# Dimensions of Biodiversity

## PROGRAM SOLICITATION
## NSF 11-518

## REPLACES DOCUMENT(S):
## NSF 10-548

National Science Foundation

Directorate for Biological Sciences

Directorate for Geosciences

Office of Polar Programs

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

March 28, 2011

## IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 11-1, was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in NSF 11-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 18, 2011, must also follow the guidelines contained in NSF 11-1.

Cost Sharing: The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG)* Chapter II.C.2.g(xi) for further information about the implementation of these recommendations.

Data Management Plan: The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Postdoctoral Researcher Mentoring Plan: As a reminder, 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. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Revision Summary

For 2011 submissions there is no longer a required Letter of Intent, and the deadline for submission of proposals is earlier in the calendar year (March) than it was in 2010 (June). The Office of Polar Programs participated in this program in 2010 and will do so again in 2011. The Biological Sciences Division of Molecular and Cellular Biosciences is participating in this program for the first time in 2011, joining with the Division of Environmental Biology and the Division of Biological Infrastructure.

For 2011, the maximum budget request for research projects is $2,000,000.

For 2011, the maximum budget request, to NSF, for International Research Coordination Network proposals is $600,000.

## 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 the unknown

diversity on Earth is especially troubling given the rapid and permanent loss of biodiversity across the globe. With this loss, humanity is losing links in the web of life that provide ecosystem services, forfeiting an understanding of the history and future of the living world, and losing opportunities for future beneficial discoveries in the domains of food, fiber, fuel, pharmaceuticals, and bio-inspired innovation.

The goal of the Dimensions of Biodiversity campaign is to transform, by 2020, how we describe and understand the scope and role of life on Earth. The campaign promotes novel, integrated approaches to identify and understand the evolutionary and ecological significance of biodiversity amidst the changing environment of the present day and in the geologic past.

This campaign seeks to characterize biodiversity on Earth by using integrative, innovative approaches to fill the most substantial gaps in our understanding of the diversity of life on Earth. It will take a broad view of biodiversity, and in its initial phase will focus on the integration of genetic, taxonomic, and functional dimensions of biodiversity. Successful proposals should integrate these three dimensions to understand interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, in innovative or novel ways, to understand their synergistic roles in critical ecological and evolutionary processes.

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):

- Richard Inouye, BIO/DEB, telephone: (703) 292-4974, email: Dimensions@nsf.gov
- Rafael de Sa, BIO/DEB, telephone: (703) 292-7836, email: Dimensions@nsf.gov
- George W. Gilchrist, BIO/DEB, telephone: (703) 292-7138, email: Dimensions@nsf.gov
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- Saran Twombly, BIO/DEB, telephone: (703) 292-8133, email: Dimensions@nsf.gov
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- Hannah Carey, telephone: (703) 292-7872, email: Dimensions@nsf.gov
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- Susanne von Bodman, BIO/MCB, telephone: (703) 292-8440, email: Dimensions@nsf.gov

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

- 47.050 --- Geosciences
- 47.074 --- Biological Sciences
- 47.078 --- Office of Polar Programs

## Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 10 -- Awards are contingent on availability of funds and quality of proposals in each competition.

Anticipated Funding Amount: $15,000,000 -- A minimum of $15,000,000 is anticipated to be available for awards in FY 2011. Research awards will be up to five years duration and up to a total of $2,000,000 for individual or collaborative projects. This upper limit does not include costs of facilities or ship time. In FY2011 international research coordination network projects involving US and Chinese investigators will be funded at a level of up to $600,000 over 5 years from NSF plus up to 750,000 yuan over 5 years from NSF-China.

## Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may appear as Principal Investigator (PI), co-PI, or other senior personnel on only one proposal submitted in FY 2011 in response to this solicitation. This limitation includes proposals submitted by a lead organization, any sub-award submitted as part of a proposal, or any collaborative proposal, and this includes all types of projects. If an individual is listed as PI, co-PI, or senior personnel on more than one proposal, all of those proposals will be returned without review.

## Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Not Applicable
- Preliminary Proposal Submission: Not Applicable
- Full Proposals:
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - 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: http://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. proposer's local time):

  March 28, 2011

## Proposal Review Information Criteria

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

## Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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## I. INTRODUCTION

Life on Earth is astounding in its diversity and in its ability to transform the world around it. Despite centuries of discovery, the vast majority of our planet's diversity - taxonomic, genetic, and functional - 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 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 ecosystem services, forfeiting opportunities to understand the history and future of the living world, and losing opportunities for future beneficial discoveries in the domains of food, fiber, fuel, pharmaceuticals, and bio-inspired innovation. This reality has stimulated a campaign of integrated study across the dimensions of Earth's biodiversity.

Biodiversity research has often focused on a single dimension. For example, investigators have concentrated on the taxonomic diversity of a clade, the genetic diversity of a population or a species, or the functional role of a taxon in an ecosystem. This research has yielded important advances; yet 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, and resilience, or biological adaptation in response to rapid environmental change.

By 2020, the Dimensions of Biodiversity program is expected to have transformed our understanding of the scope and role of life on Earth. Investigators are encouraged to propose projects that are free from the constraints imposed by traditional boundaries among areas of biodiversity research. In its initial phase, the program will focus on genetic, taxonomic, and functional dimensions of biodiversity. Successful proposals should address and integrate these three dimensions to understand interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed and integrated, in innovative or novel ways, to understand the roles of biodiversity in critical ecological and evolutionary processes. Examples are provided in the following section. Projects funded in the first year of the program are listed here:

http://www.nsf.gov/news/news_summ.jsp?cntn_id=117811&org=OLPA&from=news

## 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.

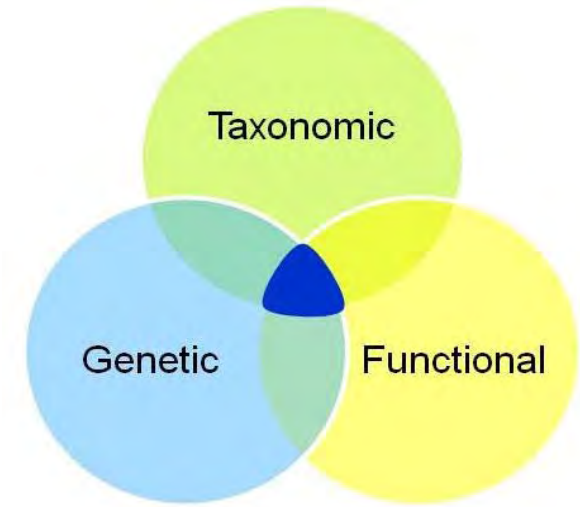


Figure 1. Three dimensions of biodiversity. This solicitation targets the area where all three overlap.

In its initial phase, the program will target three fundamental dimensions of biodiversity - genetic diversity, taxonomic diversity, and functional diversity. Genetic diversity includes but is not limited to nucleotide sequence diversity at neutral or coding loci or genomic (proteomic, transcriptomic) diversity. Taxonomic diversity refers to evolutionary lineages at and above the level of the population. Functional diversity includes but is not limited to aspects of ecosystem function such as energy flow, material cycling, or ecological resilience. (See examples listed below.)

Topics that might be addressed by Dimensions proposals include, but are not limited to, the integrated roles of the three dimensions of biodiversity in: community or ecosystem resilience, sustainability, or productivity; maintenance of symbioses and symbionts; food web and community stability, particularly with respect to environmental thresholds and alternate stable states; feedbacks between biotic and abiotic change; community invasibility and community collapse; ecological response to anthropogenic disturbances including climate change; carbon, nitrogen, and other biogeochemical cycles; rates of evolution; and relationships between spatial scale and the three targeted dimensions. Integration among these three dimensions is a critical aspect of all proposals.

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 address new questions as they arise. Funded projects must disseminate project data broadly, using widely accepted electronic data standards. Rapid online access to data via existing resources (e.g. Genbank) is strongly encouraged. All PIs will be expected to adhere to appropriate standards where they exist (e.g., for taxonomic, geospatial, ecological, gene and genome sequence data). Community coordinated development of a cyberinfrastructure will enable efficient and effective access to shared, cross-disciplinary data, tools, and services. Development of this cyberinfrastructure and related standards is ongoing and will be supported at a later phase of the campaign for areas where none exist. Continued support of projects will be contingent upon adoption of this infrastructure framework.

Proposals should focus on fundamental aspects of biodiversity research; those whose primary focus is applied in nature (e.g., food and drug development; restoration or conservation; biodiversity management) are not eligible for funding. Projects that integrate multiple dimensions of biodiversity but largely repeat or replicate existing work will not be funded. Additional examples of projects that will not be considered by this program include: 1) projects that only address the characterization of genetic diversity within a population or species; 2) projects that consist only of species surveys, inventories, or descriptions; 3) projects that only address taxonomic boundaries (e.g., species delimitation) using genetic markers; and 4) phylogenetic and/or phylogeographic studies that do not also address the genetic, taxonomic, and functional aspects of the group(s) being studied.

The NSF continues to recognize the importance of taxonomy, systematics, evolutionary, ecological, and ecosystems research that may not be directly applicable to the Dimensions of Biodiversity activity. Proposals that address biodiversity in ways not described herein should continue to be submitted to relevant NSF programs.

### Research Proposals

For this year's solicitation, research projects must integrate all three of these dimensions of biodiversity (Fig. 1) with the goal of understanding the interactions and feedbacks among these dimensions. Innovative approaches are encouraged in order to accelerate the characterization and understanding of these three dimensions of biodiversity and their relative importance; empirical, experimental, theoretical, and modeling approaches are all appropriate. 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), although this is not a requirement of the solicitation.

Projects that develop original computational methods or technology (e.g., informatics, instrumentation, imaging, analysis) and other tools specific to integrative biodiversity studies are also welcomed, as are both single investigator and collaborative efforts.

If a project to characterize multiple dimensions of biodiversity and understand its ecological and evolutionary significance has a global scope, investigators are encouraged to develop international collaborations to address these challenges.

International collaborators are encouraged to seek support from their respective funding organizations. 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.

### US-China International Research Coordination Networks

Dimensions of Biodiversity has an interest in funding international research coordination networks (IRCNs) that focus on US and Chinese scientists. NSF anticipates expanding this activity in the future to include other international partners, however for FY2011 IRCN proposals will only be accepted if the focus is on coordination between scientists in the US and China. NSF has partnered with NSF-China (NSFC) to support researchers in the United States and China who are interested in fostering new, international collaborations and research agendas. These investigators are encouraged to develop international research coordination networks. Such networks would support interactions among US and Chinese scientists to develop new research directions or to advance new fields of research. Groups of investigators in the United States and China may be supported to communicate and coordinate their research, training, and educational activities across disciplinary, organizational, institutional, and geographic boundaries.

The goal of an IRCN proposal should be to advance a field or create new directions in research on biodiversity. Innovative ideas for implementing novel networking strategies are especially encouraged. Groups of investigators will be supported to communicate and coordinate their research, training and educational activities across disciplinary, organizational, geographic and international boundaries. Proposed networking activities should focus on new approaches to studying biodiversity, and must address and integrate genetic, taxonomic, and functional diversity.

The size of a network may vary depending on the needs of the proposed activity; inclusion of new researchers, post-doctoral researchers, graduate students, and undergraduate students is strongly encouraged. Funds may be requested to promote collaborative activities, such as short visits among member laboratories, exchange visits of students, sharing of unique facilities, establishment of a public web site, network retreats, or partial support of workshops uniquely tied to the network activities. Innovative ideas for implementing novel networking strategies to promote research collaborations and enable new research directions or advancement of a field are especially encouraged. Proposals should include information about how the network will develop or grow over the term of the project.

Additional information about goals of the Research Coordination Network program is available at the RCN website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=11691.

The partnership between NSF and NSFC is a component of the joint climate change research program between these two agencies. NSF-China has agreed to provide up to 750,000 Yuan to Chinese participants and NSF will support the activities of US researchers. 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.

NSF will solicit suggestions for appropriate external reviewers from NSF-China, but will independently manage the review of proposals in accordance with NSF policies and procedures. At the conclusion of the review process, joint US-China RCN proposals that are recommended for funding will be shared with NSFC. The associated reviews will also be shared with NSFC, but reviewer names will be redacted. Coordinated support will be arranged for successful proposals by the participating organizations with NSF funding the US participants and NSFC funding Chinese participants through its standard award process.

## III. AWARD INFORMATION

NSF anticipates that at least $15,000,000 will be available in Fiscal Year 2011. Research awards will be up to five years duration and up to a total of $2,000,000 for individual or collaborative projects. This upper limit does not include costs of facilities or ship time. In FY2011 international research coordination network projects involving US and Chinese investigators will be funded at a level of up to $600,000 over 5 years from NSF plus up to 750,000 yuan over 5 years from NSF-China.

## IV. ELIGIBILITY INFORMATION

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may appear as Principal Investigator (PI), co-PI, or other senior personnel on only one proposal submitted in FY 2011 in response to this solicitation. This limitation includes proposals submitted by a lead organization, any sub-award submitted as part of a proposal, or any collaborative proposal, and this includes all types of projects. If an individual is listed as PI, co-PI, or senior personnel on more than one proposal, all of those proposals will be returned without review.

Additional Eligibility Info:

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program solicitation. In particular, institutions and organizations with personnel and interests in the broad field of biodiversity study such as academic institutions, natural history museums, marine and freshwater science institutes, field stations, and botanical gardens should consider research opportunities supportable through the Dimensions program.

## 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 Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG 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: (http://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. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

Required Information for full proposals:

***Proposal Title***: Titles of proposals for Dimensions of Biodiversity should begin with "Dimensions: " followed by the substantive title. Titles of International Research Coordination Network Proposals should begin with "Dimensions IRCN:" followed by the substantive title.

***Project Summary:*** For research proposals, the project summary, which is limited to one-page, must address three aspects under

the following three headings: *Intellectual Merit, Broader Impacts, Integration*. Under Integration, the project summary must explicitly summarize how the project integrates the three dimensions of biodiversity as defined in this solicitation.

Proposals that do not address all three aspects in the project summary will be returned without review.

For IRCN proposals, the Project Summary must consist of three parts: (1) a list of steering committee members along with their home institutions; (2) a succinct summary of the intellectual merit of the proposed project including the goal of the proposed network, major planned networking activities, and mechanisms for actively promoting participation by all interested parties; and (3) the broader impacts of the proposed work.

***Project Description:*** For research and IRCN proposals, the project description must address the following points:

- 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.

For IRCN proposals, the project description must also describe the following:

Management plan. Describe plans and procedures for the development and assessment of the proposed activity. Include formal mechanisms to ensure fair and equitable allocation of group resources. Clearly define the responsibilities for leadership and the role of the PI and the steering committee. Delineate the procedures used for the selection of initial network participants, the plans for maintaining an appropriate degree of openness and for encouraging the involvement of additional interested parties. Means for self-evaluation of progress toward the network goals should be presented as an important part of the management plan.

Coordination plan. If the proposed network will work with an established network or group, or if there is a similar activity being planned or ongoing in other countries, describe the plans for coordination and cooperation among the relevant networks.

Information and material sharing. Give careful consideration to issues related to intellectual property rights and materials sharing in the management plan. For example, if the proposed activity is expected to result in community resources (such as databases or collections of biological materials), present a clear plan for sharing of these resources not only among the network participants but with the scientific community at large. Address in the proposal plans for determining authorship or proper attribution of credit for peer-reviewed or other publications, Internet resources, etc. that may be expected to result from the activity.

Increasing diversity. A research coordination network is an important opportunity for encouraging the involvement of investigators from under-represented groups and investigators located in a diverse range of organizations. Describe (1) a well designed plan to increase participation of members of under-represented groups that is specific to the proposed project; (2) a plan to involve investigators at a variety of organizational settings; (3) if applicable, a plan to include new researchers, post-docs, graduate students and undergraduates; and (4) how the plans for increasing diversity are integrated with the proposed project plan.

***Results from Prior NSF Support***: If any PI or co-PI on the project has received NSF funding in the past five years, information on prior award(s) is required. Each PI and co-PI who has received more than one prior award (excluding amendments) must report on the award most closely related to the proposal. The information required is described in the GPG. Reviewers will be asked to comment on the quality of the prior work described in this section of the proposal. Please note that the proposal may devote up to five pages to describe the results, within the maximum 15 pages of Project Description. Results may be summarized in fewer than five pages, which would leave the balance of the 15 pages for the Project Description.

***Vertebrate Animals***: If the proposed research includes the collection of vertebrate animals, the Principal Investigator must respond to the NSF Grant Proposal Guide section on required documentation for proposals involving vertebrate animals. See Section II.D.6. of the Grant Proposal Guide. Grants.gov users should refer to Section V.4.2. of the NSF Grants.gov Application Guide.

***Budget***: Budgets should be prepared in compliance with the Proposal and Award Policies and Procedures (PAPP) http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp) or NSF Grants.gov Application Guide guidelines.

***Collaborative Proposals***: All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

***Proposals Requiring Research Facilities including Ship Time***: 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. UNOLS research vessels, research aircraft, or field equipment). For research involving UNOLS vessels, a UNOLS ship request should be appended to proposals. Likewise, research involving polar regions should follow established guidelines for requesting logistical assets, as discussed in the relevant proposal solicitations (for Antarctic Sciences, see NSF 09-536; for Arctic Sciences, see NSF 10-503). Principal investigators are responsible for filing the appropriate requests for major research platforms; a copy of the request must be attached as an appendix to the proposal.

***International RCN Proposals***: For US-China international RCNs, 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.

***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 GPG. 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). For Grants.gov users, supplementary documents should be attached in Field 12 of the R&R Other Project Information Form.

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 be returned without review.

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 (if applicable) are: plans for data collection and analysis; details of collaborative efforts; information about import, export and collecting permits; plans for providing voucher specimens; plans for digitization of specimens; agreements with existing collections for archiving and maintaining voucher specimens and digitized images of those specimens; 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 be returned without review (see the PAPP Guide Part I: *Grant Proposal Guide* Chapter II for further information about the implementation of this new requirement).

***Single Copy Documents***: Conflicts of Interest. For the PI, all Co-PIs, and all Senior Personnel, including Chinese collaborators on IRCN proposals, list all persons or institutions with which there is a conflict of interest, using an alphabetized spreadsheet with the following column headers: full name (last name first), institutional affiliation, and type of conflict (e.g., advisor, advisee, co-author in last 48 months, collaborator, institutional). Do not include the names of people with whom you do not have conflicts as this may unnecessarily limit qualified reviewers. In addition, list all subawardees who would receive funds through the Dimensions award.

## 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. proposer's local time):

  March 28, 2011

## D. FastLane/Grants.gov Requirements

- For Proposals Submitted Via FastLane:

  Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are 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.

  ***Submission of Electronically Signed Cover Sheets.*** The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- 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: http://www07.grants.gov/applicants/app_help_reso.jsp. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding 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.

# VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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.

## A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

NSF staff also will give careful consideration to the following in making funding decisions:

***Integration of Research and Education***
One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

***Integrating Diversity into NSF Programs, Projects, and Activities***
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- 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.

Additional Review Criteria:

For research proposals, reviewers will also 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 global data should be clearly detailed in the proposal.

For International Research Coordination Network (IRCN) proposals, reviewers will also be asked to evaluate whether the project will advance a field or create new directions in research or education by implementing networking strategies to communicate and coordinate research, training, and educational activities across disciplinary, organizational, geographic, and international boundaries.

For all proposals involving international collaborations, reviewers 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, where such individuals are engaged in the research or IRCN activities.

## 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 formulate a recommendation to either support or decline each proposal. 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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, 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.

In all cases, 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 and 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.

## 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 letter, 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 letter; (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 letter. 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 http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 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 *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

## 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 at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after 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 that PI. 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 FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report 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.

# VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Richard Inouye, BIO/DEB, telephone: (703) 292-4974, email: Dimensions@nsf.gov
- Rafael de Sa, BIO/DEB, telephone: (703) 292-7836, email: Dimensions@nsf.gov
- George W. Gilchrist, BIO/DEB, telephone: (703) 292-7138, email: Dimensions@nsf.gov
- Matt Kane, BIO/DEB, telephone: (703) 292-7186, email: Dimensions@nsf.gov
- Saran Twombly, BIO/DEB, telephone: (703) 292-8133, email: Dimensions@nsf.gov
- Reed Beaman, BIO/DBI, telephone: (703) 292-8167, email: Dimensions@nsf.gov
- DeAndra Beck, telephone: (703) 292-8998, email: Dimensions@nsf.gov
- Hannah Carey, telephone: (703) 292-7872, email: Dimensions@nsf.gov
- Roberta L. Marinelli, OPP, telephone: (703) 292-7448, email: Dimensions@nsf.gov
- Michael Sieracki, GEO/OCE, GEO/OCE, telephone: (703) 292-2688, email: Dimensions@nsf.gov
- Susanne von Bodman, BIO/MCB, telephone: (703) 292-8440, email: Dimensions@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; 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.

Please direct emails inquires to: Dimensions@nsf.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, National Science Foundation Update is a free e-mail subscription service 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 Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://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 40,000 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 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* provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 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 http://www.nsf.gov

- Location: 4201 Wilson Blvd. Arlington, VA 22230
- 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 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 Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). 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
Division of Administrative Services
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Arlington, VA 22230