EMpowering BRoader Academic Capacity and Education (EMBRACE)

PROGRAM SOLICITATION

NSF 23-617



National Science FoundationDirectorate for Geosciences

Full Proposal Target Date(s):

November 20, 2023

May 15, 2024

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) that is in effect for the relevant due date to which the proposal is being submitted. The NSF PAPPG is regularly revised and it is the responsibility of the proposer to ensure that the proposal meets the requirements specified in this solicitation and the applicable version of the PAPPG. Submitting a proposal prior to a specified deadline does not negate this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

EMpowering BRoader Academic Capacity and Education (EMBRACE)

Synopsis of Program:

The NSF Directorate for Geosciences (GEO) EMpowering BRoader Academic Capacity and Education (EMBRACE) program seeks to support research and educational efforts at "non-R1" institutions, including non-R1 minority serving institutions (MSIs), two-year colleges (2YCs), primarily undergraduate institutions (PUIs), and emerging research and masters level institutions (see Carnegie Classification and Integrated Postsecondary Education Data System). With this solicitation, the EMBRACE program aims to mitigate multiple barriers faced by faculty members in geosciences and related fields at non-R1 institutions in submitting and obtaining federal funding (e.g., high teaching loads, increased expectations for teaching and mentoring, low or no start-up packages, and limited institutional infrastructure and research support personnel).

The EMBRACE program supports two categories of proposals: Seed and Growth.

Seed proposals can request up to two years of funding for faculty members in GEO-related disciplines at non-R1 institutions to (1) initiate research and/or education programs at their own institutions; and/or (2) build or catalyze research collaborations or partnerships:

- within the same institution; or
- across peer institutions; or
- with research-intensive institutions; or
- with industry or other non-academic entities; or
- any combination mentioned above.

Growth proposals can request up to four years of funding to enable faculty members at non-R1 institutions to establish independent GEO-related disciplinary research programs. In addition to research, funding may be used to support undergraduate and/or graduate students, post-doctoral scholars, salary (summer, course buyout, sabbatical) and other research related expenses.

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.

• GEO-EMBRACE Working Group, telephone: (703) 292-8500, email: geo-embrace@nsf.gov

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

• 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 20 to 25
Anticipated Funding Amount: \$6,000,000

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

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

Proposals may only be submitted by institutions of higher education (IHEs) not currently classified as a Doctoral University
with "Very High Research Activity" (R1 institutions) according to the Carnegie Classification and Integrated Postsecondary
Education Data System.

Non-R1 institutions include two- and four-year IHEs [such as tribal colleges and universities (TCUs), historically black colleges and universities (HBCUs), other non-R1 minority serving institutions (MSIs), two-year colleges (2YCs), primarily undergraduate institutions (PUIs), and emerging research and masters level institutions] accredited in and having a campus located in the U.S., acting on behalf of their faculty members.

Who May Serve as PI:

Principal Investigators (PIs) must hold primary appointments at institutions eligible to submit proposals in response to this solicitation. Submission from PIs at R1 institutions will be returned without review.

Limit on Number of Proposals per Organization:

There is no limit on the number of proposals per institution. Separately submitted collaborative proposals are allowed if the collaborating institutions are also non-R1s. Participation by R1 institutions must be included only using the subaward mechanism.

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

An individual may be designated as PI or co-PI on up to two proposals per annual competition. An individual may not be a PI or co-PI on an active NSF award. Questions about possible exceptions should be directed to geo-embrace@nsf.gov.

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:

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

C. Due Dates

• Full Proposal Target Date(s):

November 20, 2023

May 15, 2024

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

"Talent is the treasure on which America's S&E [scientific and engineering] enterprise and the nation's prosperity, health, and security depend." (National Science Board, *Vision 2030*). With the increasing number of complex geoscience-related problems faced by society, e.g., natural and social conditions and implications of climate change, natural hazards, growing capacity and retaining scientists with diverse experiences,

perspectives, and concerns are essential to reach crucial findings and arrive at effective solutions. Efforts to ensure a healthy and impactful growth of the research enterprise, to broaden participation, to build capacity, and to promote and to include the participation of the full spectrum of diverse talent in STEM require initiatives to expand investments for research and education at non-R1 institutions. Such investments shall bolster institutional capacity, ability to collaborate or pursue collaborative potential, and STEM workforce development.

Of the nearly 4,000 U.S. institutions of higher education (IHEs; IPEDS), ~150 are considered R1 with "very high research activity" (Carnegie Classification). The remaining "non-R1" IHEs encompass the vast majority of colleges and universities where geoscientists are trained and earn degrees. Fifty-two percent of the approximately \$5 billion awarded to universities and colleges by the Directorate for Geosciences (GEO) between 2013 and 2019 went to 20 universities (AGI, 2020), of which 19 are classified as R1. NSF and GEO have prioritized the goal to "increase both the involvement of communities underrepresented in STEM and enhance capacity throughout the nation" (NSF 22-068). The EMpowering BRoader Academic Capacity and Education (EMBRACE) program acknowledges that non-R1 institutions are underrepresented in GEO and epitomize sites of research capacity building opportunities.

GEO recognizes that faculty members at non-R1 institutions possess valuable research, teaching, and mentoring skills that meaningfully contribute to the S&E enterprise.

II. PROGRAM DESCRIPTION

The EMBRACE program is intended to expand the portfolio of institution types funded by the Divisions of Atmospheric and Geospace Science, Earth Sciences, Ocean Sciences, and the Office of Polar Programs within GEO. To enhance access to funding for faculty members at non-R1 institutions, EMBRACE supports projects that tackle well-focused scientific problems relevant to GEO. Funding support includes budget accommodations to mitigate barriers that include high teaching loads, increased expectations for teaching and mentoring, low or no start-up packages, and limited institutional infrastructure and research support personnel. Emerging results from EMBRACE activities should enable the submission of subsequent successful proposals to other NSF funding opportunities. The combination of the proposed activities and their potential to increase capacity and collaboration for research/education and for training should be transformative for students, the investigators, and the institutions.

The expected outcome of EMBRACE is to attract, grow, and retain diverse talent in the U.S. research enterprise. Investments made through EMBRACE provide needed resources, enable impactful activities, and enhance the research and scientific training environment at non-R1 institutions. These investments reflect the integrated GEO efforts to broaden, strengthen, and diversify the STEM workforce. In bolstering the capacity, collaboration, and workforce at non-R1 institutions, EMBRACE will help cultivate and retain diverse talent that can provide new perspectives and solutions on current and future challenges that humans face.

GEO strongly encourages participation by faculty members at non-R1 institutions from the full spectrum of diverse talent in STEM.

To be competitive, EMBRACE proposals must include a well-formulated plan to address a scientific problem relevant to GEO, present compelling broader impacts, and describe how the proposed activities are potentially transformative for students, investigators, and the institutions. EMBRACE proposals should also describe how proposed activities could lead to specific future proposals and enhance the capacity of students, faculty members, and institutions. EMBRACE supports two categories of proposals: **Seed** and **Growth**.

Seed proposals aim to offset the lack of resources (e.g., start-up, analytical equipment, laboratory space) and/or dedicated research time faced by faculty members at non-R1 institutions by providing funds to (1) initiate research and/or education programs at their own institutions; and/or (2) build or catalyze research collaborations or partnerships:

- within the same institution; or
- across peer institutions; or
- with research-intensive institutions; or
- with industry or other non-academic entities; or
- any combination mentioned above.

Proposers may pursue activities that establish viable independent research programs and/or collaborations to launch, or re-launch, their research careers. Awards from Seed proposals can help collect initial observations and/or obtain proof-of-concept results.

Seed proposals may request up to \$200,000 total, for a maximum of 24 months.

Growth proposals enable faculty members at non-R1 institutions to establish independent GEO-related disciplinary research programs by engaging undergraduate and/or graduate students, or post-doctoral scholars. With the intent to offset high teaching/mentoring loads and potential lack of research infrastructure, Growth proposals allow faculty members to initiate or sustain disciplinary research and related educational activities at their institution.

Growth proposals may request up to \$400,000 total, for a maximum of 48 months.

All EMBRACE award recipients are highly encouraged to participate in an annual virtual conference held by GEO. This conference will provide EMBRACE Pls an opportunity to network and share experiences and results with other recipients and interested faculty members at non-R1

institutions.

III. AWARD INFORMATION

Seed proposals: projects with total budgets up to \$200,000 total, for a maximum of 24 months.

Growth proposals: projects with total budgets up to \$400,000 total, for a maximum of 48 months.

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

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

Proposals may only be submitted by institutions of higher education (IHEs) not currently classified as a Doctoral University
with "Very High Research Activity" (R1 institutions) according to the Carnegie Classification and Integrated Postsecondary
Education Data System.

Non-R1 institutions include two- and four-year IHEs [such as tribal colleges and universities (TCUs), historically black colleges and universities (HBCUs), other non-R1 minority serving institutions (MSIs), two-year colleges (2YCs), primarily undergraduate institutions (PUIs), and emerging research and masters level institutions] accredited in and having a campus located in the U.S., acting on behalf of their faculty members.

Who May Serve as PI:

Principal Investigators (PIs) must hold primary appointments at institutions eligible to submit proposals in response to this solicitation. Submission from PIs at R1 institutions will be returned without review.

Limit on Number of Proposals per Organization:

There is no limit on the number of proposals per institution. Separately submitted collaborative proposals are allowed if the collaborating institutions are also non-R1s. Participation by R1 institutions must be included only using the subaward mechanism.

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

An individual may be designated as PI or co-PI on up to two proposals per annual competition. An individual may not be a PI or co-PI on an active NSF award. Questions about possible exceptions should be directed to geo-embrace@nsf.gov.

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.

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

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via

Research.gov. PAPPG Chapter II.E.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.D.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 the guidance in the PAPPG and NSF Grants.gov Application Guide.

Proposals responding to this solicitation must be submitted for consideration to one of the categories listed above (**Seed** or **Growth**). Proposals that include a request for equipment must follow the PAPPG (II.D.2.f.iii).

Project Title

To help sort proposals for review, proposal title must begin with "EMBRACE-", identify the Division or Office most closely aligned with the research, and the category of proposal.

For Seed proposals:

- EMBRACE-AGS-Seed: for research aligned with Atmospheric and Geospace Sciences
- EMBRACE-EAR-Seed: for research aligned with Earth Sciences
- EMBRACE-OCE-Seed: for research aligned with Ocean Sciences
- EMBRACE-OPP-Seed: for research aligned with the Office of Polar Programs

For Growth proposals:

- EMBRACE-AGS-Growth: for research aligned with Atmospheric and Geospace Sciences
- EMBRACE-EAR-Growth: for research aligned with Earth Sciences
- EMBRACE-OCE-Growth: for research aligned with Ocean Sciences
- EMBRACE-OPP-Growth: for research aligned with the Office of Polar Programs

Project Summary

The project summary must include a brief description of the overarching goal(s) of the proposal.

Project Description

The Project Description is a detailed statement of the proposed work that provides a clear plan to address a scientific problem relevant to GEO. The statement should include a description of activities that will provide the foundation for a competitive, long-term, productive research program. The narrative should describe compelling broader impacts that are appropriate for the institution, project, and/or proposer. It should also discuss how the proposed activities can enhance research and educational training capacity, lead to future NSF proposal submissions, and describe how the proposed activities are potentially transformative for the students, investigators, and institutions. Careful attention should be paid to the "Additional Solicitation Specific Review Criteria" listed in this solicitation.

The maximum length of the Project Description is 8 pages for a **Seed** proposal and 15 pages for a **Growth** proposal. Fair review of all proposals is encouraged regardless of length of Project Descriptions as long as it is within the allowable page range limit. The Project Description should include information about the following:

- Work Plan: Provide a compelling work plan that addresses a scientific problem relevant to GEO and aligns with the chosen EMBRACE proposal type. The work plan should include the research questions or hypotheses, the broad design of proposed activities, and, where appropriate, a clear description of methods and procedures as well as any preliminary data or a description of how data will be obtained and analyzed. The plan should include motivation and a discussion of the work's novelty in the context of existing literature.
- **Broader Impacts:** Provide compelling broader impacts of 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. Broader impacts may include a description of how the proposed activities will increase participation of the next generation of scientists from the full spectrum of diverse talent in geosciences as well as plans for enhancing graduate and undergraduate participation in research experiences. Proposers may consult the National Alliance for Broader Impacts (NABI) Guiding Principles and Questions for National Science Foundation Proposals.
- **Enhancing Capacity:** Describe how the proposed work could bolster the capacity of students, faculty members, and institutions in the research enterprise. The description should explain how the proposed activities can be leveraged toward future NSF proposals.

- Transformative Aspects for Participants: Discuss how the proposed activities are potentially transformative for students, investigators, and the institutions. The description may address how the activities are impactful in enhancing or establishing a unique research and scientific training environment, that otherwise would not occur, to cultivate and retain diverse talents.
- Results from Prior NSF Support (if applicable): Describe intellectual merit and broader impacts of prior NSF funding with research components (if any). See PAPPG Chapter II.D.2.d.iii for guidance. If more than one award with a research component has been received, only report on the one most closely related to this proposal. Support from NSF as well as other agencies and foundations should be listed in the Current and Pending (Other) Support section. For non-NSF awards and support, the PI should very briefly explain in the project description, the purpose of any listed awards and their role in the project.

Special Information & Supplementary Documents

Except for a Data Management Plan, Postdoctoral Mentoring Plan (if appropriate), equipment quotes (if appropriate), and letters of collaboration (if appropriate; see below), no other supplementary documents are permitted.

Letters of collaboration should be limited to a statement of the intent to collaborate and should not contain endorsements or evaluation of the proposed project. Letters of collaboration should follow the single-sentence format:

"If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by the NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description/Research Plan or the Facilities, Equipment or Other Resources section of the proposal."

Projects involving collaboration with foreign organizations and/or work in foreign countries: As stated in the PAPPG, NSF rarely provides direct funding to support foreign organizations and only provides support for the U.S. portion of collaborative projects. If foreign organization involvement is essential to the project, subawards or consultant arrangements may be considered if the foreign organization contributes unique resources not otherwise available, or significant education, training and/or research opportunities to the U.S. Such information must be provided in the Project Description section of the proposal. For studies in countries other than the United States, the Project Description should discuss, where appropriate, collaborations with scientists and students from the host country, and how these individuals will be involved in the project. Collaborations should be well justified, in that they represent true intellectual collaboration and utilize the expertise and specialized skills, facilities, and/or resources of the foreign collaborator. Letters of collaboration must be included in the Other Supplementary Documents section of the proposal. These letters should include a discussion of the role of the collaborator in the project and the resources the collaborating foreign institution/organization will provide to the project. Principal investigators are encouraged to provide U.S. students and junior researchers with international research experiences. Where relevant, arrangements to allocate samples and data between host country organization(s) or institution(s) and U.S. organization(s) or institution(s) should be discussed in the proposal. Investigators are encouraged to include any such permits (including legally required collecting, import, and export permits for samples, instrumentation, and data), authorizations, and agreements, in the Other Supplementary Documents section of the proposal.

Projects involving Native/Tribal/Indigenous communities: Proposals that include research in Native/Tribal communities or on Tribal lands must include a letter or email as a Supplementary Document that confirms community collaboration and/or permission to work on associated lands from the relevant community organizations or tribal leadership (see the U.S. Department of Housing and Urban Development Tribal Directory Assessment tool or the National Congress of American Indians tribal directory). Collaborations should be well justified, in that they represent true intellectual collaboration and utilize the expertise and specialized skills, facilities, and/or resources of the community. Collaboration with Native/Tribal/Indigenous communities should be reflected in the proposal budget and budget justification, such as through requests for sufficient funding to support the time and travel of Native community members, and through co-authorship on publications and presentations, as appropriate. Arrangements to allocate and share samples and data with the relevant communities should be discussed in the proposal or in the Data Management plan, following FAIR (Findable, Accessible, Interoperable, and Reusable) principles for data management and CARE (Collective benefit, Authority to control, Responsibility, and Ethics) principles for indigenous data governance.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Participation by principal investigators at R1s must be included only using the subaward mechanism.

Budget Preparation Instructions:

Seed awards are for a maximum of 24 months and up to \$200,000 total per project, including indirect costs. **Growth** awards are for 48 months and up to \$400,000 total per project, including indirect costs. Suggested budget items below are applicable for both **Seed** and **Growth** awards. A

budget justification of **no more than 5 pages** is required, explaining each line item for which funds are requested. Major cost items or unusual situations should be explained/justified in the budget justification.

Salary: Faculty members at non-R1 institutions are allowed to request up to 3 months of salary per year, with justification.

Salary and fringe benefits for supporting personnel central to the project is allowable. This includes support for a post-baccalaureate research associate or assistant, laboratory technician, other research staff (including student workers), or postdoctoral support. Providing enhanced graduate stipend beyond the typical amount at the PIs department/institution is encouraged to promote participation.

Release time: Course release is allowed for faculty members at non-R1 institutions during the academic year to conduct the proposed work or help leverage sabbatical leaves.

Collaborators at R1 Institutions: Collaborating R1 institutions that receive funding support must be strongly justified and must be supported via subawards. In addition, no more than 15% of the total personnel cost requested may be allocated to support salaries for R1 collaborators. Support for R1 collaborators may include travel expenses.

Equipment: The purchasing of new and upgrading of existing research and/or research-educational equipment is allowed. This budget line may also support the development of research-educational equipment that involves students. Leveraging resources of NSF investments and NSF-supported Federally Funded Research and Development Centers (FFRDCs) is encouraged. These include, for example, the National Center for Atmospheric Research, National Solar Observatory, and NSF Antarctic research investments, among others. Leveraging NSF-supported high-performance computing resources, data infrastructure, or advanced visualization resources is also encouraged. See PAPPG Chapter II.E.7 for guidance.

Travel: Travel expenses are allowed and may be used for:

- Conference attendance by the PIs and/or associated personnel (including students and collaborators).
- Research-related travel to field sites and/or partnering institutions to use specialized equipment. Travel costs for project personnel and students to receive training and for fieldwork. Travel support for administrative personnel to receive training.

Training: Funds may be used to cover the training of students and personnel necessary to acquire needed skills to conduct the proposed activities. Training support is allowed for administrative personnel (including SPOs or personnel within departments who helps manage grants) to help implement the project. Relevant administrative trainings include those that develop skills in award management, handling grant budget, and procurement to meet programmatic purposes.

Publication/documentation/dissemination costs: Funds may be used to cover the costs of documenting, preparing, publishing, or otherwise making available the outcomes of the proposed work. This includes publication fees and costs associated with the management and sharing of data, samples, and other research products.

Tuition-related costs: Tuition for undergraduates in GEO-relevant majors and for graduate students is allowed and should be included as other costs.

Administrative and contractual administrative services: Support can be requested for administrative services (including those by SPOs or personnel within departments who help manage grants) and for contractual administrative services that are important to the implementation of the project but are not currently available on campus. These services include award management, handling grant budget, and procurement to meet programmatic purposes. For further guidance, see PAPPG Chapter II.D.2.f(i)(b) on NSF's Administrative and Clerical Wages Policy.

C. Due Dates

• Full Proposal Target Date(s):

November 20, 2023

May 15, 2024

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 1-800-381-1532 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when

reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

EMBRACE aims to support geosciences research and research-educational activities at non-R1 institutions that can help build and/or enhance capacity in research/education, collaboration, and future workforce in geosciences. Emerging results from these activities should lead to the submission of subsequent successful proposals to other NSF funding opportunities while retaining, growing, and diversifying our talent pool. Reviewers are asked to consider:

- 1. The potential of the proposed activities to enhance the capacity of students, faculty members, and institutions for research and to form a basis for future competitive NSF proposals, and
- 2. Whether the proposed activities are seen to be potentially transformative for the students, investigators, and the institutions.

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

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

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

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's Build America, Buy America webpage.

Special Award Conditions:

All EMBRACE recipients are highly encouraged to participate in an annual virtual conference held by GEO. This conference will serve to network, and to share experiences and results with other recipients and interested faculty members at non-R1 institutions.

To meet programmatic purpose, direct costs for training and administrative and contractual administrative services are considered allowable for awards made under this solicitation.

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.

Pls 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.

Additional requirements apply beyond the standard NSF reporting. Namely,

Data Reporting Requirements: PIs are required to provide updates on the status of data sharing and archiving in annual and final annual reports, in the section titled "Products," and in accordance with the data policy of the Division or Office most closely aligned with the research, available on the NSF website at https://www.nsf.gov/geo/geo-data-policies/.

Broader Impacts Activities: Investigators are expected to address progress on activities related to proposed Broader Impacts in annual and final annual reports. Information should be provided in the "Accomplishments" section, such as in response to questions about opportunities for training and professional development and dissemination of results to communities of interest. The impacts of these activities should be provided in the "Impacts" section, such as in response to questions about impacts on society beyond science and technology.

Enhancing Capacity: Investigators are expected to address progress on activities related to Enhancing Capacity in annual and final annual reports. Information should be provided in the "Accomplishments" section, under significant results or under key outcomes or other achievements. The impacts of these activities should be provided in the "Impacts" section, such as in response to questions about impacts on the development of human resources, on physical resources that form infrastructure, and on institutional resources that form infrastructure.

Transformative Aspects for Participants: Investigators are expected to address progress on activities related to Transformative Aspects for Participants in annual and final annual reports. Information should be provided in the "Accomplishments" section, under significant results or key outcomes or other achievements. The impacts of these activities should be provided in the "Impacts" section, such as in response to questions about impacts on the development of human resources and on teaching and educational experiences.

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:

• GEO-EMBRACE Working Group, telephone: (703) 292-8500, email: geo-embrace@nsf.gov

For questions related to the use of NSF systems contact:

• NSF Help Desk: 1-800-381-1532

• 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 (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the NSF Proposal & Award Policies & Procedures Guide Chapter II.F.7 for instructions regarding preparation of these types of proposals.

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

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

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

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

• Location: 2415 Eisenhower Avenue, Alexandria, VA 22314

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 (NCE Information Contact)

(703) 292-5111

(NSF Information Center):

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or telephone: (703) 292-8134

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PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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

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