Advances in Biological Informatics (ABI)

PROGRAM SOLICITATION
NSF 10-567

REPLACES DOCUMENT(S):
NSF 08-563

National Science Foundation

Directorate for Biological Sciences

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

August 23, 2010

July 12, 2011

Second Tuesday in July, Annually Thereafter

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

1. Submission date type changed from Target Date to Deadline.

2. Program scope and description changed to identify two classes of submission: Innovation awards and Development awards.

3. Language pertaining to available funds and anticipated numbers of awards has been changed to reflect:

    a. the amount of total funds available for new awards.

    b. the approximate balance between numbers of Innovation and Development awards.

4. Proposal Preparation and Submission Instructions have been edited to:

    a. accommodate changes related to the two submission types

    b. provide a template to be used for all letters of commitment

5. Added additional merit review considerations for Innovation and Development awards.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Advances in Biological Informatics (ABI)

Synopsis of Program:

The Advances in Biological Informatics (ABI) program seeks to encourage new approaches to the analysis and dissemination of biological knowledge for the benefit of both the scientific community and the broader public. The ABI program is especially interested in the development of informatics tools and resources that have the potential to advance, or transform, research in biology supported by the Directorate for Biological Sciences at the National Science Foundation. The ABI program accepts two major types of proposals: Innovation awards that seek to pioneer new approaches to the application of informatics to biological problems and Development awards that seek to provide robust cyberinfrastructure that will enable transformative biological research.

Cognizant Program Officer(s):

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

- Anne M. Maglia, 615N, telephone: (703) 292-8470, email: dbiabi@nsf.gov
- Peter McCartney, Program Director, Directorate for Biological Sciences, Division of Biological Infrastructure, 615N, telephone: (703) 292-8470, fax: (703) 292-9063, email: dbiabi@nsf.gov
- Julie A. Dickerson, telephone: (703) 292-8470, email: jdickers@nsf.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 20 to 30 Actual number of awards may vary depending on the ratio of Innovation to Development awards, which in turn may vary according to overall portfolio balance and individual proposal merits.

Anticipated Funding Amount: $22,000,000 Total estimated funding is approximately $22 million annually, subject to the availability of funds. Approximately $8-10 million is available for new awards depending on prior commitments.

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.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

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):

  August 23, 2010

  July 12, 2011

  Second Tuesday in July, Annually Thereafter

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.

TABLE OF CONTENTS

I. INTRODUCTION

Biological processes at all scales from molecules to ecosystems are mediated through the encoding, exchange, and interpretation of information. Advances in the biological sciences are enabled by our capacity to recognize, manage, represent, and analyze the structure in biological data through the use of modern digital media and computational tools. Developing an integrated understanding of cell function, regulatory systems, or ecological responses to environmental change are just a few examples of biological research areas that involve large amounts of data generated through observation, experiment, and modeling.

The Directorate for Biological Sciences (BIO), through the Division of Biological Infrastructure (DBI), supports the design,

development, implementation, and use of information resources and tools for which a need has been identified by the biology community. All fields of science supported by BIO are eligible for support under the ABI program. The ABI program seeks to encourage new approaches to the deployment of biological knowledge that renders the data and information therein of greater value to the scientific community. The ABI program is especially interested in proposals that offer potentially transformative outcomes through the development of informatics tools and resources that (1) offer novel and significant advances in the use of biological data and/or (2) will enable and stimulate advances through their impact on a significant segment of the biological research community supported by the NSF BIO Directorate.

The submission of duplicate or substantially similar proposals concurrently for review by more than one program without prior NSF approval may result in the return of such proposals without review. Research proposals to BIO cannot be duplicates of proposals to any other Federal agency for simultaneous consideration. The only exceptions to this rule applicable to the ABI program are proposals from PIs who are beginning investigators (individuals who have not been a principal investigator (PI) or co-principal investigator (co-PI) on a federally funded award with the exception of doctoral dissertation, postdoctoral fellowship or research planning grants). For proposers who qualify under this exception, the box for "Beginning Investigator" must be checked on the proposal Cover Sheet.

As per the NSF Proposal and Award Policies and Procedures Guide, Chapter 1.B, NSF does not normally support technical assistance, pilot plant efforts, research requiring security classification, the development of products for commercial marketing, or market research for a particular project or invention. Research with disease-related goals, including work on the etiology, diagnosis or treatment of physical or mental disease, abnormality, or malfunction in human beings or animals, is normally not supported. Animal models of such conditions or the development or testing of drugs or other procedures for their treatment also are not eligible for support.

II. PROGRAM DESCRIPTION

Scope of the ABI program

The Advances in Biological Informatics program seeks to support research that enables investigators to make use of biological data and information for the discovery of new knowledge and the advancement of the field of biology. Examples include new tools that scale well to complex biological data; theoretical research on data structures; design of easy-to-use interfaces and tools for data input, manipulation, analysis and extraction; and planning and prototype development of new types of biological data- or knowledge-bases. Proposals supported by ABI must lead to the solution of significant problems in biology. Multidisciplinary research is encouraged.

The ABI program encourages innovation and/or development in areas that may include (but are not limited to):

- New data types, algorithms, and methods for recognizing and understanding complexity and connectivity in biological systems across multiple scales of organization from molecules to ecosystems
- Algorithms, software or ontologies related to the retrieval, integration, and use of heterogeneous biological information, for example, data-mining, search, portals, semantic integration or visualization
- Tools that facilitate biological research work-flows, analytic pathways, or integration between the field and the laboratory, or between observation, experiments and models
- Software and methods for making use of new technologies for the acquisition , communication or visualization of biological data
- New methods and tools for the construction, operation, and utilization of biological databases, including research into database architectures and infrastructures, data standards designed to be extendable to different biological domains, and data structures for new types of biological information
- Informatics tools and approaches that bridge interdisciplinary differences in concepts and data between biology and other sciences

Types of awards

The provision of cyberinfrastructure for scientific research often follows a trajectory from exploratory research on new methods and approaches; through development of robust, production quality databases and software tools; to the long term maintenance and operation of those resources. Complexity, effort required, and merit criteria can vary through this continuum, so the ABI program has defined two types of awards in order to appropriately align funding levels and review criteria.

Innovation awards. These awards are distinguished by a high degree of novelty and potential impact. The scope of the proposal should be focused on one discreet, or several very tightly coupled, problem(s) in biological informatics. Outcomes will typically be publication of new methodologies, proof of concept, or production of a prototype for further development. Innovation awards enable a team to solve challenging, high risk problems with relatively shorter timelines and less complex management plans.

Development awards. These awards involve the development of a finished product that will have demonstrable impact in advancing biological research. Development awards convey their likelihood of success through greater attention to user engagement, design quality, engineering practices, management plan, and dissemination. Budgets and award durations are expected to be larger for development awards in order to accommodate the iterative process of bringing a proof of concept into a robust, broadly-adopted cyberinfrastructure.

Other program considerations

The ABI program encourages proposals that conduct collaborative and planning activities such as workshop series, network retreats, exchange visits, and the development of virtual organization frameworks. Those activities that promote interaction between the computational sciences and biology communities, as well as innovative networking strategies that foster research collaborations or enable new research directions, are especially encouraged. Activities that foster participation of colleagues at small institutions, minority-serving institutions, community colleges, and secondary school teachers are also recommended.

The ABI program will place a higher priority on proposals to create computational/informatics tools and database architectures that are applicable to a broad range of biological research questions. Proposals to develop tools or databases that are needed for a specific research project should be submitted to the relevant BIO programs that would normally support that project.

III. AWARD INFORMATION

Estimated Number of Awards: 20 to 30 Actual number of awards may vary depending on the ratio of Innovation to Development awards, which in turn may vary according to overall portfolio balance and individual proposal merits.

Anticipated Funding Amount: $22,000,000 Total estimated funding is approximately $22 million annually, subject to the availability of funds. Approximately $8-10 million is available for new awards depending on prior commitments.

Estimated program budget, number of awards and average award size and duration are subject to the availability of funds, the quality of submissions, and the anticipated benefits to biology. Both standard and continuing grants will be awarded. The specific grant type will be determined on a proposal by proposal basis. Earliest start dates for awards will be approximately six months after the proposal submission deadline.

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.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

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 information provides instructions that supplement the GPG or NSF Grants.gov Application Guide.

Cover sheet: The project title should be prefixed with either "ABI Innovation:" or "ABI Development:". The title should be descriptive of the project and avoid acronyms or proper names that merely identify, rather than describe, the research subject. If a

proposal is considered to be responsive to both types, the PI should identify the proposal as "ABI Development".

Project Description (maximum length 15 pages): Proposals should address the project goals, the anticipated product(s) of the work, and implications for biological informatics with specific reference to the anticipated impact on the community served by the proposed developments.

Proposals should identify the biological user community and provide evidence of the need for the proposed work. Proposals should also explicitly state how the proposed work will advance the capabilities of the biology research community.

Proposals should discuss plans for making the products of research (e.g., publications, standards, software, and databases) available to the biological sciences research community.

Proposals should include a management plan that identifies the personnel responsible for all major tasks with time schedules for all members of the team for the duration of the project; annual milestones for judging productivity and progress; means of communication and data management within the project team; training and outreach activities, including field, laboratory, and museum experiences for trainees, leadership development for key team members, and integration of new team members; and plans for coordination with other projects.

In accordance with the broader impact review criterion, proposals should describe specific plans to address broader impacts of the proposed activity (see Section VI of this solicitation for additional information and a link to examples).

Note: Inclusion of a web site to provide additional description of the proposed project is not allowed. Reviewers will be advised to review what is presented in the 15 pages and not to consider additional information provided on a web site. For further information, see GPG Chapter II.C.2d(ii).

In addition to these general guidelines, proposals for Development projects should also address the following information:

A conceptual design that specifies software architecture, data schemas, protocol standards, and metadata standards, as appropriate to explain what is to be built and what the necessary effort and potential risks will be. Existing community driven standards should be utilized where they exist. To improve broader impact, preference will be given to proposals that provide community access to source software, data and methods.

A plan for user engagement that identifies how users will contribute to the design of the product and what their role in its evaluation will be.

A dissemination plan that identifies the products, and the timing and means of release. Describe how tools and resources that may have broad applicability will be made accessible and usable by the broader community of biologists and by those in other disciplines. Provide a clear statement of relevant intellectual property considerations and any constraints these may place on access to the proposed resource.

A sustainability plan that presents a strategy for ensuring the long-term (i.e., beyond the term of NSF support for this project under the planned award) availability of data, software or services generated as deliverables. Describe the process the project will use in selecting which deliverables are appropriate for long-term preservation. Alternative models for long-term sustainable financial support of important community information resources should also be addressed. These plans may include the use of resources provided through NSF cyberinfrastructure initiatives as well as other resources that provide opportunities for economies of scale. Programs such as SBIR should be referenced where appropriate.

Budget: Budgets should be well justified according to the effort required to carry out the proposed work. There are no specific guidelines for budget amounts beyond the information provided above regarding funds available for, and the anticipated number of, new awards. However, it is expected that the level of effort required for Development proposals may on average be greater than for Innovation proposals due to factors described elsewhere in this solicitation. For major equipment or software materials, a vendor, model, and price quote should be specified whenever possible. Justification should explicitly address why the need cannot be met by existing facilities either at the institution or within national cyberinfrastructure supported by other NSF programs. Requests for major computing infrastructure must account for administration and maintenance both during, and beyond, the tenure of the award. Budget justification should also include details of any other sources of support for the project, such as government, industry, or private foundations. Funds for facility construction or renovation may not be requested. Justification for foreign travel must identify the destination country or countries.

Facilities, Equipment, & Other Resources (maximum length 2 pages):
Include a brief description of available facilities, including space and computational equipment necessary to carry out the project. Where requested equipment or materials duplicate existing items, explain the need for duplication.

Special Information and Supplementary Documentation:
Projects requiring contributed effort or resources by an individual or organization not directly supported under this proposal should submit a signed letter of commitment using the template below:

To: NSF ABI Program

By signing below I acknowledge that I am listed as a collaborator on this ABI proposal, entitled "_____ *proposal title*_____," with _____*PI name*_____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources therein designated to me.

Signed: _____ Print Name:_____

Date: _____ Institution:_____

The Project Description should document the nature and need for the collaboration. Each statement must be signed by the designated collaborator. Requests to collaborators for these statements should be made by the PI well in advance of the proposal submission deadline, since they must be included at the time of the proposal submission. Letters deviating from this template in any way are not accepted and may be grounds for returning the proposal without review.

Single Copy Documents:
A conflict of interest document - Prepare a list, in the form of a single alphabetized table, consisting of the full name (last, first, MI) of all people having a conflict of interest with any senior personnel and others whose biographical sketches are included in the proposal. Conflicts to be identified are (1) Ph.D. thesis advisors or advisees, (2) collaborators or co-authors for the past 48 months including postdoctoral mentors and mentees, and (3) any other individuals or institutions with which the senior personnel has financial ties.

In addition to the conflict of interest document, other correspondence to the program not intended to be sent to reviewers such as a list of potential reviewers should be provided through the Single Copy Document section of FastLane.

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):

  August 23, 2010

  July 12, 2011

  Second Tuesday in July, Annually Thereafter

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.

Additional Solicitation Specific Review Criteria

Program-specific review criteria:

Innovation projects. Successful proposals in this category are expected to be responsive to well-defined biological needs, demonstrate novel contributions to biological informatics, offer potential impact to biological research supported in the BIO directorate, and draw upon advanced mathematical and computational methods. High risk research is encouraged.

Development projects. Successful proposals in this category are expected to be requirements-driven, have clear and detailed workplans, demonstrate potential for success and reasonable control over risks, and have well-defined plans for dissemination, evaluation and sustainability.

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.

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.

Reviewers will be selected based on appropriate technical expertise and familiarity with the biological applications of the proposed projects.

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.

For all collaborative awards, a single, integrated report for the entire project must be appended to the individual report submitted by each awardee. Annual reports must provide at least one project URL with public information about the project including the NSF disclaimer and links to any data, software or materials that have been released.

VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Anne M. Maglia, 615N, telephone: (703) 292-8470, email: dbiabi@nsf.gov
- Peter McCartney, Program Director, Directorate for Biological Sciences, Division of Biological Infrastructure, 615N, telephone: (703) 292-8470, fax: (703) 292-9063, email: dbiabi@nsf.gov
- Julie A. Dickerson, telephone: (703) 292-8470, email: jdickers@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.

Support for biological informatics activities that address a specific biological research question or for operation of cyberinfrastructure used by a specific user audience should be sought from programs that serve those research communities. Several research programs within the BIO Directorate support database applications within the context of research projects.

In addition, the Science and Engineering Information Integration and Informatics program in the Information and Intelligent Systems Division (IIS) of the Directorate for Computer and Information Science and Engineering (CISE) supports computer science research on integration of information and informatics applications in all sciences. With the SEIII program, NSF intends to support a group of projects that will advance the understanding of technology to enable scientific discovery, and that will creatively integrate research and education for the benefit of technical specialists and the general population. In determining where to seek support, recognize that biological informatics research and developments occur over a continuum, from database systems research to database application maintenance and data curation. The support of fundamental database research rests with the Information and Data Management program in IIS/CISE. Support of software application maintenance and data management rests with the appropriate BIO Directorate research program.

The Office of Cyberinfrastructure (OCI), in conjunction with BIO and other Directorates, periodically support programs closely related to ABI including advanced computing infrastructure, long-term data preservation, data interoperability, software development, and other topics.

Finally, NSF periodically offers foundation-wide initiatives that may compliment the informatics and cyberinfrastructure goals of ABI. Cyber-Enabled Discovery and Innovation (CDI) is one such program for proposals which create revolutionary science and engineering research outcomes made possible by innovations and advances in computational thinking. These proposals should also define a bold multidisciplinary research agenda that, through computational thinking, promises paradigm-shifting outcomes in more than one field of science and engineering.

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 Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities 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:

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