

Human-Environment and Geographical Sciences Program - Doctoral Dissertation Research Improvement Awards (HEGS-DDRI)

PROGRAM SOLICITATION NSF 21-621

REPLACES DOCUMENT(S): NSF 20-583



National Science Foundation

Directorate for Social, Behavioral and Economic Sciences
Division of Behavioral and Cognitive Sciences

Full Proposal Deadline(s):

Proposals Accepted Anytime

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:

Human-Environment and Geographical Sciences Program - Doctoral Dissertation Research Improvement Awards (HEGS-DDRI)

Synopsis of Program:

The objective of the Human-Environment and Geographical Sciences Program is to support basic scientific research about the nature, causes and/or consequences of the spatial distribution of human activity and/or environmental processes across a range of scales. Contemporary geographical research is an arena in which diverse research traditions and methodologies are valid. Recognizing the breadth of the field's contributions to science, the HEGS Program welcomes proposals for empirically grounded, theoretically engaged, and methodologically sophisticated, generalizable research in all sub-fields of geographical and spatial sciences.

Because the National Science Foundation's mandate is to support basic scientific research, the NSF Human-Environment and Geographical Sciences program does not fund research that takes as its primary goal humanistic understanding or applied research. HEGS welcomes proposals that creatively integrate scientific and critical approaches, and that engage rigorous quantitative, qualitative, or mixed methods in novel ways. However, a proposal that applies geographical/spatial methods to a social problem *but does not propose how that problem provides an opportunity to make a theory-testing and/or theory expanding contributions to geographical science will be returned without review*. HEGS supported projects are expected to yield results that will enhance, expand, and transform fundamental geographical theory and methods, and that will have positive broader impacts that benefit society. A proposal to the HEGS Program must also articulate how the results are generalizable beyond the case study.

It should be noted that HEGS is situated in the Behavioral and Cognitive Sciences Division of the Social, Behavioral and Economic Sciences Directorate at NSF. Therefore, it is critical that research projects submitted to the Human-Environment and Geographical Sciences Program *illustrate how the proposed research questions engage human dimensions relevant and important to people and societies*.

A proposal that fails to be responsive to these program expectations will be returned without review.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Scott M. Freunds Schuh - Program Director, 13147, telephone: (703) 292-7076, email: sfreunds@nsf.gov
- Jeremy Koster - Program Director, 13186, telephone: (703) 292-9068, email: jkoster@nsf.gov

- Thomas Evans - Program Director, 13152, telephone: (703) 292-9068, email: tevens@nsf.gov
- Cori J. Jacildo - Program Specialist, telephone: (703) 292-8740, email: cjacildo@nsf.gov

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

- 47.075 --- Social Behavioral and Economic Sciences

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 10 to 15

During a fiscal year, HEGS expects to recommend (either on its own or through co-funding with one or more other NSF programs) a total of 10 to 15 doctoral dissertation research improvement (DDRI) awards.

Anticipated Funding Amount: \$250,000 to \$375,000

Pending availability of funds. Project budgets should be developed at scales appropriate for the work to be conducted. DDRI awards supported by HEGS may not exceed \$20,000 in direct costs; indirect costs are in addition to this maximum direct cost limitation and are subject to the awardee's current Federally negotiated indirect cost rate.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

Who May Serve as PI:

DDRI proposals must be submitted with a principal investigator (PI) and a co-principal investigator (co-PI).

The PI must be the advisor of the doctoral student or another faculty member at the U.S. university where the doctoral student is enrolled. There is no limitation on the number of times that an individual may be the principal investigator on a DDRI proposal submitted to HEGS, either during a specific competition or over the course of her/his career.

A doctoral student may submit a DDRI proposal to HEGS to support her/his dissertation research only twice during her/his lifetime. A student and her/his advisor therefore should carefully consider what times during the student's graduate program are most appropriate for submission of a DDRI proposal.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

As noted above, there are no limitations on the number of DDRI proposals submitted to HEGS by an advisor or other faculty member functioning as the PI during a specific competition or over the course of her/his career.

Also as noted above, A doctoral student may submit a DDRI proposal to HEGS to support her/his dissertation research only twice during her/his lifetime. A student and her/his advisor therefore should carefully consider what times during the student's graduate program are most appropriate for submission of a DDRI proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via 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.
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- o 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):**

Proposals Accepted Anytime

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:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The objective of the Human-Environment and Geographical Sciences (HEGS) Program is to support basic scientific research about the nature, causes, and/or consequences of the spatial distribution of human activity and/or environmental processes across a range of scales. Projects about a broad range of topics may be appropriate for support if they enhance fundamental geographical knowledge, concepts, theories, methods, and their application to societal problems and

concerns.

II. PROGRAM DESCRIPTION

The objective of the Human-Environment and Geographical Sciences Program is to support basic scientific research about the nature, causes and/or consequences of the spatial distribution of human activity and/or environmental processes across a range of scales. Contemporary geographical research is an arena in which diverse research traditions and methodologies are valid. Recognizing the breadth of the field's contributions to science, the HEGS Program welcomes proposals for empirically grounded, theoretically engaged, and methodologically sophisticated, generalizable research in all sub-fields of geographical and spatial sciences.

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It should be noted that HEGS is situated in the Behavioral and Cognitive Sciences Division of the Social, Behavioral and Economic Sciences Directorate at NSF. Therefore, it is critical that research projects submitted to the Human-Environment and Geographical Sciences Program *illustrate how the proposed research questions engage human dimensions relevant and important to people and societies.*

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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, Research.gov, 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 nsfpubs@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 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.

Proposal Format

With the exception of 11 page limit for Project Descriptions for HEGS DDRI, proposals not in conformance with the proposal-preparation requirements of the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) or the *NSF Grants.gov Application Guide* may be returned without review.

Proposers should be sure to note explicit formatting requirements regarding proposal pagination, fonts, margins, line spacing, and page formatting. Proposers must adhere to these requirements in order to ensure the readability of proposals and to ensure that the proposers are not seen as trying to gain an unfair advantage over other proposers in the same competition.

For some sections of the HEGS DDRI proposal, guidance provided below takes precedent over the requirements specified in the PAPPG and *NSF Grants.gov Application Guide*. Proposers should carefully review this section to ensure that their DDRI proposal is prepared properly before the proposal is submitted to HEGS. **Failure to comply with HEGS DDRI solicitation-specific instructions may also result in a proposal being returned without review.**

Proposal Sections to Be Prepared as Directed in the PAPPG or the NSF Grants.gov Application Guide

The following sections of the proposal are mandatory and should be prepared in accordance with instructions regarding those sections in the PAPPG or the *NSF Grants.gov Application Guide*:

- **Project Summary** (Note the requirements regarding explicit discussion of the project overview, intellectual merit, and broader impacts in separate subsections.)
- **References Cited** (Note that this is a separate section of the proposal and that it immediately follows the Project Description.)
- **Biographical Sketches** (Note that biographical sketches for the PI, co-PIs, and other senior personnel should include all required sections and that there are a maximum number of items that may be listed for some categories. Note that lists of collaborators and other affiliations must not be included in biographical sketches.)
- **Budgets** (Note that a narrative with budget justification should follow the budget forms, with explanations for all costs being as detailed as possible.)
- **Current and Pending Support** (Note that this proposal is considered a pending activity and should be listed on the form for the advisor, doctoral student, and any other PIs.)
- **Facilities, Equipment, and Other Resources** (Note that descriptions of other resources that may assist in the conduct of the project may be identified, but these descriptions should be narrative in nature and must not include any quantifiable financial information. Note also that if there are no facilities, equipment, or other resources to describe, a statement to that effect must be included in the proposal.)

Collaborators and Other Affiliations Information (Note that a single-copy document that accompanies the proposal but technically is not part of the proposal

must be submitted for the advisor (PI), the doctoral student (co-PI), and all other senior personnel. This information should be prepared in accordance with PAPPG Chapter II.C.1. For additional information about the submission of information about collaborators and other affiliations, refer to <https://nsf.gov/bfa/dias/policy/coa.jsp>.)

Proposal Sections with Special Instructions for Proposals Submitted in Response to This Solicitation

The following sections of the proposal are mandatory and should be prepared in accordance to the following supplementary instructions as well as to guidance in the PAPPG or the *NSF Grants.gov Application Guide*.

Proposal Cover Sheet

The solicitation number for this solicitation should be specified as the program solicitation number. Proposers should **not** use the number for the solicitation for other kinds of awards made by the HEGS Program or the number of the *NSF Proposal and Award Policies and Procedures Guide*.

For the NSF organizational unit to consider the proposal, select BCS - Human-Env and Geographical Sci-DDRI. You may select additional programs if you would like those programs to consider co-review of your proposal with HEGS. (Note that HEGS normally does not engage in co-review of DDRI proposals with other programs because of the extra work involved relative to the size of the awards, so a request for co-review should be made only when PIs believe the proposed work makes a strong case for advancing theory and basic knowledge in multiple communities served by multiple programs.)

"Doctoral Dissertation Research:" should be the prefix before the substantive title of the DDRI proposal. The substantive title of the proposal should follow. This substantive portion of the title should describe the project in concise, informative language so that a scientifically or technically literate reader could understand what the project is about. The title should emphasize the scientific work to be undertaken. Proposers should not use "cute" or "attention-grabbing" subtitles, but instead focus on the intellectual contribution question of the project.

Start date of project. PIs should indicate a start date for their project that is at least six (6) months after the date on which their proposal is submitted to NSF

Personnel Listed on the Cover Sheet. DDRI awards focus on providing support for the dissertation research of a doctoral student, but the doctoral student's advisor or another faculty member at the university where the student is enrolled must serve as the principal investigator (PI) of the proposal, and the advisor is expected to play an active role in helping the student develop a strong and compelling proposal. The doctoral student must be listed as a co-principal investigator (co-PI). In cases when a student is working closely with multiple faculty members, an additional faculty member may be added as another co-PI. (Note that identification of an individual as a PI or co-PI means that they will have administrative responsibility for an award based on the proposal.)

Project Description

As specified in Chapter II.C.2.d of the PAPPG and in the comparable section of the *NSF Grants.gov Application Guide*, the project description should be a clear statement of the work to be undertaken. Proposers should note that the project description must contain a separate section within the narrative labeled "Broader Impacts" that discusses the broader impacts of the proposed activities.

To be competitive for HEGS funding, the project description should provide clear descriptions of relevant literature and theoretical frameworks within which the project is set, a complete description of the research methods that will be used, and discussion of the expected intellectual merit and broader impacts that may result from the project.

Proposers should note the HEGS-specific review criteria that are used to complement consideration of the standard NSF merit review criteria and should consider explicitly identifying the expected larger-scope, longer-term significance of their project as well as its likelihood of success.

Letters of support from other individuals and/or organizations that are not permitted as supplementary documents may be included in the project description.

A section describing Results from Prior NSF Support is **NOT** required in a DDRI proposal submitted to HEGS.

The project description of a HEGS -DDRI proposal may not exceed eleven (11) pages in length. No additional pages are permitted. The HEGS program directors strongly urge proposers to consider the use of non-narrative visualizations to complement text in their project descriptions, but all tables, figures, and accompanying captions must be included in the eleven pages.

Special Information and Supplementary Documentation

Following are supplementary documents for which special instructions are provided for proposals submitted in response to this solicitation that supplement guidance in the PAPPG and the *NSF Grants.gov Application Guide*:

Data-Management Plan

All proposals must include a plan for data management and for sharing the products of research. The Data-Management Plan to be submitted with a proposal must be no longer than two (2) pages in length and must be included as a Supplementary Document.

When preparing their Data-Management Plans, proposers should address all five of the points specified in Chapter II.C.2.j of the PAPPG and the comparable section of the *NSF Grants.gov Application Guide*. Proposers should specify how they intend to make data, software, and other products of the research readily available to potential users through **institutionally maintained** archives, repositories, and/or distribution networks so that the products may be easily accessed by others over long time periods.

Signed Statement from the Principal Investigator

The advisor or other faculty member serving as the principal investigator (PI) of the proposal is required to submit a signed statement affirming that the student will be able to undertake the proposed research soon after a DDRI award is made. In addition, the PI must affirm that she/he has read the proposal and believes that it makes a strong case for support of the dissertation research project.

The following template must be used to prepare this statement, with changes permitted only to provide information where there are blank lines in the template. Additional text is not permitted. The statement must display a real signature of the PI. Any alternatives, such as an electronic signature from the PI or a real signature from another faculty member, will be permitted only with prior written approval from a HEGS program director.

Required template for a statement signed by the PI:

To: NSF Human-Environment and Geographical Sciences Program (HEGS)

From: _____ [Insert name of the PI]

By signing below, I affirm that, to the best of my knowledge, the proposal titled " _____ " [Insert title of proposal] represents the first/second submission [Remove the inappropriate word and the slash] of a doctoral dissertation research improvement (DDRI) proposal to the NSF Human-Environment and Geographical Sciences (HEGS) Program by _____ [Insert name of doctoral student].

I affirm that the doctoral student is at a stage in her/his graduate program that makes it very likely that the student will be able to undertake the dissertation research described in this proposal soon after a DDRI award is made.

I affirm that I have read this proposal, and I believe that this proposal makes a strong case for NSF support for this project. [Print this paragraph in bold text]

Signed: _____ [Insert PI's signature]

University: _____ [Insert university name]

Date: _____ [Insert date that the statement is signed by the PI]

This letter must be included in the proposal as a supplementary document. It should **not** be submitted as a single-copy document that accompanies the proposal but is not part of the proposal.

Letters of Collaboration

Letters of Collaboration are allowed as per the PAPPG. Projects that collaborate with local institutions should include relevant Statements of Collaboration following the template found in the current PAPPG.

IRB and/or IACUC Certifications

If the submitting organization's Institutional Review Board (IRB) has approved plans for research involving human subjects or the Institutional Animal Care and Use Committee (IACUC) has approved research involving vertebrate animals, certification of IRB and/or IACUC approval may be included in appropriate sections of the cover sheet. Documentation of the certification may be included as a supplementary document, but that is not required if sufficient information is provided by the sponsored research office on the cover sheet of the proposal.

If the IRB and/or IACUC have not approved the research plans when the proposal is submitted, the appropriate box(es) should be checked on the cover sheet and "Pending" should be listed on the line that follows. If IRB or IACUC approval is granted while the proposal is under review at NSF, certification of the approval should be sent to the HEGS program directors. If the IRB or IACUC asks that plans be forwarded to it only when the investigators have received word that their project may be supported, the investigators should have the application ready for prompt submission, because notification from the NSF program directors that they would like to recommend the proposal for an award may come with a very brief time period during which necessary materials (including the IRB or IACUC certification) must be obtained. If the required certifications cannot be supplied quickly, HEGS program directors may have to turn their attention to other meritorious projects that can be funded right away.

Most IRB or IACUC approvals are valid for specific time periods. If the expiration of the current approval will occur before or soon after the possible start date for an award, investigators should seek renewal of the approval so that they have an active certification if they are informed the proposal will be recommended for funding. Once the investigators receive written certification that the renewal has been approved, the institutions IRB should send the approval to the managing HEGS program officer. Program officers cannot accept IRB approval documents from the PI or co-PI - these documents must come directly from the IRB representative.

Other Supplementary Documents

Unless authorized here or in the PAPPG or the NSF Grants.gov Application Guide, no other materials should be included in as supplementary documents. Survey or interview protocols are not permitted in this section, nor are reprints of articles previously published by the investigators. Letters of recommendation, letters of support, transcripts, and other such materials should not be included as supplementary documents. Proposals that include materials in this section that belong in the project description may be returned without review.

Investigators who have questions regarding the appropriateness of submitting specific items as supplementary documents should contact the HEGS program officers well in advance of the time when they plan to submit the proposal to obtain guidance regarding how to proceed.

Appendices

No appendices are permitted.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Project budgets should be developed at scales appropriate for the work to be conducted.

Proposal budgets cannot exceed \$20,000 in direct costs for the entire duration of the award; indirect costs are in addition to this maximum direct cost limitation and are subject to the awardee's current Federally negotiated indirect cost rate.

The direct costs requested in a DDRI proposal must be allowable costs that will improve the conduct of dissertation research. Student stipends, tuition expenses, assistantships, and the doctoral advisor's travel expenses are **NOT** eligible for support. Travel to conferences to disseminate the results of research and obtain constructive feedback prior to completion of the dissertation may be included in the proposal, but DDRI awards recommended by HEGS should not have direct conference travel costs that exceed \$1,000 for one conference or a total of \$1,500 for two conferences. HEGS will not recommend funding of DDRI awards solely to support travel to conferences to disseminate research results.

C. Due Dates

- **Full Proposal Deadline(s):**

Proposals Accepted Anytime

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. 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 FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov 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 or 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.

Additional Solicitation Specific Review Criteria

HEGS seeks to assess the potential longer-term significance of research projects. As a complement to assessing the intellectual merit and the broader impacts of a proposed project, reviewers are asked to provide responses and scores to the following two questions:

1. **As described in the proposal, what is the expected larger-scope, longer-term significance of the project if the project is conducted successfully?**

Score of 5 - Extremely Significant

Score of 4 - Very Significant

Score of 3 - Moderately Significant

Score of 2 - Mildly Significant

Score of 1 - Not Significant

2. **As described in the proposal, what is the likelihood that the project will be conducted successfully?**

Score of 5 - Extremely Likely to succeed

Score of 4 - Very Likely to succeed

Score of 3 - Moderate chances of success

Score of 2 - Minimal chances of success

Score of 1 - Unlikely to succeed

Proposals generally will be most competitive if both scores assessing potential significance and likelihood of success are high.

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.

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:

- Scott M. Freundsuh - Program Director, 13147, telephone: (703) 292-7076, email: sfreunds@nsf.gov
- Jeremy Koster - Program Director, 13186, telephone: (703) 292-9068, email: jkoster@nsf.gov
- Thomas Evans - Program Director, 13152, telephone: (703) 292-9068, email: tevans@nsf.gov
- Cori J. Jacildone - Program Specialist, telephone: (703) 292-8740, email: cjacildo@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.

For all general inquiries to the HEGS program, please email hegs-info@nsf.gov. This email will reach all current HEGS program officers and one of them will reply to you.

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) 292-8143
- **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
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