MIP?
2. Are there any documents that further explain the goals of this program?

ELIGIBILITY

3. Is there a limit on the number of MIP proposals that can be submitted from a lead institution?
4. May a PI be involved in more than 1 MIP proposal?
5. Is there a limit on the number of PIs, Co-PIs and Senior Personnel?
6. Should Bio Sketches and Current and Pending Support documents be submitted for those listed as Senior Personnel?
7. Can the research team be comprised of Senior Personnel from multiple institutions?
8. Can a team submit a MIP proposal as a "collaborative proposal from multiple organizations"?
9. Can teams submit proposals to both the MIP and DMREF programs in the same year?

RESEARCH FOCUS

10. Should the research team be comprised of at least 3 Senior Personnel?
11. Since the focus of the solicitation is on the growth of new materials, is synthesis more important than characterization or theory/modeling?
12. Are there special requirements for the management of data?
13. Since a MIP is focused on a targeted materials grand challenge and/or technological outcome that address a national priority, should proposals be device focused or heavily engineering?
14. The focus of the first MIP solicitation is on developing new bulk and thin film crystalline "hard materials". What constitute "hard materials"?
15. Do proposals have to conduct research in both bulk crystals and thin films?
16. For proposals conducting research in both bulk crystals and thin films, is there an emphasis of one over the other?
17. Does "bulk crystal" mean support for research to develop processes to scale up crystals to large crystals or boules?
18. Are polycrystalline thin films considered responsive to the solicitation?
19. Can research be proposed in multiple material classes or systems?
20. What is meant by closed-looped and iterative?
21. What is the difference between a collaborator and a user of the MIP facility?
22. What level of Education and Outreach activities are expected?
23. How many students are expected to be involved or funded?

USER FACILITY

BUDGET

SINGLE COPY DOCUMENTS

SUPPLEMANTRY DOCUMENTS

GENERAL

1. **What is a MIP?**

   Materials Innovation Platforms (MIP) are DMR mid-scale research infrastructure awards that represent a new approach to conducting materials research, where advances in materials research on a national scale are expected. A MIP combines the efforts of a team with the service of a user facility. The research is expected to be conducted by a team of experimentalists and theorists working in a tight-knit collaborative and iterative manner to address a focused and well-defined grand challenge question in materials research. The user facility is expected to provide the science community access to specialized state-of-the art instrumentation and expertise not readily available at the nation's universities and colleges. Together, the in-house research and research conducted by the external user community are expected to accelerate the discovery of new materials and materials phenomena. MIPs are embedded in a University environment and will contribute to the training of the next generation of materials scientists. The first MIP solicitation focuses on developing new bulk and thin film crystalline hard materials, i.e. inorganic systems.

2. **Are there any documents that further explain the goals of this program?**

   Yes, there are three useful documents:

   - The Materials Genome Initiative (MGI) has a website (http://www.whitehouse.gov/mgi) and a recently published *Strategic Plan* that discuss this White House initiative's goal to "discover, manufacture, and deploy advanced materials in half the time and at a fraction of the cost."
   - A recent NSF Mathematical and Physical Sciences (MPS) Directorate Advisory

Subcommittee study - Materials Instrumentation highlights the opportunity to advance materials science through targeted, shared, mid-scale infrastructure investments which forms a framework for Materials Innovation Platforms.
- For this call, the 2009 National Academy report, Frontiers in Crystalline Matter: From Discovery to Technology, identifies grand challenges in new materials discovery, which informed this solicitation.

ELIGIBILITY

3. **Is there a limit on the number of MIP proposals that can be submitted from a lead institution?**

   Only 1 MIP proposal may be submitted from an institution.

4. **May a PI be involved in more than 1 MIP proposal?**

   No. Individuals may appear as Senior Personnel (Co-PI, Faculty, or Other Senior Associate) on only 1 MIP proposal.

5. **Is there a limit on the number of PIs, Co-PIs and Senior Personnel?**

   A minimum of 3 senior personnel are required in a MIP proposal. There should be at least 1 expert leading each of the areas of synthesis, characterization, and theory/simulation. To accelerate outcomes, these areas are expected to work in a collaborative and iterative process wherein theory guides computational simulation, computational simulation guides experiments, and experiments further informs theory.

   There is no maximum number of senior personnel. While there is no limit to the number of Senior Personnel, the in-house research of a MIP is expected to be a tight-knit collaboration where research is conducted in an iterative and closed-loop mode of operation. Proposals with an extremely large group of personnel will have to articulate the efficacy of the arrangement.

   Per the NSF Grant Proposal Guide, the maximum number of PIs that can be listed on the Cover Sheet is 5. List all senior personnel with University and Department affiliation at the beginning of the Project Description within the Participant List section.

6. **Should Bio Sketches and Current and Pending Support documents be submitted for those listed as Senior Personnel?**

   Yes. Per the NSF Grant Proposal Guide (GPG), all Senior Personnel listed must provide a NSF 2-page Bio Sketch and Current & Pending Support documents.

7. **Can the research team be comprised of Senior Personnel from multiple institutions?**

   Yes. But, consider the following: The in-house research of a MIP is expected to be conducted in an iterative, tight-knit and closed-loop manner, and proposals with Senior Personnel at multiple intuitions will need to articulate how the team is responsive to this required mode of operation. In addition, the external users of the MIP user facility should have access to the synthesis, characterization, and theory/modeling expertise and resources of the MIP. The impact on access to resources for the external user community needs to be described.

8. **Can a team submit a MIP proposal as a "collaborative proposal from multiple organizations"?**

Per the solicitation, collaborative proposals from multiple organizations are allowed but discouraged. Please note that collaborative proposals from multiple organizations must be submitted with a title that begins with "MIP: Collaborative Research..."

9. **Can teams submit proposals to both the MIP and DMREF programs in the same year?**

   Yes, but the two should propose research that is substantively different. Proposals submitted in response to this solicitation must be substantially different to other proposals funded or concurrently under consideration by NSF or to proposals previously declined by NSF. The DMREF program has similar submission restrictions.

RESEARCH FOCUS

10. **Should the research team be comprised of at least 3 Senior Personnel?**

    Yes. There should be at least 1 expert leading each of the areas of synthesis, characterization, and theory/simulation. To accelerate outcomes, these areas are expected to work in a collaborative and iterative process wherein theory guides computational simulation, computational simulation guides experiments, and experiments further informs theory.

11. **Since the focus of the solicitation is on the growth of new materials, is synthesis more important than characterization or theory/modeling?**

    No. Synthesis, characterization, and modeling/theory are equally weighted in the in-house research of a MIP, with advances anticipated in each. In addition, the MIP user facility is expected to be a significant resource in each of these three areas.

12. **Are there special requirements for the management of data?**

    All MIPs must have a well thought out plan for enhanced data management that ensures transparency, data sharing, and open source software, including an explicit statement of which open source license(s), if applicable, will be used.

13. **Since a MIP is focused on a targeted materials grand challenge and/or technological outcome that address a national priority, should proposals be device focused or heavily engineering?**

    No. The NSF Division of Materials Research (DMR) supports fundamental, hypothesis driven materials research. MIPs will focus on solving fundamental materials science grand challenges currently impeding the discovery of new materials and new phenomena that will advance a particular technological field. Research outcomes from a MIP could result in new devices.

14. **The focus of the first MIP solicitation is on developing new bulk and thin film crystalline "hard materials". What constitute "hard materials"?**

    Broadly speaking, "hard materials" refers to inorganic systems as opposed to "soft materials", like biomaterials, liquid crystals, polymers, gels, etc. Please refer to the National Academy report referenced in the solicitation, *Frontiers in Crystalline Matter.*

15. **Do proposals have to conduct research in both bulk crystals and thin films?**

    No. A MIP can advance the field of new bulk single crystal materials, thin film systems, or both.

16. **For proposals conducting research in both bulk crystals and thin films, is there an**

emphasis of one over the other?

No. It will depend on the proposed grand challenge and research program.

17. **Does "bulk crystal" mean support for research to develop processes to scale up crystals to large crystals or boules?**

    No. MIPs seek to solve fundamental materials science grand challenges impeding the discovery of new materials and materials phenomena. This may include improved crystal growth techniques to produce crystals of sufficient size for fundamental studies, where crystal availability or size is currently a limitation for the study of fundamental properties. Scale-up or the manufacturing of industrial size crystals is by itself not appropriate for MIPs.

18. **Are polycrystalline thin films considered responsive to the solicitation?**

    Yes. Please refer to the National Academy report referenced in the solicitation - Frontiers in Crystalline Matter.

19. **Can research be proposed in multiple material classes or systems?**

    Yes. MIPs seek to solve focused and specific fundamental materials grand challenges that advances materials research in an area of technological significance and national importance. In the case of multiple material classes or system, proposers will need to articulate a compelling cross-cutting intellectual theme that bridges numerous materials systems under the vision of the proposed MIP. Please refer to the NSF Mathematical and Physical Sciences (MPS) Directorate Advisory Subcommittee study - Materials Instrumentation.

20. **What is meant by closed-looped and iterative?**

    MIPs conduct in-house research through a collaborative and iterative approach wherein theory guides computational simulation, computational simulation guides experiments, and experiments further guide theory. Advances in synthesis/growth/processing techniques, characterization/testing methodology, and theory/data/computation/simulation approaches are expected. This mode of operating is expected to accelerate the discovery and development of new materials, enable the prediction and optimization of materials properties, and inform the design aspect of new materials systems.

21. **What is the difference between a collaborator and a user of the MIP facility?**

    Collaborators are those whose work is intended to directly inform the MIP in-house research and would naturally result in joint publications. The number of collaborators is expected to be limited to a number than can effectively contribute to the iterative feedback loop.

    Users are those who gain access to the facility and expertise of the MIP through a competitive proposal process.

22. **What level of Education and Outreach activities are expected?**

    NSF seeks creative and impactful approaches to integrating training and education with the scientific research of a MIP, while supporting a limited number of outreach activities aimed at raising awareness of the general public.

23. **How many students are expected to be involved or funded?**

MIPs will support the purchase of essential instrumentation, professional staff for the user facility and to conduct research, as well as students and post-doctoral researchers. NSF envisions approximately 3 or so graduate students, but proposals should articulate the appropriate balance for the scale of the research endeavor proposed.

USER FACILITY

24. **Does 50% of the effort devoted to the user facility mean 50% of the budget is allocated to the MIP facility?**

    No. 50% relates to the time and effort, not the budget. NSF is interested in increasing access to cutting edge instrumentation and domain experts. MIPs will provide approximately 50% of time on the instrumentation to external users and the remaining time for internal research.

25. **What type of instrumentation is located at a MIP?**

    MIPs are expected to have state-of-the-art instrumentation that lead to transformational outcomes in MIP-related research; by both the in-house research team and external users. Tools (or the suite of tools) acquired or developed through a MIP award are considered essential and underpin the scientific research of a MIP 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 combination of tools in a MIP user facility should be unique and not merely a collection of general purpose fabrication and characterization instruments.

26. **If the use of MIP equipment is free, how do we respond to the Project Description section on "User fee structure"?**

    Instruments purchased through a MIP award are to be made available to external users at no cost through a competitive proposal review process. User fees can be charged for access to equipment in place prior to the MIP. Describe the established cost recovery/user fee system, the current utilization of instruments, how MIP-related researchers (internal and external) gain access, and how data is managed, etc.

27. **Can user fees be charged for access to User Facilities already on campus prior to the MIP?**

    Yes. The access to user facilities, or selected equipment in those facilities, should be described in the Project Description, including any established cost recovery/user fee system, the current utilization of the equipment, how MIP-related researchers (internal and external) gain access, and how data is managed, etc.

BUDGET

28. **MIPs are anticipated to be five year awards totaling $10M to $25M for the award period, with an estimated number of 1-3 awards. We anticipate $10M to be available in FY15. Can you explain further?**

    The solicitation outlines the following funding scenario:

    - NSF anticipates having $10M in the DMR budget for Year 1 to fund the 1-3 MIP awards. This is a new program, where the budget is expected to grow modestly over time, if funds are available.
    - A MIP award itself will range between $10M-$25M, depending on the scope of the proposed research and investment in new equipment.

NSF anticipates supporting 1-3 MIP awards, as a function of the size of successful proposals and funds being available.

29. **Is cost sharing allowed for MIP proposals?**

    No. Cost sharing is prohibited and Line M on the proposal budget will not be available for use by the proposer.

30. **Where do we describe resources available for the project?**

    In order to assess the scope of the project, all organizational resources necessary for the project must be described within the "Scientific Program", "Description of Platform", and "User Facility" sections of the Project Description. In addition, the **Facilities, Equipment and Other Resources** section may be used to further describe organizational resources. This description should be narrative in nature and must not include any quantifiable financial information. These resources are not financially auditable by NSF and should not be included in the proposal budget or budget justification.

SINGLE COPY DOCUMENTS

31. **What format is most useful for communicating the Conflicts of Interest (COI)?**

    The COI document should be uploaded as a PDF where the information may be extracted or copied. In addition, PIs are strongly encouraged to send this information to sljones@nsf.gov as a Excel file with the following format "proposal #_institution_COI (replacing institution with university name)". The following matrix format is recommended:

Senior Personnel	Last Name	First Name	Current Affiliation	Type of Conflict
PI's name	Last Name (A)	First Name	Current Affiliation	Co-editor
PI's name	Last Name (B)	First Name	Current Affiliation	Postdoctoral advisee
CO-PI #1's name	Last Name (A)	First Name	Current Affiliation	Co-author

32. **On the list of Suitable Reviewers, may reviewers from national laboratories, industry, or foreign be included?**

    Yes. A limited number of reviewers from foreign universities as well as experts who conduct research in industry and US national laboratory can be included in the list of suitable reviewers.

    The suitable reviewer document should be uploaded as a PDF, where the information may be extracted or copied. In addition, PIs are strongly encouraged to send this information to sljones@nsf.gov as an Excel file with the following format "proposal #_institution_reviewers" (replacing institution with university name). The following matrix format is recommended:

Senior	First	Current Affiliation	Phone	Email	Areas of Expertise

Personnel Last Name	Name		Number	Address	
Last Name (A)	First Name	Current Affiliation			
Last Name (B)	First Name	Current Affiliation			

SUPPLEMENTARY DOCUMENTS

33. **Are Letters of Collaboration allowed?**

    Yes. Letters of collaboration should only confirm the intent to collaborate. NSF anticipates a limited number of external collaborations, and the nature and necessity of the collaboration should be described in the body of the proposal.

34. **Are Letters from anticipated external users of the MIP user facility allowed?**

    No. NSF is interested in evaluating the degree of open access to the facility and the process to grow the user community, as opposed to evaluating a list of potential users.

35. **Are Letters of Support allowed?**

    No. Letters of support are not allowed; only letters of collaboration.