

# NSF Fellowships for Transformative Computational Science using CyberInfrastructure (CI TraCS)

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## PROGRAM SOLICITATION

NSF 10-553



National Science Foundation

Office of Cyberinfrastructure

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

June 21, 2010

January 13, 2011

January 13, 2012

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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Program Title:

NSF Fellowships for Transformative Computational Science using CyberInfrastructure (CI TraCS)

Synopsis of Program:

The overarching goal of the *NSF Fellowships for Transformative Computational Science using Cyberinfrastructure (CI TRaCS)* program is to support outstanding scientists and engineers who have recently completed doctoral studies and are interested in pursuing postdoctoral activities in computational science, and thereby nurturing the future leaders in this emerging and important multidisciplinary field. Computational research and education activities that are cyberinfrastructure-based and cross disciplinary boundaries are a key focus of this program. Successful Fellows may, for example, use cyberinfrastructure to make revolutionary advances in their disciplines, and/or deploy cyberinfrastructure-based technologies that enable innovative computational practices.

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.*

- Mark Suchman, telephone: (703) 292-8061, email: [citracs@nsf.gov](mailto:citracs@nsf.gov)
- Mimi McClure, telephone: (703) 292-5197, email: [citracs@nsf.gov](mailto:citracs@nsf.gov)

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

- 47.080 --- Office of Cyberinfrastructure

### Award Information

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Anticipated Type of Award: Fellowship

Estimated Number of Awards: 6 to 8 It is anticipated that approximately 6 - 8 new awards will be made each year, depending upon the quality of proposals and the availability of funds.

Anticipated Funding Amount: \$2,000,000 The anticipated program annual budget is \$2,000,000 per year, depending on the availability of funds. The number of awards and average award size/duration are subject to the quality of the submissions and the availability of funds.

### Eligibility Information

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Organization Limit:

Proposals may only be submitted by the following:

- Only individuals may apply. CI TraCS Fellowships are awards to individuals and applications are submitted directly by applicants to NSF. Applicants must be U.S. citizens, nationals, or legally admitted permanent resident aliens of the United States and meet other eligibility criteria listed below in the

program solicitation. Applications must identify a host research institution (e.g., colleges and universities, and privately-sponsored nonprofit institutes, government agencies and laboratories, and, under special conditions, for-profit organizations). Applications must also include statements from the host institution(s) committing to providing resources and supporting the research and education activities proposed in the application, and must identify an individual (or individuals) who is willing to mentor the applicant.

PI Limit:

Each Fellowship is awarded to a single recipient.

Limit on Number of Proposals per Organization:

Only individuals may apply. There is no limit on the number of applicants that an institution may host.

Limit on Number of Proposals per PI: 1

Applicants may submit only one fellowship application to the CI TraCS program per fiscal year. Please see full solicitation for additional PI eligibility information.

## Proposal Preparation and Submission Instructions

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### 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](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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide))

### B. Budgetary Information

- Cost Sharing Requirements: Cost Sharing is not required under this solicitation.
- Indirect Cost (F&A) Limitations: Fellowships are awarded to individuals and have an institutional allowance in lieu of indirect costs
- Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

### C. Due Dates

- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
  - June 21, 2010
  - January 13, 2011
  - January 13, 2012

## Proposal Review Information Criteria

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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

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

Reporting Requirements: Standard NSF reporting requirements apply.

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## I. INTRODUCTION

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Computation has been accepted as the critical third pillar of science and engineering (complementing theory and experimentation) and is a central theme that cuts across virtually every discipline. The overarching vision of the *Cyberinfrastructure Framework for 21<sup>st</sup> Century Science and Engineering (CF21)* <sup>1</sup> is to catalyze new thinking, paradigms and practices in science and engineering. CF21 fosters a pervasive cyberinfrastructure that enables research at unprecedented scales, complexity, resolution, and accuracy by integrating computation, data and experiments in novel ways. CF21 has the potential for revolutionizing virtually every discipline by providing unique insights into complex problems, and thus represents unprecedented opportunities for understanding and managing natural, human, and engineered systems.

CF21 envisions a linked cyberinfrastructure architecture that integrates large-scale computing, high-speed networks, massive data archives, instruments and major facilities, observatories, experiments, and embedded sensors and actuators, nationally and internationally, and has the potential for enabling science and engineering applications that are fundamentally collaborative and information/data-driven, and that symbiotically and opportunistically combine computations, experiments, observations, and real-time information to understand and manage natural and engineered systems.

Complementing this vision, the NSF Fellowship for Transformative Computational Science using Cyberinfrastructure (CI TraCS) will support recent doctoral graduates in sciences and engineering and enable them to engage in computational research and education.

[1] <http://www.nsf.gov/pubs/2010/nsf10015/nsf10015.jsp>

## II. PROGRAM DESCRIPTION

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The CI TraCS Fellowship seeks to emphasize the central role of computational concepts, methodologies, and technologies in all sciences (including physical, biological, geological, mathematical, social, behavioral, economic, computer, information, and data), and to bridge the large gaps in training, language, approach, perspective, and knowledge that continue to divide inherently multidisciplinary computational disciplines. It will enable recent doctoral graduates to attain the necessary multidisciplinary expertise to effectively leverage cyberinfrastructure to significantly benefit specific disciplines and society at large.

For example, the CI TraCS Fellowships may support doctoral graduates from the physical sciences seeking to gain expertise in CI aspects such as scalable computing, large-scale data management and analytics or virtual organizations. Similarly, a CI TraCS Fellowship may support doctoral graduates from the computational/computing disciplines seeking to gain expertise in a science or engineering domain, which would enable them to effectively apply CI to advance that domain. Note that postdoctoral research activities that are appropriate to the CI TraCS program must be computational in nature and CI-based. Fellows must display a significant ability to contribute to computational research and educational efforts that integrate distinct theoretical models and computational methodologies to achieve overall goals, and lead to a new generation of applications and technologies for solving important real-world problems using CI.

Fellowship applicants are expected to include a plan for education and mentoring activities in their proposal. Examples of such activities include teaching or co-teaching courses during each year of the Fellowship at their host institution or an academic institution with ties to their host institution, developing educational materials for formal or informal education venues, or engaging in a significant program of community outreach or public education. As a rough guideline, Fellows should plan on their educational activities taking up no less than 10% and no more than 25% of their time. Applicants are encouraged to discuss the proposed educational activities with their proposed host institution prior to proposal submission to ensure that their educational plan is consistent with opportunities and plans at the institution.

Fellowships are awarded to the applicant. Fellows must identify a host research organization. Hosts can be colleges and universities, and privately-sponsored nonprofit institutes, government agencies and laboratories, and, under special conditions, for-profit organizations.

Host research organizations must commit to providing resources, support the proposed research and education activities, and an individual (or individuals) must be identified who is willing to mentor the Fellow. Fellows seeking to spend the Fellowship tenure in more than one institution must discuss and get permission from the cognizant NSF program officer prior to submitting the proposal.

Fellows will be expected to participate in an annual Fellows' Workshops.

### III. AWARD INFORMATION

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#### A. Duration and Tenure

Fellowships are awarded for up to 3 years. They can be extended by at most 1 year (at no cost) if the Fellow spends time in a research laboratory in industry. Tenure begins on the first of the month only. For fellowships awarded in 2010, tenure may commence at the Fellow's request between June 1, 2010 and January 1, 2011. Interruptions in tenure or extensions without additional cost to NSF are permitted only for extenuating circumstances beyond the control of the Fellow. Fellowships are not renewable.

#### B. Stipend and Allowances

The total fellowship amount is \$240K over 3 years and includes

(1) Stipend for 3 years as follows: Year 1 Stipend - \$60,000.00, Year 2 Stipend - \$65,000.00, Year 3 Stipend - \$70,000.00. Award not to exceed \$195,000.00 per recipient over a three year period and paid directly to the Fellow as an electronic funds transfer into a personal account at a financial institution.

(2) Institutional Allowance is \$5,000.00 per year not to exceed \$15,000.00 for each recipient is paid to the host institution for fringe benefits, including health insurance for the Fellow, and for expenses incurred in support of the Fellow, such as space, equipment, and general-purpose supplies.

(3) Research Allowance Supplement: \$10,000.00 per year not to exceed \$30,000.00, for expenses directly related to the conduct of the research, such as materials and supplies, subscription fees and recovery costs for databases, travel, and publication expenses. Fellows must apply for this supplement every year.

There are no allowances for dependents or travel separate from these two allowances. Fellowships are awards to individuals and have an institutional allowance in lieu of indirect costs.

#### C. Research Starter Supplement

Fellows being supported by this program and moving on to a tenure-track faculty position can apply for a research starter supplement to support the setup of their research environment. The typical amount of these supplements is expected to be \$50,000; however request for larger amounts will be considered. Fellows wishing to apply for this supplement should contact the cognizant NSF program officer.

D. Cost Sharing is not required in applications submitted under this Program Solicitation.

### IV. ELIGIBILITY INFORMATION

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#### Organization Limit:

Proposals may only be submitted by the following:

- Only individuals may apply. CI TraCS Fellowships are awards to individuals and applications are submitted directly by applicants to NSF. Applicants must be U.S. citizens, nationals, or legally admitted permanent resident aliens of the United States and meet other eligibility criteria listed below in the program solicitation. Applications must identify a host research institution (e.g., colleges and universities, and privately-sponsored nonprofit institutes, government agencies and laboratories, and, under special conditions, for-profit organizations). Applications must also include statements from the host institution(s) committing to providing resources and supporting the research and education activities proposed in the application, and must identify an individual (or individuals) who is willing to mentor the applicant.

#### PI Limit:

Each Fellowship is awarded to a single recipient.

#### Limit on Number of Proposals per Organization:

Only individuals may apply. There is no limit on the number of applicants that an institution may host.

#### Limit on Number of Proposals per PI: 1

Applicants may submit only one fellowship application to the CI TraCS program per fiscal year. Please see full solicitation for additional PI eligibility information.

#### Additional Eligibility Info:

##### Applicants

- Must be U.S. citizens, nationals, or legally admitted permanent resident aliens of the United States at the time of application.
- and meet other eligibility criteria listed below in the program solicitation.
- Must receive a doctoral degree by the start date of the award, but no more than two years before as of January 1 of the year of the award.
- Must select a host institution and sponsoring scientist(s) different from their doctoral degree. Under extraordinary circumstances, applicants may continue at their doctoral institution and/or be sponsored by their doctoral advisor, but must select a research plan that is significantly different from their PhD research. In the latter case, applicants must discuss and get permission from the cognizant NSF program

- officer prior to submitting the proposal.
- Must not have previously received an award by the CI TraCS program
- Must present a research and training plan that falls within the purview of CI TraCS program and **must include the required information for the specific competition as described in this document.**
- Must not have submitted concurrently the same project to another NSF program.

Applications that fail to meet eligibility criteria will be returned without review.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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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=ggp](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=ggp). 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](mailto: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](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](mailto:nsfpubs@nsf.gov).

Due to the unique nature of fellowship proposals, submission via FastLane is strongly encouraged. Only one proposal is permitted per individual. A full proposal consists of many parts and requires input from the fellowship applicant, the proposed sponsoring scientist(s), and the proposed host institution(s). Applicants are advised to begin the proposal well in advance of the submission deadline and to submit as early as possible. Partially completed proposals may be saved for future completion and submission. The submission of incomplete or late proposals is not permitted.

Detailed instructions for submitting a proposal to a postdoctoral fellowship program are available from the [FastLane homepage](#) by clicking on the link for [Postdoctoral Fellowships and Other Programs](#).

Preparing your Fellowship application is different in several ways from preparing a research proposal:

- Do not submit your proposal through a sponsored projects office at your home or host institution; you are submitting the proposal as an individual. You must first register as an individual researcher before you or your references can gain access to the application and reference procedures.
- A complete submitted proposal requires the following materials:
  - The application proposal consisting of the Project Summary, Project Description, References and 2-page CV of the applicant.
  - A letter of commitment from the host institution(s) and sponsoring scientist(s), including a mentoring plan and 2-page CV for each sponsoring scientist.
  - Two (2) reference letters, one of which is from the applicant's doctoral thesis advisor.

**Project Summary:** The project summary is limited to one page. It must separately address NSF merit review criteria, intellectual merit and broader impacts (see the Grant Proposal Guide for instructions). If either of the merit review criteria is not included in the summary, the proposal will be returned without review. The project summary must also identify the proposed sponsoring scientist(s) and the proposed host institution(s).

**Project Description:** The project description must not exceed ten (10) single-spaced pages (including figures, pictures, and tables), which must include the following information:

- A detailed plan for research and education activities. The plan should highlight the key CI related components and how CI will be used to advance the discipline.
- A detailed justification for the choice of the host institution(s) and sponsoring scientist(s), identifying collaborating scientist(s), relating the proposed work to current research and educational efforts at the host institution(s), and describing available mentoring and facilities and resources;
- A description of the applicant's long-term career goals and the role of this postdoctoral research and education experience in achieving them.

**Letter of commitment (Uploaded as Supplementary Docs):** A letter of commitment from the prospective host institution that must be signed by the department chair (or equivalent) and the proposed sponsoring scientist(s).

- The letter should certify that (1) the applicant's proposal has been read and approved by the proposed scientific mentor(s), and (2) that adequate facilities and support will be provided for the Fellow, in both, her/his research and education activities.
- The letter should include a mentoring plan that discusses the role the proposed scientific mentor(s) will play in the professional development of the Fellow, and of the opportunities for training and research at the host institution that will be of particular benefit to the Fellow. The mentoring plan should address mentoring in all aspects of the proposed multidisciplinary research plan.
- A 2-page CV for each sponsoring scientist should be attached to the letter of commitment.

Reference Letters (Uploaded as Supplementary Docs): The application proposal must include two letters of reference. One of the letters must be from the applicant's doctoral thesis advisor and the other may be from a scientist who knows the applicant well. Do not use your sponsoring scientist as a reference.

Abstract of Thesis Research (Uploaded as Supplementary Docs - One page limit): The application proposal must include an abstract describing the applicant's thesis research.

Guidance on the Research and Education Plan: The research plan describes the research that you will conduct and the training that you will receive during the Fellowship period and how they relate to your career goals. The plan should highlight the key CI related components and how CI will be used to advance the discipline. Include in the research and training plan: 1) a brief and informative introduction or background section; 2) a statement of research objectives, methodologies and expected contributions, and significance; 3) training objectives and plan for achieving them (these may include scientific as well as other career preparation activities); 4) an explanation of how the Fellowship activities will enhance your career development; and 5) a justification of the choice of sponsoring scientist(s) and host institution(s). As with all NSF proposals, broader impacts must also be addressed.

The education plan should outline the education and mentoring activities that you will perform during your Fellowship and how this relates to your research plan and your career goals. Examples of such activities include participating in teaching a course at their host institution or an academic institution with ties to their host institution, developing educational materials for formal or informal education venues, or engaging in a significant program of community outreach or public education. As a rough guideline, you should plan on your educational activities taking up no less than 10% and no more than 25% of your time. You are encouraged to discuss the proposed educational activities with your proposed host institution prior to proposal submission to ensure that your educational plan is consistent with opportunities and plans at the institution.

Guidance on the Sponsoring Scientist(s) Statement: The sponsoring scientist(s) statement is meant to show how the proposed host(s) and host institution(s) provide the best environment for the Fellow's proposed research and education plan and form the basis for a future independent research career. Therefore, it should include a specific mentoring plan, a description of how the Fellow's independence will be nurtured, and what aspects of the project, if any, cannot go with the Fellow when the Fellow leaves. Since education activities (related to the proposed research activities) are a necessary part of the Fellowship, mentoring and support of the Fellow in these activities should also be addressed in the statement. If there are multiple sponsors, one integrated statement must be developed and submitted. To summarize, the statement should address:

- A brief description of the research projects in the host research group(s), including a statement of current and pending research support, both private and public, for each sponsor. If any sponsor has submitted similar research for funding, what is the degree of overlap?
- An explanation of how the research and training plan of the applicant would fit into and complement ongoing research of the sponsor(s) and indicate the personnel with whom the Fellow would work.
- How the sponsor(s) will determine what mentoring the applicant needs in research, teaching, and career development skills and translate these into a specific plan to foster the development of the applicant's future independent research career.
- What role the sponsor(s) will play in the proposed research and training and what other resources will be available to the Fellow to complete their development plan during the Fellowship.
- What limitations, if any, will be placed on the Fellow regarding the research following the Fellowship.

Note that a 2-page CV for each sponsor should accompany the statement.

## B. Budgetary Information

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

Indirect Cost (F&A) Limitations: Fellowships are awarded to individuals and have an institutional allowance in lieu of indirect costs

Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

## C. Due Dates

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- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
  - June 21, 2010
  - January 13, 2011
  - January 13, 2012

## D. FastLane/Grants.gov Requirements

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- 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](mailto: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](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](mailto: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;

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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

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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 judgments.

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

Applicants are evaluated based on their ability, accomplishments, and potential as evidenced by the submitted CV and reference letters. The research and training plan is evaluated based on its scientific merit, its feasibility, its significance in generating new knowledge, and its impact on the career development of the applicant. Other important evaluative factors are the suitability and availability of the sponsoring scientist(s) and host institution(s), including colleagues and facilities.

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

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

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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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

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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](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](mailto: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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

Special Award Conditions:

Fellows are expected to participate in an annual Fellows' Workshops.

### C. Reporting Requirements

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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.

More comprehensive information on NSF Reporting Requirements 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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

## VIII. AGENCY CONTACTS

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*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:

- Mark Suchman, telephone: (703) 292-8061, email: [citracs@nsf.gov](mailto:citracs@nsf.gov)
- Mimi McClure, telephone: (703) 292-5197, email: [citracs@nsf.gov](mailto:citracs@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto: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](mailto:support@grants.gov).

## IX. OTHER INFORMATION

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The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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

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

*Facilitation Awards for Scientists and Engineers with Disabilities* 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: [nspubs@nsf.gov](mailto:nspubs@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 3145-0023. Public reporting burden for this collection of information is estimated to average 12 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton  
Reports Clearance Officer  
Division of Administrative Services  
National Science Foundation  
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