

# NSF 24-574: Biodiversity on a Changing Planet (BoCP)

## Program Solicitation

### Document Information

#### Document History

- **Posted:** May 16, 2024
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#### National Science Foundation

Directorate for Biological Sciences  
Division of Environmental Biology  
Division of Biological Infrastructure  
Division of Integrative Organismal Systems  
Directorate for Geosciences  
Division of Earth Sciences  
Office of Polar Programs  
Division of Ocean Sciences



National Natural Science Foundation of China



The Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)



National Research Foundation (NRF) of South Africa

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

September 05, 2024

First Thursday in September, Annually Thereafter

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## **Important Information And Revision Notes**

Guidance has been clarified for projects involving marine and polar fieldwork. Details about the international partnerships have been clarified. The budget cap for the Implementation Track has been removed (see "Award Information" section for additional detail).

The Directorates for Biological Sciences and Geosciences at NSF require 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 NSF Proposal & Award Policies & Procedures Guide (PAPPG). Instructions for inclusion of a 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:**

Biodiversity on a Changing Planet (BoCP)

#### **Synopsis of Program:**

The biodiversity found in nature is essential for healthy ecosystems and human well-being. However, the disruption and decline of Earth's biodiversity is currently occurring at an unprecedented rate. The resulting shifts in biodiversity dynamics — including changes in the scope and structure of biodiversity — are increasingly significant but not well understood. Shifting biodiversity dynamics (i.e., shifts in scope, structure, and interactions of biodiversity) in turn influence functional biodiversity, which includes the roles of traits, organisms, species, communities, and ecosystem processes in natural systems. Changes in biodiversity dynamics and functional biodiversity are components of future planetary resilience under environmental change, including climate change. The connection between functional biodiversity and biodiversity dynamics on a changing planet is the main focus of the Biodiversity on a Changing Planet (BoCP) program. The program encourages proposals that integrate ecological and evolutionary approaches in the context of the continual gain, loss, and reorganization of biodiversity on a changing planet. To advance a comprehensive understanding of functional biodiversity requires a highly integrative approach – including consideration of spatial and temporal dimensions from the organismal to the ecosystem level, and from recent to deep timescales.

The BoCP program is a cross-directorate and international program led by NSF that invites submission of interdisciplinary proposals addressing grand challenges in biodiversity science within the context of unprecedented environmental change, including climate change. Successful BoCP proposals will test novel hypotheses about functional biodiversity and its connections to shifting biodiversity on a changing planet, with respect to both how environmental change affects taxonomic and functional biodiversity, as well as how the resulting functional biodiversity across lineages feeds back on the environment. Proposals that seek to improve predictive capability about functional biodiversity across temporal and spatial scales by considering the linkages between past, present, and future biological, climatic, and geological processes are also encouraged. While this focus complements several core programs at NSF, it differs by requiring an integrative approach to understanding functional biodiversity as it relates to shifting biodiversity under changing environmental conditions.

The program supports both U.S.-only collaborative proposals and proposals with international partnerships with the National Natural Science Foundation of China (NSFC), the São Paulo Research Foundation (FAPESP) of Brazil, and the National Research Foundation (NRF) of South Africa. International collaborative proposals are to be submitted jointly, with the U.S. PIs submitting to NSF and the collaborating Chinese, Brazilian, or South African PIs submitting to their appropriate national funding agencies. These agreements do not preclude other international collaborations (see solicitation for additional details).

### **Broadening Participation in STEM**

NSF recognizes the unique lived experiences of individuals from communities that are underrepresented and/or underserved in science, technology, engineering, and mathematics (STEM) and the barriers to inclusion and access to STEM education and careers. NSF highly encourages the leadership, partnership, and contributions in all NSF opportunities of individuals who are members of such communities supported by NSF. This includes leading and designing STEM research and education proposals for funding; serving as peer reviewers, advisory committee members, and/or committee of visitor members; and serving as NSF leadership, program, and/or administrative staff. NSF also highly encourages demographically diverse institutions of higher education (IHEs) to lead, partner, and contribute to NSF

opportunities on behalf of their research and education communities. NSF expects that all individuals, including those who are members of groups that are underrepresented and/or underserved in STEM, are treated equitably and inclusively in the Foundation's proposal and award process.

NSF encourages IHEs that enroll, educate, graduate, and employ individuals who are members of groups underrepresented and/or underserved in STEM education programs and careers to lead, partner, and contribute to NSF opportunities, including leading and designing STEM research and education proposals for funding. Such IHEs include, but may not be limited to, community colleges and two-year institutions, mission-based institutions such as Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), women's colleges, and institutions that primarily serve persons with disabilities, as well as institutions defined by enrollment such as Predominantly Undergraduate Institutions (PUIs), Minority-Serving Institutions (MSIs), and Hispanic Serving Institutions (HSIs).

"Broadening participation in STEM" is the comprehensive phrase used by NSF to refer to the Foundation's goal of increasing the representation and diversity of individuals, organizations, and geographic regions that contribute to STEM teaching, research, and innovation. To broaden participation in STEM, it is necessary to address issues of equity, inclusion, and access in STEM education, training, and careers. Whereas all NSF programs might support broadening participation components, some programs primarily focus on supporting broadening participation research and projects. Examples can be found on the NSF Broadening Participation in STEM website.

**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.*

- Christopher Balakrishnan, telephone: (703) 292-2331, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Steven Dudgeon, telephone: (703) 292-2279, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Rebecca Gast, telephone: (703) 292-2356, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Matthew Herron, telephone: (703) 292-5361, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
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- Keith Reinhardt, telephone: (703) 292-4854, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Yurena Yanes, telephone: (703) 292-2649, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)

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

- 47.050 --- Geosciences
- 47.074 --- Biological Sciences

**Award Information**

**Anticipated Type of Award:** Standard Grant or Continuing Grant

**Estimated Number of Awards:** 8 to 12

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

**Anticipated Funding Amount:** \$14,000,000

Depending on the quality of proposals, 4-6 awards are estimated to be made for each award track (Design/Implementation).

For the U.S. portion of the budget, up to \$500,000 per proposal are available for the Design track. This upper limit does not include costs of NSF facilities or logistics support. Implementation Track projects do not have a maximum award size.

Funding for Design track U.S.-China collaborative proposals will be at a level of up to ¥1.0M for 3-year projects (Chinese portion of the project). The number of Design track U.S.-China collaborative proposals funded will depend on the quality of the projects submitted. For Implementation track U.S.-China Collaborative Research Proposals the expected funding from NSFC will be at a level of up to ¥4.5M for 5-year projects (Chinese side of the budget). A maximum of three Implementation track projects will be funded, depending on the quality of the submitted proposals and the availability of funds. Please consult the NSFC guidelines for how the funds should be allocated per allowed activities.

The expected funding for the FAPESP portion of U.S.-FAPESP collaborative proposals will be at a level of R\$15.5M (Real) for up to five Regular Research Grants (NSF's Design track) and up to three awards, in any combination of Thematic Research Grants and Young Investigator Grants (NSF's Implementation track). Please consult the FAPESP guidelines for how the funds should be allocated per allowed activities.

The expected funding from NRF for the South African portion of U.S.-South Africa collaborative Design proposals will be up to two 3-year projects at a level of up to R1.8M (Rand), R600k per annum. Up to two 5-year U.S.-South Africa Collaborative Research awards may be funded for Implementation track proposals at a level of up to R10.0M (Rand), R2.0M per annum from NRF. Please consult the NRF guidelines for how the funds should be allocated per allowed activities.

Multilateral collaborative proposals, involving NSF and more than one international partner among NSFC, FAPESP, and NRF will also be considered.

## **Eligibility Information**

### **Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the U.S., acting on behalf of their faculty members. Special Instructions for International Branch Campuses of U.S. IHEs: If the proposal includes funding to be provided to an international branch campus of a U.S. 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 U.S. campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.

### **Who May Serve as PI:**

There are no restrictions or limits.

### **Limit on Number of Proposals per Organization:**

There are no restrictions or limits.

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

There are no restrictions or limits.

## **Proposal Preparation and Submission Instructions**

### **A. Proposal Preparation Instructions**

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide (PAPPG)* guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=pappg](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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)).

## **B. Budgetary Information**

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

Not Applicable

- **Other Budgetary Limitations:**

Not Applicable

## **C. Due Dates**

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

September 05, 2024

First Thursday in September, Annually Thereafter

## **Proposal Review Information Criteria**

### **Merit Review Criteria:**

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

### **Award Administration Information**

#### **Award Conditions:**

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

#### **Reporting Requirements:**

Standard NSF reporting requirements apply.

## **I. Introduction**

**The Biodiversity on a Changing Planet Program** supports projects using an integrative approach to understand the connections between biodiversity dynamics (i.e. shifts in scope, structure, and interactions of biodiversity) and functional biodiversity under changing environmental conditions, including climate change. Successful projects will address theoretical, methodological, infrastructure, and data gaps regarding biodiversity dynamics and functional biodiversity,

and their interactions with climate and Earth systems. Functional biodiversity refers to the numerous roles of traits, organisms, species, communities, and ecosystem processes in natural systems. Functional biodiversity also includes the roles of emergent properties and processes across all levels of biological organization. Changes in taxonomic and functional diversity can be both cause and consequence of changing environmental conditions, and BoCP supports projects addressing both types of relationship, as well as feedback between them.

Interdisciplinary research across ecology, evolutionary biology, geology, and paleontology is necessary to achieve a deeper understanding of biodiversity dynamics and functional biodiversity. The BoCP Program therefore encourages proposals from collaborative and diverse teams of scientists including, for example, evolutionary biologists, ecologists, paleontologists, organismal biologists, systematists, biogeographers, marine scientists, geobiologists, geochemists, critical zone scientists, hydrologists, modelers, and/or climatologists. Prospective principal investigators (PIs) must develop proposals that work across scientific, disciplinary, geographic, and organizational divides, push conceptual boundaries, and contribute new theory regarding the understanding of functional biodiversity and its relationship to shifting biodiversity dynamics under environmental change.

The Program encourages inclusive science teams with meaningful involvement of individuals that span the full spectrum of diverse talent in STEM. NSF also recognizes that STEM research and education occurs at a wide range of institutions, including Minority-Serving Institutions (MSIs), Primarily Undergraduate Institutions (PUIs), and two-year colleges, as well as major research institutions. NSF welcomes single-institution and multi-institutional collaborative proposals from all types of institutions and encourages authentic and substantive collaborations and partnerships across diverse geographies and types of institutions. Proposals from EPSCoR jurisdictions are especially encouraged.

## **II. Program Description**

The goal of the BoCP Program is to achieve a deeper understanding of functional biodiversity and biodiversity dynamics in the context of changing biotic and abiotic conditions. The Program encourages proposals that integrate ecological and evolutionary approaches to enhance understanding of functional biodiversity. Overall, projects should pursue development of a synthetic understanding of the continual loss, gain, maintenance, and reorganization of biodiversity on a changing planet. Projects should consider past and current ecological and evolutionary processes to enhance understanding of functional biodiversity under various types of environmental change. Successful proposals may take advantage of phylogenetic and biogeographic frameworks as well as insights from neontology (extant biodiversity) and paleontology (extinct biodiversity), fossil records, -omics approaches, remote sensing, and/or the use of models and forecasting approaches (see Infrastructure section below).

Examples of research areas include, but are not limited, to:

- Understanding fundamental principles related to shifting biodiversity on a changing planet. Examples include: research on speciation/diversification/extinction rates and dynamics under changing environmental conditions; the effects of phylogenetic history and relatedness on trait evolution and functional biodiversity.
- Understanding the range of interactions and feedbacks between biodiversity dynamics and functional biodiversity. Examples include: how diverse life histories, genetic architecture, and other traits influence evolutionary responses to environmental disruption; how ancient and current environmental changes lead to evolutionary and/or ecological novelty.
- Understanding how functional biodiversity change may trigger population-, species-, phylogenetic-, community-, and ecosystem-level responses, under changing environments. Examples include: research into integrated macroecological, macroevolutionary approaches to investigating community assembly, species coexistence, and ecosystem responses along changing environmental gradients; the relationships among trait diversity, species diversity, phylogenetic diversity and functional diversity on ecological and evolutionary timescales.
- Understanding the interconnection between ecosystem-level events and climatic and geological processes, and their relationship to functional changes in biodiversity in a changing environment. Examples include: how changes in functional biodiversity impact biophysical and biogeochemical processes, climate, and nutrient and water

cycles; analyses of the paleorecord to identify environmental tipping points and associated shifts in biodiversity dynamics and functional effects.

- Conceptual and theory development pertaining to shifting biodiversity dynamics and functional biodiversity on a changing planet. Examples include: the role of emergent and non-linear properties in complex biodiversity dynamics and functional biodiversity; connections between macroecology and macroevolutionary theory and causality as they pertain to functional biodiversity.

These examples are illustrative only. Proposals may focus on any of these areas, a combination of these areas, or topics outside of these areas.

All proposals to the National Science Foundation must include plans for broader impacts, which are expected to provide benefits to society. We encourage broader impact activities that enhance the participation of the full spectrum of diverse talent in STEM. Additionally, the BoCP program encourages proposals that describe effective plans to find synergies between broader impacts and biodiversity science. Specific broader impacts may include plans to improve societal understanding of the roles of biodiversity, improve societal understanding of biodiversity change in the context of climate change, and/or translate specific research outcomes to education or conservation actions.

### **Special Information:**

#### **A. Tracks:**

Proposals submitted to this solicitation must be responsive to either the Design Track or the Implementation Track, both described below. Proposals will be considered for funding only within their selected track. A proposal cannot attempt to respond to more than one track. Both tracks should provide opportunities to train and build successful partnerships with a diverse next generation of scientists and to engage society in topics related to biodiversity responding to a changing planet. Both tracks are strongly encouraged to provide an organizational structure that supports collaborative involvement in leadership and broad participation in activities by all team members.

**Design Track:** NSF will fund collaborative U.S.-only or international collaborative grants of up to \$500,000 over a maximum of three (3) years in this track. Design proposals are aimed at building new teams with no prior collaborative history and must combine specific team-building activities over the three years of the project with the development of creative research and technical approaches that start to address critical, but perhaps untested, novel, or high-risk aspects of functional diversity and biodiversity dynamics in the context of changing environmental conditions. It is not expected that projects be funded first in the Design track prior to being considered in the Implementation track.

**Implementation Track:** NSF will fund collaborative U.S.-only or international collaborative grants over a maximum of five (5) years in this track. Implementation proposals are suitable for diverse collaborative teams at a more developed research stage, ready to implement a large-scale project addressing functional biodiversity on a changing planet. Projects should tackle research themes that have high potential to engender substantial research advances in understanding functional biodiversity under changing environmental conditions. Submission or award through the Design track is not required to submit an Implementation track proposal.

#### **B. Infrastructure:**

The BoCP program recognizes that advances in methods to characterize biodiversity and its function in a rapidly changing world require adaptable tools, training, and infrastructure. Proposals that use current or planned data, samples, or assignable assets from NSF-supported activities (e.g., NEON) or those that enhance broader scientific infrastructure are welcome. The Program also welcomes proposals that are entirely based on data reuse. The use of these resources, data management, and training opportunities for team members and participants should be clearly described in the Project Description, Project Management Plan and/or the Data Management and Sharing Plan, as appropriate.

#### **C. International Partnerships:**

The Biodiversity on a Changing Planet Program broadly welcomes, but does not require, that projects include international partners. PIs considering BoCP research in non-U.S. locations need to partner with local scientists in the

design and conduct of the research project and the nature of this partnership should be fully described in the project proposal.

Three specific forms of international partnership (NSFC, FAPESP and NRF) are described below. These specific activities do not preclude other international collaborations. Any proposal submitted to the BoCP Program with any of these three international partners must include researchers that are eligible to be supported by the NSFC of China, the FAPESP of Brazil, and/or the NRF of South Africa.

**U.S.-China Joint Research Projects:** Recognizing the potential for international collaboration to advance biodiversity research and education objectives, NSF continues its partnership with the NSFC. The Chinese component of the U.S.-China Collaborative Projects will be funded by the NSFC using funds provided by the Chinese government.

Chinese researchers applying under this heading can apply to both tracks, but must meet NSFC eligibility requirements, and must apply through an institution eligible to receive NSFC funding. Please see NSFC eligibility rules:

<http://www.nsf.gov.cn/publish/portal0/tab948/> .

The collaborative proposal must be submitted to the NSFC application submission system by the Chinese scientists.

#### **U.S.-São Paulo Joint Research Projects:**

Recognizing the potential for international collaboration to advance biodiversity research and education objectives, NSF continues its partnership with the FAPESP from São Paulo, Brazil to facilitate coordinated funding. These projects can focus on any topic that falls within the scope and the two tracks of this solicitation.

Regular Research Grants will be equivalent to NSF's Design track, with the duration of 3 years, R\$150K/per year funding, and include scholarships for post-docs. São Paulo State researchers applying to FAPESP under this heading must meet FAPESP eligibility requirements. Exceptionally for this opportunity, current grant holders of a Regular Research Award may submit a proposal for another Regular Award in the Design Track, and current grant holders of Thematic, JP2, CEPID, CPE/A and PITE modalities may submit a proposal for a Thematic Project in the Implementation Track. Special conditions applied can be viewed at <https://fapesp.br/6517/national-science-foundation> .

**U.S.-South Africa Joint Research Projects:** Recognizing the potential for international collaboration to advance biodiversity research and education objectives, NSF continues to partner with the NRF for U.S.-South Africa Collaborative projects. NRF has agreed to provide up to R11.8M (Rand) to South African participants. The collaborative proposal must be submitted to the NRF by the South African scientists.

**Multilateral International Projects:** Multilateral projects – those that will be supported by NSF and FAPESP, NRF, and/or NSFC – will also be considered and should follow the instructions provided above for bilateral projects. Please note that for multilateral collaborative projects, proposals must be submitted to each agency involved in the project.

#### **D. Educational Supplements and other programs:**

The BoCP Program only considers support for proposals submitted to the annual competition. Except for Career-Life-Balance supplements, program funds are not used to provide post-award supplements to existing awards. If activities that align with REU, RET, and RAHSS educational supplements are planned, these activities should be described and budgeted for in the original proposal submission.

The BoCP Program does not participate in the CAREER, RCN, or RUI/ROA programs and does not consider RAPID, EAGER, conference, or other proposals that are not externally reviewed.

#### **E. Collection and Transfer of Samples:**

Plans to collect and transfer samples should be approved by the appropriate government authorities. Arrangements for the incorporation of traditional knowledge or the collection of samples from the lands and waters of local peoples should be based upon full disclosure and informed consent of those peoples. Under best practices, such arrangements develop as a partnership with early and ongoing full participation of community representatives in project design. If Indigenous peoples, based on religious or other concerns, object to specific uses, widespread dissemination or other treatments of

the knowledge or resources they provide, these concerns should be respected. Any dissemination of samples or data that were collected in a foreign country, or dissemination of results based on samples or data collected in a foreign country, should be done with the full knowledge and consent of collaborators in that country, and under any agreements that exist with government agencies in that country.

#### **F. Environmental Policy Considerations of Fieldwork:**

Federal agencies must comply with the National Environmental Policy Act and other applicable laws and policies such as the Endangered Species Act, the Marine Mammal Protection Act, and the National Historic Preservation Act (NHPA). Projects will be assessed for environmental impacts prior to award and additional consultations, or mitigation efforts may be required. PIs should expect to be involved in the assessment and environmental compliance process for their projects. Investigators may need to travel to communities or meetings as part of the environmental compliance for projects and should request these funds in their award. Researchers proposing work that may affect cultural or historic properties, or whose work involves tribal lands, must cooperate with NSF in complying with the consultation requirements of section 106 of the NHPA and the Native American Graves Protection and Repatriation Act (NAGPRA). For additional information on cultural or historic preservation issues, see the Advisory Council on Historic Preservation's web site at <https://www.achp.gov/protecting-historic-properties>; for information concerning NAGPRA see <https://www.nps.gov/subjects/nagpra/index.htm>.

### **III. Award Information**

**Award size:** Under this solicitation, the U.S. components of a collaborative research project may receive a maximum of \$500,000 for the Design Track. This upper limit does not include costs of NSF facilities or logistics support. Implementation Track projects do not have a maximum award size.

**Award Duration:** The maximum award duration is three years for the Design Track proposals and five years for Implementation Track proposals.

**Award number:** Approximately 8-12 new awards are anticipated, depending on the quality of submissions. NSF anticipates that \$14.0-17.0M will be available for awards per year, but estimated program budget, number of awards, and average award size/duration are subject to the availability of funds.

For **U.S.-China Joint Research Projects**, the Chinese component of the collaboration will be awarded through the NSFC in accordance with its policies and regulations.

For **U.S.-São Paulo Joint Research Projects**, the São Paulo component of the collaboration will be awarded through FAPESP in accordance with its policies and regulations.

For **U.S.-South Africa Joint Research Projects**, the South African component of the collaboration will be awarded through NRF in accordance with its policies and regulations.

### **IV. Eligibility Information**

#### **Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the U.S., acting on behalf of their faculty members. Special Instructions for International Branch Campuses of U.S. IHEs: If the proposal includes funding to be provided to an international branch campus of a U.S. 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 U.S. campus.

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

**Who May Serve as PI:**

There are no restrictions or limits.

**Limit on Number of Proposals per Organization:**

There are no restrictions or limits.

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

There are no restrictions or limits.

**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](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](mailto: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](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](mailto: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.

For **U.S.-China joint research projects**, an identical scientific research project description must be submitted to NSF by the U.S. researcher and to NSFC by the Chinese collaborator(s). Applications with non-eligible China partners will not be considered for funding as U.S.-China Collaborative Projects. The proposal budget submitted to NSF should include only the costs of U.S. participants; the anticipated budget for Chinese participants should be submitted as a supplementary document.

For **U.S.-São Paulo joint research projects**, an identical scientific research project description must be submitted to NSF by the U.S. researcher and to FAPESP by the FAPESP eligible collaborator(s). The proposal budget submitted to NSF should include only the costs of U.S. participants and an anticipated budget for São Paulo state participants as a supplementary document. The proposal budget submitted to FAPESP should include only the costs of São Paulo participants and an anticipated budget for U.S. participants submitted as a supplementary document (more information on limits, restrictions, and allowable items at <https://fapesp.br/6517/national-science-foundation> [↗](#)). Proposal budgets submitted to NSF and FAPESP do not have to request equal funding from each agency; each proposal should have a budget that reflects the participation of scientists from each region. Further details for requirements for FAPESP submissions are available at <https://fapesp.br/6517/national-science-foundation> [↗](#).

For **U.S.-South Africa joint research projects**, an identical scientific research project description must be submitted to NSF by the U.S. researcher, and to NRF by the South African collaborator(s). The proposal budget submitted to NSF should include only the costs of U.S. participants; the anticipated budget for South African participants should be submitted as a supplementary document.

Applications to both tracks must be submitted through an online application process to the NRF using NRF Connect at <https://nrfconnect.nrf.ac.za/> [↗](#). For the NRF submission system, applicants must attach the required documents in PDF format in the following order: CV of partner/s, the budget of partner/s, budget division of the South African team, in particular budget sharing between the historically advantaged and HDIs and completed Impact Pathway Template. Failure to submit compulsory documents will result in the disqualification of the application. Applicants are further advised to consult the most recent 'NRF General Application Guide 2025' for assistance on the steps to follow when applying for international research grants. The link to the most recent guide will be published on this web page: <https://www.nrf.ac.za/funding/> [↗](#).

**The deadline for the NRF submission is September 5, 2024 (23:59 SAST).**

**Proposal Title:** Informative proposal titles must begin with "BoCP-Design:" or "BoCP-Implementation:", depending on the track being proposed. Proposals with specific international partnerships will also include the designation of one or more international partnership programs, and then the substantive title:

- Titles of **U.S.-China joint research proposals** should begin with "BoCP-Design or BoCP-Implementation: U.S.-China:" followed by the substantive title.
- Titles of **U.S.-São Paulo joint research proposals** should begin with "BoCP-Design or BoCP-Implementation: U.S.-São Paulo:" followed by the substantive title.
- Titles of **U.S.-South Africa joint research proposals** should begin with "BoCP-Design or BoCP-Implementation: U.S.-South Africa:" followed by the substantive title.

**Project Summary:** As part of the Overview section, the proposal must explicitly summarize how the project addresses functional biodiversity in the context of a changing planet as defined in this solicitation.

#### **Project Description:**

- In addition to the reporting requirement format described by the PAPPG, the **Results from Prior NSF Support** section must include evidence of deposition of samples, data and/or data products in recognized, accessible, community-accepted repositories by listing such repositories and, if practical, metadata. All publications, data, data products, programs and/or scripts that are specifically mentioned in the Results from Prior NSF Support section must be referenced in the References Cited section and must provide unique, resolvable, and persistent identifiers (such as Digital Object Identifiers [DOIs]; Uniform Resource Locators [URLs], or similar).
- For **Design track proposals**, the project description must describe how building a new team is combined with the development of creative research and technical approaches that start to address critical, but perhaps untested, novel, or high-risk aspects of the functional axes of biodiversity. Successful Design track proposals will articulate how the team formation includes diverse perspectives and approaches, collaboration, and coordination strategies.

- For **Implementation track proposals**, the project description must describe how the proposed research has a high potential to engender substantial research advances in understanding functional biodiversity on a changing planet, and clearly articulate a compelling vision of advances beyond existing efforts.

### Special Information and Supplementary Documentation:

**Senior/Key Personnel List Spreadsheet.** An additional spreadsheet listing all senior/key personnel involved in the project **must** be submitted. This spreadsheet is separate from the spreadsheet that lists collaborators and other affiliations (COA) information. The spreadsheet template can be found at [https://www.nsf.gov/bio/deb/BoCP\\_Participant\\_List.xlsx](https://www.nsf.gov/bio/deb/BoCP_Participant_List.xlsx). Please read the instructions carefully. Using the template, compile an Excel file that provides information for all persons identified in the proposal as: "PI or co-PI" (i.e., those listed on the Cover Sheet); "Other Senior/Key Personnel/Subawardee"; or "Other Personnel" who have a biographical sketch included in the proposal, including all international collaborators. Only one spreadsheet should be submitted per project. The file **must** include the proposal ID assigned after submission of your proposal (i.e., not the Temporary ID # or Grants.gov ID #). Once completed, the file should be submitted by email to [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov) within one business day of proposal submission.

### Supplementary Document – Data Management and Sharing Plan:

The PAPPG requires the inclusion of a Data Management and Sharing Plan with all full proposal submissions. For BoCP projects, the Data Management and Sharing Plan must include two sections: (1) Data Plans and (2) Intellectual Property Plans. Those sections should address the following points:

**1. Data Plans:** All projects must ensure that data and biological/geological materials are collected, archived, digitized, and made available using methods that allow current and future investigators to access data and material. Funded projects must disseminate project data broadly, in a timely and responsible manner using widely accepted electronic data standards, a named community-accepted, publicly accessible data repository and with as few restrictions as possible. Data and digital products should be identified, and the following described for each of them: Format and standard of primary data; Metadata to be collected and disseminated with the primary data; Timetable of release of ALL data, consistent with privacy and other concerns regarding sensitive information; Public repository to be used; License for use, with an emphasis on open source licenses such as MIT and GPL; Any constraints on release, which must be clearly justified; and person(s) responsible for the release.

All software and code must be in a versioned code repository (e.g., GitHub, BitBucket). We strongly encourage release of ready-to-use software and code through integration with computing resources (e.g., Galaxy, CyVerse), in Virtual Machines (e.g., AWS, JetStream), and/or in Containers (e.g., Docker/DockerHub). Published results should always include information on how to access the supporting data.

The BoCP Program encourages appointment of a data management coordinator and/or data scientists where appropriate.

Additional guidance about the development of Data Management and Sharing plans, including domain-specific guidance, is provided by the Directorate for Biological Sciences (<https://www.nsf.gov/bio/biodmp.jsp>). Additional requirements apply to proposals on certain topics:

- Projects focused on **organisms in Polar Regions**: The data plan structure must be compliant with the specific Office of Polar Programs Data, Code, and Sample Management Policy described in NSF 22-106 ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf22106](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf22106))
- Projects focused on **marine organisms**: The data plan structure must use the Biological and Chemical Oceanography Data Management Office (BCO-DMO) as the primary data management source and be compliant with guidelines specified in the Division of Ocean Sciences Data and Sample Policy described in NSF 17-037 ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf17037](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17037))
- Projects focused on **Earth sciences**: The data plan must adhere to the current EAR Division Data Sharing Policy with the goal of making EAR-supported data products findable, accessible, interoperable, and reusable (FAIR). Pls

are strongly encouraged to identify long-lived disciplinary repositories most appropriate for the data types to be collected.

**2. Intellectual Property Plans (IP):** The Data Management and Sharing Plan MUST provide a protocol and timeline for the development of intellectual property agreements. The agreement should indicate:

- Who the owners are of any data or other intellectual property;
- How financial benefits of the intellectual property will be allocated;
- How authorship of publications will be determined; and
- How Intellectual Property disputes will be adjudicated.

A reasonable charge for community resources is permissible, but the fee structure must be outlined clearly in the IP plan. If a Material Transfer Agreement is required, the terms must be described in detail. No reach-through rights are allowed. Data or materials resulting from NSF-funded research obtained with proprietary materials must be readily available without any restrictions to the users. For this reason, the terms of any usage agreements should be stated clearly in the IP plan.

For **multi-institutional projects**, the lead institution is responsible for coordinating and managing the intellectual property resulting from the award. A complete IP agreement MUST be included with the first annual report of the project.

#### **Supplementary Document – Project Management Plan (PMP, maximum 2 pages):**

**All proposals**, regardless of track, must include a PMP. The PMP should describe strategies for developing collaborative teams that include diverse perspectives, facilitate effective and timely accomplishment of goals, develop leadership capacity, and foster teamwork skills. For Implementation track proposals, naming a designated project manager is highly encouraged. The PMP should (1) include roles and intellectual contributions of each U.S. and international (if applicable) partner (i.e., PI, co-PI, and senior/key personnel), (2) specify their expertise relevant to the project scope, and (3) describe the specific tasks each member of the research team is expected to oversee, and (4) explain how education and training activities will enhance the future workforce for the field of biodiversity science. Professional expertise or significant experience in project management should be demonstrated in this document. The Project Management Plan must include a Project Timeline that specifies milestones and expected completion dates of project deliverables. Proposals without a PMP or deviating from the page limit outlined above will be returned without review.

#### **Supplementary Document - Polar and/or Marine Fieldwork Logistics, Assignable Assets:**

Projects including **facilities, logistics, or assignable asset costs** (e.g., NEON, Arctic Research Support and Logistics, Ship-time and Marine Equipment [SME] for use of Academic Research Fleet) must provide evidence showing that requests have been submitted for appropriate support and use.

Proposals centered on **Polar habitats** need to be discussed **prior to submission with a Cognizant BoCP program officer** for additional guidance and logistics requirements. Polar projects should explore logistics available for Arctic ([https://www.nsf.gov/geo/opp/arctic/res\\_log\\_supp.jsp](https://www.nsf.gov/geo/opp/arctic/res_log_supp.jsp)) and Antarctic (<https://www.nsf.gov/geo/opp/ail/>) fieldwork. Proposals requesting support for polar fieldwork should expect to go to the field no sooner than 12 months after proposal submission to allow time to plan, budget, and complete environmental compliance documentation.

Proposals requiring logistics support from the Academic Research Fleet in **Marine and Great Lakes habitats** need to be discussed prior to submission with a Cognizant BoCP program officer. Requests for ship time on a vessel in the U.S. Academic Research Fleet (ARF; <https://www.unols.org/> ) must be submitted via the UNOLS Marine Facility Planning (MFP) website at <https://mfp.us/> ) with a SME form included in the proposal as a supplementary document. Proposals requesting ship time should expect to go to the field no sooner than 12 months (Intermediate, Regional, and Local-class vessels) or 18 months (Global or Ocean class vessels) after proposal submission to allow time to plan, budget, and complete environmental compliance documentation (<https://www.nsf.gov/geo/oce/pubs/Guidance-for-Proposals-with-ship-time-Jan2022.pdf>, <https://www.unols.org/marine-facilities-planning-scientist-how-guide> )

PIs are responsible for filing the appropriate requests for major research platforms; a copy of the request must be submitted as a Supplementary Document. Any science support provided by third-party organizations must be described in a 1 – 2-page Supplementary Document that outlines the scope of support and a cost estimate. Please allow service providers 4-6 weeks to prepare Supplementary Documents to include in proposals and initiate the request far in advance of proposal submission. For any instrument or infrastructure deployed to the field, investigators should include the scope and cost for the demobilization or other disposal of the property.

Per the NSF PAPPG, recipients are responsible for acquiring and complying with all permits necessary for their work and are responsible for all activities conducted under the award. NSF is not responsible for costs associated with medical evacuations or other interruptions to scheduled fieldwork and reserves the right to seek reimbursement for costs incurred for search, rescue, or medical evacuation. Proposers should ensure all members of the field team are covered by institutional medical evacuation insurance or request funds to purchase medical evacuation insurance, which is an allowable grant cost. All investigators should have a risk management plan for their fieldwork including a plan for emergencies.

### **Supplementary Document – 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 Safe and Inclusive Fieldwork (SAIF) Plan 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 NSF 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 biological and geological sciences 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.

### **Single-Copy Document – Consent to Share Reviews:**

Any proposal submitted to the BoCP Program with any of the three **international partners** must also include, as a single-copy document, consent to share unattributed reviews with partner funding agencies. The following text must be included and signed by the lead us investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact:

On behalf of the proposal investigators, I, \_\_\_\_\_ (*insert U.S. Lead PI Name*), consent that the proposal, as well as its unattributed reviews, will be shared with the Biodiversity on a Changing Planet partner funding agencies.

Signed: \_\_\_\_\_

Organization: \_\_\_\_\_

Date: \_\_\_\_\_

### **All U.S.-International Joint Research Proposals:**

**Combined BoCP Participant List Document:** The template found at [https://www.nsf.gov/bio/deb/BoCP\\_Participant\\_List.xlsx](https://www.nsf.gov/bio/deb/BoCP_Participant_List.xlsx), contains two tabs. Please read the Instructions carefully and follow the guidance. using the template, compile an Excel workbook that identifies BoCP network Senior/Key Personnel. Following the Instructions provided in the template, the completed Excel workbook should be emailed to [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov) immediately after you submit your proposal, but no later than 5pm EDT on the Tuesday of the week following the deadline (e.g., no later than 5 pm EDT on September 10th in 2024). This document is for the NSF internal review process. Proposals from PIs who fail to submit the required Excel document by 5PM EDT on the Tuesday of the following week will be immediately returned without review. Do not use the temporary proposal number to fill out the template. You must use the assigned NSF proposal ID assigned at the time of proposal submission. This NSF proposal ID will be seven digits long and will start with the fiscal year numbers (e.g., for FY24, all the proposal IDs will start with "24"). Include the NSF proposal ID in the subject line of the email, and the Excel file title.

### **Additional Documents - International Partners:**

#### **U.S.-China Joint Research Proposals:**

Information for the Chinese portion of the proposal submitted to NSF should be included as **Supplementary Documents, except where noted**, and written in English. That information should include **only the following**:

- Biographical sketches of all Chinese Senior/Key personnel prepared in accordance with the standard biographical sketch format described in the PAPPG.
- Collaborators & Other Affiliations (COA) forms for all Chinese PIs/co-Pis/Senior/Key Personnel using the spreadsheet template as described in the PAPPG. COA information should be included in the **Additional Single Copy Documents** section of the proposal.
- NSFC budget: A PDF version of the consolidated budget for NSFC should be included as a supplementary document in the NSF proposal. Except for justification of the requested budget, this document must not include any additional project information; all such information should be included in the Project Description.
- Letters of collaboration: Letters of collaboration from Chinese scientists are required. These letters must be restricted to a statement of intent to collaborate only following PAPPG guidelines. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
- Institutional endorsement: An institutional acknowledgment of the submission must be a signed letter from an authorized Chinese institutional representative with the following text: "I confirm on behalf of [insert name of Chinese institution] that the U.S.-China Collaborative proposal between [insert name of U.S. PI and institution] and [insert name of Chinese PI] is endorsed and has been submitted by [name of U.S. Research Office]."

The NSF submission must be mirrored by a proposal submitted to NSFC. We strongly encourage the Chinese PIs to confer with the NSFC program officer(s) on all the documentation needed for the NSFC submission prior to the NSFC submission deadline.

#### **U.S.-São Paulo Joint Research Proposals:**

Information for the FAPESP portion of the proposal submitted to NSF should be included as **Supplementary Documents, except where noted**, and written in English. That information should include **only the following**:

- Biographical sketches of all São Paulo state Senior/Key personnel prepared in accordance with the biographical sketch format described in the PAPPG.
- Collaborators & Other Affiliations (COA) forms for all São Paulo state Senior/Key Personnel using the spreadsheet template as described in the PAPPG. COA information should be included in the **Additional Single Copy**

**Documents** section of the proposal.

- São Paulo budget: A PDF version of the FAPESP's SAGe platform budget tab should be included in the NSF proposal. Except for justification of the requested budget, this document must not include any additional project information.
- Letters of collaboration: Letters of collaboration from São Paulo scientists are required. These letters are restricted to a statement of intent to collaborate only, following PAPPG guidelines. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
- Institutional endorsement: An institutional acknowledgment of the submission signed by an authorized São Paulo state institutional representative using the following text: "I confirm on behalf of [insert name of São Paulo institution] that the U.S.-São Paulo Collaborative proposal between [insert name of U.S. PI and institution] and [insert name of São Paulo PI] is endorsed and has been submitted by [name of U.S. Research Office]."

The NSF submission must be mirrored by a proposal submitted to FAPESP. The following documents must be included in the FAPESP submission:

- A PDF version of the U.S. Senior/Key Personnel Biographical Sketches, following the format required by NSF, should be included as a Supplementary Document.
- A PDF version of the NSF budget pages containing the cost for the U.S. components of the project should be included as a Supplementary Document. Except for justification of the requested budget, this document must not include any additional project information.

We strongly encourage the Brazilian PIs to confer with the FAPESP program officer(s) on all the documentation needed for the FAPESP submission prior to the FAPESP submission deadline.

#### **U.S.-South Africa Joint Research Proposals:**

Information for the South African portion of the proposal submitted to NSF should be included as **Supplementary Documents, except where noted**. That information should include only the following:

- Biographical sketches of South African Senior/Key personnel prepared in accordance with the standard biographical sketch format described in the PAPPG.
- Collaborators & Other Affiliations (COA) forms for all South African Senior/Key Personnel using the spreadsheet template as described in the PAPPG. COA information should be included in the **Additional Single Copy Documents** section of the proposal.
- South Africa budget: A PDF version of the consolidated NRF budget should be included in the NSF proposal. Except for justification of the requested budget, this document must not include any additional project information.
- Letters of collaboration: Letters of collaboration from South African scientists are required. These letters are restricted to a statement of intent to collaborate only, following PAPPG guidelines. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
- Institutional endorsement: An institutional acknowledgment of the submission signed by an authorized South African institutional representative (Designated Authorities) using the following text: "I confirm on behalf of [insert name of South African institution] that the U.S.-South Africa Collaborative proposal between [insert name of U.S. PI and institution] and [insert name of South African PI] is endorsed and has been submitted by [name of U.S. Research Office]."

The NSF submission must be mirrored by a proposal submitted to NRF by September 5th, 2024, through the NRF Online Submission System at <https://nrfconnect.nrf.ac.za/> .

We strongly encourage the South African PIs to confer with the NRF program officer(s) on the documentation needed for the NRF submission prior to the NRF submission deadline.

## B. Budgetary Information

### Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

### Budget Preparation Instructions:

**Sub-awards:** In accordance with the applicable award terms and conditions, proposers are reminded of their responsibilities with regard to sub-awardees. Should an award be made, the primary recipient is responsible for ensuring compliance with the appropriate terms and conditions to, as well as the management and oversight of, any sub-awardees. on the project, including any foreign sub-awardees.

## C. Due Dates

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

September 05, 2024

First Thursday in September, Annually Thereafter

## 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/ProposalPreparation)

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

For Research.gov user support, call the Research.gov Help Desk at 1-800-381-1532 or e-mail [rgov@nsf.gov](mailto: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 web page: <https://www.grants.gov/applicants>. 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](mailto: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 acknowledgment 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/](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**

In addition to the standard NSF review criteria, reviewers will be asked to consider the following questions for Biodiversity on a Changing Planet proposals:

1. What is the potential for the proposed work to integrate ecology and evolution, bridge disciplinary and geographic divides, push conceptual boundaries, and contribute new theory regarding the understanding of functional biodiversity and its relationship to shifting biodiversity under environmental change?
2. To what degree does the Project Management Plan engender confidence that the research team will effectively coordinate activities and achieve the goals of the proposed project?
3. For **Design Track** proposals, to what extent does the proposal describe the building of a new collaboration, strengths of the new team to address proposed biodiversity research challenges, inclusive team science, and specific activities to facilitate communication, coordination, and participation of all team members and participating institutions?
4. For the **U.S.-China, U.S.-São Paulo, U.S.-South Africa and multilateral joint research projects**, to what extent do they demonstrate substantial collaboration between the U.S. and China, São Paulo, and/or South African partners? The most competitive projects will be those in which the international collaboration brings substantial additional value to the project.

Reviewers will also be instructed to evaluate the **Safe and Inclusive Fieldwork (SAIF) Plan**, when required, within the Broader Impacts review criterion, specifically:

1. 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)?
2. Does the proposed plan identify and adequately address the unique challenges for the team and the specific off-campus or off-site setting(s)?

3. Are the organizational mechanisms to be used for reporting, responding to, and resolving issues of harassment, should they occur, clearly outlined?

## **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](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](mailto: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](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](#) web page

### **Special Award Conditions:**

As a condition of funding, any digitized data and/or digital media (e.g., images, audio files) of voucher material from this project must be made available through the online National Resource for Digitized Collections ( [iDigBio.org](https://www.digbio.org/) [↗](#) ), located at the University of Florida and funded by NSF.

## **C. Reporting Requirements**

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final 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](https://www.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](https://www.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](https://www.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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg).

## **VIII. Agency Contacts**

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

General inquiries regarding this program should be made to:

- Christopher Balakrishnan, telephone: (703) 292-2331, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Steven Dudgeon, telephone: (703) 292-2279, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Rebecca Gast, telephone: (703) 292-2356, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Matthew Herron, telephone: (703) 292-5361, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Matthew D. Kane, telephone: (703) 292-7186, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Ricardo M. Letelier, telephone: (703) 292-7356, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Melissa A. Pilgrim, telephone: (703) 292-4152, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Keith Reinhardt, telephone: (703) 292-4854, email: [biodiversity@nsf.gov](mailto:biodiversity@nsf.gov)
- Yurena Yanes, telephone: (703) 292-2649, email: [biodiversity@nsf.gov](mailto:biodiversity@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](mailto: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](mailto: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, U.S. 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](mailto: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:

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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