

Science, Technology, Engineering and Mathematics (STEM) Education Postdoctoral Research Fellowships (STEM Ed PRF)

PROGRAM SOLICITATION NSF 22-531



National Science Foundation

Directorate for Education and Human Resources
Division of Graduate Education
Division of Human Resource Development
Research on Learning in Formal and Informal Settings
Division of Undergraduate Education

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

March 01, 2022

IMPORTANT INFORMATION AND REVISION NOTES

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

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Science, Technology, Engineering and Mathematics (STEM) Education Postdoctoral Research Fellowships (STEM Ed PRF)

Synopsis of Program:

The Directorate for Education and Human Resources (EHR) STEM Education Postdoctoral Research Fellowships (STEM Ed PRF) program funds individual and institutional postdoctoral awards designed to enhance the research knowledge, skills, and practices of recent doctoral graduates in STEM, STEM Education, Education, and related disciplines, with a goal of advancing their preparation to engage in fundamental and applied research in STEM education that advances knowledge within the field. The STEM Ed PRF program offers two tracks: (I) Individual Postdoctoral Fellowships and (II) Institutional Cohort Postdoctoral Fellowships.

Individual Postdoctoral Fellowship proposals must be submitted by Individuals. However, if an award is recommended, the proposal will be transferred to the host institution where the postdoctoral Fellow will be named as the PI. The award will be issued to the host institution as a regular research award, and the award will be administered by the host institution.

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.

- Earnestine Easter, telephone: (703) 292-8112, email: eeaster@nsf.gov
- Ellen M. Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Eric Knuth, telephone: (703) 292-8402, email: eknuth@nsf.gov
- Regina Sievert, telephone: (703) 292-2808, email: rsievert@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 1 to 14

6 -10 Individual Postdoctoral Fellowship Awards, 2 - 4 Institutional Cohort Postdoctoral Fellowship Awards

Anticipated Funding Amount: \$8,000,000

Pending availability of funds, NSF anticipates approximately \$8,000,000 will be available for the FY2022 competition.

Funds will be awarded as follows: (1) Individual Postdoctoral Fellowship awards up to \$300,000 with a duration of up to 24 months (\$150,000 maximum annually); and (2) Institutional Cohort Postdoctoral Fellowship awards up to \$1,250,000 for awards to single institutions or up to \$2,500,000 for awards to collaborating institutions, with a duration of up to 36 months. Consistent with Individual Postdoctoral Fellowships, Institutional Cohort Postdoctoral Fellowship awards must allocate a \$70,000 salary per postdoctoral fellow annually with a duration of up to two years.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- NSF STEM Education Postdoctoral Research Fellowships proposals may be submitted by individuals (Individual Postdoctoral Fellowship); or by single institutions or a collaboration of institutions (Institutional Cohort Postdoctoral Fellowship). Proposals may be submitted only by the following entities.

Individual Postdoctoral Fellowship proposers must meet the following eligibility requirements:

- Be a U.S. citizen, national, or legally admitted permanent resident alien of the United States as of the proposal deadline,
- Hold a doctoral degree in a field of science, technology, engineering, or mathematics (STEM), STEM Education, Education, or a related discipline earned no more than 24 months before the proposal deadline *or* will earn such a degree within 10 months after the proposal deadline,
- Must not hold a tenure-track position, and
- Must not have submitted the same fellowship proposal concurrently to another NSF program or to a similar program in another Federal agency.

Individual Postdoctoral Fellowship proposals are submitted directly by the fellowship proposer to NSF. Each fellowship proposer must affiliate with a sponsoring STEM education researcher and host institution (with whom the sponsor is affiliated) at the time of proposal submission. Appropriate host institutions include:

- Institutions of Higher Education (IHEs) Two-and-four-year IHEs (including community colleges), accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.
- Non-profit, Non-academic organizations - Independent museums, observatories, research laboratories, professional societies and other similar organizations located in the U.S. that are directly associated with educational or research activities.

Individual fellowship proposers are encouraged to propose host institutions that differ from the institution that awarded their doctorate to broaden their professional networks and experiences. Proposers who are women, veterans, persons with disabilities, and/or other members of groups underrepresented in STEM education research, or who have attended community colleges or Minority-Serving Institutions (Historically Black Colleges and Universities, Tribal Colleges and Universities, Alaska Native -Serving Institutions, Native Hawaiian-Serving Institutions, Predominantly Black Institutions, Asian American and Pacific Islander-Serving Institutions, Native American-Serving Non-Tribal Institutions, and Hispanic-Serving Institutions) are especially encouraged to apply.

Proposals that fail to meet the above eligibility requirements will be returned without review.

By signing and submitting the proposal, the fellowship proposer is certifying that the proposer meets the eligibility criteria specified in this program solicitation. Willful provision of false information in this request and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Institutional Cohort Postdoctoral Fellowship proposers (single and collaborative) must meet the following eligibility requirements:

- Institutions of Higher Education (IHEs) Two-and-four-year IHEs (including community colleges), accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.
- Non-profit, Non-academic organizations - Independent museums, observatories, research laboratories, professional societies and other similar organizations located in the U.S. that are directly associated with educational or research activities.

Proposals for Institutional Cohort Postdoctoral Fellowships from or including partnerships with Minority Serving Institutions (MSIs) and institutions located within EPSCoR jurisdictions are encouraged.

Who May Serve as PI:

For **Individual Postdoctoral Fellowships**, proposers must have earned a doctoral degree in STEM, STEM Education, Education, or a related discipline no more than 24 months prior to the proposal deadline or will earn such a degree within 10 months after the application deadline and must not hold a tenure-track position. If an award is recommended, the Fellowship proposal will be transferred to the proposed host institution where the Postdoctoral Fellow will be named as the PI.

For **Institutional Cohort Postdoctoral Fellowships**, PIs must hold full-time positions at the lead institution as associate or full professors (or their equivalent), in STEM, STEM Education, Education, or a related discipline with a research emphasis in STEM education. Full-time academic or research faculty members from partner (secondary) institutions or those who hold senior positions at non-profit, non-academic organizations, such as museums and similar organizations in the United States associated with STEM education and/or STEM education

research activities, may be named as co-PIs.

Limit on Number of Proposals per Organization: 1

Each institution may be named in only one Institutional Cohort Postdoctoral Fellowship proposal per competition, in either a single institutional or collaborative institutional proposal. There are no restrictions on the number of Individual Postdoctoral Fellowship proposers that an organization may host.

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

Proposers for Individual Postdoctoral Fellowships may submit only one STEM Ed PRF proposal per competition. Likewise, for Institutional Cohort Postdoctoral Fellowship proposals, PIs are limited to one per competition.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
 - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:**

Not Applicable
- **Other Budgetary Limitations:**

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

C. Due Dates

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

March 01, 2022

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:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Directorate for Education and Human Resources (EHR) STEM Education Postdoctoral Research Fellowships (STEM Ed PRF) program funds individual and institutional postdoctoral projects designed to enhance the research knowledge, skills, and practices of recent doctoral graduates in STEM, STEM Education, Education, and related disciplines, with a goal of advancing their preparation to engage in fundamental and applied research in STEM education that advances knowledge within the field. STEM Ed PRF awards support opportunities for fellows to engage in ongoing research, develop independent research, participate in professional development under the guidance of experienced mentors, and collaborate with other professionals in the STEM Education research community. Individual Fellows must affiliate with appropriate host institutions and are expected to devote themselves full time to the fellowship activities for the duration of the fellowship.

II. PROGRAM DESCRIPTION

To realize its identified goals of promoting discovery, learning, research infrastructure and stewardship, NSF supports projects judged as promising to “advance the frontiers of knowledge, cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens, build the nation’s research capability through investments in advanced instrumentation and facilities, and support excellence in science and engineering research and education through a capable and responsive organization” (<https://www.nsf.gov/about/glance.jsp>). Working towards the particular objective of furthering the Nation’s ability to develop an effective STEM workforce requires high-quality STEM education informed by robust STEM education research. The STEM Ed PRF program directly aligns with this work by funding projects designed to build STEM education research capacity and advance knowledge in STEM education.

The STEM Ed PRF program offers two tracks of fellowship opportunities for recent doctoral graduates: Track I - Individual Postdoctoral Fellowships and Track II- Institutional Cohort Postdoctoral Fellowships. For both tracks, the program encourages proposals to support postdoctoral experiences for those holding doctorates in STEM education research as well as those who have earned doctorates in STEM, STEM Education, Education, and related disciplines who have career interests in STEM education research. The Individual Postdoctoral Fellowships (Track I) provide an opportunity for recent doctoral graduates in these disciplines to receive training and mentorship under the direction of a sponsoring STEM education researcher(s) from a host institution. The Institutional Cohort Postdoctoral Fellowships (Track II) provide an opportunity for institutions to design a postdoctoral training and mentorship program and host a cohort of recent doctoral graduates in these disciplines.

As part of NSF’s goal to cultivate an inclusive world-class STEM workforce, the STEM Ed PRF program encourages proposals with a focus on broadening the participation of women and people who are members of groups underrepresented in the STEM workforce. The program affords multiple opportunities for broadening participation, including providing support for fellows who are members of groups underrepresented in STEM, supporting the involvement of MSIs in STEM education research, and funding projects that support fellows conducting research on broadening participation in STEM. Principal Investigators are encouraged to incorporate findings from the broadening participation literature in the design of their proposed projects as relevant. Examples include customizing research-based postdoctoral experiences that address the unique experiences of fellows who are members of groups underrepresented in STEM to ensure their retention and development as STEM education researchers and designing innovative higher-education consortia that include community colleges and/or MSIs as integral partners in the project.

Given the priorities outlined in the previous paragraphs, proposers should note that additional review criteria for evaluating the merit of proposals submitted to the STEM Ed PRF program will include the participation of women and persons from groups underrepresented in STEM in project designs; the inclusion of MSIs, community colleges, and institutions within EPSCoR jurisdictions in significant project roles and evidence of the appropriateness of project designs in meeting the unique needs of these groups and institutions. For a list of the criteria reviewers will use in assessing the merits of proposals submitted in response to this solicitation, please refer to section VI.A of this document.

Track 1: Individual Postdoctoral Fellowships

Individual Postdoctoral Fellowships (Track I) provide funds to support an individual working full-time as a postdoctoral fellow at a host institution for up to 24 months. The fellowship proposer must identify a sponsoring STEM education researcher who will provide mentoring and training proposed by the fellowship candidate and a host institution (with whom the sponsoring researcher is affiliated) at the time of proposal submission. The proposer is responsible for making prior arrangements with the sponsoring researcher and host institution. The fellowship proposal must include a mentoring plan and statement that attests to an environment prepared to support the fellowship activities. The history, resources, and potential of the sponsoring researcher and host institution for supporting the development of STEM education researchers will be considered in judging the merits of the proposal. To broaden their professional experiences and networks, proposers are encouraged to identify host institutions that differ from their doctorate-granting institution. If awarded a fellowship, the fellow is expected to remain affiliated with the host institution and sponsoring researcher for the entire tenure of their fellowship.

Documentation required from host institutions is described in Section V below. The host institution's letter must specifically acknowledge that the institution will accept responsibility for administering the award and that the Fellow will be named as the PI on the award and receive salary and benefits as an institutional employee.

Track 2: Institutional Cohort Postdoctoral Fellowships

Proposers for Institutional Cohort Postdoctoral Fellowships (Track II) may be an individual institution of higher education or a collaborative of multiple institutions (up to three institutions, including the lead institution). The primary (lead) institution must be accredited and include an active STEM education research program and experts prepared to actively mentor postdoctoral fellows. For collaborations of multiple institutions, the secondary (collaborating) institutions must be accredited two-year, four-year, or graduate-level institutions of higher education (including community colleges) or can be non-profit, non-academic organizations engaged in STEM education and/or STEM education research activities. While not all collaborating institutions must host a fellow or fellows, all institutions should have a substantive role and contribute significant value to the proposed project.

III. AWARD INFORMATION

Pending availability of funds, NSF anticipates approximately \$8,000,000 will be available for the FY2022 competition.

Funds will be awarded as follows: (1) Individual Postdoctoral Fellowship awards up to \$300,000 with a duration of up to 24 months (\$150,000 maximum annually); and (2) Institutional Cohort Postdoctoral Fellowship awards up to \$1,250,000 for awards to single institutions or up to \$2,500,000 for awards to collaborating institutions, with a duration of up to 36 months. Consistent with Individual Postdoctoral Fellowships, Institutional Cohort Postsecondary Fellowships awards must allocate a salary of \$70,000 per postdoctoral fellow annually with a duration of up to two years.

Individual Postdoctoral Fellowship proposals must be submitted by the individual seeking a postdoctoral fellowship. If support for the Individual Postdoctoral Fellowship award is recommended, it will be transferred to the host institution as a regular research award and administered by the host institution, with the postdoctoral fellow named as the PI.

Within the fellowship period, one month per year of fellowship duration may be used for paid leave, including parental or family leave. The paid leave cannot be used to increase the level of NSF support beyond the duration of the fellowship. NSF enables career-life balance through a variety of mechanisms. For more information, see <https://www.nsf.gov/career-life-balance/>.

Applicants selected to receive fellowship awards will be contacted by the NSF and asked to provide additional information, such as forms required for a pre-award transfer to the host institution. Successful applicants who have not completed the PhD at the time of proposal submission must provide certification of the completion of PHD degree requirements before the start of the fellowship activities.

Fellowships are not renewable and are subject to the availability of funds.

During the period of the fellowship, no additional appointment or fellowship may be held without prior permission of the cognizant NSF program officer.

If a Fellow chooses to accept a tenure-track position or other employment during the first year of the Fellowship, the fellowship award will be terminated upon the start of the new position. In such cases, the host institution is responsible for initiating procedures for a termination by mutual agreement in accordance with Chapter XII of the NSF PAPPG. Fellows are encouraged to consult the cognizant program officer if they choose to accept a tenure-track position or other employment during the second year of the Fellowship.

Pre-Award Transfer Process: To process the Pre-award Proposal Transfer, the Fellow, acting as the original proposing organization's Authorized Organizational Representative (AOR), must submit to the cognizant Program Officer (PO) an e-mail concurring with the transfer of the proposal to the host institution. This documentation will be added to the files by the PO as correspondence associated with the proposal. The cognizant PO then will request that the host institution's Sponsored Projects Office submit to NSF a revised:

- Cover Sheet (with the Fellow named as the PI) and Certification pages signed by the AOR; and
- Budget and Budget Justification. The Fellow must be named as the PI and must receive a monthly or bi-weekly salary of \$70,000 per year plus institutional employee benefits. The host institution's budget is expected to include fringe benefit costs for the Fellow. The \$80,000 per year for research costs may be distributed in the budget to cover fringe benefits and other direct research costs, including but not limited to, materials and supplies, equipment, computing resources, access to databases, domestic and international travel, publication charges, and subscription fees. The applicable U.S. Federally negotiated indirect cost rate(s) must be used in computing indirect costs (F&A). Organizations that do not have a current negotiated rate agreement with a cognizant Federal agency may request indirect cost recovery up to the de minimis rate of 10% of modified total direct costs.

The PO will update the proposal system with the new organizational and budget data so that processing of the proposal award to the host institution can proceed. The Fellow's original Cover Sheet and Certification pages will not be modified and will be retained for the historical record of how the proposal was submitted to NSF.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- NSF STEM Education Postdoctoral Research Fellowships proposals may be submitted by individuals (Individual Postdoctoral Fellowship); or by single institutions or a collaboration of institutions (Institutional Cohort Postdoctoral Fellowship). Proposals may be submitted only by the following entities.

Individual Postdoctoral Fellowship proposers must meet the following eligibility requirements:

- o Be a U.S. citizen, national, or legally admitted permanent resident alien of the United States as of the proposal deadline,
- o Hold a doctoral degree in a field of science, technology, engineering, or mathematics (STEM), STEM Education, Education, or a related discipline earned no more than 24 months before the proposal deadline or will earn such a degree within 10 months after the proposal deadline,
- o Must not hold a tenure-track position, and
- o Must not have submitted the same fellowship proposal concurrently to another NSF program or to a similar program in another Federal agency.

Individual Postdoctoral Fellowship proposals are submitted directly by the fellowship proposer to NSF. Each fellowship proposer must affiliate with a sponsoring STEM education researcher and host institution (with whom the sponsor is affiliated) at the time of proposal submission. Appropriate host institutions include:

- o Institutions of Higher Education (IHEs) Two-and-four-year IHEs (including community colleges), accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.
- o Non-profit, Non-academic organizations - Independent museums, observatories, research laboratories, professional societies and other similar organizations located in the U.S. that are directly associated with educational or research activities.

Individual fellowship proposers are encouraged to propose host institutions that differ from the institution that awarded their doctorate to broaden their professional networks and experiences. Proposers who are women, veterans, persons with disabilities, and/or other members of groups underrepresented in STEM education research, or who have attended community colleges or Minority-Serving Institutions (Historically Black Colleges and Universities, Tribal Colleges and Universities, Alaska Native -Serving Institutions, Native Hawaiian-Serving Institutions, Predominantly Black Institutions, Asian American and Pacific Islander-Serving Institutions, Native American-Serving Non-Tribal Institutions, and Hispanic-Serving Institutions) are especially encouraged to apply.

Proposals that fail to meet the above eligibility requirements will be returned without review.

By signing and submitting the proposal, the fellowship proposer is certifying that the proposer meets the eligibility criteria specified in this program solicitation. Willful provision of false information in this request and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Institutional Cohort Postdoctoral Fellowship proposers (single and collaborative) must meet the following eligibility requirements:

- o Institutions of Higher Education (IHEs) Two-and-four-year IHEs (including community colleges), accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.
- o Non-profit, Non-academic organizations - Independent museums, observatories, research laboratories, professional societies and other similar organizations located in the U.S. that are directly associated with educational or research activities.

Proposals for Institutional Cohort Postdoctoral Fellowships from or including partnerships with Minority Serving Institutions (MSIs) and institutions located within EPSCoR jurisdictions are encouraged.

Who May Serve as PI:

For **Individual Postdoctoral Fellowships**, proposers must have earned a doctoral degree in STEM, STEM Education, Education, or a related discipline no more than 24 months prior to the proposal deadline or will earn such a degree within 10 months after the application deadline and must not hold a tenure-track position. If an award is recommended, the Fellowship proposal will be transferred to the proposed host institution where the Postdoctoral Fellow will be named as the PI.

For **Institutional Cohort Postdoctoral Fellowships**, PIs must hold full-time positions at the lead institution as associate or full professors (or their equivalent), in STEM, STEM Education, Education, or a related discipline with a research emphasis in STEM education. Full-time academic or research faculty members from partner (secondary) institutions or those who hold senior positions at non-profit, non-academic organizations, such as museums and similar organizations in the United States associated with STEM education and/or STEM education research activities, may be named as co-PIs.

Limit on Number of Proposals per Organization: 1

Each institution may be named in only one Institutional Cohort Postdoctoral Fellowship proposal per competition, in either a single institutional or collaborative institutional proposal. There are no restrictions on the number of Individual Postdoctoral Fellowship proposers that an organization may host.

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

Proposers for Individual Postdoctoral Fellowships may submit only one STEM Ed PRF proposal per competition. Likewise, for Institutional Cohort Postdoctoral Fellowship proposals, PIs are limited to one per competition.

Additional Eligibility Info:

Additional Eligibility Info:

For **Individual Postdoctoral Fellowships**, each Fellowship proposer must identify a sponsoring researcher(s) and must affiliate with a U.S. host institution. Appropriate host institutions include:

- Institutions of Higher Education (IHEs) Two-and four-year IHEs (including community colleges) accredited in, and having a campus located in the U.S., acting on behalf of their faculty members.
- Non-profit, Non-academic organizations -Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.

If an award is recommended, the proposal will be transferred to the proposed host institution where the postdoctoral Fellow will be named as the project's PI. The award will be issued to and administered by the host institution. See Section III for additional information about the Pre-

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nspubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nspubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via FastLane. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

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.

For those submitting proposals involving **multiple collaborating institutions**, the PAPPG section II.D.3 provides additional information on collaborative proposals.

Registration for Individual Postdoctoral Fellowship Candidates

Before starting proposal preparation, the proposer must be registered as an Individual. Proposers must register as a [new Individual in Research.gov](#) and/or as a [new individual in Grants.gov](#). Proposals to the **Individual Postdoctoral Fellowship** track must be submitted by the Fellowship proposer, not by the Authorized Organizational Representative (AOR) at your home or proposed host institution. At the proposal submission stage, the proposer serves as his/her own Sponsored Project Office (SPO) and AOR for the purposes of any research administration functions in FastLane or Grants.gov. Submission through NSF FastLane is strongly recommended because these are Fellowships with unique requirements. If the proposer elects to submit through Grants.gov, notification that ALL required documents have been successfully uploaded into FastLane by the deadline date must be affirmed.

Proposal Preparation

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

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

Individual Postdoctoral Fellowship

The following information and instructions supplement the guidelines provided in the PAPPG and NSF Grants.gov Application Guide.

- **Proposal Cover Sheet:** FastLane Users: Select the STEM Ed PRF program solicitation number shown at the beginning of this solicitation from the drop-down menu. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. The title must start with "STEM Ed PRF", followed by a descriptive title of the project.. If the project will involve international partners, check the "International Cooperative Activities" box and identify the country/countries involved.

Information about Principal Investigator/Project Director.

- Co-PIs - **No co-PIs are permitted** on the Cover Sheet.
- **Project Summary**, not to exceed one page, that includes an overview of the research and professional development plan and its relation to the candidate's career development goals, and separate statements that clearly address the intellectual merit and broader impacts of the proposed fellowship activities. In addition, the Project Summary must identify the sponsoring researcher's name and title, and the proposed host institution.
- **Project Description**, not to exceed twelve single-spaced pages (including any figures, pictures, and tables), which must include the following information:
 - Research and professional development plans that detail the STEM education research and professional development activities during the fellowship period.
 - Per the PAPPG, the Project Description must contain, as a separate section within the narrative, a section labeled "Broader Impacts"
 - Mentoring plan that clearly describes the planned mentoring activities and their relation to the research and professional development plan as well as to the applicant's career development,

- o A detailed rationale for the choice of the host institution that identifies the sponsoring researcher, describes the institution's available facilities and resources, relates the proposed work to current research and educational efforts at the host institution, and otherwise justifies the suitability of the host institution, and
- o A description of the applicant's long-term career goals and the role of this postdoctoral fellowship in achieving them.

Special certifications and permits may be required when projects involve human subjects, vertebrate animals, endangered species, hazardous materials, collecting in foreign countries, or other elements. The research plan should provide general information on these matters and address feasibility. If selected, candidates must submit required documentation of institutional approval to the NSF program officer before an award can be made.

Additional guidance on these sections is found later in this document.

- **References Cited.** See the Proposal & Award Policies & Procedures Guide (PAPPG) for format (no page limit).
- **Biographical Sketch.** See the most recent Proposal & Award Policies & Procedures Guide for format. The biographical sketch for the fellowship proposer is not to exceed three pages.
- **Budget.** Individual fellowships are awarded for up to \$300,000 (\$150,000 annually) for a maximum duration of 24 months. From that total, \$140,000 must be allocated for fellow salary (\$70,000 annually) and up to \$160,000 (\$80,000 annually) may be allocated for other expenses such as research-related costs (travel, professional memberships, equipment, etc.) and/or fringe benefits (e.g., health insurance). Co-PIs and other senior personnel are not allowed.
- **Budget Justification.** A budget justification must list and justify estimated expenditures under the annual fellowship allowance.

Should a proposal be recommended for award, the primary host organization will be required to submit a revised budget and budget justification that allocates the proposed direct costs to the appropriate NSF budget line item(s). Institutional fringe benefits and indirect costs will also be added to the budget prior to award in accordance with the guidance provided in Section III above.

- **Current and Pending Support.** See the Proposal & Award Policies & Procedures Guide (PAPPG). Include current support for research and training. Under pending support, include this proposal, as well as pending and planned applications to other fellowship or research programs. The project submitted to this solicitation should not be concurrently under review by another program. This information is to be submitted only for the applicant; not for the sponsoring researcher(s).
- **Facilities, Equipment and Other Resources,** as applicable. Insert text or upload a document that states: "See Letter(s) of Collaboration from the prospective host organization(s)." See the Proposal & Award Policies & Procedures Guide (PAPPG).
- **Supplementary Documentation.** Must include the following:
 - o **Data Management Plan,** not to exceed two pages, must describe plans for data management and sharing of the products of research, or justify the absence of the need for such plans (See the PAPPG Data Management Plan.).
 - o **Dissertation Abstract,** not to exceed one page, must describe the applicant's dissertation research
 - o **A statement from the sponsoring researcher** indicating that the applicant's proposal has been read and approved by the sponsoring researcher and acknowledging the sponsor's commitment and specific role in guiding the fellow in their research and educational plans.
 - o **A Biographical Sketch of the sponsoring researcher,** not to exceed three pages and conforming to the format specified in the PAPPG.
 - o **Postdoctoral Mentoring Plan** for the fellow, not to exceed one page, describing the sponsoring researcher's past experience in mentoring postdocs, especially in mentoring underrepresented minorities (if applicable), the expected availability of the sponsoring researcher for consultation during the award period, the role that the sponsoring researcher will play in the professional development of the fellow, the environment in which the fellow will be trained and mentored and resources that are available to support the proposed fellowship activities, and the appropriateness of match between the fellow and sponsoring researcher. Sponsors are not expected to provide the mentoring solely but may leverage resources of the host institution or other organizations. The statement also should include the name, title, department, email address, and telephone number of the sponsoring researcher, as well as the address and phone number of the sponsoring researcher's department at the host institution. The sponsoring researcher should sign the statement before sending it to the fellow.

Letter(s) of Collaboration from the prospective host institution, signed by the department chair (or equivalent) and the Sponsored Research Office, certifying that adequate facilities and support will be provided for the fellow to accommodate the proposed activities and certifying plans to appoint the Fellow as project PI if an award is recommended. The host institution's letter must specifically acknowledge that 1) the organization is aware that award recommendations will require a pre-award transfer of the proposal to the host institution, 2) the institution will submit all documents required for a pre-award transfer, including a new cover page that lists the Fellow as the PI and a budget that adds funding for organizational fringe and overhead costs to support the Fellow's benefits, and 3) the institution will administer the award to provide the Fellow's salary, benefits and proposed research activities. If the host institution has not received prior NSF funding, the institution will need to submit "New Awardee" documentation, which will be subject to NSF's evaluation before an award can be made or transferred.

For individuals who have not completed the PhD at the time of proposal submission, a signed letter from the graduate advisor or Dean confirming the expectation that the candidate will receive the degree before the requested start date of the fellowship.

The fellowship applicant and the proposed sponsoring scientist(s) should submit their collaborator information under "Collaborators & Other Affiliations (COA)" specified in the PAPPG using the instructions and spreadsheet template. These are submitted as Single Copy Documents.

Guidance on the Project Description:

The research and professional development plans describe the STEM education research study that the fellow will conduct and the training that the fellow will receive during the fellowship period.

The **research plan** should include an introduction or background section; an explanation of the research significance and its implications; a brief review of the relevant literature and its relation to the proposed research; a statement of research objectives and/or research questions; a description of the research design and methods; and how the proposed research relates to the fellow's career development and future research directions. The research plan should also include a timetable with goals and benchmarks for the major research activities.

The **professional development plan** should include the training objectives and the activities and timeline for achieving them. The plan may include research-related activities as well as other career preparation activities. The professional development activities might, for example, include formal coursework, workshops, and scholarly community activities such as conference presentations or colloquia participation. Teaching activity (no more than one course per year) should be incorporated into the professional development plan if such teaching experience is deemed valuable for the fellow's career development (i.e., the fellow intends to pursue a career in academia). The professional development plan should also include a timetable with annual goals along with benchmarks for major anticipated outcomes. Finally, the professional development plan should include an evaluation of how the professional development activities will enhance the fellow's career development and future research directions.

Institutional Postdoctoral Cohort Fellowship

The following information and instructions supplement the guidelines provided in the PAPPG and NSF Grants.gov Application Guide.

- **Project Summary.** Not to exceed one page, that includes an overview of the research and education training plans, an overview of the recruitment/application/selection plan, and separate statements that clearly address the intellectual merit and broader impacts of the proposed program.
- **Project Description.** Not to exceed fifteen single-spaced pages (including any figures, pictures, and tables), and provides the following information:
 - Research and professional development training plans that detail the research and professional development activities during the fellowship period.
 - Recruitment/application/selection plans, that include, as relevant, efforts to recruit postdoctoral fellows who are member of underrepresented groups and those from Minority Serving Institutions (MSIs), as well as details about the application and selection processes,
 - Plan for evaluating the success of the postdoctoral program that identifies the evaluator, the evaluation design, and metrics that will be employed, with attention paid to the solicitation-specific criteria,
 - A detailed account regarding the roles and responsibilities of the PI and co-PI(s) as mentors to the postdoctoral fellow cohort, and
 - For collaborative institutional proposals, an explanation of the rationale for the collaboration, the value-added from the collaboration, and the means of developing community among the postdoctoral fellows and across the institutions.

Further guidance on these sections can be found in the section titled *Guidance on Project Description* later in this document.

- **Budget.** Institutional fellowships will be awarded up to \$1,250,000 for awards to single institutions, or up to 2,500,000 for awards made to collaborating institutions (up to three institutions, including the lead), for a duration of up to three years. Other limitations apply. Please see section V.B. *Budgetary Information* in this document for further guidelines.
- **Budget Justification.** A budget justification that lists and justifies estimated expenditures for the fellowship program and its administration.
- **Supplementary Documentation.** Must include the following:
 - **Data Management Plan,** not to exceed two pages, must describe plans for data management and sharing of the products of research, or asserts the absence of the need for such plans. For proposals that are collaborations of multiple institutions in a single project, only one Data Management Plan should be submitted. Proposers should refer to the PAPPG for additional guidance on the DMP.
 - **Postdoctoral Mentoring Plan,** not to exceed one page, describing the researcher's past experience in mentoring postdocs, especially in mentoring underrepresented minorities (if applicable), the expected availability of the sponsoring researcher for consultation during the award period, the role that the sponsoring researcher will play in the professional development of the fellow, the environment in which the fellows will be trained and mentored and resources that are available to support the proposed fellowship activities, and the appropriateness of match between the fellows and the sponsoring researcher. Sponsors are not expected to provide the mentoring solely but may leverage resources of the host institution and partner organizations. The statement also should include the name, title, department, email address, and telephone number of the sponsoring researcher, as well as the address and phone number of the sponsoring researcher's department at the host institution. The sponsoring researcher should sign the statement before submitting with the proposal application. For further information, proposers are advised to consult the PAPPG. For collaborations of institutions, only one postdoctoral mentoring plan should be submitted for the entire project.

Guidance on the Project Description:

The project description should include the following six sections: significance, research training plan, professional development plan, evaluation plan, personnel, and recruitment/application/selection plans. The postdoctoral mentoring plan is also required as part of the proposal but is uploaded into Supplementary Documentation as a separate document, apart from the Project Description.

Significance: Describe the importance of the proposed postdoctoral fellowship project as well as its relation to the goals of the STEM Ed PRF Program. As relevant, describe the proposed project's strategies for broadening participation of members of underrepresented groups in STEM education research.

Research Plan: Describe the training opportunities that will actively engage fellows in ongoing and independent research projects that promote their development beyond their doctoral dissertation work and helps establish them as self-directed scholars. Although the proposed research experiences may focus on any STEM education-related topic, the STEM Ed PRF Program encourages innovative proposals that focus on one or more of the research topic areas listed below. This list of research topic areas is neither exhaustive nor mutually exclusive.

- Diversity, equity, and inclusion in STEM education and workforce
- Interdisciplinary research in STEM education fields
- Factors at the institutional, structural, organizational, societal, and systemic levels that affect STEM education and workforce
- Informal STEM education
- STEM education at two-year and community colleges
- STEM education policy research and research that builds on and expands the foundations for evaluating STEM education and workforce development initiatives

Professional Development Plan: Describe the professional development opportunities that will assist fellows in developing professional competencies, for example, acquisition of new research methods, knowledge of the research literature, participation in scholarly communities, proficiency in instruction, or grant writing skills. The professional development opportunities should extend beyond the typical kinds of professional development activities expected of new scholars. Also note that teaching activity (no more than one course per year) should be incorporated into the professional development plan if such experience is deemed valuable for the fellow's future career development.

Evaluation Plan: Describe the plan that will be used to evaluate the success of the postdoctoral program, including the metrics and methods used in the evaluation design. Special attention should be paid to evaluating the effectiveness of the program in 1) supporting the development of highly prepared STEM education researchers, especially those who are women and members of groups underrepresented in STEM, and 2) significantly involving MSIs, community colleges, and institutions within EPSCoR jurisdictions in the project. The evaluator(s) may be internal or external to the institution but should not include personnel involved in the design or delivery of the fellowship project. PIs may wish to enlist specialists in education research, either from their own institutions or others, to serve as evaluators.

Personnel: Describe the expertise and experience of the senior personnel at each institution, and their specific roles and responsibilities in the postdoctoral project.

Recruitment/Application/Selection Plan: Describe plans for the recruitment, application process, and selection of the cohort of postdoctoral fellows. Include a description of activities to recruit postdoctoral fellows who are women and/or members of underrepresented groups and those from Minority Serving Institutions (MSIs) including Historically Black Colleges and Universities, Tribal Colleges and Universities, Alaska Native -Serving Institutions, Native Hawaiian-Serving Institutions, Predominantly Black Institutions, Asian American and Pacific Islander-Serving Institutions, Native American-Serving Non-Tribal Institutions, and

Hispanic-Serving Institutions.

For Collaborative Institutional proposals, also include the following section:

Plan for Collaboration: Describe the plans for collaboration, including the nature of the collaborative activities, the value-added from the collaborative effort, the plans for developing community among the cohort fellows and across institutions, and the management plan, roles, and responsibilities of each institution. While not every institution in the collaborative is required to host a postdoctoral fellow(s), the roles of each partner institution should be substantial and contribute significant value to the proposed project.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

The award amount is set based on the duration of the award (for individual awards) or project (for institution awards).

Budget Preparation Instructions:

For **Individual Postdoctoral Fellowship** awards, the award amount is based on the fellowship duration and may be prorated accordingly. The \$70,000 salary should be entered in Senior Personnel with 12 calendar months. An annual Budget must be submitted for each of up to two years of fellowship support. For the Budget Justification, a description must be provided detailing the plan for utilizing the \$80,000 annual allowance for research-related activities (travel, professional memberships, equipment, etc.). Note that all awards will be made to the host institution using the Pre-award Transfer Process. Budgets and award documents will be adjusted to include institutional fringe benefits and overhead costs.

For **Institutional Cohort Postdoctoral Fellowship** awards to single or multiple institution collaboratives, the award amount is based on the award duration, number of fellows, and costs of related project activities, and may be prorated accordingly. Along with the other parts of a collaborative proposal as outlined in the PAPPG, section II.D.3, each institution in the collaborative should enter a budget and budget justification, detailing costs involved with administering the project at their institution. Evaluation costs should be included in the lead institution budget.

Because the STEM Ed PRF funding is primarily intended to support postdoctoral fellowships, at least 80% of the project budget(s) for those institutions hosting fellows must be allocated to those fellowships. Fellowship funding should be consistent with the guidelines for Individual Postdoctoral Fellowship awards under this program as follows:

- Postdoctoral fellow stipends – \$70,000 annually per fellow, for \$140,000 over 24 months per fellow
- Other postdoctoral fellow expenses – Up to \$80,000 annually per fellow, for a maximum of \$160,000 over 24 months per fellow. Other expenses might include travel costs related to research and professional development, research expenses such as equipment or participant stipends, and fringe benefit expenses such as health insurance.

For awards to single institutions, the approximate number of postdoctoral fellows expected in the two-year cohort is four. For awards to collaborating institutions, the approximate number of postdoctoral fellows expected in the two-year cohort may vary from four to six, with a minimum of two postdoctoral fellows at any institution hosting STEM Ed PRF fellows.

Note it is expected that the first year of the institutional awards will primarily involve project administration, such as advertising the fellowship opportunities, recruiting candidates, and selecting fellows, with postdoctoral fellows beginning the project at the start of the second year.

C. Due Dates

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

March 01, 2022

D. FastLane/Grants.gov Requirements

Guidance for Individual Postdoctoral Fellowship Proposers

For Proposals Submitted Via Fastlane:

Before starting proposal preparation, the proposer must register as a new individual in Research.gov: <https://www.research.gov/accountmgmt/assets/welcomeunaffiliated.html> . Detailed instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm> . For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov . The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submitting the Proposal: Fellowship proposals must be submitted by the individual, not by the individual's current or proposed organizational Sponsored Projects Office (SPO). The individual serves as his/her own SPO and Authorized Organizational Representative (AOR) for the purposes of any research administration functions in FastLane. As such, the proposer, serving as the SPO/AOR must electronically sign and submit the proposal using the Sign and Submit button in FastLane. The individual is signing on his/her own behalf and by signing the proposal NSF is in no way inferring that the individual has assumed organizational status. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp> .

For Proposals Submitted Via Grants.gov:

Before starting proposal preparation, the proposer must register as a new individual in Research.gov and Grants.gov. To register as a new individual in

Research.gov go to: <https://www.research.gov/accountmgmt/assets/welcomeunaffiliated.html> and to register in Grants.gov go to: <https://www.grants.gov/web/grants/applicants/registration.html>. Once registered, the proposer can then apply for grant opportunities which indicate "Individual" eligibility on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <https://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Fellowship proposals must be submitted by the individual, not by the individual's current or proposed organizational Sponsored Projects Office (SPO). Once all documents have been completed, the individual must submit the proposal to Grants.gov and verify the desired funding opportunity and agency to which the proposal is submitted. The individual must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

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

Guidance for Institutional Cohort Postdoctoral Fellowship Proposers

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the NSF Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The NSF Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

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

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and 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 STEM Ed PRF proposals will be reviewed by a panel of disciplinary and interdisciplinary experts spanning many STEM education disciplinary areas. Ad hoc reviews may also be sought if deemed necessary. In addition to the regular NSF review criteria, reviewers/panelists will also consider the following criteria for fellowship proposals:

For Every EHR STEM Ed Fellowship Proposal

- How well does the mentoring plan balance providing supervisory guidance for the fellow(s) with promoting their independent growth as a scholar(s)?
- Does the research plan provide meaningful opportunities to engage the fellow(s) in ongoing and independent research projects that promote development of fellow(s) beyond doctoral dissertation work and advancement as self-directed scholars?

- To what extent does the professional development plan offer a range of appropriate research and career development opportunities?
- To what extent does the professional development plan provide meaningful opportunities for the fellow(s) to develop professional competencies (e.g., research methods expertise, teaching expertise, grant writing expertise, expertise in mentoring graduate students)?
- To what extent does the proposed project design prioritize broadening participation through the inclusion of women and people from groups underrepresented in STEM as fellowship recipients?
- How well qualified is the sponsoring researcher for mentoring postdoctoral fellows in the development of knowledge and skills as STEM education researchers? Is there evidence of a history of success in this role?
- Does the proposal include supporting postdoctoral research studies focused on broadening participation in STEM?

Additional Review Criteria for Individual Postdoctoral Fellowship Proposals

Along with the additional review criteria listed above for every EHR STEM Ed PRF proposal, one other criterion, described here, should be considered in reviews of Individual Postdoctoral Fellowship proposals.

- To what extent is the sponsoring mentor and host institution a suitable match to the fellow's proposed project?
- To what extent does the mentoring plan provide a beneficial balance of supervisory guidance and the fellow's independent growth as a scholar?
- To what extent does the Fellow demonstrate the potential to meet the program goals?

Additional Review Criteria for Institutional Cohort Postdoctoral Fellowship Proposals

Along with the additional review criteria for every EHR STEM Ed PRF proposal listed above, the following criteria should be considered in reviews of Institutional Cohort Postdoctoral Fellowship proposals.

- How well does the project design address the unique challenges experienced by postdoctoral fellows who are women and/or members of groups underrepresented in STEM to ensure their retention and rigorous preparation as STEM education researchers?
- To what extent are the project recruitment/application/selection plans designed to broaden participation of fellows who are women and members of groups underrepresented in STEM?
- How well does the evaluation design the project design include explicit plans to establish and maintain community among the cohort of fellows?
- Does the evaluation plan provide an adequate means of assessing the fellowship project's success, particularly in regard to the program's prioritized groups and institutions?
- Is the proposal submitted by an MSI, community college, or an institution from an EPSCoR jurisdiction?

Collaborative Institutional Cohort Fellowship Proposals

Along with the additional review criteria for every EHR STEM Ed PRF proposals and for Institutional Cohort Postdoctoral Fellowship proposals, listed above, the following criteria should also be considered in reviews of Collaborative Institutional Cohort Postdoctoral Fellowship proposals.

- Does the collaborative involve MSIs, community colleges, and/or institutions from EPSCoR jurisdictions in significant roles including Historically Black Colleges and Universities, Tribal Colleges and Universities, Alaska Native-serving Institutions, Native Hawaiian-serving Institutions, Predominantly Black Institutions, Asian American and Pacific Islander-serving Institutions, Native American-serving Non-Tribal Institutions, and Hispanic-serving Institutions?
- How well does the proposed project design promote a meaningful and equitable collaboration among the institutions?
- To what extent does the proposed project address the cultivation and maintenance of community among the collaborative cohort of Fellows?
- To what extent does the collaborative add value to the Fellows' experiences and to their development?

B. Review and Selection Process

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

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

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

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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.

Special Award Conditions:

Additional award conditions apply.

Co-PIs and other senior personnel are not allowed in Individual Postdoctoral Fellowship proposals.

A Fellow may transfer to another eligible host organization at any time during the award period. The primary host organization will facilitate the transfer of the award using NSF's standard PI Transfer process. Before such a transfer will be approved by NSF, the Fellow's new organization must supply to the cognizant NSF Program Officer documentation required of a primary host organization that is detailed in Section V of this solicitation. Transfer of an award issued under this solicitation to a substitute PI is not permissible, and the awardee cannot terminate the award without NSF's concurrence.

If a Fellow chooses to accept employment (i.e. a tenure-track position) during the first year of the Fellowship, the fellowship award will be terminated upon the start of the new position. In such cases, the primary host organization is responsible for initiating procedures for a termination by mutual agreement in accordance with Chapter XII of the NSF PAPPG.

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.

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:

- Earnestine Easter, telephone: (703) 292-8112, email: eeaster@nsf.gov
- Ellen M. Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Eric Knuth, telephone: (703) 292-8402, email: eknuth@nsf.gov

- Regina Sievert, telephone: (703) 292-2808, email: rsievert@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

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

General questions about proposal submission can be directed to any SBE program director associated with the relevant disciplinary area of the proposal. Specific inquiries regarding this program should be directed to the cognizant program officers listed above, or to the following e-mail address: sbe-buildandbroaden@nsf.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>.

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

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

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

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <https://www.nsf.gov>

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

Send an e-mail to: nsfpubs@nsf.gov

or telephone: (703) 292-8143

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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

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