Advancing Digitization of Biological Collections (ADBC)

PROGRAM SOLICITATION
NSF 10-603

National Science Foundation

Directorate for Biological Sciences
Emerging Frontiers

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

December 10, 2010

IMPORTANT INFORMATION AND REVISION NOTES

This is a new solicitation.

Please be advised that the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) includes guidelines implementing the mentoring provisions of the America COMPETES Act (ACA) (Pub. L. No. 110-69, Aug. 9, 2007.) As specified in the ACA, each proposal that requests funding to support postdoctoral researchers must include a description of the mentoring activities that will be provided for such individuals. 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 requirement).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Advancing Digitization of Biological Collections (ADBC)

Synopsis of Program:

This program seeks to create a national resource of digital data documenting existing biological collections and to advance scientific knowledge by improving access to digitized information (including images) residing in vouchered scientific collections across the United States. The information associated with various collections of organisms, such as geographic distribution, environmental habitat data, phenology, information about associated organisms, collector field notes, tissues and molecular data extracted from the specimens, etc. is a rich resource for providing the baseline from which to further biodiversity research and provide critical information about existing gaps in our knowledge of life on earth. The national resource will be structured at three levels: a national hub, thematic networks based on collaborative groups of collections, and the physical collections. This resource will build upon a sizable existing national investment in curation of the physical objects in scientific collections and contribute vitally to scientific research and technology interests in the United States. It will be an invaluable tool in understanding the biodiversity and societal consequences of climate change, species invasions, natural disasters, the spread of disease vectors and agricultural pests, and other biological issues.

Cognizant Program Officer(s):

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 7 to 12 [1 Home Uniting Biocollections (HUB) as a cooperative agreement, 6-11 Thematic Collections Networks (TCN)]

Anticipated Funding Amount: $10,000,000 Total amount available across all awards in this program for FY2011, pending availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- 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.
- State and Local Governments: State educational offices or organizations and local school districts.
- **When a consortium of eligible organizations submits a HUB proposal, it must be submitted as a single proposal with one organization serving as the lead and all other organizations as subawardees. Separately submitted collaborative HUB proposals will not be accepted and will be returned without review. Organizations ineligible to submit to this program solicitation may not receive subawards.**

  All collaborative TCN 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.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 1

Only one proposal may be submitted by any one organization as the lead organization in this competition for the HUB or for a TCN.

Limit on Number of Proposals per PI: 1

An individual may be included in only one proposal as the Principal Investigator (PI), co-PI, or equivalent (e.g., "senior personnel").

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:** Cost Sharing is not required under this solicitation.
- **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):

  December 10, 2010

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

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I. INTRODUCTION

An estimated 1.8 million named species of organisms exist on Earth today and many more are now extinct. This rich diversity is documented through research collections of organisms housed in natural history museums, universities, field facilities, botanical gardens, and other institutions maintaining collection facilities. These voucher collections provide validation for species names and identifications along with a wealth of ancillary data such as DNA samples, field notes, environment/habitat information, time of collection and the condition in which the specimen existed when collected. Paleontological collections provide time of existence, evolutionary history and past distribution information.

Existing collections data provide the baseline from which to continue biodiversity studies and reveal gaps in our knowledge of biodiversity. Filling these gaps is crucial to a complete understanding of the biodiversity of the planet, both in space and time. Specimens and their associated data allow us to reconstruct the history of climate change as reflected in a validated record of life on earth. Having this baseline information allows efficiency of effort in biodiversity exploration. Gaps in specimen collections and associated natural history data can be used to strategically target further research and field exploration. The effort to digitize, image, and provide online accessibility to these data is critical for understanding biological knowledge in space and time, and underpins how we address contemporary scientific and societal issues, including planetary and climate change.

Knowledge of the planet's biodiversity documented in vouchered scientific collections represents an area of exploration and discovery carried out over the entire course of scientific history, yet the extent of life on earth is still not known definitively. New efforts and approaches to understanding biodiversity and advancing our knowledge are represented by several NSF programs (e.g., Dimensions of Biodiversity, Planetary Biodiversity, Biological Survey and Inventories). However, there is a digitization bottleneck that effectively limits access to information residing in the various voucher collections across the U.S. and the world. It is estimated that U.S. collections contain one billion specimens, but only 10% of these are accessible online. As a consequence, the critical information in the physical collections is underutilized, the usefulness of scientific collections data in research remains limited, and the importance of the collections is not appreciated.

The Interagency Working Group on Scientific Collections developed a comprehensive report on the current status of federally owned collections, and NSF, as part of that working group, surveyed federally supported collections. Both reports emphasized the importance of leveraging past investments by digitizing collections and making them available and searchable online to researchers worldwide.

Responding to concerns expressed in these reports, members of the biological collections community developed a ten-year strategic plan to digitize, image and mobilize biological collections data. The goal of the digitization effort is "to produce a resource of lasting value for answering major research questions." The plan stated the following key objectives: "*digitize data from all U.S. biological collections, large and small, and integrate these in a web accessible interface using shared standards and formats*, *develop new web interfaces, visualization and analysis tools, data mining, georeferencing processes and make all available for using and improving the collections resource, create real-time upgrades of biological data and prevent the future occurrence of non-accessible collection data through the use of tools, training, and infrastructure."* The community effort is called the Network Integrated Biocollections Alliance (NIBA).

II. PROGRAM DESCRIPTION

Digitizing and mobilizing the Nation's biological collections represents a grand challenge and will require development of both technical and human resources to support the creation of an enduring digital alliance of collections and institutions. Collections digitization is defined broadly for the purpose of this solicitation to include transcription into electronic format of various types of data associated with specimens, the capture of digital images of specimens, and the georeferencing of specimen-collection localities. This program will create an organizational structure and processes inclusive of the broad biological collections community, provide open data access, and empower biological researchers.

Proposals that address the goals of NIBA through innovative plans, strong collaborations among large and small institutions, and mechanisms to build upon existing digitization projects are strongly encouraged. Collaboration with federally held collections is encouraged, but federally held collections cannot be supported with NSF funds. The federal agencies are developing guidelines for federally owned collections through the Interagency Group on Scientific Collections and where partnerships are formed with federal collections, the proposal should describe the integration of any federal standards and data with the proposed project. A document from the federal collections noting any requirements should be included in Supplemental Documents.

This solicitation, representing the first year of the program, will accept two types of proposals: the Home Uniting Biocollections (HUB)

and Thematic Collections Networks (TCN), outlined below. Future solicitations will address digitization technology development and further thematic networks. Improvements to individual collections and smaller regional collaborations are supported through the Improvements to Biological Research Collections program in the Division of Biological Infrastructure.

Proposals for the HUB award:

The strategic plan made clear the need for a Home Uniting Biocollections (HUB). HUB proposals will be submitted by groups willing to assume a leadership and coordination role. A single award made as a cooperative agreement, of up to five years with potential for a single renewal, will be given. The successful entity will be expected to play a key role in the development of a national resource, and to develop a coordination network with members from the funded thematic network proposals. In addition to forming the coordinating scientific team, the HUB will be responsible for performing a variety of functions in order to unite the collections community, oversee implementation of standards and best practices for the collections, plan for the long-term sustainability of the national resource, facilitate communication and standards for training, and assure that results are disseminated to the scientific community utilizing collections, the collections community, and other similar efforts internationally. The HUB should promote outreach activities for research, education, and downstream user communities, and facilitate novel and traditional uses of collections data. Documenting the use of digitized collections data will be an important function of the HUB, which should design and maintain a living resource that tracks research outcomes, outreach activities, and innovative discoveries that result from this support.

The national HUB will coordinate the digitization effort, fostering partnerships, training, and innovations, facilitating workflows, serving as a central site for integrating data and techniques, monitoring data online in a timely manner and regular schedule, and establishing cohesion and interconnectivity among digitization projects funded by this program or other existing digitization activities. In addition, the HUB will coordinate activities with the thematic collections networks, described below, enable ongoing communication between partners in the digitization activity, and help to identify gaps and priorities for digitization efforts. Innovative proposals for this entity are strongly encouraged and can come from a single institution, an institution with partners through subawards, a virtual organization, or other creative models that will provide unity and oversight for the national resource.

The NSF "Cyberinfastructure Vision for 21st Century Discovery" document provides definitions, goals for coherent data cyberinfrastructure, and various issues for data and virtual organizations. Strong informatics and technology expertise should be partnered with collections research and management, since the HUB will facilitate implementation of digitization and data interoperability as well as enable links with existing digitization projects and other national and international entities that promote biological research based in collections, collections standards, and training necessary for the digitization through thematic networks. The HUB will need to establish a community-wide plan for storage, maintainance, access, and long-term preservation of digital data through partnerships with appropriate cyberinfrastructure resources. The HUB should also demonstrate experience and understanding of the various kinds of collections issues associated with disparate organisms, ancillary data, types of preservation, size of institution and/or collection, curatorial practices, and collection administration structure. The HUB and its advisory body should be able to assess gaps in digitization of collections. Plans for linking to similar efforts in the federal government, other countries, and existing networks of collections are required.

The proposal must include 1) a management plan that designates an advisory board that draws from the communities impacted by this effort and changes over time, including some members from the Thematic Collections Networks as they are established, 2) an assessment plan to measure progress against goals, and 3) a sustainability plan for the resource beyond this ten-year program at NSF. It is anticipated that funding for the HUB will not exceed $2 million per year requested from NSF.

The management plan should describe the organizational structure of the project including plans for administration of the coordination hub, and the functions of any key personnel, describe plans for external oversight, e.g., an external advisory board, and reporting that include the roles of an external advisory body and explains the selection criteria and mechanisms for visiting or fixed-term personnel, individuals and groups, including those for ensuring broad participation by the scientific community.

A single five-year award will be made for the HUB, which will be renewable one time only for an additional five years, contingent on successful implementation of the HUB, as well as an acceptable plan for sustaining activities and resources beyond the ten-year period of NSF support. Funding for the HUB will not exceed $2 million per year. This award will be a cooperative agreement with a lead organization and subawards for any collaborating institutions or partners. Only those organizations eligible to receive full awards may receive subawards.

Proposals for Thematic Collections Networks (TCNs):

Thematic Collections Network (TCN) proposals will be submissions for two-to-four year awards based on size of the collections to be digitized. Recipients will perform fundamental collections digitization but will also be engaged in training activities and the development of appropriate technology and standards to produce an interoperable network. Collaborative TCN proposals are strongly encouraged.

TCNs will partner with the national HUB, participate in national HUB activities and conform to the standards and practices set through the coordinating group of the national resource. All data from the TCNs will be made available through the national HUB in a timely manner. TCNs will be required to participate in the development and/or adoption of strategies, standards, and interoperability infrastructure in cooperation with the HUB and any advisory bodies of the overall national alliance. TCNs will be required to interact with the HUB and to promote a community of collections, such as social networking tools, coordination workshops, or synthesis meetings held by the HUB.

TCNs will conduct the digitization effort at a number of collections. TCNs will consist of large and small collections justified by a research 'theme,' such as impacts of climate change, invasive species, or biota of a given biogeographic region. These networks will focus on digitization and mobilization of collections data and images in existing collections where the research theme requires the use of collection images and integration of data enabling the community to address that theme. Integration across types of collections is expected for broad research themes, and proposals should include a description of the metadata to be used to integrate these disparate collections. TCNs will share infrastructure among the collections involved in the project, identify deliverable goals and metrics for assessment, identify specific needs for community support and reach out to other collections for inclusion in the digitization effort.

Priority will be given to TCNs that 1) fill gaps in the effort to provide online access to specimen data for all existing biological collections and 2) integrate with other ongoing digitization activities, such as the new collaborative networks funded under the Improvements to Biological Research Collections Program (BRC). TCNs should be broad and inclusive of all collections related to the theme to avoid duplicative efforts, whereas the BRC proposals have a smaller budget and a narrower focus such as collection type, taxonomic category, or local regions. BRC-funded collaborative projects will be expected to become part of this national resource, since these projects are directed toward the regional networks and individual collections as outlined in the last portion of the community strategic plan (NIBA); therefore TCNs should develop plans to integrate with any appropriate projects funded under the Improvements to Biological Research Collections program.

The proposal should include a management plan for accomplishing the project, training plan for participants and students, priorities for tasks, task analysis, a plan for sustaining the data, and plans for interacting and integrating with the successful hub. While many of these networks will be collaborative proposals, some may be from single institutions partnering with smaller collections to integrate those collections into the national resource. TCNs may request a maximum duration of 4 years; the budget should support the scope of work proposed.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 7 to 12 [1 Home Uniting Biocollections (HUB) as a cooperative agreement, 6-11 Thematic Collections Networks (TCN)]

Anticipated Funding Amount: $10,000,000 Total amount available across all awards in this program for FY2011, pending availability of funds.

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

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- 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.
- State and Local Governments: State educational offices or organizations and local school districts.
- **When a consortium of eligible organizations submits a HUB proposal, it must be submitted as a single proposal with one organization serving as the lead and all other organizations as subawardees. Separately submitted collaborative HUB proposals will not be accepted and will be returned without review. Organizations ineligible to submit to this program solicitation may not receive subawards.**

  All collaborative TCN 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.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 1

Only one proposal may be submitted by any one organization as the lead organization in this competition for the HUB or for a TCN.

Limit on Number of Proposals per PI: 1

An individual may be included in only one proposal as the Principal Investigator (PI), co-PI, or equivalent (e.g., "senior personnel").

Additional Eligibility Info:

Federally-owned collections are excluded from this solicitation. Partnerships with federal agencies are encouraged.

Eligibility criteria also apply to all subawards.

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.

The following instructions supplement those found in the GPG and NSF Grants.gov Application Guide.

Required Information for proposals:

Titles of Proposals: Titles of proposals should begin with "Digitization HUB:" or "Digitization TCN:" followed by the substantive title.

Project Summary: Note that proposals must address separately both of the merit review criteria approved by the National Science Board: what is the intellectual merit of the proposed activity and what are the broader impacts of the proposed activity.

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

Project Description: The project description must address the following points:

- How the project will integrate newly digitized collections data with established standards and existing databases.
- Plan for assessment and evaluation.
- Plan for sustainability of data.
- Detailed management plan.
- A separate data management section with the specific details of data standards, accessibility, electronic dissemination, and preservation.
- How training is integrated into the project.
- Plan to track use of the data produced by the project.
- 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.

Proposal Budget: Hub proposals may be up to $2 million per year for five years. Budgets for TCN proposals should reflect the scope of work proposed and should not exceed four years duration.

Special Information and Supplementary Documentation: Provide information such as letters of collaboration, and other allowed items as noted in the current issuance of the GPG. Include letters of commitment and other materials, such as MOUs with existing collections when these collections are not part of the collaborative proposal. For Grants.gov users, supplementary documents should be attached in Field 12 of the R&R Other Project Information Form.

List of Participants. List each participating institution, and each participant (faculty level or equivalent), by full name, and indicate his or her institutional and departmental affiliation. Names should be grouped by institution, and listed alphabetically within each group.

Postdoc Mentoring Plan. 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.

Data Management Plan. In addition to criteria required by the Grant Proposal Guide, these proposals should provide a clear statement of how the project will manage data, software tools and other digital resources that result from the activities supported by the NSF award. The plan should address long-term archiving, intellectual property rights and means of dissemination. A strategy should be outlined that will support sustainable engagement of cyberinfrastructure resources for data storage, maintainance, and access. Proposals should also include plans and contingencies for adoption of standards, best practices, interoperability and needed infrastructure.

Single Copy Documents:

Integrated Conflicts of Interests List for Applicants: Provide a list, in a single alphabetized table or spreadsheet of the full names and institutional affiliations of all people with **conflicts of interest** for the PI, any senior personnel, and any named personnel whose salary is requested in the project budget. The table should specify the nature of the conflict including: (1) PhD thesis advisors or advisees; (2) collaborator or co-authors, including postdocs, for the past 48 months; and (3) any other individuals or institutions with which the PI or Co-PIs have financial ties.

B. Budgetary Information

Cost Sharing: Cost sharing is not required under this solicitation.

C. Due Dates

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

  December 10, 2010

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. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: http://www.grants.gov/CustomerSupport. 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 HUB proposals the following items will be important, in addition to the noted items in the project description,

- sustainability plan
- integration and interoperability of all biological research collections
- timely and effective data dissemination
- strategy for long-term data maintenance and preservation

For TCN proposals the following items will be important, as well as the items in the project description,

- data sustainability
- integration of all biological collections
- lack of overlap with other efforts

B. Review and Selection Process

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

Proposals will undergo ad hoc and/or panel review. One or two review panels will be assembled, depending on the number of proposals received for each category (one panel for the HUB and one for the Thematic Collections Network proposals). HUB proposals may also require site visits depending upon the number of top ranked proposals by the panel review. It is expected that NSF will receive up to 15 HUB and 50 Thematic Collections Network proposals in response to this announcement.

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.

The HUB award will be a cooperative agreement which will follow NSF requirements for reporting and will report on integration results for the achievement of a national resource. There may be additional reports for the data management practices to conform and integrate with future activities for federal collections and data. Site visits may be conducted and a comprehensive site visit will occur in the third year of the award, prior to potential renewal.

The TCN awards may be collaborative projects and in those cases the annual reports should be an integrated report from all partners. In addition, all TCN reports should include statements from the HUB indicating that the data is now a part of the national resource and adding such information about the utilization of the data and conformance to the HUB standards for integration of the data.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- William C. Taylor, telephone: (703) 292-8470, email: biodigit@nsf.gov
- Reed S. Beaman, telephone: (703) 292-8470, email: biodigit@nsf.gov
- Rafael O. de Sa, telephone: (703) 292-8400, email: biodigit@nsf.gov
- Susan L. Perkins, telephone: (703) 292-8400, email: biodigit@nsf.gov
- Judith E. Skog, telephone: (703) 292-8400, email: biodigit@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.

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.

Related Programs:

Related programs are the Improvements to Biological Research Collections and Advances in Biological Informatics in the Division of Biological Infrastructure, Dimensions of Biodiversity and Systematic Biology Program in the Division of Environmental Biology.

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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