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NATIONAL SCIENCE FOUNDATION

2010 Project

To determine the function of all genes in *Arabidopsis thaliana* by the year 2010

Program Announcement
NSF 02-175

Directorate for Biological Sciences

Full Proposal Deadline(s):

December 13, 2002 by 5:00 p.m. proposer's local time

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

2010 Project
To determine the function of all genes in *Arabidopsis thaliana* by the year 2010

Synopsis of Program:

The Directorate for Biological Sciences (BIO) of the National Science Foundation (NSF) announces its intention to continue support of research to determine the function of all genes in the model plant *Arabidopsis thaliana* by the year 2010. Individual investigators or groups of investigators will be supported to conduct creative and innovative research designed to determine, using all available means, the function of a set of genes of the investigator's interest and choice. Also supported will be development of critical research tools for *Arabidopsis* functional genomics that enable a broad community of scientists to participate in the 2010 Project.

Cognizant Program Officer(s):

- Machi F. Dilworth, Division Director, Directorate for Biological Sciences, Division of Biological Infrastructure, 615 N, telephone: (703) 292-8470, fax: (703) 292-9063, email: mdilwort@nsf.gov
- Stephen Herbert, Program Director, Directorate for Biological Sciences, Division of Integrative Biology & Neuroscience, 685 S, telephone: (703) 292-8421, fax: (703) 292-9153, email: sherbert@nsf.gov
- Parag Chitnis, Program Director, Directorate for Biological Sciences, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-8443, fax: (703) 292-9061, email: pchitnis@nsf.gov
- James Rodman, Program Director, Directorate for Biological Sciences, Division of Environmental Biology, 635 N, telephone: (703) 292-8481, fax: (703) 292-7184, email: jrodman@nsf.gov

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

- 47.074 --- Biological Sciences

Eligibility Information

- **Organization Limit:** None Specified.
- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 15 - Approximately 15 awards.
- **Anticipated Funding Amount:** $10,000,000.00 Approximately $10M in FY2003, pending the availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:**

  Deviations From Standard Preparation Guidelines

  - The program announcement/solicitation contains deviations from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

- **Full Proposal Deadline Date(s):**
  December 13, 2002 by 5:00 p.m. proposer's local time

D. FastLane Requirements

- **FastLane Submission:** Full proposal submission is required.
- **FastLane Contact(s):**
  - Sarah Clark, Division of Biological Infrastructure, email: biofl@nsf.gov

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Directorate for Biological Sciences (BIO) of the National Science Foundation (NSF) announces its intention to continue support of research to determine the function of all genes in the model plant *Arabidopsis thaliana* by the year 2010. This represents a continuation of the *Arabidopsis* genome research initiative BIO has supported since 1990 and of the 2010 Project begun in FY 2001.

In 1990, plant scientists established an international research effort called "The Multinational Coordinated *Arabidopsis thaliana* Genome Research Project", by adopting the widespread use of an easily manipulated model plant called *Arabidopsis thaliana*. (For a long-range plan, see NSF 90-80.) One outcome of this effort is the entire DNA sequence of this plant, that was completed at the end of 2000. For the first time, we know the sequence of all genes necessary for a flowering plant to function. Based on the continued genome annotation efforts, the number of protein-encoding genes in the *Arabidopsis* genome currently stands at about 28,000. As a follow-up to the *Arabidopsis* genome sequencing efforts, and to take full advantage of the opportunities created by them, the community of plant biologists has proposed an important and revolutionary new initiative to determine the function of all genes of a reference species within their cellular, organismal and evolutionary contexts by the year 2010 (the 2010 Project). Details can be found at http://www.nsf.gov/cgi-bin/getpub?bio011 and http://www.arabidopsis.org/workshop1.html. In response, BIO has established the 2010 Project as a Directorate-wide activity.

As with the original Multinational Coordinated *Arabidopsis thaliana* Genome Research Project, research on functional genomics in *Arabidopsis* is an international effort. The Multinational *Arabidopsis* Steering Committee has recently issued a long-range plan in a report, "The Multinational Coordinated *Arabidopsis thaliana* Functional Genomics Project: Beyond the whole genome sequence". The report is posted at http://www.nsf.gov/pubsys/ods/getpub.cfm?bio0202 . The Committee also has established a website (http://www.arabidopsis.org/info/2010_projects) where information about the 2010 Projects and 2010-like projects can be found.

One of the factors that contributed to the success of the Multinational Coordinated *Arabidopsis thaliana* Genome Research Project was world-wide collaboration among the researchers involved. The *Arabidopsis* research community has become a model for international research collaboration. It is expected that continued efforts by the international community of scientists will be essential for the success of the 2010 Project. NSF will continue to foster activities to advance international collaboration and coordination of the 2010 Project.

The 2010 Project is distinct from the Plant Genome Research Program (NSF 01-158). The Plant Genome Research Program will not consider proposals in which *Arabidopsis* is the primary research focus. The 2010 Project is also distinct from existing BIO disciplinary programs and is not meant to be an alternative source of funding for all proposals involving *Arabidopsis*. Proposals investigating the function of individual genes or addressing specific biological question in *Arabidopsis* should continue to be submitted to the appropriate BIO program (See http://www.nsf.gov/bio/ for description of various BIO programs.)

II. PROGRAM DESCRIPTION

In FY 2003, the 2010 Project will focus on the following two activities: (1) Determination of gene function of a network or a group of genes, and (2) Development of research tools and resources. Although, these two areas will remain the focus of the FY 2003 competition, all imaginative and/or innovative proposals, will be considered as long as they are justified on the basis of the goal of the 2010 Project.

Applicants are strongly encouraged to consult the scope of the awards in the previous two years of the 2010 Project Program (see the lists of FY 2001and 2002 awards at http://www.nsf.gov/bio/pubs/awards/2010fy01.htm/ and http://www.nsf.gov/bio/pubs/awards/2010fy02.htm/ , respectively), as well as the projects funded elsewhere in the world including the German Program, Arabidopsis Functional Genomics Network. Applicants are further encouraged to coordinate proposed activities with funded projects prior to submission of new proposals. If activities similar to an already funded project are to be proposed, the proposal must describe clearly a mechanism to coordinate with ongoing activities as well as a rationale based on benefits to the overall goal of the 2010 Project.

NSF encourages participation of investigators and institutions who have not been involved in activities funded in FY 2001and FY 2002.

In addition to research, this Program will support workshops, summer courses and other outreach/training activities designed to educate and train a broad community of scientists and students in unique scientific opportunities and approaches afforded by the 2010 Project.

Determination of gene function:

Individual investigators, or groups of investigators, will be supported to conduct creative and innovative research designed to determine, using all available means, the function of a specific set or network of genes in *Arabidopsis thaliana* of the investigator's interest and choice. The number of investigators involved in a single proposal should be determined by the scope and approach used in the proposal. The NSF expects that both large and small laboratories should be able to participate in the 2010 Project by taking advantage of various publicly available, whole genome tools and resources.

Investigators are expected to have selected a set of genes as the subject of their research prior to the submission of a proposal. These genes must be identified in the proposal by GenBank accession number or by other identifiers from a publicly accessible database. The size of the selected gene set will depend on a number of factors, such as how the particular set was selected (e.g., based on a specific sequence motif or a set of genes expressed under a specific condition), and the interest and throughput capacity of the applicant. Genes being investigated by the previous 2010 Project awardees are publicly posted on a website at The *Arabidopsis* Information Resources

(http://www.arabidopsis.org/) or on an individual 2010 project's website addresses of which can be found in the award abstracts available through the FY 2001 and FY 2002 award lists (http://www.nsf.gov/bio/pubs/awards/2010fy01.htm/ and http://www.nsf.gov/bio/pubs/awards/2010fy02.htm/).

For required items to be included in the proposal, please see "Project Description" section below.

Development of research tools and resources:

While the genome sequence and annotation information in public databases, microarray expression data at public websites, and a variety of biological resources at the *Arabidopsis* Biological Resource Center provide a good start for the community to begin the 2010 Project, NSF recognizes that additional tools and community biological resources are needed to enable individuals or groups of individuals in the scientific community to participate in the 2010 Project. As in the previous two years, building the necessary, critical tools and biological resources will be supported in FY 2003. Especially encouraged are new informatics tools that would allow individual investigators to access, analyze and utilize the massive amounts of *Arabidopsis* data accumulating rapidly. The goal of new informatics tools would be to enable individual researchers to formulate a query of all the available resources so that they can make full use of the tools and resources that are in place as well as those that will become available in the future. Also encouraged are the bioinformatics and experimental tools that will allow deduction and determination of roles of the genes with completely unknown functions.

Proposals for developing community resources must have a clear focus on service, and should not include research on the materials or information to be produced. No selected group including the Principal Investigator (PI's) should have priority access to the resources/tools to be produced for general community use.

For required items to be included in the proposal, please see "Project Description" section below.

Additional considerations:

Broadening participation: As in all other NSF programs, investigators are expected to integrate research and education in proposals submitted to the 2010 Project. Activities designed to promote participation of secondary school teachers and of investigators at small institutions, minority serving institutions, community colleges are especially encouraged.

Coordination among projects: If research on the chosen set of genes is already funded in another NSF 2010 award (http://www.nsf.gov/bio/pubs/awards/2010fy01.htm/ and http://www.nsf.gov/bio/pubs/awards/2010fy02.htm) or in similar functional genomics programs in other countries (http://www.arabidopsis.org/info/2010_projects/index.html), the PI should provide a plan for coordinating activities with the funded project. If two or more proposals with substantially overlapping goals and scope remain in consideration for funding after initial merit review, the PIs of those proposals may be asked to collaborate, and to submit a coordination plan prior to the final funding decision.

International opportunity: The 2010 Project encourages laboratory-to-laboratory interactions between US and foreign laboratories whenever such opportunities exit. NSF 2010 Project funds may be requested to support foreign investigators and students to work in US laboratories and for US investigators and students to work in international laboratories. However, foreign counterparts should secure support for their projects from their own national programs. A list of *Arabidopsis* functional genomics projects in other countries can be found at http://www.arabidopsis.org/info/2010_projects/index.html.

Intellectual property: When the project involves the use of proprietary data or materials, any data or materials resulting from NSF-funded research must be made promptly and freely available, without any restrictions, to the users of such data or materials. It should be noted that prospective awardee institutions may be requested, prior to an award decision, to submit copies of any intellectual property agreements or material transfer agreements that any of the key project personnel have signed, or are planning to sign, that would impact the unrestricted and timely distribution of the outcomes of the NSF-funded research. This material will be reviewed by NSF officials only. In the case of a multi-institutional proposal, the lead institution will be responsible for coordinating and managing the intellectual property resulting from the 2010 Project award.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

It is anticipated that approximately $10 million will be made available for new awards in FY 2003, contingent upon the quality of proposals received, and the availability of funds. The award size for proposals to determine gene function will be wide-ranging, and expected to be up to $1 million per year for up to 4 years. Proposal budgets should be based on the realistic assessment of resources necessary to accomplish the stated proposal goals. Proposals with large budgets are expected to determine the function of a large number of genes.

The award size for proposals to build community resources is expected to be up to a total of $3 million for 2 years. Budget requests must be justified in relation to the proposed activities. Budget requests larger than the above guidelines will be considered if well-justified.

Funding decisions are anticipated by the end of June 2003, with awards expected to start in September 2003. Awards will be made either as grants or cooperative agreements.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/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 Web Site at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

Deviations From Standard Preparation Guidelines

Proposers are reminded to identify the program announcement/solicitation number (02-175) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

Proposals must be submitted by FastLane (see "FastLane Submission" section below) and must follow guidelines described in the GPG. The following additions or modifications apply to proposals submitted to this Program:

Proposal Cover Sheet:
In the NSF FastLane system, follow instructions on proposal preparation. When completing the Cover Sheet, click on the GO button at "Program Announcement / Solicitation / Program Description No." Highlight NSF 02-175, 2010 Project, and click on the Select button. Your proposal will automatically be assigned to BIO - 2010 Project. You must then "Go Back" to the Cover Sheet Components Form and complete the remainder of the cover sheet.

BIO Proposal Classification Form (PCF):
Complete the BIO PCF, available on the NSF FastLane system. The PCF is an on-line coding system that allows the Principal

Investigator to characterize his/her project when submitting proposals to the Directorate for Biological Sciences. Once a PI begins preparation of his/her proposal in the NSF FastLane system, selects any cluster within the Directorate for Biological Sciences as the first (or only) organizational unit to review the proposal, and saves the cover sheet, the PCF will be generated and available through the Form Preparation screen. Additional information about the BIO PCF is available in FastLane at http://www.fastlane.nsf.gov/a1/BioInstr.htm .

Project Summary (1 page):
The project summary should consist of three parts in the following order:

1. A list of senior personnel (PI and Co-PIs appearing on the coverpage) along with their home institutions;

2. A summary of the proposed project in 200 words or less. Principal Investigators must state in the very first sentence of the Summary whether the proposed work pertains to:

   (1) Determination of gene function for a network or group of genes

   or

   (2) Development of research tools or resources for the community.

3. Broader Impacts of the proposed research project in 200 words or less.

Please note that a project summary that does not include both scientific goals and the expected boarder impacts will be returned without review. Detailed explanation can be found at http://www.inside.nsf.gov/cgi-bin/getpub?iin127/

Project Description (maximum 15 pages including figures and tables):
In addition to the standard description in GPG (Chapter II, Section C.3), the following guidelines must be followed:

- Results from Prior NSF Support (up to 5 pages): Only the most relevant prior awards should be included in this section for any of the PIs and Co-PIs listed in "Project Summary".

- Justification: Briefly explain how the proposed activities meet the goals of the 2010 Project.

- **For proposals aimed at determining the function of a network of genes, the following information must be included in the project description:** (1) a list of genes to be studied identified by their accession numbers in GenBank or other identifiers in a publicly accessible database. If the list is long, this can be attached as an appendix outside of the 15 page limit [See **Special Information and Supplementary Documentation A-1** below]; (2) why and how those genes were selected; (3) experimental plans to determine their function, including the level at which the functions are determined, e.g., the molecular/protein, biochemical, cellular, or higher levels; (4) how the investigators plan to add their results to the community-wide effort to update and add value to the primary sequence information in GenBank; and (5) a projected timetable for accomplishing the stated proposal goals. If research tools and resources such as mutants and global expression data are produced during the course of the proposed project, the proposal should describe a plan for their public release and coordination with the existing distribution mechanisms.

- **For proposals aimed at building research tools and resources for the *Arabidopsis* functional genomics community, the following information must be included:** (1) a list of deliverables including necessary informatics tools; (2) experimental plans to develop the resources/tools including mechanisms of quality assessment; (3) project timetable; (4) detailed plan for public release of the resources/tools; (5) any conditions to be placed on users, e.g. material transfer agreement; (6) if applicable, list related, ongoing activities in the US as well as elsewhere in the world so as to maximize the efficiency and the usefulness to the research community. Coordination mechanisms can be provided as an appendix outside of the 15 page limit. [See **Special Information and Supplementary Documentation A-3** below]); and (7) a plan to maintain and distribute the resource after NSF support has ended. It should be noted that resources (biological materials, software, etc.) produced with the support of NSF must be made available as soon as their quality is checked to satisfy the specifications described in the proposal and approved by reviewers. Further, they must be made available to all segments of the scientific community.

Budgeting for short-term and long-term distribution of the project outcomes needs to be described in the proposal. A reasonable user charge is permissible, but the fee structure must be clearly outlined in the proposal. If accessibility differs between industry and the academic community, the differences must be clearly spelled out. It will be permissible to use a qualified commercial operation for long-term maintenance and distribution of the project outcome, if appropriate; however, such an arrangement should be made clear in the proposal.

- The broader impacts of the proposed activities should be described [See "NSF Review Process" below for examples of "broader impacts"] Plans for integration of research and education must be described within the context of the proposed activity.

Proposal Budget:
Provide a summary budget and a yearly budget for the duration of the proposed project. When subawards are involved, summary and yearly budgets are required for each subaward. A Budget Justification should be provided for both the proposer and any subawardees. The 2010 Project program is fully committed to provide sufficient funds to complete any project it supports. A careful and realistic budget will add to the overall strength of a proposal. Funds for facility construction or renovation may NOT be requested. Foreign collaborator's projects are expected to be supported by their national sources. NSF funds may be used for US investigators, postdocs and students on exchange visits to their foreign collaborator's laboratory or to cover expenses associated with hosting foreign collaborators in the US investigators laboratory.

Biographical Sketches: Provide the information requested in the GPG, Chapter II, Section C.5. for PI and Co-PIs listed on the Cover Page, and other senior personnel requesting support in the proposed budget.

Special Information and Supplementary Documentation:
With the exception of a "conflict of interest document" (see Special Information and Supplementary Documentation A-4 below) which should be sent directly to the 2010 Project, include the following materials, if applicable, in addition to the 15 page Project Description. Additional materials should be clearly labeled and included in the Supplementary Documents section of FastLane.

(A-1) List of genes to be studied (no page limit):
If the proposal is to determine the function of a network of genes, a list of genes to be studied must be included. Each gene must be identified by its accession number in GenBank or other identifiers in a publicly accessible database. Provide this information in a tabular form, using a font size no smaller than 10 point.

(A-2) Management Plan (maximum 3 pages):
Each proposal involving 4 or more PIs (1 PI and 3 Co-PIs) OR with PIs/Co-PIs from 3 or more different institutions, OR proposing to develop community research tools and resources must provide an additional description of the management plan for coordinating activities of the group or the management of the service aspect. This description should include plans for internal means of communication, coordinating data and information management, evaluating and assessing progress, allocating funds and personnel, interacting with users in a service project, and other relevant issues specific to the proposed activities. The overall project leader (normally the PI) must be identified and his/her role should be described. Change of project leader will require prior NSF approval. For complex projects, appointment of a project manager/administrator in addition to the PI(s) is strongly encouraged. The exact time commitment of each key member to the project should be indicated in the management plan, regardless of whether any of his/her salary has been requested from NSF. A project timetable with yearly goals should be included for all projects, regardless of the number of personnel involved.

(A-3) Coordination with Outside Groups (maximum 3 pages): If the proposed activity is part of a national or international collaborative project, describe the relationship of the proposed activity to the overall collaborative project and how the components will be coordinated. If a project similar to the proposed project (e.g., either addressing the same set of genes or producing the same kind of community resources) is already supported elsewhere, a coordination plan is mandatory.

(A-4) A "conflict of interest" document must be sent as an E-mail attachment directly to: the 2010 Project by E-mail (bio2010@nsf.gov), within one week of the proposal submission deadline. The document would consist of a list, **in a single alphabetized table**, with the full names of all people with conflicts of interest for all senior personnel (PI and Co-PI's) and any named personnel whose salary is requested in the project budget. Conflicts to be identified are (1) PhD thesis advisors or advisees, (2) postdoctoral advisors or advisees, (3) collaborators or co-authors for the past 48 months, and (4) any other individuals or institutions with which the investigator has financial ties (please specify type).

(A-5) Color Images: Be advised that NSF cannot accommodate the printing of color images as part of proposal submission through the FastLane system, and submitted proposals that require the use of color or of very high resolution photographic images will necessitate additional steps. (See GPG Chapter I, Section E.1 "Special Instructions for....")

Provide only the allowable and applicable items as noted in the GPG, Chapter II, Section C.9. Include the materials in the FastLane submission by transferring them as PDF files through the "Supplementary Docs" module of the FastLane system.

Proposals that are not compliant with the guidelines may not be reviewed. It is the submitting institution's responsibility to ensure that the proposal is compliant with all applicable guidelines.

Proposers are reminded to identify the program solicitation number listed above in the program announcement/solicitation block on the proposal Cover Sheet (NSF Form 1207). Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost Sharing is not required in proposals submitted under this Program Announcement.

C. Due Dates

Proposals must be submitted by the following date(s):

Full Proposal Deadline(s) :

December 13, 2002 by 5:00 p.m. proposer's local time

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane website at: http://www.fastlane.nsf.gov

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-

serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III, Section A for further information). 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 he/she 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 and original 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?

NSF staff 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 Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be assigned to the most relevant review panels within the Directorate of Biological Sciences, by matching the proposed activity with the panel's expertise. Awards will reside in an appropriate BIO cluster .

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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 70 percent of proposals. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

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 its 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 Division 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.A. 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 (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Web site at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Machi F. Dilworth, Division Director, Directorate for Biological Sciences, Division of Biological Infrastructure, 615 N, telephone: (703) 292-8470, fax: (703) 292-9063, email: mdilwort@nsf.gov

- Stephen Herbert, Program Director, Directorate for Biological Sciences, Division of Integrative Biology & Neuroscience, 685 S, telephone: (703) 292-8421, fax: (703) 292-9153, email: sherbert@nsf.gov

- Parag Chitnis, Program Director, Directorate for Biological Sciences, Division of Molecular & Cellular Biosciences, 655 S, telephone: (703) 292-8443, fax: (703) 292-9061, email: pchitnis@nsf.gov

- James Rodman, Program Director, Directorate for Biological Sciences, Division of Environmental Biology, 635 N, telephone: (703) 292-8481, fax: (703) 292-7184, email: jrodman@nsf.gov

For questions related to the use of FastLane, contact:

- Sarah Clark, Division of Biological Infrastructure, email: biofl@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF web site at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

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the program announcement/solicitation for further information.

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- **For General Information** (NSF Information Center)**:** (703) 292-5111
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- **To Order Publications or Forms:**

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

  or telephone: (301) 947-2722
- **To Locate NSF Employees:** (703) 292-5111

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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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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