

NSF 24-558: Focus on Recruiting Emerging Climate and Adaptation Scientists and Transformers

Program Solicitation

Document Information

Document History

- **Posted:** March 13, 2024

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National Science Foundation

Directorate for Geosciences

Division of Research, Innovation, Synergies, and Education

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

January 29, 2025

Deadline for Track 1 "Coordination Hub" proposals

April 30, 2025

Deadline for Track 2 and Planning Grant proposals

April 29, 2026

Deadline for Track 2 and Planning Grant proposals

April 28, 2027

Deadline for Track 2 proposals



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Important Information And Revision Notes

The Directorate for Geosciences requires that proposers who include off-campus or off-site research as part of their project submit, as supplementary documentation, a Safe and Inclusive Fieldwork (SAIF) Plan. For this solicitation, this document replaces the required plan associated with the certification in Chapter II.E.9 of the Proposal and Award Policies and Procedures Guide (PAPPG). Instructions for inclusion of the SAIF Plan can be found in the additional proposal preparation instructions in this solicitation.

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:

Focus on Recruiting Emerging Climate and Adaptation Scientists and Transformers (FORECAST)

Synopsis of Program:

Focus On Recruiting Emerging Climate and Adaptation Scientists and Transformers (FORECAST) seeks to facilitate the transition from status quo graduate career preparation to a student-centered model with a particular emphasis on building entrepreneurial and innovation capacity at emerging research institutions (ERIs). Transformers are scientists ready to tackle the challenges the nation and world are facing due to climate change. This opportunity will adopt the spirit of multiple directives for the research community;

for example, the [National Academies of Sciences, Engineering, and Medicine \(NASEM\) report on Earth System Science](#) and the [Advisory Committee for Environmental Research and Education report on Engaged Research](#). These directives call on the research enterprise to support the building of a robust scientific workforce ready to work with communities in addressing societal challenges. Through convergence research approaches to address societal challenges, the [transdisciplinary](#) researchers engaged in FORECAST will foster community resilience and the translation of research outcomes for societal benefits, as well as gain a broader understanding of the governmental context related to these issues. A new generation of scientists trained in "engaged research" will be expected to have a national impact in communities that may be disproportionately affected by climate change impacts. The program will build cohorts of innovative scholars from the full spectrum of diverse talent at emerging research institutions to include groups historically excluded in science, technology, engineering and mathematics (STEM). Participants, who are senior students in undergraduate programs and students who are in master's degree programs, will be supported through intentional professional development activities. FORECAST participants must be US citizens or permanent residents.

FORECAST proposals will fall into three categories: Track 1, Track 2, and FORECAST Planning grants. Track 1 will support one Coordination Hub, to coordinate support for rising seniors from emerging research institutions (ERIs) or historically excluded and underserved groups as part of a national cohort to participate in structured professional development opportunities. Track 2 projects will support cohorts of Master's degree students at ERIs. Mentorship and capacity building should be central to the cohort approach. FORECAST Planning grant proposals will build capacity at ERI institutions and with the appropriate partners to undertake the activities necessary to establish a future FORECAST track 2 cohort.

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.

- Aisha Morris, telephone: (703) 292-8500, email: geoforecast@nsf.gov
- Lisa Rom, telephone: (703) 292-8500, email: geoforecast@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 or Cooperative Agreement

Estimated Number of Awards: 16

NSF expects to make up to 16 awards per year contingent upon availability of funds. One Track 1 award for the coordination hub, up to five Track 2 awards for graduate student cohorts, and up to 10 FORECAST planning grants at ERIs.

Anticipated Funding Amount: \$15,000,000

The average total award size is expected to be less than \$100K for FORECAST planning grants, \$4M for Track 2 awards, and \$7.5M for the Track 1 award. The duration of FORECAST planning grant awards will be up to 12 months. The duration of the Track 1 award will be a maximum of 60 months, and the duration of the Track 2 awards will be a maximum of 48 months. Anticipated funding amount, number of awards, and average award size and duration are contingent upon the availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- **Track 1:**

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.

Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Track 2 and FORECAST Planning Grants:

Master's degree-granting Emerging Research Institutions (defined in 42 USC 18901 as institutions of higher education with an established undergraduate or graduate program that have less than \$50,000,000 in Federal research expenditures) that award degrees in STEM disciplines supported by NSF and that are accredited in, and have a campus located in the US. Information from NSF 24-308, the Higher Education Research and Development (HERD) Survey (Table 24. Federally financed higher education R&D expenditures, ranked by FY 2022 R&D expenditures: FYs 2010–22) will be used to determine institutional eligibility (<https://nces.nsf.gov/pubs/nsf24308/>).

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

FORECAST does not accept separately submitted collaborative proposals. Any collaboration among organizations should be through a subaward.

An eligible organization may submit only two (2) proposals. Proposals that exceed the organizational eligibility limit will be returned without review. Potential PIs are advised to contact their institutional office of research regarding processes used to select proposals for submission.

Organizations participating only as evaluators or subawardees on projects are excluded from this limitation.

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

An individual may serve as Principal Investigator (PI) or co-PI on only one (1) proposal submitted to this solicitation. Proposals that exceed the PI/co-PI eligibility limit (beyond the first submission based on timestamp) will be returned without review regardless of the individual's role (PI or co-PI) in the returned proposal(s).

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 Deadline(s)** (due by 5 p.m. submitting organization's local time):

January 29, 2025

Deadline for Track 1 "Coordination Hub" proposals

April 30, 2025

Deadline for Track 2 and Planning Grant proposals

April 29, 2026

Deadline for Track 2 and Planning Grant proposals

April 28, 2027

Deadline for Track 2 proposals

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:

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

I. Introduction

Focus On Recruiting Emerging Climate and Adaptation Scientists and Transformers (FORECAST) seeks to facilitate the transition from status quo graduate career preparation to a student-centered model with an emphasis on building entrepreneurial and innovation capacity at emerging research institutions (ERIs). The [CHIPS and Science Act](#) defines ERI as “an institution of higher education with an established undergraduate or graduate program that has less than \$50,000,000 in federal research expenditures.” FORECAST will support students through intentional entrepreneurial and innovation-building development activities for both undergraduate scholars and master’s degree students at ERIs. Using convergence research approaches to address societal challenges, the [transdisciplinary](#) researchers engaged in FORECAST will foster community resilience and the translation of research outcomes for societal benefits, as well as gain a broader understanding of the governmental context related to these issues (e.g. policies, regulations, and processes).

Congress and several important studies have called on the scientific enterprise to develop and support a robust research workforce with skills to address societal and economic challenges and national priorities. In 2018, Congress authorized NSF to provide grants for innovative approaches to STEM (Science, Technology, Engineering, and Mathematics) workforce development. The authorization reiterated the need for a workforce with the right mix of skills to meet the diverse needs of the economy. The findings of recent reports from the scientific community align with Congressional and Federal priorities, as seen in the [2022 National Academies' Earth System Science Report](#) [\[2\]](#), and [2022 Advisory Committee for Environmental Research and Education report on Engaged Research](#), and call on NSF to prepare people to conduct “engaged research.” Undergraduate and graduate students must be prepared to enter the work environment, as well as conduct community and partner-engaged science for the benefit of society and the economy. Understanding the broader policy context related to community-engaged research topics, within which climate resilience innovations can be adopted widely, will help students become more effective scientists, innovators, and entrepreneurs as they enter the workforce.

It is critical to consider who is presently involved in science and how we can build a workforce that reflects the diversity of the nation, a theme also reflected in the recent Congressionally approved CHIPS and Science Act. Many of the communities that are most vulnerable to natural hazards and environmental change include significant populations of groups that historically have not been included in STEM fields or in the development of STEM research.

This solicitation strives to create a community of scientists ready to tackle the challenges the nation and world are facing due to climate change, who know the means and vehicles available to them to meet that challenge, and who can effectively work within established social, economic, and social justice fabric to ensure implementation and sustainability of solutions co-designed with parties in need of climate resilience. Success in this arena requires new, creative, entrepreneurial ways of thinking, project selection, and problem solving, as well as awareness of the broader governmental context that affects climate resilience implementation, in ways that have not been part of traditional graduate education and training. This solicitation changes that dynamic with an emphasis on social entrepreneurship, engaging with communities to understand their needs in climate mitigation and working with them to devise workable solutions that they can implement and that can be translated to other communities with similar needs. It also provides an understanding of the entrepreneurial process and the means and process of leading and successfully spinning off components of successful solutions to the economy.

II. Program Description

A. Focus and Goals

The FORECAST solicitation invites creative proposals designed to prepare students to enter the work environment and conduct community and partner-engaged science in benefit of society. Using a student-centered approach, the goals of the program are to:

- Catalyze entrepreneurship and innovation while fostering supportive student cohorts and professional development opportunities that would result in a new generation of innovators, entrepreneurs, and scientists trained in “engaged translational research” and aware of governmental processes;
- Increase capacity for master’s degree programs at ERIs to train diverse cohorts of transdisciplinary STEM professionals for a range of research and research-related careers within the workforce;

- Promote building innovative community flexibility and adaptability to environmental change by fostering community resilience and the translation of core research outcomes for societal benefits.

Creation of sustainable programmatic capacity at institutions is an expected outcome. Consequently, all proposals should describe mechanisms to institutionalize effective training elements after award expiration and provide appropriate documentation of institutional support for such efforts (see Proposal Preparation Instructions, section V.A.).

B. Funding Tracks

Track 1: Coordination Hub, one managing organization will be selected to coordinate support for rising seniors from either emerging research institutions (ERIs) or from historically excluded and underserved groups as part of a national cohort to participate in structured professional development opportunities.

Track 2: FORECAST Cohorts at Emerging Research Institutions (ERIs) projects will support cohorts of Master's degree students at ERIs. Mentorship and capacity building should be central to the cohort approach.

FORECAST Planning grant proposals for Track 2 will be accepted to build capacity at the institution and with the appropriate partners to undertake the activities necessary to establish a future FORECAST cohort or similar activities at ERIs.

Track 1 (1 award; Coordination Hub):

There will be one award to a managing hub organization (the coordination hub). The coordination hub will oversee the Track 1 undergraduate senior program and assist with coordination of the Track 2 projects. Track 1 proposals may request a total budget (up to five years in duration) of up to \$7.5 million.

The hub organization will develop, design, and deliver professional development for Track 1 participants. The participants will start the program, Phase 1, during their senior year and could continue to participate if they transition to a graduate program, Phase 2. Professional development should include attention to training and building skills necessary for making connections between basic science and translation to societal benefits. These skills include management, having vision, communications, and knowing how to organize science ([National Academies of Sciences, Engineering, and Medicine 2022](#) [\[4\]](#)). The professional development for the cohort should include entrepreneurial and innovative approaches to community and/or campus resilience, as well as an introduction to government processes related to climate resilience. Participants will have the opportunity to develop transdisciplinary projects while engaging communities in setting up research goals.

Track 1 Phase 1: The coordination hub will be expected to use the [Education and Training Application Portal \(ETAP\)](#) to solicit and review participant applications. Each national cohort of senior undergraduate student participants should be comprised of at least 25 students. Facilitated by the coordination hub, participants enrolled in the last year of their undergraduate program will hone skills on translational research, engaged research, and innovation. The undergraduate student participants will design research projects that they could implement as graduate students or develop business plans in support of the goals and interests of companies or communities.

Track 1 Phase 2: Following their undergraduate education, Track 1 participants may continue to be supported during the first two years of a graduate program (Master's or PhD) at a school of their choice. In Phase 2, graduate student participants will become FORECAST Associates and will continue to receive professional development and support as they implement the research projects designed during Phase 1.

The hub will manage funding for all Track 1 participants. Receiving a living wage while engaged in activities is crucial to facilitate participation of individuals from a wide range of backgrounds ([National Academies of Sciences, Engineering, and Medicine 2023](#) [\[4\]](#)). Undergraduate participants (Phase 1) will receive a stipend to be paid for time spent preparing for, traveling to/from, and participating in professional development activities. Undergraduate student participants who become graduate student FORECAST Associates (Phase 2) will receive an educational allowance for up to two years. Phase 2 FORECAST Associates may accept fellowships, tuition assistance, etc. in addition to the educational allowance provided by FORECAST.

Track 2 (~5 awards): FORECAST Cohorts at Emerging Research Institutions (ERIs)

Master's degree-granting emerging research institutions (ERIs) are eligible to submit proposals to both train cohorts of master's degree graduate students *and* build institutional capacity in [translational](#), engaged research to address challenges related to global change. Track 2 proposals should include an introduction to the broader governmental context of climate resilience. Track 2 proposals may request a total budget (up to four years in duration) of up to \$4 million.

Eligibility to submit to Track 2 is limited to master's degree-granting ERIs accredited in, and having a campus located in the US, acting on behalf of their faculty members, that award degrees in STEM disciplines supported by the National Science Foundation.

FORECAST Planning Grants (10 awards):

Master's degree-granting emerging research institutions (ERIs) are eligible to submit FORECAST planning grant proposals to build capacity at the institution and with the appropriate partners to undertake the activities necessary to establish a future FORECAST Track 2 cohort. Eligibility to submit to FORECAST Planning Grants is limited to master's degree-granting ERIs accredited in, and having a campus located in the US, acting on behalf of their faculty members, that award degrees in STEM disciplines supported by the National Science Foundation.

NSF recognizes that institutions may have interest in establishing a cohort, but may not have the full complement of skills, expertise, and relationships needed to successfully implement a meaningful cohort. FORECAST Planning Grants can be used to support team formation activities (e.g. filling gaps in expertise); develop and nurture relationships with potential partners; and access specialized frameworks or resources needed to better develop a Track 2 cohort project. FORECAST Planning Grants are suitable for institutions that would like to prepare to host a Track 2 project and ensure their institution is fully inclusive and welcoming to project participants, by training staff, conducting climate surveys, or establishing collaborations and partnerships. FORECAST Planning Grants should include plans for the expansion, sustainability, and scale of their activities. Proposers funded through this solicitation may use the FORECAST Planning Grant funding to organize catalytic activities (including, but not limited to, workshops and conferences) that can help collaborating organizations to crystallize their vision to address a transdisciplinary graduate student cohort and build entrepreneurial and translational capacity at the institution and to develop a Track 2 project proposal. FORECAST Planning Grants could include a small pilot program and adequate evaluation. It is expected that FORECAST planning grants will have a period of performance of 12 months. Having a planning grant awarded is not a guarantee of subsequent funding for a Track 2 project. A Planning Grant is not a prerequisite for future FORECAST competitions. FORECAST Planning Grant proposals may request a total budget (up to 12 months in duration) of up to \$100,000.

Please note that the FORECAST Planning Grant proposals described in this solicitation are a solicitation-specific project category and are separate and distinct from the type of proposal described in Chapter II.F.1 of the PAPPG. When preparing a Planning proposal in response to this solicitation, the "Research" type of proposal should be selected in the proposal preparation module in Research.gov or Grants.gov.

Competitive FORECAST Planning Grants, Track 1 and 2 Project proposals will be based on inclusive research and training principles and prioritize strategic partnerships while developing an entrepreneurial mindset in the participants. Successful projects will be rooted in mentorship, ally-ship, equity, anti-racist and anti-harassment practices, and increasing accessibility. Project leaders need to show their commitment to foster research and learning environments with a strong sense of belonging and safety for all. Proposals seeking funds to support an existing activity must clearly demonstrate the effectiveness of current activities and identify the gaps that would be addressed if additional resources were made available.

REFERENCES:

Advisory Committee for Environmental Research and Education (2022) [Engaged research for environmental grand challenges: Accelerating discovery and innovation for societal impacts. A report of the NSF Advisory Committee for Environmental Research and Education](#), Prepared by the Advisory Committee on Environmental Research and Education.

Batchelor, R. L., Ali, H., Gardner-Vandy, K. G., Gold, A. U., MacKinnon, J. A. and Asher, P. M. (2021) [Reimagining STEM workforce development as a braided river](#), *Eos*, 102, Published on 19 April 2021. <https://doi.org/10.1029/2021EO157277>

Berhe, A. A., Barnes, R. T., Hastings, M. G. et al. (2022) [Scientists from historically excluded groups face a hostile obstacle course](#). *Nature Geoscience*, 15, 2–4. <https://doi.org/10.1038/s41561-021-00868-0>

Burrage, A, Carter, T., and Goldstein, A. (2022) [The future of academic research on climate solutions](#), *Second Nature*.

Marin-Spiotta, E., Diaz-Vallejo, E. J., Barnes, R. T., Mattheis, A., Schneider, B., Berhe, A. A., et al. (2023) [Exclusionary behaviors reinforce historical biases and contribute to loss of talent in the Earth sciences](#). *Earth's Future*, 11, e2022EF002912. <https://doi.org/10.1029/2022EF002912>

Mosher, S., and Keane, C. (Eds.) (2021) *Vision and change in the geosciences: The future of undergraduate geoscience education*, American Geosciences Institute.

National Academies of Sciences, Engineering, and Medicine (2022) *Next generation Earth systems science at the National Science Foundation*, Washington, DC: The National Academies Press. <https://doi.org/10.17226/26042>

National Academies of Sciences, Engineering, and Medicine (2023) *Transforming research and higher education institutions in the next 75 years: Proceedings of the 2022 Endless Frontier Symposium*, Washington, DC: The National Academies Press. <https://doi.org/10.17226/26863>

National Science and Technology Council, Committee on STEM Education (2018) [Charting a course for success: America's strategy for STEM education](#).

Quider, A. M., and Blazey, G. C. (2023) How to keep emerging research institutions from slipping through the cracks, *Issues in Science and Technology* 39, no. 3 (Spring 2023), 50 - 53. <https://doi.org/10.58875/ACQP2387>

III. Award Information

The average total award size is expected to be less than \$100K for FORECAST planning grants, \$4M for Track 2 awards, and \$7.5M for the Track 1 award. The duration of FORECAST planning grant awards will be up to 12 months. The duration of the Track 2 awards will be a maximum of 48 months, and the duration of the Track 1 award will be a maximum of 60 months. Anticipated funding amount, number of awards, and average award size and duration are contingent upon the availability of funds.

IV. Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Track 1:

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.

Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Track 2 and FORECAST Planning Grants:

Master's degree-granting Emerging Research Institutions (defined in 42 USC 18901 as institutions of higher education with an established undergraduate or graduate program that have less than \$50,000,000 in Federal research expenditures) that award degrees in STEM disciplines supported by NSF and that are accredited in, and have a campus located in the US. Information from NSF 24-308, the Higher Education Research and Development (HERD) Survey (Table 24. Federally financed higher education R&D expenditures, ranked by FY 2022 R&D expenditures: FYs 2010–22) will be used to determine institutional eligibility (<https://ncses.nsf.gov/pubs/nsf24308/>).

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

FORECAST does not accept separately submitted collaborative proposals. Any collaboration among organizations should be through a subaward.

An eligible organization may submit only two (2) proposals. Proposals that exceed the organizational eligibility limit will be returned without review. Potential PIs are advised to contact their institutional office of research regarding processes used to select proposals for submission.

Organizations participating only as evaluators or subawardees on projects are excluded from this limitation.

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

An individual may serve as Principal Investigator (PI) or co-PI on only one (1) proposal submitted to this solicitation. Proposals that exceed the PI/co-PI eligibility limit (beyond the first submission based on timestamp) will be returned without review regardless of the individual's role (PI or co-PI) in the returned proposal(s).

Additional Eligibility Info:

The FORECAST program encourages proposals from ERIs designated as [Minority Serving Institutions](#).

V. Proposal Preparation And Submission Instructions

A. Proposal Preparation Instructions

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

- Full Proposals submitted via [Research.gov](#): Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via [Grants.gov](#): Proposals submitted in response to this program solicitation via [Grants.gov](#) should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the [Grants.gov](#) website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the [Grants.gov](#) site, then click on the Apply Step 1:

Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.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.

Please note that the FORECAST Planning Grant proposals described in this solicitation are a solicitation-specific project category and are separate and distinct from the type of proposal described in Chapter II.F.1 of the PAPPG. When preparing a Planning proposal in response to this solicitation, the "Research" type of proposal should be selected in the proposal preparation module in Research.gov or Grants.gov.

The following instructions supplement or deviate from the guidance contained in the PAPPG:

Title: Provide a short informative title that begins with the appropriate prefix. The proposal title should clearly indicate which proposal type is being supported by the proposed project, using the relevant format here:

- For Track 1 projects, the title should read as "FORECAST Track 1: [Rest of Project Title...]"
- For Track 2 projects, the title should read as "FORECAST Track 2: [Rest of Project Title....]"
- For planning grant projects, the title should read as "FORECAST Planning Grant: [Rest of Project Title...]"

Cover Sheet: If international activities are proposed, whether or not they will be funded via the FORECAST award, the international cooperative activities box should be checked, and the individual countries listed.

Project Description: The project description should provide a clear statement of the work to be undertaken and must include the objectives for the period of the proposed work and the expected significance. In addition to the guidance contained in the PAPPG, including the requirement for a separate section labeled "Broader Impacts", the Project Description should include the following:

Track 1: Coordination Hub (maximum 20 pages)

Overview. Provide a brief description of the goals and objectives of the proposed project, the intellectual focus, organizational structure.

Organizational/Institutional Profile(s). Provide a brief description of the submitting organization and any other organizational partners in the project. Proposals should describe current student training opportunities and programs that include diverse perspectives. If more than one organization is involved in the project, the proposal should describe the goals of the collaboration and the anticipated outcomes of the collaboration.

Project Design. Describe the goals and implementation plan for the professional development of the students. Describe the characteristics of the student participant cohort that would be engaged in this project. Describe how the organization plans to interact with recipients of Track 2 awards. Include a project timetable.

- *Participant Recruitment and Selection.* Describe outreach, recruitment, and selection plan for senior student participants that would accomplish the organization's desired cohort characteristics. FORECAST participants must be US citizens or permanent residents. Describe number of FORECAST students per cohort with a minimum of two cohorts of at least 25 students per cohort. The coordination hub will be expected to use the [Education and Training Application Portal \(ETAP\)](#) to solicit and review participant applications.
- *Senior Undergraduate/Associate Support.* Describe the mechanism that will be put in place to support cohort participants, including opportunities to connect with the broader community that is demographically and/or geographically diverse. Describe plans for managing student funding support during Phase 1 (senior undergraduate participants) and Phase 2 (when participants move to graduate school).
- *FORECAST Community Networking Plan.* Proposals must describe planned efforts to connect and foster the broader FORECAST community. Describe plans to connect Track 1 and Track 2 participants with entrepreneurial options

via professional development opportunities. Provide a detailed plan addressing hub efforts to train senior undergraduate participants in working respectfully and equitably with community partners.

Project Personnel. This subsection should describe any relevant experience and the record of involvement with research, training, education of, and/or equity and inclusion efforts for the target population, by the PI, and other professionals who may serve as mentors for the proposed activities. In addition, this section should describe any relevant experience and the record of involvement with transdisciplinary research and STEM innovation. The description should include information on the record of the project team in providing professional development opportunities, work in improving workplace culture through diversity, equity, inclusion, and accessibility (DEIA) efforts, or expertise in working in equitable partnerships with local communities. This section should also discuss the collective diversity of the staff involved, including mentors, and the preparation of that staff to manage the activities; strategies for recruiting and selecting additional mentors if needed; any training, mentoring, or monitoring that staff and mentors have received or will receive to help them support the project.

Project Evaluation. The project team should ensure that the project benefits from an unbiased and external perspective in project assessment/evaluation activities. Project evaluator(s) can be from an internal or external assessment unit or consulting entity. If a project chooses to involve an individual or team from the lead or collaborating institution(s) in the evaluation, then the project must provide justification and explain how lack of bias is ensured. This section should also describe project evaluation sustainability plans including the efforts that will be made so that the assessment/evaluation tools that are developed/implemented during the project period are available to the academic community at the participating institution/s beyond the award period. The lead evaluator must be listed as senior personnel. This requirement does not impact institutional eligibility, as organizations participating solely as project evaluators are excluded from the eligibility limit (see Section IV).

Track 2: FORECAST Cohorts at Emerging Research Institutions (ERIs) (maximum 15 pages)

Overview. Provide a brief description of the goals and objectives of the proposed project, the intellectual focus, organizational structure, and any participating organizations' commitment to the activity.

Institutional Profile(s). Provide a brief description of the submitting institution and any other organizational partners in the project. Proposals should describe the current status of graduate or related geoscience education, research, and/or training opportunities, including the diverse perspectives of the faculty, staff, and the profile of existing graduate programs in which students in the cohort could potentially have their academic home, this includes number of students in the programs, current demographics, and scientific discipline. If more than one organization is involved in the project, the proposal should describe the goals of the collaboration and the anticipated outcomes for anyone who will participate in the collaboration.

Project Design. Describe the overarching research theme, vision, and goals of the proposed FORECAST project with a focus on implementing new approaches to training STEM graduate students in the targeted transdisciplinary research area. Identify the potential of the FORECAST project to provide added value to the current degree programs and methods of graduate training at the institution(s), including the professional development needed for faculty who would be involved in the project. Emphasize the graduate training needs in the project's thematic research field, both at the host institution(s) and nationally. In addition, describe the need for professionals with master's degrees in the project's thematic research area. Articulate how the proposed FORECAST project will foster transdisciplinary synergisms emerging from ongoing research activities and/or via FORECAST-funded initiatives. Describe how the proposed FORECAST project complements and builds on other ongoing or prior institutional efforts to improve STEM graduate education. Proposers should describe how the outcomes of the FORECAST program will be communicated broadly beyond the institution. Address implications of the proposed FORECAST project for broadening participation in STEM programs and STEM careers. Describe plans to institutionalize innovations in training diverse cohorts of transdisciplinary STEM professionals for a range of research and research-related careers within the current and future workforce. Include a project timetable. Describe plans to integrate FORECAST participants into the broader national FORECAST community via interactions with the managing hub.

Cohort Recruitment and Selection. Describe outreach, recruitment, and selection plan for the cohort of associates. Describe number of FORECAST Associates per cohort with a minimum of two cohorts of at least 6 students per cohort. Describe professional development activities, including transdisciplinary collaborations within the institution, with the university community, and with the broader geographic or demographic community. FORECAST participants must be US citizens or permanent residents.

FORECAST Associate Professional Development. Describe professional development plan. Describe evidence-based plans to equitably support FORECAST cohort graduate students.

Community Partnership Plan. Proposals that include partnerships with local communities need to provide a detailed plan on how the partnership will be established in an equitable and respectful manner. The plan should detail what commitments have been made by all involved parties and how impact and results will be assessed and shared across all partners.

Project Personnel. This subsection should describe any relevant experience and the record of involvement with research, training, education of, and/or equity and inclusion efforts for the target population, by the PI, the faculty or other professionals who may serve as mentors for the proposed activities. In addition, this section should describe any relevant experience and the record of involvement with transdisciplinary research and STEM innovation. The description should include information on the record of PIs in providing professional development opportunities, work in improving workplace culture through DEIA efforts, or expertise in working in equitable partnerships with local communities. This section should also discuss the collective diversity of the staff involved, including mentors, and the preparation of that staff to manage the activities; strategies for recruiting and selecting additional mentors if needed; any training, mentoring, or monitoring that staff and mentors have received or will receive to help them support the project.

Project Evaluation. Projects should include plans to evaluate the success of the project activities. In particular, the proposal should identify specific competencies and outcomes along with performance measures and an evaluation timetable. Although the focus should be on the FORECAST Associates, the evaluation plan should also assess how the FORECAST project affects faculty teaching and research, academic programs, and institutional policies regarding transdisciplinary collaboration in STEM graduate education. The assessment plan should describe how and when assessment outcomes would be shared with the project participants, including FORECAST Associates and institutional administration. Describe mechanisms for regular feedback from the evaluator(s) and the associates and faculty personnel to the leadership team and how that feedback will inform the project implementation practices. Proposals should include plans for communicating assessment results both within the FORECAST community and more broadly through publications and professional meetings. Awardees should be prepared to contribute to FORECAST program evaluation, including participation in systematic data collection via NSF monitoring systems, contributions at NSF-sponsored PI meetings, and periodic cross-award, joint video conferences to share insights, effective practices, and evaluation findings.

FORECAST Planning Grants (maximum 8 pages)

Overview. Provide a brief description of the goals and objectives of the proposed project, the intellectual focus, organizational structure, timetable, and any participating organizations' commitment to the activity.

Institutional Profile(s). Provide a brief description of the submitting institution and any other organizational partners in the project. If more than one organization is involved in the project, the proposal should describe the goals of the collaboration and the anticipated outcomes for anyone who will participate in the collaboration.

Project Design. Proposals should describe the specific activities that will be undertaken to achieve the goals outlined in this solicitation, and how the activities are appropriate for a FORECAST planning grant. Include the plan for participant and community engagement. For FORECAST planning grants that aim to establish new graduate programs, a plan for these activities should be presented.

Project Personnel. This subsection should describe any relevant experience and the record of involvement of PIs and involved staff with research, education of, equity and inclusion, and/or innovation efforts. This section should also include trainings the PIs and involved staff will undertake as part of their own professional development to prepare for a Track 2 proposal.

Evaluation. Provide a succinct plan for summative evaluation of the proposed activities. PIs must engage specialists in evaluation (from their organization or another one) in planning and implementing the project evaluation. Evaluation expertise should be from outside the PI and Co-PI team.

Supplementary Documents: In addition to the guidance contained in the PAPPG, all FORECAST proposal types should include the following Supplementary Documents, if applicable:

List of Project Personnel: A list of project personnel and partner organizations as described below is required. This information provides NSF and reviewers with a comprehensive list of personnel and organizations involved in the project.

- List all project personnel who have a role in the management, research, education, broadening participation, and knowledge transfer components of the FORECAST project. Use the following format: last name, first name, institution/organization.
- List of all institutions and organizations with which project personnel are affiliated. Designate for each an appropriate category: Institution of Higher Education, National Laboratory, Federal Government, Industry, Non-Governmental Organization, State/Local Government, or International organization.

Safe and Inclusive Fieldwork (SAIF) Plan: All proposals submitted to this solicitation that include research that will be conducted off-campus or off-site must submit a plan for safe and inclusive fieldwork as a supplemental document that will be considered under the broader impacts review criterion. This supplemental document is in lieu of the required plan associated with the certification called for in Chapter II.E.9 of the PAPPG. More information regarding review of the plan is provided under Solicitation Specific Review Criteria.

It is NSF policy to foster safe and harassment-free environments wherever science is conducted. Work conducted off-campus or off-site should be an enriching experience for everyone and help draw researchers to geosciences research. By requiring advanced planning and attention to maintaining an inclusive environment, NSF is working to ensure that off-campus or off-site research is safe and inclusive for all participants.

Off-campus or off-site research is defined as data/information/samples being collected off-campus or off-site, such as fieldwork and research activities on vessels and aircraft. The plan must be no longer than two pages.

The SAIF Plan must include:

- a brief description of the field setting and unique challenges for the team;
- the steps the proposing organization will take to nurture an inclusive off-campus or off-site working environment, including processes to establish shared team definitions of roles, responsibilities, and culture, e.g., codes of conduct, trainings, mentor/mentee mechanisms and field support that might include regular check-ins, and/or developmental events;
- communication processes within the off-site team and to the organization(s) that minimize singular points within the communication pathway (e.g., there should not be a single person overseeing access to a single satellite phone);
- and the organizational mechanisms that will be used for reporting, responding to, and resolving issues of harassment if they arise.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Budget: The proposed budget for Track 1 proposals can be up to \$7.5 million (maximum). The proposed budget for Track 2 proposals can be up to \$4 million (maximum). Proposal budgets for both tracks should be consistent with the costs to develop, offer, administer, and evaluate the program elements and the number of proposed FORECAST Associates. Direct

costs for explicit associate support and programmatic elements must be commensurate with the goals specified in the proposal. For further information on allowable costs see Chapter IIC.2.g. of the PAPPG. The proposed budget for FORECAST planning grants can be up to \$100K (maximum).

Budget Preparation Instructions:

In addition to the guidance contained in the PAPPG, Track 1 and Track 2 FORECAST proposals should address the following items, as applicable:

Track 1: Coordination Hub: Provide an annual budget for up to five years.

- **Student Participant and FORECAST Associate Support** Include all student participant support (e.g., stipend, travel) as Participant Support Costs in the budget. Student Participants (Phase 1 and Phase 2) must be full-time students enrolled at an accredited U.S. institution and hold United States citizenship or national or permanent resident status. Undergraduate participants (Phase 1) will receive a stipend in line with the amount for a GS-5 Step 1. In Year 1 of the project, the stipend should be equivalent to the FY24 annual amount of \$33,578 (see <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/2024/general-schedule>), including the appropriate locality pay for the student's institution. Stipend and locality pay should be escalated by 3% each subsequent year. The anticipated time commitment for undergraduates in Phase 1 is approximately 40 hours/semester, equivalent to two weekend-long training sessions or a week-long short-course. However, the professional development offered to students may be structured in different ways and the format is not prescribed. Undergraduate student participants who become graduate student FORECAST Associates (Phase 2) will receive an educational allowance of \$40,000 per year for up to two years, provided they are enrolled in an accredited graduate program and make satisfactory progress towards degree completion.
- **Senior Personnel Salaries:** Salary support must be consistent with contributions to the support and management of undergraduate participant and FORECAST Associate professional development. Support for postdoctoral fellows is not allowed unless they explicitly have an instructional or other training role.
- **Other Budget Items:** Other budget requests (e.g., non-FORECAST Associate travel, equipment, and research support) must reflect the training focus of the program. Projects should budget for a FORECAST Project Coordinator (50%-100% appointment) and an evaluator. The budget should include funds for one PI to attend a two-day PI meeting in Washington, DC during the first year of the project.

Track 2: FORECAST Cohorts at Emerging Research Institutions (ERIs): Provide an annual budget for up to four years.

- **FORECAST Associate Support:** Include all support for FORECAST Associates (e.g., stipend, costs of education, travel) as Participant Support Costs in the budget. FORECAST stipend and education costs are intended for those associates (master's students) whose graduate research is aligned with the project's research theme. Associates must be full-time students and hold United States citizenship or national or permanent resident status. For Year 1 of the project, the NSF **minimum** contribution to FORECAST stipends is at the GS-7 Step 1 (\$41,966 in FY24) plus applicable locality pay (see <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/2024/general-schedule>) per year per associate. Stipend and locality pay should be escalated by 3% each subsequent year. Associates are expected to minimally receive two years of stipend support over their Master's degree tenure. FORECAST Associates cannot be charged tuition or any other required costs of education while they are receiving a FORECAST stipend. Thus, the budget should include customary costs of education (i.e., tuition, required fees, necessary computing resources) for FORECAST Associates of at least \$20,000 per year. Additional costs for all Associates to participate in programmatic and training elements should be designated as Travel, Subsistence, or Other Participant Support Costs in the budget.
- **Faculty/Senior Personnel Salaries:** Salary support must be consistent with contributions to the cohort of FORECAST Associates. Support for postdoctoral fellows is not allowed unless they explicitly have an instructional or other training role.

- **Other Budget Items:** Other budget requests (e.g., non-FORECAST Associate travel, equipment, and research support) must reflect the training focus of the program. Projects should budget for a FORECAST Project Coordinator (50%-100% appointment) and an evaluator. The budget should include funds for one PI to attend a two-day PI meeting Washington, DC during the first year of the project.

FORECAST Planning Grants: FORECAST Cohorts at Emerging Research Institutions (ERIs): Provide an annual budget for up to 12 months.

- **Faculty/Senior Personnel Salaries:** Salary support must be consistent with contributions to the development of a FORECAST Track 2 project. Support for postdoctoral fellows is not allowed unless they explicitly have an instructional or other training role.
- **Other Budget Items:** The budget should include funds for one PI to attend a two-day PI meeting Washington, DC during the first year of the project. In addition, funds to support the evaluation of the planning grant should be included.
- **Budget Justification:** The Budget Justification must clearly explain how funds will be used in direct support of participants and program. For proposals with any subawards, each subaward must include a separate budget justification. See PAPPG Chapter II.D.2.g.

C. Due Dates

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

January 29, 2025

Deadline for Track 1 "Coordination Hub" proposals

April 30, 2025

Deadline for Track 2 and Planning Grant proposals

April 29, 2026

Deadline for Track 2 and Planning Grant proposals

April 28, 2027

Deadline for Track 2 proposals

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?](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationanc)

[_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationanc](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationanc)

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.

The NSF [Grants.gov Proposal Processing in Research.gov informational page](#) provides submission guidance to applicants and links to helpful resources including the NSF [Grants.gov Application Guide](#), [Grants.gov Proposal Processing in Research.gov how-to guide](#), and [Grants.gov Submitted Proposals Frequently Asked Questions](#). Grants.gov proposals must pass all NSF pre-check and post-check validations in order to be accepted by Research.gov at NSF.

When submitting via Grants.gov, NSF strongly recommends applicants initiate proposal submission at least five business days in advance of a deadline to allow adequate time to address NSF compliance errors and resubmissions by 5:00 p.m. submitting organization's local time on the deadline. Please note that some errors cannot be corrected in Grants.gov. Once a proposal passes pre-checks but fails any post-check, an applicant can only correct and submit the in-progress proposal in Research.gov.

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 and Sharing Plan and the Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

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

For Track 1, Track 2, and FORECAST Planning Grant Proposals:

Integration of Diversity, Equity, Inclusion, and Accessibility into NSF Programs, Projects, and Activities: What is the quality of the recruiting and retention plans to broaden participation? Is there evidence of sufficient engagement of key personnel? Are collaborations and/or existing programs appropriately engaged?

Evaluation: Does the evaluation plan include outcomes, performance measures, benchmarks, and an evaluation timetable, as well as a description of how formative evaluation will improve practice? Are research and educational activities addressed? Is there a plan to share insights, practices, and findings broadly? Will the evaluation and monitoring plan provide sufficient documentation that project goals and outcomes have been realized?

Reviewers will be instructed to evaluate the Safe and Inclusive Fieldwork Plan within the Broader Impacts review criterion, specifically:

- Is there a compelling plan (including the procedures, trainings, and communication processes) to establish, nurture, and maintain inclusive off-campus or off-site working environment(s)?
- Does the proposed plan identify and adequately address the unique challenges for the team and the specific off-campus or off-site setting(s)?
- Are the organizational mechanisms to be used for reporting, responding to, and resolving issues of harassment, should they occur, clearly outlined?

Further criteria for Track 2 proposals:

Community Partnerships: Does the proposed project have existing authentic community partnerships or a clear plan on how these will be established in an equitable and respectful manner?

Sustainability: Does the proposed project have a feasible plan for program activities to persist beyond the duration of the award?

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 proposers whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new recipients 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.

TBD - Programmatic Terms and Conditions:

Programmatic Terms and Conditions for cooperative agreements will be developed during the award process.

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 annual project report, and a project outcomes report for the general public.

Failure to provide the required annual or final annual 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 annual 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.

FORECAST projects are required to contribute to NSF evaluations of the FORECAST program, including sharing data with evaluation contractors for the purpose of performance monitoring and/or evaluation. These data capture the information required to demonstrate progress towards achieving the goals of the FORECAST program.

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:

- Aisha Morris, telephone: (703) 292-8500, email: geoforecast@nsf.gov
- Lisa Rom, telephone: (703) 292-8500, email: geoforecast@nsf.gov

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

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

For questions relating to Grants.gov contact:

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

IX. Other Information

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on [NSF's website](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <https://www.grants.gov>.

About The National Science Foundation

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (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
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

Privacy Act And Public Burden Statements

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by proposers 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 proposers 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:

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