Dimensions of Biodiversity FY2020

PROGRAM SOLICITATION
NSF 20-524

REPLACES DOCUMENT(S):
NSF 19-535

National Science Foundation

Directorate for Biological Sciences
Division of Environmental Biology

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

April 20, 2020

IMPORTANT INFORMATION AND REVISION NOTES

The NSF deadline has been updated. Deadlines for the collaborating international agencies should be confirmed with the respective program contact listed for NSFC, NRF, or FAPESP.

Description of how to report the public release of data from previously funded projects in the "Results from Prior NSF Support" section has been updated.

Description of supplementary documentation requirements for international partners on collaborative research proposals has been updated.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1), which is effective for proposals submitted, or due, on or after February 25, 2019.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Dimensions of Biodiversity

Synopsis of Program:

Despite centuries of discovery, most of our planet's biodiversity remains unknown. The scale of Earth's unknown diversity is especially troubling given the rapid and permanent loss of biodiversity across the globe. The goal of the Dimensions of Biodiversity campaign is to transform how we describe and understand the scope and role of life on Earth.

This campaign promotes novel integrative approaches to fill the most substantial gaps in our understanding of the diversity of life on Earth. It takes a broad view of biodiversity, and focuses on the intersection of genetic, phylogenetic, and functional dimensions of biodiversity. Successful proposals must integrate these three dimensions to understand interactions among them. While this focus complements several core programs in the Biological Sciences Directorate at NSF, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, in novel ways, to understand their synergistic roles in critical ecological and evolutionary processes, especially pertaining to the mechanisms driving the origin, maintenance, and functional roles of biodiversity.

The 2020 Dimensions of Biodiversity program is restricted to projects supported by 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. Proposals are to be submitted jointly, with the US PIs submitting to NSF and the collaborating Chinese, Brazilian, or South African PIs submitting to their appropriate national funding agencies.

Investigators wishing to inquire about the suitability of potential projects for Dimensions of Biodiversity are encouraged to email a brief summary and contact information to Dimensions@nsf.gov.

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.

- Katharina Dittmar, BIO/DEB, telephone: (703) 292-7799, email: Dimensions@nsf.gov
- Christopher Balakrishnan, telephone: (703) 292-2331, email: Dimensions@nsf.gov
- Kendra McLauchlan, BIO/DEB, telephone: (703) 292-2217, email: Dimensions@nsf.gov
- Diana Pilson, BIO/DEB, telephone: (703) 292-2592, email: Dimensions@nsf.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 4 to 6

Awards are contingent on availability of funds and the quality of proposals.

Anticipated Funding Amount: $8,000,000 to $12,000,000

NSF anticipates that at least $8.0M will be available in fiscal year 2020. Research awards will be up to five years duration and up to a total of $2.0M for the US component of collaborative projects. This upper limit does not include costs of NSF facilities.

Up to three US-China Collaborative Research Projects may be funded at a level of up to up to ¥3.0M from NSFC for the Chinese component of the collaboration.

Up to two 5-year US-São Paulo Collaborative Research Projects may be funded. FAPESP will fund Thematic Project investigators at a level up to the equivalent of $2.0M (this total value includes both the overhead for researcher direct use and the overhead for institutional infrastructure) and Young Investigator Award researchers at a level up to the equivalent of $1.5M (this total value includes both the overhead for researcher direct use and the overhead for institutional infrastructure) for the São Paulo components.

Up to two 5-year US-South Africa Collaborative Research Project awards may be funded at a level of up to R10.0M (Rand) for a period of 5 years (R2.0M per annum) from NRF. Please consult the NRF guidelines for how the funds should allocated per allowed activities.

Multilateral collaborative projects, 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 US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

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: 1

An individual may appear as Principal Investigator (PI) or co-PI on only one proposal per submission deadline.

If an individual is listed as PI or co-PI on more than one proposal to this solicitation, all proposals in excess of the limit for any person will be returned without review in the reverse order received.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summm.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_summm.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

  Not Applicable

C. Due Dates

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

  April 20, 2020

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

Life on Earth is astounding in its diversity and in its ability to transform the world. Despite centuries of discovery, the vast majority of our planet's biodiversity remains unknown. Only a few years ago scientists shared the view that the diversity of life on Earth was so vast that it might be beyond cataloging, much less understanding. This is no longer the case. Advances in our capacity to collect, analyze, and integrate biological data have provided tools with which researchers can significantly expand our knowledge of Earth's biodiversity and revolutionize our understanding of the living world. Unfortunately, the pace of discovery is increasingly offset by rapid and permanent loss of biodiversity. Drivers of biodiversity loss include climate change, over-exploitation of natural resources, planetary re-engineering (such as urbanization, land use change, water diversions, coastal development, fertilizer use), and the intentional or unintentional movement of species. With biodiversity loss, humanity is losing links in the web of life that provide important ecosystem services, forfeiting opportunities to understand the history and future of the living world, and losing opportunities for future beneficial bio-inspired discoveries and innovations. This reality has stimulated a campaign of integrated study across the dimensions of Earth's biodiversity.

Biodiversity research has often focused on single dimensions. For example, investigators have concentrated on the taxonomic diversity or phylogenetic history of a clade, the genetic diversity of a population or a species, or the functional role of a taxon in an ecosystem. Although this research has yielded important advances, huge gaps persist in our understanding of biodiversity. We understand little about how these various dimensions, individually and in concert, contribute to environmental health, ecosystem stability, productivity, resilience, and biological adaptation in response to rapid environmental change.

The Dimensions of Biodiversity program expects to transform our understanding of the scope and role of life on Earth. Investigators are encouraged to propose projects that transcend traditional boundaries among areas of biodiversity research. The Dimensions program focuses on genetic, phylogenetic, and functional dimensions of biodiversity. Beginning in 2019 and continuing in 2020, only International collaborations involving the NSFC of China, the FAPESP of Brazil, and/or the NRF of South Africa will be considered. **Successful proposals will test hypotheses about the mechanisms regulating the origin, maintenance and/or functional roles of biodiversity and must integrate across these three dimensions, with evidence of strong collaboration of US participants with researchers in China, Brazil, and/or South Africa**. While this focus complements several core programs in BIO, it differs by requiring that multiple dimensions of biodiversity be addressed and integrated in innovative ways to understand the roles of biodiversity in critical ecological and evolutionary processes. Examples are provided in the following section.

Projects previously funded by the program are listed within: https://www.nsf.gov/awardsearch/advancedSearchResult?ProgEleCode=7968&BooleanElement=Any&BooleanRef=Any&ActiveAwards=true&#results

II. PROGRAM DESCRIPTION

The Dimensions of Biodiversity campaign takes a broad view of biodiversity that ranges from genes through species to ecosystems in an effort to integrate both descriptive and functional aspects of biodiversity on Earth. The long-term goal of the campaign is to develop an integrated understanding of the key dimensions of biodiversity in an ever-changing world.

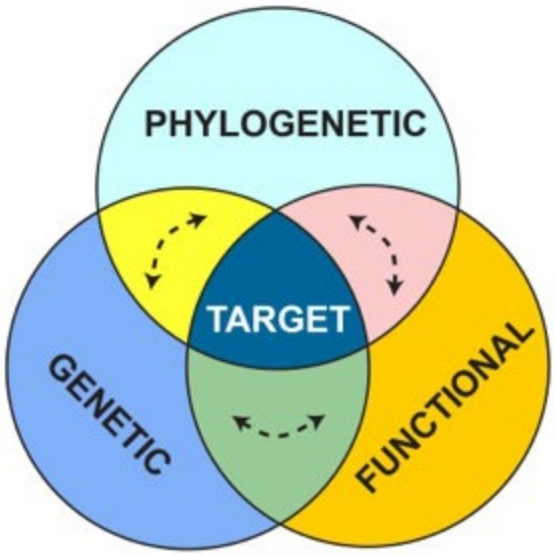

Figure 1. Three dimensions of biodiversity: phylogenetic, genetic, and functional. This solicitation targets biodiversity research areas where all three overlap.

The Dimensions of Biodiversity program currently targets three fundamental dimensions of biodiversity - genetic diversity, phylogenetic diversity, and functional diversity. **Integration across these three dimensions is an essential aspect of all proposals.** Genetic diversity includes genetic, genomic, transcriptomic, and proteomic diversity. Phylogenetic diversity refers to reconstructing evolutionary relationships among lineages at and above the level of the population and how these relationships inform taxonomic understanding. Functional diversity refers to the roles that organisms play within populations, communities, and ecosystems, including the regulation of ecological processes and the role of key innovations in the generation and maintenance of biodiversity across spatial and temporal scales. **Investigators must study the dynamic relationships among these three dimensions (Fig. 1) and seek to understand how these relationships change and evolve over time. Because a primary goal of the program is to describe the largest unknown mechanisms driving the origin, maintenance, and functional roles of biodiversity, proposals that have the potential to fill large gaps in our understanding of biodiversity are particularly encouraged.**

Examples of topics that might be addressed by Dimensions proposals include, but are not limited to, the integrated roles of the three dimensions of biodiversity in: food web and community stability or ecosystem resilience; sustainability or productivity, particularly with respect to environmental thresholds and alternate stable states; eco-evolutionary feedbacks across space and time; maintenance of symbioses; genetic/phylogenetic diversification enabled by natural selection on novel traits; ecological response to anthropogenic disturbances including climate change; carbon, nitrogen, and other biogeochemical cycles; and macro- and microevolutionary patterns and processes.

The Dimensions of Biodiversity program also encourages proposals that leverage data networks, databases, centers, and other forms of national and/or international scientific infrastructure (e.g., flux tower networks, biological collections, cyberinfrastructure, etc.).

All projects must ensure that data and biological materials are collected, archived, digitized, and made available using methods that allow current and future investigators to access data to address new questions. Funded projects must disseminate project data broadly, using widely accepted electronic methods. Data publication via existing repositories (e.g., GenBank, Dryad, iDigBio, MorphBank, Open Tree of Life) is strongly encouraged. All projects will be expected to adhere to appropriate standards where they exist (e.g., for taxonomic, geospatial, ecological, gene and genome sequence data) and to identify and maintain data linkages across repositories where possible. **As a condition of funding: any digitized data and/or digital media (e.g., images, audio files) of voucher material from the project must be made available through the online National Resource for Digitized Collections (iDigBio.org); and, any phylogenetic character matrices and trees must be formatted and deposited for inclusion within the Open Tree of Life (see https://blog.opentreeoflife.org/data-sharing/ for instructions).**

Proposals should focus on fundamental aspects of biodiversity research; those whose primary focus is applied in nature (e.g., food and drug development; biomedical prospecting; restoration, or biodiversity conservation or management) are not eligible for funding. Projects that integrate multiple dimensions of biodiversity but largely repeat or replicate existing work will also not be funded. Additional examples of proposals that will not be considered by this program include: 1) projects that address only the characterization of genetic diversity within a single population or species; 2) projects that focus on species surveys, discovery, inventories, or descriptions (including projects that solely focus on large-scale sequence acquisition, for example microbiome surveys, without integrating the three dimensions of biodiversity); 3) projects that address only taxonomic boundaries (e.g., species delimitation) using genetic markers; 4) phylogenetic and/or phylogeographic studies that do not also address the genetic and functional aspects of the focal group(s); and 5) projects that focus wholly, or in part, on marine biodiversity and/or marine environments.

Research on biodiversity science that is focused exclusively on systematics, evolution, ecology, or ecosystem science is supported by NSF; however, proposals addressing those individual areas may not be directly applicable to the Dimensions of Biodiversity Program. **Proposals that do not integrate the three dimensions as described herein will not be considered by the Dimensions of Biodiversity program and should be submitted to relevant NSF programs instead.**

Research Proposals

Research projects must integrate all three dimensions of biodiversity (Fig. 1) with the goal of understanding the complex interactions among these dimensions. Innovative approaches that accelerate the characterization and understanding of these three dimensions of biodiversity are encouraged, as are empirical, experimental, theoretical, and modeling approaches. Projects may incorporate the context provided by one or more drivers of biodiversity loss (e.g. climate change; over-exploitation of natural resources; planetary re-engineering such as land use change, water diversions, coastal development, fertilizer use; and the intentional or unintentional movement of species), but this is not a requirement of the solicitation. Projects that also develop original computational methods or technology that will be useful to a wide community of researchers (e.g., informatics, instrumentation, imaging, analysis) and other tools specific to integrative biodiversity studies are also welcome.

Both single investigator and collaborative efforts on the US side of the project are acceptable. Beginning in 2019, Dimensions proposals must include researchers that will be supported by the NSFC of China, the FAPESP of Brazil, and/or the NRF of South Africa. In addition to the required China, Brazil, and/or South Africa partnership, projects including other international collaborators are welcome.

All international collaborators are expected to seek support from their respective funding organizations. NSF funding guidelines for involving international collaborators allow the following expenses to be included in the NSF budget:

- Travel expenses for US scientists and students participating in exchange visits integral to the project.
- Project-related expenses for international partners to engage in research activities while in the United States as project participants.
- Project-related expenses for US participants to engage in research activities while abroad.

Dimensions of Biodiversity funds provide support only for projects based on proposals submitted to and evaluated during the annual Dimensions of Biodiversity competition. Funds are not used to provide supplements to current awards. This program does not support CAREER awards. Dimensions of Biodiversity funds are not used to co-fund proposals submitted to regular NSF programs, and the Dimensions of Biodiversity program does not fund proposals submitted directly for NSF program officer review, such as RAPID or EAGER proposals.

International Partners

US-China Collaborative Research Projects

Recognizing the potential for international collaboration to advance Dimensions of Biodiversity research and education objectives, NSF continues its partnership with the NSFC of China. The Chinese component of the US-China Collaborative Projects will be funded by the NSFC using funds provided by the Chinese government.

Chinese researchers applying under this heading must meet NSFC eligibility requirements, and must apply through an institution eligible to receive NSFC funding. Please see NSFC eligibility rules: http://www.nsfc.gov.cn/nsfc/cen/xmzn/2019xmzn/sqxz.html

Applications with non-eligible China partners will not be considered for funding as US-China Collaborative Projects. The proposal budget submitted to NSF should include only the costs of US participants; the anticipated budget for Chinese participants should be submitted as a supplementary document. ***The deadline for NSFC submission is April 20, 2020***.

US-São Paulo Collaborative Research Projects

Recognizing the potential for international collaboration to advance Dimensions of Biodiversity research and education objectives, NSF will continue the partnership with the FAPESP of Brazil to facilitate coordinated funding of up to two US-São Paulo Collaborative Research projects. These projects can focus on any topic that falls within the scope of this Dimensions of Biodiversity solicitation and the corresponding FAPESP- BIOTA call for proposals published at http://www.fapesp.br/biota/dimensions-NSF2020. These projects must have a 5-year duration and should take advantage of the unique and innovative opportunities offered by an international collaboration. ***The deadline for the FAPESP proposal submission of the project is April 3, 2020. The deadline for the eligibility pre-consultation is February 27, 2020 (details following below).***

São Paulo state researchers applying to FAPESP under this heading must meet FAPESP eligibility requirements and must apply through an institution eligible to receive FAPESP funding. Researchers should meet the FAPESP eligibility requirements for either Thematic Projects (http://www.fapesp.br/yia) or for Young Investigator Awards (http://www.fapesp.br/thematic). São Paulo state researchers must send the documents as described in item 4.1 **(Eligibility Pre-consultation) of the FAPESP call** published at **http://www.fapesp.br/biota/dimensions-NSF2020 no later than February 27, 2020 to assess eligibility** as a PI for a FAPESP Thematic Project or Young Investigator award. Please note that for Dimensions of Biodiversity competition only, FAPESP will consider Young Investigator Award proposals with a duration of 5 years.

For a US-São Paulo Collaborative Research Project, the FAPESP budget may be up to the equivalent of $2.0M (this total value includes both the overhead for researcher direct use and the overhead for institutional infrastructure) for Thematic Projects and up to the equivalent of $1.5M (this total value includes both the overhead for researcher direct use and the overhead for institutional infrastructure) for Young Investigator Awards. The proposal budget submitted to NSF should include only the costs of US participants; the anticipated budget for São Paulo state participants should be submitted as a supplementary document. The proposal budget submitted to FAPESP should include only the costs of São Paulo participants; the anticipated budget for US participants should be submitted as a supplementary document in the proposal submitted to FAPESP. 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.

Special requirements for FAPESP submissions

The following exceptions to normal FAPESP rules will apply:

1. **Thematic Grants**
    a. Each proposal must have at least two co-Principal Investigators, in addition to the Principal Investigator. Please consult with FAPESP before preparing a proposal to ensure the people proposed as co-PIs meet the necessary qualification requirements.
    b. The requested budget must allocate at least 40% of the total funds to support fellowships.
    c. Proposers may request up to three MSc Fellowships, as a quota ("Bolsas como Item Orçamentário")
2. **Young Investigator Awards**

    Proposers may request:

    a. Up to two MSc Fellowships, as a quota (“Bolsas como Item Orçamentário”).
    b. Up to one Post-Doctoral Fellowship, as a quota (“Bolsas como Item Orçamentário”).

US-South Africa Collaborative Research Projects

Recognizing the potential for international collaboration to advance Dimensions of Biodiversity research and education objectives, NSF will continue to partner with the NRF for US-South Africa Collaborative projects. NRF has agreed to provide up to R10.0M (Rand) to South African participants. The proposal budget submitted to NSF should include only the costs of US participants; the anticipated budget for South African participants should be submitted as a supplementary document.

South African applications must be submitted through an online application process to the NRF on the NRF Online Submission System at https://nrfsubmission.nrf.ac.za/. Applicants are advised to consult the NRF General Application Guide 2021 available at https://www.nrf.ac.za/funding/framework-documents/funding-framework-documents for further details on how to apply for this opportunity (and for making use of the NRF Online Submission System).

The deadline for the NRF proposal submission of the project is March 30, 2020.

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.

Projects that only involve US researchers, and no collaborators from China, São Paulo and/or South Africa, will not be considered in 2020.

Collection and Transfer of Samples

Plans to collect and transfer samples should be approved by the appropriate government authorities. Arrangements for the use of traditional knowledge or the collection of samples from the lands 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 cooperating indigenous groups, on the basis of 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.

III. AWARD INFORMATION

Award size: Under this solicitation, the US components of a collaborative research project may receive a maximum of $2.0 M per award duration. This upper limit does not include costs of NSF facilities.

Award Duration: The maximum award duration is five years.

Award number: Approximately 4-6 new awards are anticipated in 2020, depending on the quality of submissions. NSF anticipates that at least $8.0M will be available in fiscal year 2020, but estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

For **US-China** Collaborative Research Projects, the Chinese component of the collaboration will be awarded through the NSFC in accordance with its policies and regulations. The collaborative proposal must be submitted to the NSFC application submission system by the Chinese scientists by the NSFC-established deadline.

For **US-São Paulo** Collaborative Research Projects, the São Paulo component of the collaboration will be awarded through FAPESP in accordance with its policies and regulations. **São Paulo state researchers must confirm eligibility with** FAPESP prior to submission according to **FAPESP guidelines** (http://www.fapesp.br/biota/dimensions-NSF2020).

For **US-South Africa** Collaborative Research Projects, the South African component of the collaboration will be awarded through NRF in accordance with its policies and regulations. The collaborative proposal must be submitted to the NRF by the NRF-established deadline.

Multilateral projects, involving NSF and two or more international partners from FAPESP, NRF and NSFC, will also be considered. Funding partner specific deadlines, as well as eligibility criteria apply (see above).

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 US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

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: 1

An individual may appear as Principal Investigator (PI) or co-PI on only one proposal per submission deadline.

If an individual is listed as PI or co-PI on more than one proposal to this solicitation, all proposals in excess of the limit for any person will be returned without review in the reverse order received.

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 Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

The following instructions supplement the guidance in the NSF PAPPG or NSF Grants.gov Application Guide.

For US-China Collaborative Research Projects, an identical scientific research project description must be submitted to NSF by the US researcher and to NSFC by the Chinese collaborator(s).

For US-São Paulo Collaborative Research Projects, an identical scientific research project description must be submitted to NSF by the US researcher and to FAPESP by the FAPESP eligible collaborator(s).

For US-South Africa Collaborative Research Projects, an identical scientific research project description must be submitted to NSF by the US researcher, and to NRF by the South African collaborator(s).

Proposal Title: Titles of proposals submitted to the Dimensions of Biodiversity program should begin with "Dimensions: " followed by the designation of one or more international partnership program, and then the substantive title.

Titles of US-China Collaborative Research proposals should begin with "Dimensions US-China: " followed by the substantive title.

Titles of US-São Paulo Collaborative Research proposals should begin with "Dimensions US-São Paulo: " followed by the substantive title.

Titles of US-South Africa Collaborative Research proposals should begin with "Dimensions US-South Africa: " followed by the substantive title.

Multilateral projects should begin with “Dimensions US” and be followed by the appropriate combination from China, São Paulo, and/or South Africa.

Project Summary – Research proposals: The one-page Project Summary must separately address Intellectual Merit, Broader Impacts, and Integration. Descriptions of Intellectual Merit and Broader Impacts must be entered into the appropriate text boxes if the proposal is created in FastLane. **As part of the Overview text box, explicitly summarize how the project integrates the three dimensions of biodiversity as defined in this solicitation.** Grants.gov has revised instructions for completion of the summary. Although there are not separate text boxes, the information described above must be included.

Project Description (max 15 pages): For all proposals, the project description must include:

* A description of how the project integrates the three dimensions of biodiversity, as defined in this solicitation.

- Details about why the work represents an innovative approach to biodiversity research.
- Information about how the work will rapidly increase understanding of biodiversity.
- Identification of the substantial gap(s) in biodiversity knowledge that will be filled by the proposed research.
- A section titled **Results from Prior NSF Support** must follow the format described in PAPPG Chapter II.C.2.d.iii for this section**.** 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). Results from Prior NSF support must be reported in the Project Description for each PI or co-PI identified on the proposal who has received any NSF funding with an end date in the past five years, regardless of whether the support was directly related to this proposal. Funding includes not just salary support, but any funding awarded by NSF.

Biographical Sketches (*up to two pages each*): Biographical sketches following the standard NSF format, as described in the PAPPG should be submitted for all PIs, co-PIs, and Senior Personnel.

Budget: Proposals Requiring Research Facilities: Budgets should include all costs charged to the project for platforms and facilities supporting the proposed research, except those facilities separately supported by NSF (e.g. research aircraft or field equipment). PIs are responsible for filing the appropriate requests for major research platforms; a copy of the request must be submitted as a supplementary document.

Special Information and Supplementary Documentation: Provide information such as letters of collaboration, foreign counterpart agency letters of commitment, collecting permits, environmental impact statement, and other allowed items as noted in the current issuance of the PAPPG. Include letters of commitment and other materials (such as the vertebrate animal care certificate, if applicable, or Memoranda of Understanding with existing collections for maintenance and archiving voucher specimens and digitized images).

Supplementary Document - Student Training Plan: *(up to two pages, if applicable)***:** Building a diverse, interdisciplinary, globally engaged, scientific workforce capable of transforming and communicating our understanding of biodiversity on Earth is one of the major activities of the Dimensions of Biodiversity Program. The future of biodiversity science is highly interdisciplinary and as such, Dimensions proposals require student training in broad research competencies including areas such as ecology, evolution, genetics, phylogenetics, bioinformatics, data management and modeling. Training should promote intellectual and methodological cross-fertilization and encourage a systems/integrative perspective towards understanding biodiversity.

Each proposal that requests funding to support undergraduate and/or graduate students should include, as a supplementary document, a description of the training activities that will be provided for such individuals. The goal of the Training Plan is to prepare students to develop broad hypotheses and to become well versed with all aspects of inter-disciplinary biological research. This may be accomplished, for example, through lab rotations among PI institutions, cross-training plans, and/or integrative training workshops. NSF believes that student research experiences have their greatest impact in situations that lead the participants from a relatively dependent status to as independent status as their competence warrants. A training plan must be included that explains the approach, depth and breadth of instruction. The training plan must not exceed two pages. Proposers should describe specifically how the proposed training plan will enhance the future workforce for the field of biodiversity science and how trainees will be better able to engage in emerging research areas employing newly developing methods and tools. Only one Student Training Plan should be submitted for each project, even if it is a collaborative project.

Supplementary Document – Postdoctoral Researcher Mentoring Plan *(one page, if applicable)***:** Each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. The mentoring plan must not exceed one page. Only one Postdoctoral Mentoring Plan should be submitted for each project, even if it is a collaborative project. Proposals that do not comply with this requirement will not be accepted or will be returned without review.

Supplementary Document - Data Management Plan *(up to two pages)***:** Each proposal must include, as a supplementary document, a data management section with the specific details of data standards, accessibility, electronic dissemination, and preservation. Of particular logistical importance (where applicable) are: plans for data collection and analysis; plans for dissemination of data and archiving; details of collaborative efforts; information about import, export and collecting permits; plans and agreements with existing collections for the distribution and long term storage of voucher specimens; plans for digitization (and sharing with iDigBio) of all voucher material along with a description of specific data standards to be implemented; and information about access to resources that are not immediately under the investigator's control (e.g., museum collections, research sites, computing facilities). The data management plan must not exceed two pages. Proposals that do not comply with this requirement will not be accepted or will be returned without review.

Supplementary Documents - Letters of Collaboration – If the project involves collaborative arrangements of significance beyond those of the US and international PIs and Senior Personnel (e.g., individuals or organizations who will provide materials, data, or analytical capabilities) then these arrangements should be documented through letters of collaboration. Letters of collaboration should be limited to stating the intent to collaborate and should not contain endorsements or evaluation of the proposed project. Letters of collaboration should follow the single-sentence format:

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

Letters deviating from this template will not be accepted and may be grounds for returning the proposal without review. Letters of collaboration should not be provided for any individual designated as a PI or Senior Personnel, nor are letters of collaboration required for any organization that will be a subawardee in the proposal budget. Letters of collaboration should not be provided from data repositories where deposition of relevant data is already in scope (e.g., GenBank, Dryad, iDigBio, MorphBank, Open Tree of Life). Each letter of collaboration must be signed by the designated collaborator. Requests for letters of collaboration should be made by the PI well in advance of the proposal submission deadline, because they must be included at the time of submission. ***Please note that letters of recommendation for the PI or other letters of support for the project are not permitted.***

Single Copy Documents: Suggested Reviewers. PIs may submit names and contact information for 4-8 individuals who have expertise appropriate to review the proposal. Do not include the names of people with whom you have conflicts of interest, including collaborators and other affiliations.

Single Copy Documents: Collaborators & Other Affiliations (COA) information specified in the PAPPG should be submitted using the instructions and spreadsheet template found on the *Collaborators and Other Affiliations Information website*.

Personnel List Spreadsheet. The spreadsheet template can be found at https://www.nsf.gov/bio/deb/debpersonnellist.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 page); "Other Senior Personnel/Subawardee"; or "Other Personnel" who have a biosketch included in the proposal. Only one spreadsheet should be submitted per project. All participants in a multi-institutional collaborative proposal should be included on the lead proposal's Personnel List Spreadsheet. The file **must include the NSF proposal ID # assigned after submission of your proposal (i.e., not the Temporary ID #)**. Once completed, the file should be submitted by email to dimensions@nsf.gov **within one business day** of proposal submission.

Supplementary Documents International Partners:

A. **Supplementary Documents: US-China Collaborative Research Proposals.** Information for the Chinese portion of the proposal submitted to NSF should be included as Supplementary Documents written in English. That information should include only the following:
    1. Biographical sketches of Chinese senior personnel: These biographical sketches must conform to NSF format and limitations as described in the PAPPG.
    2. Collaborators & Other Affiliations (COA): This information should be submitted as a supplementary document for the Chinese PIs/co-PIs/Senior Personnel using the spreadsheet template found on the *Collaborators and Other Affiliations Information* website.
    3. China budget: Costs for the China component of the project should be entered onto budget worksheets that conform to NSF standards. 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. A PDF version of the form should be included as a supplementary document in the NSF proposal.
    4. Letters of collaboration: Letters of collaboration from Chinese scientists are required. These letters must be restricted to a statement of intent to collaborate only (follow template above: **Supplementary Documents - Letters of Collaboration**). Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
    5. Institutional endorsement: An institutional acknowledgement 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 institution] that the U.S.-China Collaborative proposal between [insert name of US PI and institution] and [insert name of Chinese PI] is endorsed and has been submitted by [name of Research Office]."

        The NSF submission must be mirrored by a proposal submitted to NSFC by close of business on **April 20, 2020**. 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.

B. **Supplementary Documents: US-São Paulo Collaborative Research Proposals.** Information for the FAPESP portion of the proposal submitted to NSF should be included as Supplementary Documents written in English. That information should include only the following:
    1. Senior Personnel Biographical Sketches: A PDF version of the São Paulo state Senior Personnel Biographical Sketches, following the format required by FAPESP, should be included as a Supplementary Document in the proposal submitted to NSF.
    2. Collaborators & Other Affiliations (COA): This information should be submitted as a supplementary document for the São Paulo PIs/co-PIs/Senior Personnel using the spreadsheet template found on the *Collaborators and Other Affiliations Information* website.
    3. São Paulo budget: A PDF version of the FAPESP consolidated budget should be included as a supplementary document in the NSF proposal.
    4. Letters of collaboration: Letters of collaboration from São Paulo scientists are required. These letters must be restricted to a statement of intent to collaborate only (follow template above: **Supplementary Documents - Letters of Collaboration**). Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
    5. Institutional endorsement: For the proposal submitted to NSF, an institutional acknowledgement of the submission should be included as a Supplementary Document. This must be a signed letter from an authorized São Paulo state institutional representative and should consist of the following text: "I confirm on behalf of [insert name of institution] that the US-São Paulo Collaborative proposal between [insert name of US PI and institution] and [insert name of São Paulo PI] is endorsed and has been submitted by [name of Research Office]."

    The NSF submission must be mirrored by a proposal submitted to FAPESP by close of business on **April 3, 2020**. The following documents must be included in the FAPESP submission:

    1. A PDF version of the US Senior Personnel Biographical Sketches, following the format required by NSF, should be included as a Supplementary Document in the proposal submitted to FAPESP.
    2. 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 in the proposal submitted to FAPESP by the São Paulo PI. Except for justification of the requested budget, this document SHOULD NOT include any additional project information; all such information should be included in the Project Description.

        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.

C. **Supplementary Documents: US-South Africa Collaborative Research Proposals.** Information for the South African portion of the proposal submitted to NSF should be included as Supplementary Documents. That information should include only the following:
    1. Biographical sketches of South African senior personnel: These biographical sketches must conform to NSF format and limitations as described in the PAPPG.
    2. Collaborators & Other Affiliations (COA): This information should be submitted as a supplementary document for the South African PIs/co-PIs/Senior Personnel using the spreadsheet template found on the *Collaborators and Other Affiliations Information* website.
    3. South Africa budget: Costs for the South Africa component of the project should be entered onto budget worksheets that conform to NSF standards. 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. A PDF version of the

form should be included as a supplementary document in the NSF proposal.

4. Letters of collaboration: Letters of collaboration from South African scientists are required. These letters must be restricted to a statement of intent to collaborate only (follow template above: **Supplementary Documents - Letters of Collaboration**). Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.
5. Institutional endorsement: An institutional acknowledgement of the submission must be a signed letter from an authorized South African institutional representative (Designated Authorities) with the following text: "I confirm on behalf of [insert name of institution] that the U.S.-South Africa Collaborative proposal between [insert name of US PI and institution] and [insert name of South African PI] is endorsed and has been submitted by [name of Research Office]."

   The NSF submission must be mirrored by a proposal submitted to NRF by close of business on **March 30, 2020,** through the NRF Online Submission System at https://nrfsubmission.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.

C. Due Dates

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

  April 20, 2020

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For Fastlane user support, call the Fastlane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

Reviewers will be asked to evaluate whether the proposal defines a bold agenda that will use innovative approaches to integrate examination of the three dimensions of biodiversity as defined in this document. Strong plans for integration of the information and results from the project with other data should be clearly detailed in the proposal.

US-China, US-São Paulo, US-South Africa and multilateral collaborative research projects will be reviewed with respect to the extent to which they demonstrate substantial collaboration between the US 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 of these international collaborations will consider: mutual benefits, true intellectual collaboration with the foreign partner(s), benefits to be realized from the expertise and specialized skills, facilities, sites and/or resources of the international counterpart, and active research engagement of U.S. students and early-career researchers.

NSF will manage the review of proposals through its standard review process in consultation with NSFC (for US-China Collaborative Projects), FAPESP (for US-Sao Paulo Collaborative Projects), and NRF (for US-South Africa Collaborative Projects). Copies of proposals, and unattributed reviews will be shared with the partner funding organizations, as appropriate. Upon conclusion of the review process, meritorious projects may be recommended for funding in consultancy with the partner funding organizations. The international project component will be awarded through the respective international partner, and administrated in accordance with their respective policy and regulations.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A PI 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, PIs 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 PI/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

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

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

Special Award Conditions:

For US-China Collaborative Research projects, NSFC awardees are subject to NSFC reporting and administration requirements as appropriate and outlined on the NSFC website at **http://www.nsfc.gov.cn/publish/portal0/tab475/info70247.htm**. Annual and final reports of projects awarded by NSF and NSFC should describe activities of the entire collaborative effort.

For US-São Paulo Collaborative Research projects, FAPESP awardees are subject to FAPESP reporting and administration requirements as appropriate and outlined in the FAPESP guidelines for Thematic Grants (http://www.fapesp.br/176) and Young Investigator (http://www.fapesp.br/jp/). Annual and final reports of projects awarded by NSF and FAPESP should describe activities of the entire collaborative effort.

For US-South Africa Collaborative Research projects, NRF awardees are subject to NRF reporting and administration requirements as appropriate and outlined on the Conditions of Grant (CoGs) guidance provided by the NRF. Annual and final reports of projects awarded by NSF and NRF should describe activities of the entire collaborative effort.

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), located at the University of Florida and funded by NSF.

Also, as a condition of funding, any phylogenetic character matrices and trees must be formatted and deposited for inclusion within the Open Tree of Life, funded by the AVAToL program at NSF (see https://blog.opentreeoflife.org/data-sharing/ for instructions).

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

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

As a requirement of the Dimensions of Biodiversity program: 1) any digitized data and/or digital media (e.g., images, audio files) of voucher material must be made available through the online National Resource for Digitized Collections (iDigBio.org), located at the University of Florida, and 2) any phylogenetic character matrices and trees must be formatted for inclusion within the Open Tree of Life

(see http://purl.org/opentree/data-sharing for instructions). Consequently, PIs must include statements in annual and final reports indicating that their project data are being prepared according to these standards for integration or, in the case of voucher material, any media and/or digitized data are now part of the national resource and the physical specimens are part of a permanent natural history collection.

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:

- Katharina Dittmar, BIO/DEB, telephone: (703) 292-7799, email: Dimensions@nsf.gov
- Christopher Balakrishnan, telephone: (703) 292-2331, email: Dimensions@nsf.gov
- Kendra McLauchlan, BIO/DEB, telephone: (703) 292-2217, email: Dimensions@nsf.gov
- Diana Pilson, BIO/DEB, telephone: (703) 292-2592, email: Dimensions@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk: 1-800-673-6188

  FastLane Help Desk e-mail: fastlane@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.

Contacts for US-China Collaborative Research Projects

Dr. Katharina Dittmar, BIO/DEB, telephone: (703) 292-7799, email: kdittmar@nsf.gov

Ms. Jing Chen, NSFC, email: chengjing@nsfc.gov.cn

Ms. Xiuping Liu, NSFC, email: liuxp@nsfc.gov.cn

Contacts for US-São Paulo Collaborative Research Projects

Dr. Katharina Dittmar, BIO/DEB, telephone: (703) 292-7799, email: kdittmar@nsf.gov

Ms. Bruna Cersózimo Arenque Musa, FAPESP, email: chamada-nsf-dimensions@fapesp.br

Contacts for US-South Africa Collaborative Research Projects

Dr. Katharina Dittmar, BIO/DEB, telephone: (703) 292-7799, email: kdittmar@nsf.gov

Ms. Nombuso Madonda, NRF, email: nombuso.madonda@nrf.ac.za

IX. OTHER INFORMATION

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

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the

national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

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

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

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

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

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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