

Mid-scale Research Infrastructure-1 (Mid-scale RI-1)

PROGRAM SOLICITATION

NSF 22-637

REPLACES DOCUMENT(S):

NSF 21-505



National Science Foundation

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter's local time):

January 05, 2023

REQUIRED

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

May 05, 2023

BY INVITATION ONLY

IMPORTANT INFORMATION AND REVISION NOTES

The lower limit of Mid-scale RI-1 implementation projects has been changed to \$4 million.

Preliminary AND FULL proposals must be submitted by an Authorized Organizational Representative by the due date indicated. **Full proposal submission is by invitation only.** All proposals must be submitted through Research.gov (recommended) or Grants.gov.

Please consult NSF's [Research Infrastructure Guide \(RIG\)](#) (formerly the Major Facilities Guide) for definitions of certain terms used in this solicitation, such as the Project Execution Plan. *As noted in the RIG section specific to Mid-scale Research Infrastructure (Section 5), the Project Execution Plan (PEP) should be scaled for the complexity of the project, and may not require all of the elements described elsewhere in the RIG.*

The Mid-scale RI-1 Program seeks broad representation in its award portfolio, including a geographically diverse set of institutions (including those in EPSCoR jurisdictions) and minority-serving institutions (MSIs). PIs who are women, early-career researchers, persons with disabilities and other members of underrepresented groups, are especially encouraged. To improve participation in science and engineering research for persons with disabilities, Mid-scale RI-1 encourages PIs to incorporate accessibility as part of a Mid-scale RI-1 design and implementation projects.

For projects that are invited to submit full proposals, an Environmental Checklist must be provided as a Single Copy Document. Details are provided under the Full Proposal Preparation section of this solicitation.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), funding made available through this funding opportunity is subject to the requirement that iron, steel, manufactured products, and construction materials used in the project are produced in the United States unless waivers are submitted and granted. For additional information, see Section VII below and visit NSF's [Build America, Buy America](#) webpage.

Clarification about budget contingency has been included to indicate that such requests should be included on Line G.6. of the NSF Budget pages.

Clarification has been provided to indicate what may be requested as part of design projects.

For PIs proposing research in the Antarctic, a requirement for consultation with the NSF Office of Polar Programs (OPP) to discuss the timing and feasibility of the project has been added. For projects requiring logistical support in the Arctic region, please consult with the NSF Arctic Research Support and Logistics (RSL) Program to discuss any support requirements (see: https://www.nsf.gov/geo/opp/arctic/res_log_sup.jsp). Documentation in the form of email correspondence must be provided as a Single Copy Document in both preliminary and (if invited) full proposals.

For both preliminary and invited full proposals, a separately submitted spreadsheet (available on the [Mid-scale RI-1 Page](#)) must be submitted to MidScaleRI1@nsf.gov listing information needed to manage reviewer selection. **This is in addition to the required Collaborators and Other Affiliations Information.**

Important Information

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in [Important Notice No. 147](#). In support of these efforts, proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov and may not be prepared or submitted via FastLane.

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 for the relevant due date to which the proposal is being 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. Submitting a proposal prior to a specified deadline does not negate this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Mid-scale Research Infrastructure-1 (Mid-scale RI-1)

Synopsis of Program:

In 2016, the National Science Foundation (NSF) unveiled a set of "Big Ideas," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to the Office of Integrative Activities, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

NSF-supported science and engineering research increasingly relies on cutting-edge infrastructure. With its Major Research Instrumentation (MRI) program and Major Multi-user Facilities ("Major Facilities") projects, NSF supports infrastructure projects at the lower and higher range of infrastructure project costs, Foundation-wide, across science and engineering research disciplines. The Mid-scale Research Infrastructure Big Idea is intended to provide NSF with an agile, Foundation-wide process to fund experimental research capabilities in the mid-scale range between MRI and Major Facilities.

NSF defines Research Infrastructure (RI) as any combination of facilities, equipment, instrumentation, or computational hardware or software, and the necessary human capital in support of the same. Major facilities and mid-scale projects are subsets of research infrastructure. The NSF Mid-scale Research Infrastructure-1 Program (Mid-scale RI-1) supports either the design or implementation of unique and compelling RI projects. Mid-scale implementation projects may include any combination of equipment, instrumentation, cyberinfrastructure, broadly used large scale datasets and the personnel needed to successfully commission the project. Mid-scale RI-1 design projects include the design efforts intended to lead to eventual implementation of a mid-scale class RI project. Mid-scale RI-1 projects should involve the training of a diverse workforce engaged in the design and implementation of STEM research infrastructure.

Mid-scale RI-1 emphasizes strong scientific merit, a response to an identified need of the research community and/or fulfillment of a national need to enable U.S. researchers to be competitive in a global research environment. Well-conceived technical and management plans are essential for both design and implementation proposals, as are well-developed plans (e.g., mentoring and professional development) for student training and the involvement of a diverse STEM workforce in all aspects of mid-scale design and/or implementation activities. The inclusion of individual project participants who are women, early-career researchers, persons with disabilities and members of other underrepresented groups are especially encouraged at all levels of the project team.

Within Mid-scale RI-1, proposers may submit two types of projects, "Implementation" (e.g., acquisition and/or construction) or "Design". The "Design" track is intended to facilitate progress toward readiness for a mid-scale range implementation project. Both Implementation and Design projects may involve new or upgraded research infrastructure. Mid-scale RI-1 "Implementation" projects may have a total project cost ranging from \$4 million up to but not including \$20 million. Mid-scale RI-1 "Design" projects may request less than \$4 million, with a minimum request of \$400,000 and a maximum request up to but not including \$20 million, as appropriate, to prepare for a future mid-scale range implementation project. (Note: Successful award of a Mid-scale RI-1 design project does not imply NSF commitment to the future implementation of the project being designed, nor is a Mid-scale RI-1 design award required for the submission of an implementation project.)

The Mid-scale RI-1 Program seeks to broaden the representation of PIs and institutions in its award portfolio, including a geographically diverse set of institutions (especially those in EPSCoR jurisdictions). Proposals submitted by, or involving partnerships between institutions are encouraged. PIs who are women, early-career researchers, persons with disabilities and other underrepresented minorities in STEM are also encouraged. To improve participation in science and engineering research for persons with disabilities, Mid-scale RI-1 encourages PIs to incorporate accessibility as part of a Mid-scale RI-1 design and implementation projects.

Please consult NSF's Research Infrastructure Guide, RIG, (available at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf21107) for definitions of certain terms used in this solicitation, such as the Project Execution Plan (PEP). Section 5 of the RIG provides guidance specific to Mid-scale Research Infrastructure Projects, including references to other parts of the RIG as needed. Note that PEP should be appropriately scaled for the complexity of the project and may not require all of the elements described in the RIG.

Mid-scale research infrastructure projects with total project costs beyond the Mid-scale RI-1 Program limit are separately solicited through the Mid-scale RI-2 Program. Proposals to the Mid-scale RI-1 Program with total project costs beyond this solicitation's budgetary limits, either during initial submission or cost analyses/revisions during subsequent review, are subject to return without further review.

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.

- Randy L. Phelps, OIA/IA, telephone: (703) 292-5049, email: rphelps@nsf.gov

- Jonathan Friedman, telephone: (703) 292-7475, email: jfriedma@nsf.gov
- Dominique M. Dagenais, telephone: (703) 292-2980, email: ddagenai@nsf.gov
- Majja M. Kukla, OISE, telephone: (703) 292-4940, email: mkukla@nsf.gov
- Deepankar (Deep) Medhi, CISE, telephone: (703) 292-8950, email: dmedhi@nsf.gov
- Jill K. Nelson, EHR, telephone: (703) 292-4359, email: jnelson@nsf.gov
- John M. Papanikolas, MPS, telephone: (703) 292-8173, email: jpapanik@nsf.gov
- Frank R. Rack, GEO, telephone: (703) 292-2684, email: frack@nsf.gov
- Sridhar Raghavachari, BIO, telephone: (703) 292-4845, email: sraghava@nsf.gov
- Chinonye Whitley, OIA/EPSCoR, telephone: (703) 292-8458, email: cwhitley@nsf.gov
- Joseph Whitmeyer, SBE, telephone: (703) 292-7808, email: jwhitmey@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- STEM Education
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)
- 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 5 to 10

The number of awards within each Mid-scale RI-1 category (Implementation and Design) will depend on the program funding level, and the number, cost and quality of proposals received by NSF in each category. Mid-scale RI-1 is expected to be a biennial competition, with the frequency being dependent on the availability of appropriated funds. Proposals will typically be funded for up to five years, commensurate with the scope of the project.

"Implementation" projects may have a total project cost may have a total project cost ranging from \$4 million up to but not including \$20 million. Only "Design" projects may request less than \$4 million, with a minimum request of \$400,000 and a maximum request up to but not including \$20 million.

Anticipated Funding Amount: \$100,000,000 to \$130,000,000

Estimated two-year FY 2023/24 Mid-scale RI-1 program budget is subject to appropriated funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Proposals may only be submitted by organizations located in the United States, its territories, or possessions, as follows.
 1. Institutions of higher education (Ph.D.-granting and non-Ph.D.-granting), acting on behalf of their faculty members, that are accredited in and have their main campus in the United States, its territories, or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions.
 2. Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, for example (but not limited to) independent museums and science centers, observatories, research laboratories and similar organizations that are directly associated with the Nation's research activities. These organizations must have an independent, permanent administrative organization (e.g., a sponsored projects office) located in the United States, its territories, or possessions, and have 501(c)(3) tax status.
 3. Consortia as follows:
 - a. A legally incorporated, not-for-profit consortium that includes two or more submission-eligible organizations as described in items (1) and (2) above. Such a consortium is one with an independent administrative structure (e.g., a sponsored projects office) located in the United States, its territories, or possessions and has 501(c)(3) status.
 - b. Submission-eligible organizations as described in items (1) and (2) above, on behalf of an informal consortium. The Cover Sheet of such a proposal *must* identify both a PI and co-PI(s) from *at least two* Mid-scale RI-1 submission-eligible organizations (items 1 and/or 2 above) as lead investigators in the consortium. These consortium proposals may also include as partners, via subawards, other U.S. and non-U.S. organizations that are not eligible to submit Mid-scale RI-1 proposals.

In either case, the proposal title should indicate that a consortium is proposing.

- For-profit commercial organizations, especially U.S. small businesses with strong capabilities in scientific or engineering research or education, are eligible for infrastructure support through subawards/subcontracts as private sector partners with submitting

organizations; they may not submit proposals. Such partnerships must be substantive and meaningful and build capacity for infrastructure development within Mid-scale RI-1 submission-eligible organization(s). In addition, the value added by the for-profit commercial organization should be justified as a unique contribution that is otherwise unavailable within organizations described in (1) and (2). Unless otherwise specified in the award, title to the resulting infrastructure should be retained by the Mid-scale RI-1-eligible performing organization. Prospective PIs may contact cognizant Mid-scale RI-1 program officers regarding organizational eligibility, and for information on other NSF funding opportunities for instrumentation and research infrastructure.

Additionally:

- **Major Facilities-related Proposals:** The Mid-scale RI-1 program will not accept proposals for an instrument or other infrastructure that augments an ongoing NSF Major Multi-user Facility project in the construction stage since the scope of those projects is already defined. A list of such facilities can be found at <https://www.nsf.gov/bfa/ifo/>.
- **FFRDC-related Proposals:** NSF's Federally Funded Research and Development Centers (FFRDCs) are eligible to submit under item 2) above. Proposals involving another Federal agency or one of their FFRDCs can be submitted as a consortium proposal by a Mid-scale RI-1 submission-eligible organization under item 3b) above. For submissions under 3b) above, in addition to at least two Mid-scale RI-1 eligible organizations, the proposal must include the agency/FFRDC (or its managing organization) as a partner in the consortium, even if the role of the FFRDC in the project is solely to house the infrastructure. The research infrastructure must make unique contributions to the needs of researchers within the consortium and/or establish access to new multi-user research capabilities. Preliminary inquiry to the cognizant Mid-scale RI-1 point of contact should be made before preparing a proposal for submission.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no limits to the number of preliminary proposals submitted as the lead organization. Full proposals are to be submitted only if/when invited by NSF. There is no limit to participation as a partner organization or subawardee.

Although more than one organization may participate in a proposal, a single organization must accept overall management responsibility for the project. The proposal must be submitted by one organization, with funding provided to any other organization(s) through subawards. The use of the separately submitted collaborative proposal method is not permitted.

The Mid-scale RI-1 Program seeks to broaden the representation of institutions in its award portfolio, including a geographically diverse set of institutions (especially those in EPSCoR jurisdictions), emerging research institutions, and minority-serving institutions.

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

Any one individual may be the Principal Investigator (PI) or co-Principal Investigator (co-PI) for no more than one preliminary or full proposal. A PI or co-PI for a preliminary proposal who is not invited for a full proposal submission may later serve as a co-PI or other senior personnel on an invited full proposal at the full-proposal organization's and PI's discretion.

The inclusion of individual project participants who are women, early-career researchers, persons with disabilities and members of other underrepresented groups are especially encouraged at all levels of the project team. To improve participation in science and engineering research for persons with disabilities, Mid-scale RI-1 encourages PIs to incorporate accessibility as part of a Mid-scale RI-1 design and implementation projects.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **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:**

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

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):

January 05, 2023

REQUIRED

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

May 05, 2023

BY INVITATION ONLY

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.

TABLE OF CONTENTS

Summary of Program Requirements

- I. **Introduction**
- II. **Program Description**
- III. **Award Information**
- IV. **Eligibility Information**
- V. **Proposal Preparation and Submission Instructions**
 - A. Proposal Preparation Instructions
 - B. Budgetary Information
 - C. Due Dates
 - D. Research.gov/Grants.gov Requirements
- VI. **NSF Proposal Processing and Review Procedures**
 - A. Merit Review Principles and Criteria
 - B. Review and Selection Process
- VII. **Award Administration Information**
 - A. Notification of the Award
 - B. Award Conditions
 - C. Reporting Requirements
- VIII. **Agency Contacts**
- IX. **Other Information**

I. INTRODUCTION

The scientific research community increasingly requires infrastructure that is too complex and costly for a single organization to procure, utilize and maintain. With its Major Research Instrumentation (MRI) program and Major Multi-user Facilities, NSF is able to support instrumentation/infrastructure projects across the Foundation at the lower end and the higher end of the spectrum of infrastructure costs. The Mid-scale Research Infrastructure program is intended to provide NSF with an agile, *Foundation-wide process* to fund implementation of research capabilities in the mid-scale range between MRI and Major Multi-user Facilities.

The National Science Board report responding to Congress, "Bridging the Gap: Building a Sustained Approach to Mid-scale Research Infrastructure and Cyberinfrastructure at NSF¹", highlights that:

"The research community has identified mid-scale research infrastructure as a key enabler of scientific advances on shorter timescales than required for the larger projects funded within the MREFC (Major Research Equipment and Facilities Construction) account. Mid-scale research infrastructure can also provide the foundations for new innovative large infrastructure, and, in the process, train early-career researchers in the development, design, construction, and effective use of cutting-edge infrastructure. Likewise, cyberinfrastructure (CI) is key to solving the challenges of collecting, processing, and distributing the big data so prevalent in today's science and engineering endeavors. Infrastructure investments at the required mid-level can also help maintain the United States' standing

among global partners and competitors."

The NSB Report recommends that NSF should sustain a mid-scale infrastructure program, noting that many mid-scale projects have potential for high scientific impact and have a level of community support as indicated by National Academies reports, directorate strategic plans and/or other advisory groups.

A separate mid-scale activity, Mid-scale RI-2, supports projects with a total cost ranging from \$20 million to below the threshold for a Major Facility Project, currently \$100 million. This solicitation for Mid-scale RI-1 activities covers the lower end of the mid-scale gap.

¹<https://www.nsf.gov/nsb/publications/2018/NSB-2018-40-Midscale-Research-Infrastructure-Report-to-Congress-Oct2018.pdf>

II. PROGRAM DESCRIPTION

This Mid-scale RI-1 solicitation calls for mid-scale projects from \$4 million up to but not including \$20 million in total project costs for implementation projects and \$400,000 up to but not including \$20 million for design projects. This funding range will support a variety of activities to implement or design visionary and unique projects with high-priority and broad impact as identified by research communities in the United States. Mid-scale RI-1 is not intended to enhance projects with a campus-centric focus.

The goal of Mid-scale RI-1 is the fulfillment of a research community-defined need that enables current and next-generation U.S. researchers to be competitive in a global research environment. Solving the most pressing scientific and societal problems of the day – such as those called out in National Academies reports and decadal surveys or identified through research community planning and prioritizing exercises or other national priorities – using new technologies, techniques, and concepts is encouraged in this competition. As such, Mid-scale RI-1 focuses on innovative, potentially transformative projects. The scientific justification should demonstrate how the proposed infrastructure provides more advanced research capabilities relative to what is generally available to the general U.S. research community. Investigators whose preliminary proposals are for capabilities similar to those currently available to the U.S. research community are unlikely to be invited to submit full proposals. With the exception of design awards, infrastructure acquired or developed with support from the Mid-scale RI-1 Program is expected to be operational by the end of the award period to enable the research for which the infrastructure was proposed.

All proposals should show the project's value and benefit to the U.S. science community. Examples of benefit include, but are not limited to, new and unique research capability, broad access to research infrastructure, dedicated community observing time on the infrastructure, access to unique data products and software, and cooperation and sharing of technology with other projects. Proposals for infrastructure that are part of a larger project must clearly state the impact of the proposed infrastructure on the project and the benefit to the U.S. research communities that NSF supports.

Mid-scale projects represent opportunities to expand participation in instrument/infrastructure design and implementation within STEM fields and train the next generation of and creators of cutting-edge new capabilities in science, engineering and technology. As such, student training and involvement of a diverse workforce in mid-scale infrastructure development, implementation and/or associated data management processes are expected. To maximize the impact of Mid-scale RI-1 investments, proposals must not only focus on innovative, potentially transformative research infrastructure, but also on the opportunities the project's design or implementation presents to expand diversity and student training in all aspects of the project.

Strong project management and robust cost estimation will be emphasized in the Mid-scale RI-1 proposal review, particularly for more costly or complex projects. Proposers are strongly encouraged to account for all foreseeable costs in the project budget, including adequate plans for risk mitigation.

Prior to making a funding decision, NSF may be required to comply with applicable federal environmental laws and regulations such as the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and the Endangered Species Act (ESA). For example, these statutes require NSF to consider the potential impacts of activities associated with proposals under consideration for NSF funding on a broad range of environmental resources (NEPA), significant historic properties (NHPA), and endangered and/or threatened species (ESA). To assist NSF in determining which environmental statutes may apply and what level of environmental review may be appropriate, preliminary proposals (and if applicable full proposals) should indicate whether activities are anticipated to impact the natural or cultural environment, especially those involving renovation, construction, or major fixed equipment installation. In order to support NSF's federal environmental review and compliance obligations, additional information may be requested from the PI. For projects that are invited to submit full proposals, an Environmental Checklist must be provided as a Single Copy Document. Details are provided under the Full Proposal Preparation section in this Solicitation.

Projects with an international component may be submitted to the Mid-scale RI-1 Program in accordance with the Program's eligibility requirements and applicable provisions found in the PAPPG. International projects typically involve partnering a U.S. project with one or more international collaborators in a specific institution or organization. Successful international projects include (1) true intellectual collaboration with a foreign partner and (2) benefits that are realized from the expertise, specialized skills, capabilities, phenomena, or other resources that the foreign collaborator or research environment provides.

Examples of projects that may be supported by Mid-scale RI-1 include, but are not limited to, infrastructure that supports high-priority research experiments or campaigns, major cyberinfrastructure that addresses community and national-scale computational and data-intensive science and engineering research, major shared community infrastructure and resources as may be required to enable community-scale research and upgrades and/or major new infrastructure for existing facilities. Proposals for infrastructure that advances research on climate science and the impacts of climate change are encouraged.

All Mid-scale RI-1 proposals should describe the types of research for which the infrastructure will be used, and the benefit to the U.S. research communities that NSF supports. Proposals for infrastructure that are part of a larger project must clearly state the impact of the proposed infrastructure on the project, and whether and how any specific part(s) of the infrastructure would be identified with NSF. However, the specific research projects for which the infrastructure will be used need not be funded by NSF or the Federal government.

The Mid-scale RI-1 program will not support projects that include the following:

- Science and engineering research (except for validation of operational readiness);
- Post-implementation research, operations, or maintenance;
- Projects with a total Mid-scale RI-1 project cost that is outside the limits of this solicitation;

General-purpose buildings, support systems and equipment that are not directly required for the implementation and eventual operation of the proposed infrastructure;

- Multiple pieces of infrastructure or instrumentation that are packaged together, either within a single campus or for a collection or consortium of campus labs, to meet the minimum total project cost but without functioning as an integrated system;
- MRI-like projects that are primarily based on the acquisition of off-the-shelf instrumentation and do not have a clear justification of their uniqueness and contribution to national infrastructure;
- Other organized activities, such as research centers that are not consistent with the definition of NSF mid-scale research infrastructure provided in this solicitation.

The Mid-scale RI-1 program will consider proposals for research cyberinfrastructure (CI) projects that aim to significantly enable new science and engineering research at the community, regional, national, and international scales. Such research CI proposals must be strongly driven by the identified research needs of one or more science and engineering communities supported by NSF, advance the Nation's holistic research cyberinfrastructure ecosystem (i.e., spanning one or more of data, software, networking, and/or cybersecurity), and comprise innovative, focused technical and operational objectives. Proposals to the Mid-scale RI-1 Program that are primarily focused narrowly on data storage or seek support for broadly provisioned high-performance computing resources will not be supported by the Mid-scale RI-1 Program. Prospective principal investigators (PIs) with questions should contact the Mid-scale RI-1 Program team.

Proposals seeking support are subject to return without review if noncompliance with the above guidance is established prior to review, or declination if noncompliance is established as a result of merit review.

To organize the diverse range of projects expected across the research areas supported by NSF, with a wide range of project types and costs, the Mid-scale RI-1 Program is divided into the following categories.

1. Mid-scale RI-1: Implementation Projects (M1:IP) (e.g., Acquisition, Assembly, Construction and Commissioning)

The infrastructure resulting from implementation projects may be a) such as to enable well-defined, limited-term research experiments with broad community buy-in and shared data resources and/or b) shared-use, mid-scale infrastructure for broad community use. M1:IP provides for acquiring, assembling, constructing and commissioning mid-scale infrastructure e.g., at labs, facilities or in the field, but does not support the construction or operations of labs/facilities or the science or operations undertaken with the infrastructure.

Operations and maintenance costs are discussed below.

2. Mid-scale RI-1: Design Projects (M1:DP).

Design projects are intended to prepare for the implementation of future mid-scale range projects. Only M1:DP projects may ask for less than \$4 million. The minimum M1:DP budget request is \$400,000, with the upper request for M1:DP being the maximum allowable Mid-scale RI-1 request up to but not including \$20 million as needed to prepare for a future mid-scale range implementation project. While Mid-scale RI-1 will not support early phase Research and Development to address technological issues that are appropriate for funding through regular research programs, the program may consider prototypes on a case-by-case basis. Successful award of a Mid-scale RI-1 design project does not imply NSF's commitment to future implementation of that project, and hence the acquisition or development of long-lead items will not be considered as part of design projects. Projects supported through the M1:DP track that elect to submit to future NSF competitions for implementation will be competing against all other proposals in any competition.

The distribution of awards between the design and implementation categories will depend on the numbers and quality of the proposals received.

The Mid-scale RI-1 Program does not provide operating or maintenance funds for projects it supports through this solicitation. However, both preliminary and full proposals must describe viable plans for continuing operations and maintenance of any awarded infrastructure. (See below.)

Mid-scale RI is expected to serve a wide community and lead to readily available public access to data. Mid-scale RI-1 investments are expected to fill gaps in the Nation's infrastructure and demonstrate high potential to significantly advance the Nation's research capabilities.

Proposals will typically be funded for up to five years, commensurate with the scope of the project.

III. AWARD INFORMATION

Awards may be in the form of a standard grant, a continuing grant or a cooperative agreement, depending on the complexity of the project and the extent of government involvement. NSF reserves the right to undertake pre-award cost, schedule, management and environmental reviews as part of the review of a proposed project. Monthly and quarterly reports may be part of NSF's post-award monitoring process.

The minimum proposal budget for M1:IP projects is now \$4 million, with the maximum proposal budget for the full award duration being up to but not including \$20 million. Only M1:DP projects may request less than \$4 million, with a minimum request of \$400,000 and a maximum request up to but not including \$20 million as needed to prepare for a future mid-scale class implementation project.

Estimated program budget, number of awards and average award size are subject to the availability of funds.

Earliest expected start date is October 01, 2023.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Proposals may only be submitted by organizations located in the United States, its territories, or possessions, as follows.

1. Institutions of higher education (Ph.D.-granting and non-Ph.D.-granting), acting on behalf of their faculty members, that are accredited in and have their main campus in the United States, its territories, or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions.
2. Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, for example (but not limited to) independent museums and science centers, observatories, research laboratories and similar organizations that are directly associated with the Nation's research activities. These organizations must have an independent, permanent administrative organization (e.g., a sponsored projects office) located in the United States, its territories, or possessions, and have 501(c)(3) tax status.
3. Consortia as follows:
 - a. A legally incorporated, not-for-profit consortium that includes two or more submission-eligible organizations as described in items (1) and (2) above. Such a consortium is one with an independent administrative structure (e.g., a sponsored projects office) located in the United States, its territories, or possessions and has 501(c)(3) status.
 - b. Submission-eligible organizations as described in items (1) and (2) above, on behalf of an informal consortium. The Cover Sheet of such a proposal *must* identify both a PI and co-PI(s) from *at least two* Mid-scale RI-1 submission-eligible organizations (items 1 and/or 2 above) as lead investigators in the consortium. These consortium proposals may also include as partners, via subawards, other U.S. and non-U.S. organizations that are not eligible to submit Mid-scale RI-1 proposals.

In either case, the proposal title should indicate that a consortium is proposing.

- For-profit commercial organizations, especially U.S. small businesses with strong capabilities in scientific or engineering research or education, are eligible for infrastructure support through subawards/subcontracts as private sector partners with submitting organizations; they may not submit proposals. Such partnerships must be substantive and meaningful and build capacity for infrastructure development within Mid-scale RI-1 submission-eligible organization(s). In addition, the value added by the for-profit commercial organization should be justified as a unique contribution that is otherwise unavailable within organizations described in (1) and (2). Unless otherwise specified in the award, title to the resulting infrastructure should be retained by the Mid-scale RI-1-eligible performing organization. Prospective PIs may contact cognizant Mid-scale RI-1 program officers regarding organizational eligibility, and for information on other NSF funding opportunities for instrumentation and research infrastructure.

Additionally:

- **Major Facilities-related Proposals:** The Mid-scale RI-1 program will not accept proposals for an instrument or other infrastructure that augments an ongoing NSF Major Multi-user Facility project in the construction stage since the scope of those projects is already defined. A list of such facilities can be found at <https://www.nsf.gov/bfa/lfo/>.
- **FFRDC-related Proposals:** NSF's Federally Funded Research and Development Centers (FFRDCs) are eligible to submit under item 2) above. Proposals involving another Federal agency or one of their FFRDCs can be submitted as a consortium proposal by a Mid-scale RI-1 submission-eligible organization under item 3b) above. For submissions under 3b) above, in addition to at least two Mid-scale RI-1 eligible organizations, the proposal must include the agency/FFRDC (or its managing organization) as a partner in the consortium, even if the role of the FFRDC in the project is solely to house the infrastructure. The research infrastructure must make unique contributions to the needs of researchers within the consortium and/or establish access to new multi-user research capabilities. Preliminary inquiry to the cognizant Mid-scale RI-1 point of contact should be made before preparing a proposal for submission.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no limits to the number of preliminary proposals submitted as the lead organization. Full proposals are to be submitted only if/when invited by NSF. There is no limit to participation as a partner organization or subawardee.

Although more than one organization may participate in a proposal, a single organization must accept overall management responsibility for the project. The proposal must be submitted by one organization, with funding provided to any other organization(s) through subawards. The use of the separately submitted collaborative proposal method is not permitted.

The Mid-scale RI-1 Program seeks to broaden the representation of institutions in its award portfolio, including a geographically diverse set of institutions (especially those in EPSCoR jurisdictions), emerging research institutions, and minority-serving institutions.

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

Any one individual may be the Principal Investigator (PI) or co-Principal Investigator (co-PI) for no more than one preliminary or full proposal. A PI or co-PI for a preliminary proposal who is not invited for a full proposal submission may later serve as a co-PI or other senior personnel on an invited full proposal at the full-proposal organization's and PI's discretion.

The inclusion of individual project participants who are women, early-career researchers, persons with disabilities and members of other underrepresented groups are especially encouraged at all levels of the project team. To improve participation in science and engineering research for persons with disabilities, Mid-scale RI-1 encourages PIs to incorporate accessibility as part of a Mid-scale RI-1 design and implementation projects.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (required): Preliminary proposals are required and must be submitted via Research.gov, even if full proposals will be submitted via Grants.gov.

Preliminary Proposal Set-Up: Select "Prepare New Preliminary Proposal" in Research.gov. Search for and select this solicitation title in Step One of the Preliminary Proposal wizard. Select "Single proposal (with or without subawards)". Separately submitted collaborative proposals will be returned without review.

Please note that even though proposals must be submitted to the Office of Integrative Activities, once received the proposals will be managed by a cross-disciplinary team of NSF Program Directors. When submitted, proposals will first reside in the Office of Integrative Activities which coordinates the Mid-scale RI-1 Program in partnership with NSF Directorates.

Preliminary Proposal Contents

The preliminary proposal should consist of the following elements:

- 1. Title:** The project title must be concise and include the primary Mid-scale RI-1 purpose (Implementation Project, IP; Design Project, DP) of the proposal, e.g., "Mid-scale RI-1 (M1:IP): TITLE" or "Mid-scale RI-1 (M1:DP): TITLE". Consortium projects must also be identified in the title.
- 2. Cover Sheet:** For planning purposes October 01, 2023 should be shown as the start date.
- 3. Senior Personnel:** NSF proposals identify only a single PI and up to four co-PIs with those titles. Other major participants may be designated as "senior personnel." Please see the NSF PAPPG for definitions of Senior Personnel.
- 4. Project Summary (1-page maximum):** Please follow guidance in the NSF PAPPG. **However, the first line of the Project Summary should list the most relevant Directorate(s)/Division(s) for review of the proposal.** NSF reserves the right to assign proposals to Directorate/(s)Division(s) that are deemed to be the most appropriate for review. PI selection of a Directorate/(s)Division(s) for review is advisory to NSF.
- 5. Project Description (10-pages maximum):**
 - a. A statement of which of the categories (Implementation or Design) of Mid-scale RI-1 is most appropriate for this proposal as the first sentence.
 - b. Any project-related activities that are anticipated to have significant environmental and/or cultural impacts should be noted at the beginning of the Project Description.
 - c. Within the Intellectual Merit, describe the Scientific Justification, including the priority research capabilities relative to what is generally available to the U.S. research community and its potential to significantly advance the Nation's research capabilities.
 - d. Within the Intellectual Merit, include a discussion that explains how the requested infrastructure will fulfill a community-defined need and how that need was identified, for example, by reference to National Academies reports or Decadal Surveys, or other research community planning or prioritizing exercises that resulted in a published report. The benefits should include enabling current and next-generation U.S.-based researchers to be more competitive in a global research environment. As appropriate, describe how the proposed infrastructure responds to identified high priority needs of a research community using new technologies, techniques, and concepts. Describe how the proposed infrastructure is innovative and/or potentially transformative.
 - e. Within the Broader Impacts, include a discussion of opportunities for student training, increased participation of underrepresented groups and a description of tangible benefits to the wider U.S. research community (access, data products, technology, etc.). Student training and the involvement of a diverse STEM workforce should be apparent in all aspects of mid-scale design or implementation activities. Please note this section 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.
 - f. *Institutional Commitment to Diversity and Inclusion* - Using no more than one paragraph, describe indicators of institutional commitment to promoting diversity and inclusion within the participating institutions. For example, if one or more institutional members of the project have a SEA Change Institutional Award (<https://seachange.aaas.org/>), the level of the award(s) could be provided; if an institution has or had an ADVANCE Institutional Transformation grant (<https://beta.nsf.gov/funding/opportunities/advance-organizational-change-gender-equity-stem-academic-professions-advance>), its impact could be summarized; if nothing similar applies, other institution-wide activities sponsored by the leadership of the institution could be described.
 - g. Although not funded by Mid-scale RI-1, preliminary proposals must include an outline of planned operations and maintenance support, especially an estimate of any planned needs for ongoing, NSF-supported operations and maintenance that may be requested outside of the Mid-scale RI Program.
 - h. Note: Results from Prior NSF Support should *not* be included. Also, URLs may not be used.
 - i. Proposals with an international dimension should include a description of the foreign collaborator's role in the project. Biographical Sketches for foreign collaborators and letters of commitment from foreign institutions or organizations should be included as supplemental documents to ensure commitment to the collaboration.

6. References Cited: Please follow guidance in the NSF PAPPG for instructions.

7. Senior Personnel Documents

a. Biographical Sketches: Biographical Sketches are required for the PI, all co-PIs, and any additional senior personnel at all participating organizations. See the PAPPG for details.

b. Collaborators & Other Affiliations (COA) information specified in the PAPPG should be submitted using the instructions and spreadsheet template found at <https://www.nsf.gov/bfa/dias/policy/coa.jsp>.

8. Budget and Budget Justification: Budgets for Preliminary proposals, including budgets for any subawards, may be estimates but must be justified with a Basis of Estimates (BoE) included, and must be well thought out. Copies of vendor quotations, however, should not be included in preliminary proposals. If the budget includes contingency, that contingency must cover the known risks and be appropriate for risk mitigation. (Contingency should be listed on Line G.6. (Other) on the Budget Pages.)

9. Facilities, Equipment, and Other Resources: In order for NSF, and its reviewers, to assess the scope of a proposed project, all organizational resources not being requested from NSF but necessary for, and available to a project, must be described in this section of the proposal. Proposers should describe only those resources that are directly applicable. The description should be narrative in nature and must not include any quantifiable financial information. Proposers should include a description of the internal and external resources (both physical and personnel) that are expected to be available to the project. Such information must be provided in this section, in lieu of other parts of the proposal (e.g., Budget Justification, Project Description). No dollar value should be attached to these resources.

10. Supplementary Documents (to be entered in the Other Supplementary Documents section of Research.gov):

a. List of all project personnel, organized alphabetically who have a role in the project. Use the following format: last name, first name, middle initial, institution/organization.

b. A separate list, in alphabetical order, of all institutions and organizations with which project personnel are affiliated. Designate for each an appropriate category: Institution of Higher Education, National Laboratory, Federal Government, Industry, Non-Governmental Organization, State/Local Government, or International organization.

c. An initial version of the Project Execution Plan (PEP). The PEP documents how the project will be managed by the Recipient. (See the RIG.) While the PEP is not expected to be fully developed at the preliminary proposal stage, it should contain sufficient discussion in each relevant PEP section to demonstrate that the project team has an understanding of the complexity of project management. Greater PEP detail will be required in invited full proposals. The latest template for a Mid-scale RI PEP will be posted at https://www.nsf.gov/bfa/lfo/mid-scale_guidance.jsp.

No other items or appendices should be included. Information pertaining to "Results from Prior NSF Support", "Current and Pending Support", "Data Management Plan", and "Postdoctoral Mentoring Plan" is not required for preliminary proposals and should not be included. Preliminary proposals containing items other than those required above are subject to return without review.

11. Information to be submitted to NSF via the Single Copy Documents Section (seen only by NSF staff)

a. Required:

1. As appropriate: Pls proposing infrastructure intended for use in the Antarctic are required to consult with the NSF Office of Polar Programs (OPP) to discuss the timing and feasibility of their project. For projects requiring logistical support in the Arctic region, please consult with the NSF Arctic Research Support and Logistics (RSL) Program to discuss any support requirements (see: https://www.nsf.gov/geo/opp/arctic/res_log_sup.jsp). Documentation in the form of email correspondence must be provided as a Single Copy Document. Failure to do so may result in a proposal being returned without review.

b. Optional:

1. Proprietary or privileged information (if applicable). Any available, relevant environmental reports and/or documentation (e.g., permits, authorizations, etc.), if applicable, should be submitted in the Single Copy Document section. See PAPPG Chapter II.D.1 for additional information.

2. List of suggested reviewers or reviewers not to include (with a brief explanation or justification for why the reviewer should be excluded).

11. Required Information to be submitted to NSF via email.

In addition to their submission in the supplementary documents section of the proposal, the proposer is required to send a spreadsheet version of items 10.a. and 10.b. — lists of all personnel and participating organizations — in the form of an excel two tab spreadsheet via email to MidScaleRI1@nsf.gov. **These lists must be sent immediately after the proposal is submitted. The email subject line should be principal investigator's last name followed by the proposal number. The excel spreadsheet should be named the same (principal investigator's last name followed by the proposal number).**

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.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation

instructions provided in this program solicitation may deviate from the PAPPG instructions.

Special instructions for submitting to this solicitation

Proposal Set-Up: Select "Prepare New Full Proposal" in Research.gov. Search for and select this solicitation title in Step One of the Full Proposal wizard. Select "Research Infrastructure" as the proposal type. In the proposal details section, select "Single proposal (with or without subawards)". Separately submitted collaborative proposals will be returned without review.

Please note that even though proposals must be submitted to the Office of Integrative Activities, once received the proposals will be managed by a cross-disciplinary team of NSF Program Directors within the directorates. When submitted, proposals will first reside in the Office of Integrative Activities which coordinates the Mid-scale RI-1 Program in partnership with NSF Directorates.

Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page, however you may need to locate the Division Code, Program Code, Division Name, and Program Name for the specific solicitation you are applying to by visiting <https://www.fastlane.nsf.gov/pgmannounce.jsp>. As stated previously, even though proposals must be submitted to the Office of Integrative Activities, once received the proposals will be managed by a cross-disciplinary team of NSF Program Directors within the directorates.

Full proposals should only be submitted if invited by NSF. Full proposal submissions without an invitation will be returned without review.

If invited by NSF, full proposals must provide more detail than the preliminary proposal and include a detailed project execution plan (PEP) that clearly describes the management of the project within the "Construction Project Definition" section of the PEP.

Every effort should be made to update information that was provided in the preliminary proposal and to fully address issues raised in the preliminary proposal review. The cost and scope of the project are likely to be refined in the full proposal, but the revised cost must not exceed the limits of the Mid-scale RI-1 Program.

The following instructions supplement the guidance in the PAPPG or NSF Grants.gov Application Guide. **Additional instructions for full proposals may be provided in letters of invitation to submit full proposals.**

1. Title: The project title must be concise and include the primary Mid-scale RI-1 purpose (Implementation Project, IP; Design Project, DP) of the proposal, e.g., "Mid-scale RI-1 (M1:IP): TITLE" or "Mid-scale RI-1 (M1:DP): TITLE". Consortium projects must also be identified in the title.

2. Cover Sheet: For planning purposes October 01, 2023 should be shown as the start date. Include the Preliminary Proposal number.

3. Senior Personnel: NSF proposals identify only a single PI and up to four co-PIs with those titles. Other major participants may be designated as "senior personnel." Please see the NSF PAPPG for definitions of Senior Personnel.

4. Project Summary (1-page maximum): See instructions for Preliminary Proposals. The first line of the Project Summary should list the most relevant Directorate(s)/Division(s) for review of the proposal. NSF reserves the right to assign proposals to Directorate(s)/Division(s) that are deemed to be the most appropriate for review. PI selection of a Directorate(s)/Division(s) for review is advisory to NSF.

5. Project Description (page limit is 20 pages unless otherwise specified in the invitation letter): This section must include components listed below.

a. A statement of which of the categories of Mid-scale RI-1 (Implementation or Design) is most appropriate for this proposal as the first sentence.

b. Any project-related activities that are anticipated to have significant environmental and/or cultural impacts should be noted at the beginning of the Project Description.

c. Results from Prior NSF Support. Note that this requirement applies to the PI and all co-PIs. When appropriate, focus on awards including infrastructure or infrastructure management-related activities. See the PAPPG for details.

d. Within the Intellectual Merit section, describe the Scientific Justification. Describe the potential for addressing one or more identified high-priority science goals within the relevant research community, the potential for advancing scientific discovery and the potential to significantly advance the Nation's research capabilities. Describe how the proposed infrastructure is innovative and/or potentially transformative. Explain the unique research capabilities and lack of general availability of the proposed mid-scale infrastructure. The scientific justification should demonstrate how the proposed infrastructure provides unique research capability relative to what is currently available to the general U.S. research community.

e. Within the Intellectual Merit, include a description of the tangible benefits the proposed infrastructure will have to the wider U.S. research community explaining how it will fulfill a community-defined need and how that need was identified, for example, by reference to National Academies reports or Decadal Surveys, or other research community planning or prioritizing exercises that resulted in a published report. The benefits should include enabling current and next-generation U.S.-based researchers to be competitive in a global research environment. As appropriate, describe how the proposed infrastructure responds to identified high-priority needs of a research community using new technologies, techniques, and concepts.

f. Preliminary Activities Accomplished: For Implementation projects, include a description of any preliminary activities that have already occurred and that have prepared the path for implementation, for example, identification of the primary scientific, technical and system performance requirements, and associated designs and specifications. For all proposals in which preliminary planning/design documents are available, include them as part of the Other Supplementary Documents section. For design projects, include a description of any preliminary designs/workshops/etc. that have been undertaken, summarizing the output(s) from these efforts as part of the Other Supplementary Documents section.

g. Implementation Plan: This section, elements of which will appear in the PEP, should include a summary of the technical readiness and planned project management, including how the project will be implemented by the project team. An organizational chart and a summary of key personnel and their roles should be included.

h. Operations and Utilization Plan: For Implementation projects, discuss the overall plan for operating the infrastructure including as a minimum a) management/governance plans, b) strategy for access and utilization of the infrastructure by the target research communities, and c) planned metrics and the process for evaluating the success and impact of the NSF investment in this infrastructure. This section must also identify the anticipated sources of operations and maintenance (O&M) funding, including any needs for ongoing NSF-supported operations and maintenance that may be requested outside of the Mid-scale RI-1 Program. Note that Mid-scale RI-1 does not fund post-implementation utilization and O&M, but reviewers and NSF need to understand how the infrastructure will be managed/supported over its lifetime.

i. Broader Impacts: A section discussing the anticipated Broader Impacts. (See Section VI below for examples of Broader Impacts.) At a minimum, this section should include how the project will advance student training and increase the participation of underrepresented groups (including, for example, veterans and those with disabilities). Mid-scale projects are ideal opportunities for increasing diversity among the designers, builders, implementers and users of STEM instrumentation and infrastructure projects, training the next generation of leaders in engineering, science and technology and the creators of cutting-edge new research capabilities. As such, meaningful inclusion of diverse student training and involvement in mid-scale development and/or associated data management is expected. Please note this section 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.

j. *Institutional Commitment to Diversity and Inclusion* - Using no more than one paragraph, describe indicators of institutional commitment to promoting diversity and inclusion within the participating institutions. For example, if one or more institutional members of the project have a SEA Change Institutional Award (<https://seachange.aaas.org/>), the level of the award(s) could be provided; if an institution has or had an ADVANCE Institutional Transformation grant (<https://beta.nsf.gov/funding/opportunities/advance-organizational-change-gender-equity-stem-academic-professions-advance>), its impact could be summarized; if nothing similar applies, other institution-wide activities sponsored by the leadership of the institution could be described.

k. Divestment. Mid-scale RI-1 implementation full proposals should also include a brief discussion of how the infrastructure will be decommissioned, the strategy for eventual disposal of the infrastructure and plans for close out of the project.

l. Proposals with an international dimension should include a description of each foreign collaborator's role in the project. Biographical Sketches for foreign collaborators and letters of commitment from foreign institutions or organizations should be included as Other Supplemental Documents to ensure commitment to the collaboration.

6. References Cited: Please follow guidance in the NSF PAPPG for instructions.

7. Budget and Budget Justification, including budgets for any subawards: Mid-scale RI-1 budgets should be supported by the four characteristics of a high-quality estimate: 1) well-documented; 2) comprehensive; 3) accurate; and 4) credible (see the RIG). Project schedules should be developed following the best program management practices. If the budget includes contingency, that contingency must cover the known risks and be appropriate for risk mitigation. (Contingency should be listed on Line G.6. (Other) on the Budget Pages.) Additional guidance on the budget may be provided in the letter of invitation to submit a full proposal.

8. Facilities, Equipment, and Other Resources: See instructions for Preliminary Proposals.

9. Senior Personnel Documents:

a. Biographical Sketches: Biographical Sketches are required for the PI, all co-PIs and additional senior personnel at all participating organizations. See the PAPPG for details.

b. Current and Pending Support: See the NSF PAPPG for instructions.

c. Collaborators & Other Affiliations (COA): Information specified in the PAPPG should be submitted using the instructions and spreadsheet template found at <https://www.nsf.gov/bfa/dias/policy/coa.jsp>.

10. Supplementary Documents:

a. List of all project personnel, organized alphabetically who have a role in the project. Use the following format: last name, first name, middle initial, institution/organization.

b. A separate list, in alphabetical order, of all institutions and organizations with which project personnel are affiliated. Designate for each an appropriate category: Institution of Higher Education, National Laboratory, Federal Government, Industry, Non-Governmental Organization, State/Local Government, or International organization.

c. A detailed version of the Project Execution Plan (PEP). Concurrence on an initial PEP must be reached between NSF and the proposing organization prior to any award. It is expected that the PEP will evolve during the execution of the award. Should the PI believe that some elements of the structure of the PEP described in the RIG are not applicable, the specific section(s) should include a justification for exclusion. Some material may be a duplication from other sections of the Mid-scale RI-1 proposal but should nevertheless be included for completeness and reference as the project proceeds.

The latest template for a Mid-scale RI PEP is posted at https://www.nsf.gov/bfa/lfo/lfo_documents.jsp. Please consult NSF's Research Infrastructure Guide, Section 5, for information specific to Mid-scale Project Execution Plans. The PEP should be scaled for the complexity of the project, and may not require all of the elements described elsewhere in the RIG.

For Implementation Projects, Full Proposal PEPs must also include, as part of Section 9 (Integration and Commissioning), a fully developed discussion of the transition to routine operations and maintenance, specifying if that O&M support will be requested from NSF or other sources.

d. If the site selected has any known or potential requirements for permitting or federal environmental compliance, a discussion of this should be included in the PEP. Inclusion of other PEP components detailed in the NSF's Research Infrastructure Guide should consider the specific execution and management needs of the project.

e. Include a letter documenting the performing organization's commitment to ensuring successful operations and maintenance over the expected lifetime of the infrastructure. Proposals for infrastructure to be located at an organization other than the performing organization must provide an additional (one-page maximum) supplementary document stating the host organization's commitment to house the infrastructure.

f. Statements from individuals, on organization letterhead, confirming substantive collaboration efforts in the design or implementation of the infrastructure may be submitted, but they must follow only the format indicated below.

To: NSF Mid-scale RI-1 Coordinators

From: Org

Date:

Subject: Statement of Collaboration

By signing below I acknowledge that I am listed as a collaborator on this Mid-scale RI proposal, entitled " (proposal title) ," with (PI name) as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources therein designated to me.

Signed:

The proposal body itself should describe the nature and need for a collaboration and/or describe the major users and their need for the infrastructure. Statements of collaboration by individuals beyond that specified above, including letters of support/endorsement, are not allowed. Each statement must be signed by the designated collaborator/user. PI requests to collaborators for these statements should be made well in advance of the proposal submission deadline since, if they are to be included, they must be included at the time of the proposal submission.

If a proposed effort involves a collaboration at an organizational level as opposed to an individual(s), e.g., a private sector partner, an entire organization, or a large formalized collaboration (e.g., through a memorandum of understanding or other legal document), a one- page-maximum letter confirming their participation may be included. In particular, proposals involving large formalized collaborations are encouraged to have the collaboration utilize this letter to document the role, importance and priority of the requested infrastructure in the overall efforts being undertaken by the collaboration.

g. Vendor quotations for major components must be included as Other Supplementary Documents for full proposals only. Inclusion of representative, itemized vendor quotations is required for full Mid- scale RI-1 proposals. Although a proposal might reference and have a quote(s) for a specific make and model, the proposer is reminded that his/her organization's approved procurement processes must be utilized in the event of an award to establish the appropriate item(s) to be purchased and that applicable procurement standards for institutions of higher education and other non-profit organizations are described in 2 CFR 215.40-48.

h. If any designs of the proposed infrastructure are available, they should be included or described as appropriate.

11. Data Management Plan: See the NSF PAPPG for instructions.

12. Postdoctoral Mentoring Plan, as appropriate: See the NSF PAPPG for instructions.

No other items or appendices are to be included unless expressly allowed in the invitation to submit a full proposal. Full proposals containing items other than those allowed above will be returned without review.

13. Single Copy Documents Section (seen only by NSF staff)

a. Required:

1. As appropriate: PIs proposing infrastructure intended for use in the Antarctic are required to consult with the NSF Office of Polar Programs (OPP) to discuss the timing and feasibility of their project. For projects requiring logistical support in the Arctic region, please consult with the NSF Arctic Research Support and Logistics (RSL) Program to discuss any support requirements (see: https://www.nsf.gov/geo/opp/arctic/res_log_sup.jsp). Documentation in the form of email correspondence must be provided as a Single Copy Document. Failure to do so may result in a proposal being returned without review.

b. Optional:

1. Proprietary or privileged information (if applicable). Any available, relevant environmental reports and/or documentation (e.g., permits, authorizations, etc.), if applicable, should be submitted in the Single Copy Document section. See PAPPG Chapter II.D.1 for additional information.

2. List of suggested reviewers or reviewers not to include (with a brief explanation or justification for why the reviewer should be excluded).

14. Required Information to be submitted to NSF via email.

In addition to their submission in the supplementary documents section of the proposal, the proposer is required to send a spreadsheet version of items 10.a and 10.b. — lists of all personnel and participating organizations — in form of an excel two tab spreadsheet via email to MidScaleRI1@nsf.gov. These lists must be sent immediately after the proposal is submitted. The email subject line should be principal investigator's last name followed by the proposal number. The excel spreadsheet should be named the same (principal investigator's last name followed by the proposal number).

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Implementation projects may have a total project cost ranging from \$4 million up to but not including \$20 million. Design projects may request less than \$4 million, with a minimum request of \$400,000 and a maximum request up to but not including \$20 million.

Budget Preparation Instructions:

A breakdown of Mid-scale RI-1 implementation or design components and their expected costs must be included in the Budget Justification. For preliminary proposals, the cost estimates may be preliminary, but well thought through, with basis of estimates included. Budgets in invited full proposals must be robust and be supported by the four characteristics of a high-quality estimate: 1) well-documented; 2) comprehensive; 3) accurate; and 4) credible (see the RIG). In both preliminary and invited full proposals, the budgets must fall within the limits of the Mid-scale RI-1 program.

Prior to any award, invited implementation or design full proposals will be subject to NSF cost analyses. If the final estimated costs fall outside of Mid-scale RI-1 budgetary limits, a proposal is subject to return and will not be funded.

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):

January 05, 2023

REQUIRED

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

May 05, 2023

BY INVITATION ONLY

Preliminary proposals must be submitted by the indicated deadline. Full proposal submissions will only be accepted if invited by NSF, and must be submitted by the deadline as specified.

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/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 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 webpage: <https://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. 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.

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

recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *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 Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

The higher-level focus of the preliminary proposal review will be on the significance of the intended science uses of the proposed infrastructure, the importance and benefit of the proposed infrastructure to the wider community and the appropriateness of the team to undertake the project. Other elements of the project, including the training and mentoring of students, increasing the participation of underrepresented groups, and plans for ongoing O&M after the commissioning of the infrastructure must also be addressed in the preliminary proposal. Evaluation of these plans will be part of the review. In addition to a more detailed review of these elements, the full proposal review will focus more fully on the project management, the process used to derive the cost estimates, and evaluation of plans to track and assess the value of the broader impacts of the project, including the training and mentoring of students and increasing the participation of underrepresented persons in STEM.

1. Reviews of both preliminary and invited full proposals will consider the scientific justification, including the science drivers and the unique research capabilities and lack of general availability of the requested infrastructure. A major consideration will be the project's potential to significantly advance the Nation's research infrastructure. For implementation projects, reviewers will also be asked to consider the completeness of the design activities that have led to the project being ready for mid-scale support.
2. Reviews of both preliminary and invited full proposals will evaluate the research community priority of the infrastructure, i.e., evidence, such as workshop reports or other publicly available indicators, that the infrastructure is a priority for a research community. The value and benefit to the US research community will be evaluated. Examples of benefit include, but are not limited to, new research capability, broad access to research infrastructure, open-access observing time with the infrastructure, access to unique data products and software, and cooperation and sharing of technology with other projects.
3. Reviews of both preliminary and invited full proposals will be evaluated on the strength and maturity of the plan to execute and manage the project including but not limited to project management methods, soundness of the cost estimate, feasibility of the schedule, and comprehensiveness of the risk management plan. Reviews will consider the appropriateness of the assembled team, including their qualifications, experience working in a team environment and potential to advance the goals of the project.
4. For Implementation projects, a clear description of plans for continuing operations and maintenance must be provided and will be part of the review of both the preliminary and full proposals. Preliminary and invited full proposals will be evaluated on the strength of the anticipated lifecycle plans including utilization by and anticipated impact on the target research communities and US research, and consideration of the anticipated lifecycle costs. Letters of commitment (for full proposals only) from organizations that have agreed to provide support will be considered in the review.
5. While preliminary proposals must address cost estimates, evaluation of the robustness of the budget estimates will be part of the review of the full proposal. Review of proposals that involve design of infrastructure will consider any available initial plans, likely costs and feasibility of the subsequent implementation of the proposed infrastructure.
6. While preliminary proposals must address plans for student training, mentoring and broadening participation activities, review of full proposals will more fully evaluate plans for the involvement of a substantial component of student training and inclusion of a diverse workforce in instrumentation, infrastructure development, or data management/analysis. Evaluation of an assessment plan for these activities will also play a role in the proposal's review.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, Internal NSF Review, or potential reverse site visits for complex projects.

Preliminary proposals will be reviewed by internal program officers or by external ad hoc reviews, panel reviews or a combination thereof. Full proposals, if invited, will be subject to standard NSF external review.

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

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

Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements 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)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

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

Special Award Conditions:

Grantees will be required to include appropriate acknowledgment of NSF support under the Mid-scale Research Infrastructure Program by signage on any infrastructure supported by an award:

"This infrastructure is supported by the National Science Foundation Mid-scale Research Infrastructure Program under Grant No. (Grantee enters NSF grant number.)",

and in any publication (including World Wide Web pages) for any material based on or developed under the project, in the following terms:

"This material is based upon work supported by the National Science Foundation Mid-scale Research Infrastructure Program under Grant No. (Grantee enters NSF grant number.)".

Grantees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television and news magazines.

NSF may require in-person meetings, site visits, and periodic reviews depending on project scope. The award oversight will depend on project scope and complexity.

Ensuring Adequate COVID-19 Safety Protocols

(a) This clause implements Section 3(b) of Executive Order 14042, Ensuring Adequate COVID Safety Protocols for Federal Contractors, dated September 9, 2021

(published in the Federal Register on September 14, 2021, 86 FR 50985). Note that the Department of Labor has included "cooperative agreements" within the definition of "contract-like instrument" in its rule referenced at Section 2(e) of this Executive Order, which provides:

For purposes of this order, the term "contract or contract-like instrument" shall have the meaning set forth in the Department of Labor's proposed rule, "Increasing the Minimum Wage for Federal Contractors," 86 Fed. Reg. 38816, 38887 (July 22, 2021). If the Department of Labor issues a final rule relating to that proposed rule, that term shall have the meaning set forth in that final rule.

(b) The awardee must comply with all guidance, including guidance conveyed through Frequently Asked Questions, as amended during the performance of this award, for awardee workplace locations published by the Safer Federal Workforce Task Force (Task Force Guidance) at <https://www.saferfederalworkforce.gov/contractors/>.

(c) *Subawards*. The awardee must include the substance of this clause, including this paragraph (c), in subawards at any tier that exceed the simplified acquisition threshold, as defined in Federal Acquisition Regulation 2.101 on the date of subaward, and are for services, including construction, performed in whole or in part within the United States or its outlying areas. That threshold is presently \$250,000.

(d) *Definition*. As used in this clause, *United States or its outlying areas* means:

(1) The fifty States;

(2) The District of Columbia;

(3) The commonwealths of Puerto Rico and the Northern Mariana Islands;

(4) The territories of American Samoa, Guam, and the United States Virgin Islands; and

(5) The minor outlying islands of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Atoll.

(e) The Foundation will take no action to enforce this article, where the place of performance identified in the award is in a U.S. state or outlying area subject to a court order prohibiting the application of requirements pursuant to the Executive Order (hereinafter, "Excluded State or Outlying Area"). A current list of such Excluded States and Outlying Areas is maintained at <https://www.saferfederalworkforce.gov/contractors/>

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

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

Monthly and quarterly reports may be part of NSF's post-award monitoring process. Additional reporting requirements, including possible reverse-site visits to enable NSF oversight of the funded project may be required as part of the award terms and conditions. The level of oversight will be appropriate to the complexity of the award.

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:

- Randy L. Phelps, OIA/OA, telephone: (703) 292-5049, email: rphelps@nsf.gov
- Jonathan Friedman, telephone: (703) 292-7475, email: jfriedma@nsf.gov
- Dominique M. Dagenais, telephone: (703) 292-2980, email: ddagenai@nsf.gov
- Maija M. Kukla, OISE, telephone: (703) 292-4940, email: mkukla@nsf.gov
- Deepankar (Deep) Medhi, CISE, telephone: (703) 292-8950, email: dmedhi@nsf.gov
- Jill K. Nelson, EHR, telephone: (703) 292-4359, email: jnelson@nsf.gov
- John M. Papanikolas, MPS, telephone: (703) 292-8173, email: jpapanik@nsf.gov
- Frank R. Rack, GEO, telephone: (703) 292-2684, email: frack@nsf.gov
- Sridhar Raghavachari, BIO, telephone: (703) 292-4845, email: sraghava@nsf.gov

- Chinonye Whitley, OIA/EPSCoR, telephone: (703) 292-8458, email: cwhitley@nsf.gov
- Joseph Whitmeyer, SBE, telephone: (703) 292-7808, email: jwhitmey@nsf.gov

For questions related to the use of NSF systems, contact:

- NSF Help Desk: 1-800-673-6188
- 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 (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.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** (703) 292-5111
(NSF Information Center):
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
Send an e-mail to: nsfpubs@nsf.gov
or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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

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