

EHR Core Research - Resource Coordination Hub (ECR Hub)

PROGRAM SOLICITATION

NSF 21-612



National Science Foundation

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

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

December 01, 2021

IMPORTANT INFORMATION AND REVISION NOTES

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, research 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.

This solicitation is a call for ECR: Resource Coordination Hub proposals only.

Full proposals involving multiple organizations may only be submitted from a lead organization with other collaborating organizations included as subawardees.

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:

EHR Core Research - Resource Coordination Hub (ECR Hub)

Synopsis of Program:

NSF seeks proposals to create an EHR Core Research (ECR) Resource Coordination Hub (ECR Hub) that will be an intellectual partner to the ECR:Core and the ECR Building Capacity in STEM Education Research (ECR:BCSER) grantee communities and the NSF to enhance the overall influence and reach of ECR science, technology, engineering, and mathematics (STEM) education research investments. The **ECR Hub** will be expected to work collaboratively with NSF and the ECR:Core and ECR:BCSER communities to design, implement, and execute its activities and ensure the inclusion of diverse researchers representing the full range of our nation's talent pool, of eligible institutions and organizations and of STEM education research and disciplines funded by ECR. As part of the ECR Program, ECR:Core and ECR:BCSER have multidisciplinary portfolios with research projects from investigators representing a broad range of disciplinary backgrounds and approaches.

The **ECR Hub** will: support communication among the current and past ECR:Core and ECR:BCSER awardees, prospective awardees, and others doing STEM education research or using STEM education research results; build community and research networks and outreach to new potential researchers and stakeholders; facilitate information and resource sharing among stakeholders; increase visibility and diffusion of research results from ECR awardees to other stakeholders; and strategically convene stakeholders and coordinate with other NSF resource hubs and centers.

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.

- Address questions to the program, telephone: (703)292-2333, email: ECR@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

In FY2022, one (1) ECR Resource Coordination Hub award will be made, pending the availability of funds.

The award will be made as a Cooperative Agreement, with an initial commitment for five years of support and the possibility of a competitive renewal. Ongoing support for the Cooperative Agreement will be contingent upon satisfactory performance as assessed through reviews of annual progress reports, annual site (or reverse site) visits, and annual reviews of the ECR Hub's future plans. The total amount of NSF's investment in the ECR Hub will depend upon the needs, plans, and opportunities offered by the Hub, as well as the availability of NSF funds.

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

Anticipated Funding Amount: \$5,000,000

\$5,000,000 over five years, pending availability of funds.

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

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

Not Applicable
- **Other Budgetary Limitations:**

Not Applicable

C. Due Dates

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

December 01, 2021

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

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 nation faces extraordinary opportunities and challenges in aspiring to lead the world in science, technology, engineering, and mathematics (STEM). Diversity in human capital, rapid and exciting scientific advances leading to new approaches to solving critical societal problems, and a national emphasis on the importance of innovation all point to unparalleled opportunities for the future. At the same time, these rapid technological advancements and societal changes are challenges requiring the U.S. to continue to inspire the next generation of STEM workers, including the skilled technical workforce, for the nation to remain competitive, spur innovation, and grow the economy. [1]

The mission of the Directorate for Education and Human Resources (EHR) is to achieve excellence in U.S. STEM education at all levels and in all settings (both formal and informal) to support the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry who have access to the ideas and tools of science and engineering. In fulfilling this mission, EHR seeks to support NSF's mission to enhance the quality of life of all citizens and the health, prosperity, welfare, and security of the nation.

The ECR program supports multiple solicitations under the ECR umbrella, including the ECR:Core solicitation [NSF 21-588](#) and the ECR Building Capacity in STEM Education Research (ECR:BCSER) solicitation, [NSF 20-521](#). The ECR:Core solicitation invites proposals to conduct fundamental research that advances knowledge across three research areas (STEM learning and learning environments, broadening participation in STEM, and STEM workforce development) and several research topic clusters outlined in the ECR:Core solicitation [NSF 21-588](#). The ECR:BCSER solicitation [NSF 20-521](#) requests proposals that build individuals' capacity to carry out high quality STEM education and broaden the pool of researchers who can conduct fundamental research.

There is a critical need to develop and accumulate knowledge based on fundamental research (whether basic or use inspired basic research [2]) on STEM learning and learning environments, broadening participation in STEM, and STEM workforce development. Such foundational knowledge [3] in STEM education is essential to strategically guide the broader set of STEM education investments by the Federal government and other funding agencies and foundations, and to inform the activities of policymakers, researchers, and practitioners.

1. Subcommittee of the Advisory Committee of the Education and Human Resources Directorate (2020). *STEM Education for the Future: A Visioning Report*. <https://www.nsf.gov/ehr/Materials/STEM%20Education%20for%20the%20Future%20-%202020%20Visioning%20Report.pdf>
2. Stokes, Donald (1997). *Pasteur's quadrant – Basic Science and Technological Innovation*. Washington D.C.: Brookings Institution Press.
3. *Common Guidelines for Education Research and Development* (2013). A Report from the Institute of Education Sciences US Department of Education, and the National Science Foundation, (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126)

II. PROGRAM DESCRIPTION

NSF seeks proposals to create an ECR Core Research (ECR) Resource Coordination Hub (ECR Hub) that will be an intellectual partner to the ECR:Core and the ECR:BCSER grantee communities and the NSF to enhance the overall influence and reach of ECR STEM education research investments. The **ECR Hub** will be expected to work collaboratively with NSF and the ECR:Core and ECR:BCSER communities to design, implement, and execute its activities and ensure the inclusion of diverse researchers from across the full range of our nation's talent pool, of eligible institutions and organizations and of STEM education research and disciplines funded by ECR. As part of the ECR program, ECR:Core and ECR:BCSER have multidisciplinary portfolios with research projects from investigators representing a broad range of disciplinary backgrounds and approaches.

The **ECR Hub** is meant to meet the critical need to facilitate coordination of the ECR STEM education research community by:

- Supporting communication among the current and past ECR:Core and ECR:BCSER awardees, prospective awardees, and others doing STEM education research or using STEM education research results,
- Building community and research networks and outreach to new potential researchers and stakeholders,
- Facilitating information and resource sharing among stakeholders,
- Increasing visibility and diffusion of research results from ECR awardees to other stakeholders, and
- Strategically convening stakeholders (including organizing regular ECR PI meetings) and coordinating with other NSF resource hubs and centers.

The ECR Hub will enable the NSF to influence the broader ecosystem of STEM education investments by collaborating with Federal government and other funding agencies and foundations, and to inform policymaking, research, and practice. The ECR Hub will connect, expand, and leverage the contributions of the ECR:Core and ECR:BCSER programs. The **ECR Hub** aligns with the [NSF Strategic Plan](https://www.nsf.gov/news/special_reports/big_ideas/convergent.jsp) and is consistent with the NSF Big Idea on Convergence: https://www.nsf.gov/news/special_reports/big_ideas/convergent.jsp.

III. AWARD INFORMATION

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

In FY2022, one (1) ECR Resource Coordination Hub award will be made, pending the availability of funds.

The award will be made as a Cooperative Agreement, with an initial commitment for five years of support and the possibility of a competitive renewal. Ongoing support for the Cooperative Agreement will be contingent upon satisfactory performance as assessed through reviews of annual progress reports, annual site (or reverse site) visits, and annual reviews of the ECR Hub's future plans. The total amount of NSF's investment in the ECR Hub will depend upon the needs, plans, and opportunities offered by the Hub, as well as the availability of NSF funds.

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

Anticipated Funding Amount:

\$5,000,000 over five years, pending availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPP), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Additional Eligibility Info:

Full proposals involving multiple organizations may only be submitted from a lead organization with other collaborating organizations included as subawardees.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.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.

The following instructions supplement guidelines in the PAPPG and NSF *Grants.gov Application Guide*:

Title of Proposed Project: The title of the proposed project should begin with: "ECR Hub:"

Project Description. The Project Description is limited to 15 pages and must comply with all formatting requirements of the most current PAPPG. In addition to the requirements outlined in the NSF PAPPG, proposals should address the following elements in the 15-page project description:

Project Activities and Rationale

Provide a clear and concise description of the ECR Hub activities including goals, objectives, and outcomes for each activity. The rationale for each activity should be provided. Proposals should cite relevant literature on effective communication, community building, resource sharing, diffusion, and networking when appropriate. This description should have enough detail for reviewers to evaluate the quality and expected outcomes of the proposed activities.

Management Plan

Describe the plan for implementing the hub activities over the five-year period of the award. This section should include descriptions of ECR Hub staff positions, their roles and responsibilities, and the time and effort on the project. Include a description for an external advisory committee (EAC) of experts that will advise the team on the implementation of the hub. This section should include a project timeline with milestones. The project timeline should include plans for a third-year site or reverse site visit that may include external panelists and NSF staff. This site or reverse site visit may be virtual or in person. NSF may request additional site visits if needed.

Evaluation Plan

The proposal should include a developmental or formative evaluation plan and a summative evaluation plan and identify an external evaluator. The evaluation plan should refer to the project activity goals and objectives described earlier. The developmental or formative evaluation should include a plan for collecting and analyzing data to inform the development of Hub approaches and decision-making and include indicators of progress for assessing the project's implementation processes and adaptations. The summative evaluation should assess the impact of the project activities and progress toward the overall goals and objectives. Consider consulting the [American Evaluation Association](http://www.american-evaluation-association.org) website for more information about developmental evaluations, and the following NSF publication for formative or summative evaluation plans: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf02057.

Other Required Sections: Per guidance in the PAPPG, the Project Description must contain, as a separate section within the narrative, a section labeled "Broader Impacts". Proposers can decide where to include this section within the Project Description. The proposal must also describe "Results of Prior NSF Support" for related projects in which the PI or co-PI have been involved, as outlined in the PAPPG.

Budget and Budget Justification. Budgets should be in NSF format and include up to five pages of budget justification. The budget justification should be in narrative form and include detailed explanations for each line item with budget resources listed in the budget. Information about what may or may not be included in the budget or budget justification is outlined in the NSF PAPPG or NSF *Grants.gov Application Guide*. For proposals with subawards, each subaward must include a separate budget and budget justification of no more than five pages.

Note: Full proposals involving multiple organizations may only be submitted from a lead organization with other collaborating organizations included as subawardees.

Supplementary Documentation.

Data Management Plan (DMP): All data collected for ECR projects must accord with the revised EHR Data Management Guidance, which may be found here: <https://www.nsf.gov/bfa/dias/policy/dmpdocs/ehr.pdf>. Proposals must include a Supplementary Document of no more than two pages labeled "Data Management Plan." This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of project results. See Chapter II.C of the PAPPG for full policy implementation. For additional information on the Dissemination and Sharing of Research Results, see: <https://www.nsf.gov/bfa/dias/policy/dmp.jsp>. DMPs will be reviewed by panelists and program directors and should be written with sufficient clarity and detail to support proposal processing and the merit review process. Generic DMPs should be avoided. Each DMP should describe the data, metadata, samples, software, curricula, documentation, publications, and other materials generated during the proposed research. DMPs should reflect the best practices and standards for the proposed research and types of data being generated, whether experimental, computational, text-based, media or physical materials. ECR

expects its awardees to describe how data and related materials are generated to allow others to reproduce the research study. Further the DMP should support the sharing of data, products, and methods in such a way that others can understand, validate, and replicate findings.

Postdoctoral Researcher Mentoring Plan: Each proposal that requests funding to support postdoctoral researchers must upload under "Mentoring Plan" in the supplementary documentation section, a description of the mentoring activities that will be provided for such individuals. Mentoring activities provided to postdoctoral researchers supported on the project will be evaluated under the Broader Impacts review criterion. For additional information regarding postdoctoral researcher mentoring plans, see Chapter II.C of the PAPPG.

Letters of Collaboration: Letters of Collaboration from project partners may be included. A description of Letters of Collaboration, and suggested text is included in the PAPPG. Letters of support from persons endorsing the project but not making a substantial commitment to the project are not allowed.

Project Personnel: In addition to guidance provided in the PAPPG on required Special Information and Supplementary Documents, please provide a list of all project personnel in the Supplementary Document section. Provide current, accurate information for all personnel and organizations involved in the project. Include current, accurate information for all personnel and institutions involved in the project. NSF staff will use this information in the merit review process to manage reviewer selection. The list must include all PIs, co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, project-level advisory committee members, and writers of letters of collaboration. This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:

1. Ebony Johnson-Smith; XYZ University; PI
2. John Garcia; University of PQR; Senior Personnel
3. Jane Brown; XYZ University; Postdoc
4. Jamal Green; ABC Inc.; Paid Consultant
5. Monica Chen; Welldone Research Organization; Subawardee

Appendix: Not permitted. The 15 pages of the Project Description should contain all the information needed to describe the project. Proposals submitted with an Appendix will be returned without review.

Single Copy Documents.

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

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

December 01, 2021

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 the NSF FastLane system 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 *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.

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:

The ECR Hub award will be made in the form of a Cooperative Agreement. The Cooperative Agreement will have an extensive section of Special Conditions relating to the period of performance, detailed work description, awardee responsibilities, NSF responsibilities, joint NSF awardee responsibilities, funding and funding schedule, reporting and evaluation requirements, key personnel, and other conditions. NSF will provide general oversight and monitoring of the ECR Hub and external evaluation to help assure effective performance and administration, as well as facilitating any coordination necessary to further the objectives of the ECR program. Within the first 60 days of the award, the lead organization of the partnership should submit a strategic plan for the ECR Hub for confirmation by NSF.

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:

- Address questions to the program, telephone: (703)292-2333, email: ECR@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.

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.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) 292-8134
- **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
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