

# Software Infrastructure for Sustained Innovation - SSE&SSI (SI2 - SSE&SSI)

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## PROGRAM SOLICITATION

NSF 13-525

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### REPLACES DOCUMENT(S):

NSF 11-539

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National Science Foundation  
Office of Cyberinfrastructure  
Directorate for Biological Sciences  
Directorate for Computer & Information Science & Engineering  
Directorate for Education & Human Resources  
Directorate for Engineering  
Directorate for Geosciences  
Office of Integrative Activities  
Office of Experimental Program to Stimulate Competitive Research  
Office of International Science and Engineering  
Directorate for Mathematical & Physical Sciences  
Division of Astronomical Sciences  
Division of Chemistry  
Division of Materials Research  
Division of Mathematical Sciences  
Division of Physics  
Directorate for Social, Behavioral & Economic Sciences

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

March 19, 2013

February 03, 2014

First Monday in February, Annually Thereafter

## IMPORTANT INFORMATION AND REVISION NOTES

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A revised version of the **NSF Proposal & Award Policies & Procedures Guide** (PAPPG), [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in [NSF 13-1](#) apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in [NSF 13-1](#).

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, [National Science Foundation's Merit Review Criteria: Review and Revisions](#). While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the [Grant Proposal Guide](#) and the [Award & Administration Guide](#).

*Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the [Grant Proposal Guide](#).*

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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Program Title:

Software Infrastructure for Sustained Innovation - SSE & SSI (SI2-SSE&SSI)

Synopsis of Program:

Software is an integral enabler of computation, experiment and theory and a primary modality for realizing the Cyberinfrastructure Framework for 21<sup>st</sup> Century Science and Engineering (CIF21) vision, as described in <http://www.nsf.gov/pubs/2010/nsf10015/nsf10015.jsp>. Scientific discovery and innovation are advancing along fundamentally new pathways opened by development of increasingly sophisticated software. Software is also directly responsible for increased scientific productivity and significant enhancement of researchers' capabilities. In order to nurture, accelerate and sustain this critical mode of scientific progress, NSF has established the *Software Infrastructure for Sustained Innovation (SI<sup>2</sup>)* program, with the overarching goal of transforming innovations in research and education into sustained software resources that are an integral part of the cyberinfrastructure.

SI<sup>2</sup> is a long-term investment focused on catalyzing new thinking, paradigms, and practices in developing and using software to understand natural, human, and engineered systems. SI<sup>2</sup>'s intent is to foster a pervasive cyberinfrastructure to help researchers address problems of unprecedented scale, complexity, resolution, and accuracy by integrating computation, data, networking, observations and experiments in novel ways. NSF expects that its SI<sup>2</sup> investment will result in robust, reliable, usable and sustainable software infrastructure that is critical to achieving the CIF21 vision and will transform science and engineering while contributing to the education of next generation researchers and creators of future cyberinfrastructure. Education at all levels will play an important role in integrating such a dynamic cyberinfrastructure into the fabric of how science and engineering is performed.

It is expected that SI<sup>2</sup> will generate and nurture the interdisciplinary processes required to support the entire software lifecycle, and will successfully integrate software development and support with innovation and research. Furthermore, it will result in the development of sustainable software communities that transcend scientific and geographical boundaries. SI<sup>2</sup> envisions vibrant partnerships among academia, government laboratories and industry, including international entities, for the development and stewardship of a sustainable software infrastructure that can enhance productivity and accelerate innovation in science and engineering. The goal of the SI<sup>2</sup> program is to create a software ecosystem that includes all levels of the software stack and scales from individual or small groups of software innovators to large hubs of software excellence. The program addresses all aspects of cyberinfrastructure, from embedded sensor systems and instruments, to desktops and high-end data and computing systems, to major instruments and facilities. Furthermore, it recognizes that integrated education activities will play a key role in sustaining the cyberinfrastructure over time and in developing a workforce capable of fully realizing its potential in transforming science and engineering.

The SI<sup>2</sup> program includes three classes of awards:

1. Scientific Software Elements (SSE): SSE awards target small groups that will create and deploy robust software elements for which there is a demonstrated need that will advance one or more significant areas of science and engineering.
2. Scientific Software Integration (SSI): SSI awards target larger, interdisciplinary teams organized around the development and application of common software infrastructure aimed at solving common research problems. SSI awards will result in a sustainable community software framework serving a diverse community.
3. Scientific Software Innovation Institutes (S2I2): S2I2 awards will focus on the establishment of long-term hubs of excellence in software infrastructure and technologies, which will serve a research community of substantial size and disciplinary breadth.

This solicitation includes SSE and SSI awards only. S2I2 awards will be competed in a separate solicitation (currently [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf13511](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13511))

Please refer to (i) [A Vision and Strategy for Software for Science, Engineering, and Education \(NSF 12-113\)](#) and (ii) [Implementation of NSF Software Vision \(http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504817\)](#) for further information about NSF's vision for software as part of cyberinfrastructure and the programs that support this vision.

Prospective PIs should be aware that SI<sup>2</sup> is a multi-directorate activity and that they are encouraged to submit proposals for software with broad, interdisciplinary interest. PIs are encouraged to refer to core program descriptions, Dear Colleague Letters, and recently posted initiatives on directorate and divisional home pages to gain insight as to the priorities for the relevant area(s) of science to which their proposal may be responsive. For example, the MPS and ENG directorates have particular interest in proposals related to matter by design. As not all units are participating at the same level, it is strongly recommended that prospective PIs contact a program officer from the list of Cognizant Program Officers in the division(s) closest to the major disciplinary impact of the proposed work to ascertain that the scientific focus and budget of the proposed work are appropriate for this solicitation.

Please note that some NSF units have additional specific information about their participation in this program:

- Biological Sciences (BIO) is primarily interested in SSI proposals and those are the only class of proposal that will be considered via this solicitation. PIs wishing to submit Scientific Software Elements (SSE) level projects that focus on biological sciences must submit them to ABI ([http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5444](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5444)) for the August deadline.
- CISE is interested in supporting SSE and SSI proposals that advance software infrastructure to sustain progress in CISE research areas and that advance and adapt Software Engineering research to impact the software sustainability needs of other scientific disciplines.
- Engineering (ENG) is primarily interested in SSI proposals.
- Geosciences (GEO) is interested in mid-scale (SSI) software development projects that serve groups within the geosciences or that link the geosciences with other fields. Successful projects will demonstrate deep embeddedness with geoscience end-user groups and involve a strong and interactive collaboration between geo and cyber/computer scientists. Priority will be given to projects that serve large numbers of

end-users in diverse fields. The ability to build on previous GEO and/or NSF investments in cyberinfrastructure will be considered a strength. Proposers of GEO-related projects are strongly encouraged to consult with the cognizant GEO Program Officer.

- Mathematics and Physical Sciences (MPS):
  - The Division of Materials Research (MPS/DMR) is particularly interested in projects that develop software tools to enable and support research under the Materials Genome Initiative, such as Designing Materials to Revolutionize and Engineer our Future (DMREF; see NSF 11-089), and under Sustainable Chemistry, Engineering, and Materials (SusChEM; see NSF 12-097).
  - The Chemistry Division (MPS/CHE) will not participate in funding projects in 2013, but will participate again starting in 2014.
  - The Physics Division (MPS/PHY) will consider proposals that focus on innovative computational tools that enable advances in the division's research areas.
  - The Division of Astronomical Sciences (MPS/AST) will consider proposals to support the development of sustainable software that will enable broad community progress on key questions in astronomy and astrophysics.
  - The Division of Mathematical Sciences (MPS/DMS) would welcome proposals building computational tools that have broad application in mathematical sciences and related areas.
  - MPS supports education and community development in CI, for example, through proposals that include visitor support (particularly for graduate students and postdoctoral researchers), postdoctoral opportunities, or short training courses that increase interactions of domain scientists and software and/or cyberinfrastructure specialists.

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.*

- Daniel S. Katz, Program Director, OD/OCI, telephone: (703) 292-2254, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Barry I. Schneider, Program Director, OD/OCI, telephone: (703) 292-7383, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Peter H. McCartney, Program Director, BIO/DBI, telephone: (703) 292-8470, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Almadena Y. Chtchelkanova, Program Director, CISE/CCF, telephone: (703) 292-8910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Sol Greenspan, Program Director, CISE/CCF, telephone: (703) 292-8910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- John C. Cherniavsky, Senior Advisor, EHR, telephone: (703) 292-5136, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Sumanta Acharya, Program Director, ENG/CBET, telephone: (703) 292-7494, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Eduardo A. Misawa, Program Director, ENG/EEC, telephone: (703) 292-5353, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Barbara Ransom, Program Director, GEO/OCE, telephone: (703) 292-7792, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Eva Zanzerkia, Program Director, GEO/EAR, telephone: (703) 292-8556, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Thomas Statler, Program Director, MPS/AST, telephone: (703) 292-4910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Evelyn Goldfield, Program Director, MPS/CHE, telephone: (703) 292-2173, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Daryl W. Hess, Program Director, MPS/DMR, telephone: (703) 292-4942, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Andrew D. Pollington, Program Officer, MPS/DMS, telephone: (703) 292-4878, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Jean Cottam Allen, Program Director, MPS/PHY, telephone: (703) 292-8783, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- William Y. B. Chang, Program Director, OD/OISE, telephone: (703) 292-7239, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Cheryl L. Eavey, Program Director, SBE/SES, telephone: (703) 292-7269, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.080 --- Office of Cyberinfrastructure
- 47.081 --- Office of Experimental Program to Stimulate Competitive Research

## Award Information

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Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 20 to 25 - The number of SSE and SSI awards will be determined by two separate review processes and will be based on quality of proposals, availability of funds, and responsiveness to priorities of the participating directorates/divisions.

Anticipated Funding Amount: \$19,500,000 to \$22,500,000 Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

## Eligibility Information

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#### Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- FFRDCs may not receive funds directly from NSF under this solicitation.

#### PI Limit:

None Specified

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

None Specified

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

An individual may participate as Principal Investigator, co-Principal Investigator or other Senior Personnel in at most one full proposal in this competition. Any individual whose biographical sketch is provided as part of the proposal will be considered as Senior Personnel in the proposed activity, with or without financial support from the project. After the proposal submission deadline, if a person appears on more than one full proposal, submitters have up to two weeks after the deadline to withdraw excess proposals to reduce that person's participation to one proposal. After that time, the first submitted proposal (in FastLane time-stamp chronological order) in which that individual is participating will be accepted for review, and the remainder will be returned without review. For this purpose, a multi-institution collaborative project is treated as one proposal that is considered submitted when the last component proposal is submitted.

## 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: Inclusion of voluntary committed cost sharing is prohibited.
- Indirect Cost (F&A) Limitations: Not Applicable
- Other Budgetary Limitations: Not Applicable

### C. Due Dates

- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
  - March 19, 2013
  - February 03, 2014
  - First Monday in February, Annually Thereafter

## 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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Software Infrastructure for Sustained Innovation (SI<sup>2</sup>) is a bold and long-term investment focused on realizing the Cyberinfrastructure Framework for 21<sup>st</sup> Century Science and Engineering (CIF21) vision and catalyzing new thinking, paradigms and practices in science and engineering. CIF21 fosters a pervasive cyberinfrastructure that enables research at unprecedented scales, complexity, resolution, and accuracy by integrating computation, data and experiments in novel ways. CIF21 has the potential for revolutionizing virtually every discipline by providing unique insights into complex problems, and thus creates unique opportunities for understanding natural, human and engineered systems.

Software is a primary modality through which CIF21 innovation and discovery will be realized. It permeates all aspects and layers of cyberinfrastructure (from application codes and frameworks, programming systems, libraries and system software, to middleware, operating systems, networking and the low-level drivers). CIF21 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, across the nation and the world.

The CIF21 software infrastructure should address the complexity of this cyberinfrastructure, accommodating disruptive hardware trends, ever-increasing data volumes, complex application structures and behaviors and emerging concerns such as fault-tolerance and energy efficiency. The software should be continually refined, at one end, to support these new trends and requirements. At the other end, the software should support new advances in the disciplines and their computational methodologies. Across the spectrum, attention should be paid to reducing complexity so that software can be easily used. There is also a new sense of urgency and opportunity for such an investment driven in part by the confluence of various stresses, including disruptive hardware trends, new technologies, new application formulations, emerging new and diverse collections of data, and community readiness. Education is an important element needed to sustain this vision and to propagate through time a vital and responsive cyberinfrastructure -- one that builds upon the most crucial existing cyberinfrastructure elements and one that innovatively creates needed new elements. SI<sup>2</sup> will contribute to an able workforce capable of exploiting the full capability of the cyberinfrastructure and the promise for innovation in science and engineering.

It is clear that the community must redefine research, development, and maintenance of software in the context of CIF21 and make significant long-term investments commensurate with hardware investments. The programs must focus on building robust, reliable and sustainable software that will support and advance sustained scientific innovation and discovery.

The Office of CyberInfrastructure (OCI) is partnering with Directorates and Offices across the Foundation to support SI<sup>2</sup>, a long-term comprehensive program focused on realizing a sustained software infrastructure that is an integral part of CIF21. The goal of this program is to catalyze and nurture the interdisciplinary processes required to support the entire software lifecycle, and result in the development of sustainable community software elements and reusable components at all levels of the software stack. The program addresses all aspects of cyberinfrastructure, from embedded sensor systems and instruments, to desktops and high-end data and computing systems, to major instruments and facilities.

It is envisioned that the SI<sup>2</sup> program will collectively support vibrant partnerships among academia, government laboratories and industry, including international entities, for the development and stewardship of a sustainable software infrastructure that can enhance productivity and accelerate innovation in science and engineering.

## II. PROGRAM DESCRIPTION

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The goal of the SI<sup>2</sup> program is to create a software ecosystem that scales from individual or small groups of software innovators to large hubs of software excellence. The program includes three classes of awards:

1. Scientific Software Elements (SSE)
2. Scientific Software Integration (SSI)
3. Scientific Software Innovation Institutes (S2I2)

This solicitation includes SSE and SSI awards only. S2I2 awards will be competed in a separate solicitation (currently [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf13511](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13511))

The SI<sup>2</sup> program envisions an integrated software infrastructure composed of interlocking projects of the three classes described above. Specifically, SSE awardees are expected to develop meaningful affiliations with one or more SSI groups, and with S2I2 institutes as they come online in future years. Similarly, it is expected that each SSI group will affiliate with one or more S2I2 institutes as they come online. S2I2 institutes are expected to link with each other as well as with other major elements of the national cyberinfrastructure (e.g., computing and data hubs, networking, instruments, major resources, etc.).

A competitive SI<sup>2</sup> proposal will:

- Describe application areas in science or engineering where the identified software is needed and describe how the use of the identified software will have a significant impact on science and engineering research;
- Describe the targeted user communities of the proposed software and how they will be engaged; and
- Provide a compelling discussion of the software's potential use by a wider audience and its contribution to a national cyberinfrastructure.

#### 1. Scientific Software Elements (SSE)

SSE awards target small groups that will create and deploy robust software elements for which there is a demonstrated need that will advance one or more significant areas of science and engineering. It is expected that the created software elements will be designed so as to demonstrate potential for addressing issues of sustainability, manageability, usability and interoperability, and will be disseminated into the community as reusable software resources. The development approach may support the hardening of early prototypes and/or expanding functionality to increase end-user relevance.

#### 2. Scientific Software Integration (SSI)

SSI awards target larger, interdisciplinary teams organized around the development and application of common software infrastructure that addresses shared research needs. SSI awards will result in a sustainable community software framework serving a diverse community or communities. These awards will focus on software architectures, processes that explicitly address issues of sustainability, manageability, usability, composability, and interoperability, as well as environments (e.g., code repository, build and test framework, reporting mechanisms, etc.) that are meaningful for the targeted science community. Well thought-out dissemination and outreach mechanisms, pathways for integration of community software elements (such as those developed by SSE teams) into the developed framework, as well as support structures, will be an integral part of these awards. When appropriate, involvement with industry and government laboratories, and partnering with international efforts are encouraged. SSI awards are anticipated to be continuing grants, and funds will be released annually subject to agreed-to milestones, and based on approval by NSF and the availability of funds.

Industry and International Participation in SI<sup>2</sup>: NSF encourages participation by industry and international collaborators in all classes of SI<sup>2</sup> awards where it clearly strengthens the proposed activity (e.g., involvement of specific and unique expertise or resources or addressing sustainability).

- International participants are encouraged to seek support from their funding organizations. NSF funds may not be used to support the expenses of international researchers at their home institution. However, NSF funds may be used for travel expenses for US scientists and students in exchange integral to the project, or for international collaborators to participate in activities in the US. For those who plan to submit a proposal with international counterparts, please contact the OISE program officer who covers that country: <http://www.nsf.gov/od/oise/country-list.jsp>
- The SI<sup>2</sup> program recognizes that software is a fundamental infrastructure that cross-cuts academic, government, civic, and commercial organizations. The program encourages proposals to explore novel partnerships beyond academe wherever beneficial and permissible within the guidelines of the NSF GPG.

### III. AWARD INFORMATION

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

SSE awards are expected to total up to \$500K for 3 years. SSI are expected to be up to \$1M / year for 3-5 years. It is strongly recommended that prospective PIs contact a program officer from the list of Cognizant Program Officers in the division(s) closest to the major disciplinary impact of the proposed work to ascertain that the scientific focus and budget of the proposed work are appropriate for this solicitation.

The number of SSE and SSI awards will be determined by two separate review processes and will be based on the proposals submitted and the available budget.

### IV. ELIGIBILITY INFORMATION

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Organization Limit:

Proposals may only be submitted by the following:



- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- FFRDCs may not receive funds directly from NSF under this solicitation.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may participate as Principal Investigator, co-Principal Investigator or other Senior Personnel in at most one full proposal in this competition. Any individual whose biographical sketch is provided as part of the proposal will be considered as Senior Personnel in the proposed activity, with or without financial support from the project. After the proposal submission deadline, if a person appears on more than one full proposal, submitters have up to two weeks after the deadline to withdraw excess proposals to reduce that person's participation to one proposal. After that time, the first submitted proposal (in FastLane time-stamp chronological order) in which that individual is participating will be accepted for review, and the remainder will be returned without review. For this purpose, a multi-institution collaborative project is treated as one proposal that is considered submitted when the last component proposal is submitted.

## 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=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](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).

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

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

Important Proposal Preparation Information: FastLane will check for required sections of the proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, FastLane will not accept the proposal.

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

The following supplements guidance contained in the GPG or NSF Grants.gov Application Guide.

Cover Sheet: Provide a short informative title for the proposed SI<sup>2</sup> project. To assist NSF staff in sorting full proposals for review, full proposal titles should begin with "SI2-SSE:" or "SI2-SSI:". The system allows one PI and at most four Co-PIs to be designated for each proposal. If your project involves international partners, check the international activities box and list the countries involved. If needed, additional lead personnel should be designated as non co-PI, Senior Personnel on the Budget form.

Project Summary (1-page limit):

The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the

broader impacts of the proposed activity.

The overview includes a summary description of the SI<sup>2</sup> project, including its transformative research and education goals, the innovative software infrastructure being proposed, and the community (communities) that will be impacted. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired societal outcomes. The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

**Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review. Additional instructions for preparation of the Project Summary are available in FastLane.**

Project Description (15-page limit): The project description should explicitly address the following additional items:

- Define a research and development agenda that will lead to robust and sustainable software.
- Discuss how the proposed software will fill a recognized need and advance research capability within a significant area or areas of science and engineering.
- Provide a clear description of how the proposed software compares to alternative or existing elements (including other commercial and research solutions) and what are the limitations of these existing elements. Proposals that could be supported by other programs at NSF or at other agencies should be submitted to those programs, and possibly related programs should be explicitly identified and reasoned as to why the proposal is not appropriate for those opportunities. Investigators are encouraged to contact the program with questions about appropriateness for this program prior to preparing a proposal.
- Provide an explicit description of the engineering process to be used for the design, development, and release of the software, its deployments and associated outreach to the end user community, its interoperability with widely used tools by the community, and an evaluation plan that involves end users.
- Include a project plan, including user interactions and a community-driven approach, and provide a timeline including a proof-of-concept demonstration of the key software components. The proposal must include a list of tangible metrics, with end user involvement, to be used to measure the success of the software element developed, especially the quantitative and qualitative definition of a "working prototype" against which that milestone will be judged, and the steps necessary to take the software element from prototype to dissemination into the community as reusable software resources.
- Provide a compelling discussion of the software's potential use by broader communities, preferably via use cases developed in concert with relevant domain scientists.
- Describe the extent to which issues of sustainability, manageability, usability, composability, and interoperability will be addressed and integrated into the proposed software system.
- Provide an explicit outreach and education plan to allow additional end user groups to take advantage of the proposed work.
- Describe a sustainability plan for the developed software beyond the lifetime of the award. Identify the open source license to be used.

**Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. You can decide where to include this section within the Project Description.**

Budget: Awardees are expected to participate in an Annual PI meeting with travel costs supported by the award. These travel costs should be included in the FastLane budget.

Supplementary Documents: In addition to the *Data Management Plan* and the *Postdoctoral Research Mentoring Plan* (if required), the following items are the only items permitted as supplementary documentation or appendices. Supplementary documentation should be saved and uploaded as a single Portable Document Format (PDF) file.

Management and Coordination Plan (SSI proposals only, 3-page limit): Each SSI proposal must contain a clearly labeled management and coordination plan, which includes: 1) the specific roles of the PI, co-PIs, other senior personnel and paid consultants at all institutions involved, 2) how the project will be managed across institutions and disciplines, 3) identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration (e.g., yearly workshops, graduate student exchange, project meetings at conferences, use of videoconferences, use of common software repositories, build process and/or test suites, etc.), and 4) pointers to the budget line items that support these management and coordination mechanisms.

Project Personnel (a text-searchable single PDF document, in FastLane, under Additional Single Copy Documents). List all Senior Personnel in the project. For each person, provide the last name, first name, and institution/organization. In the main body of the proposal, a corresponding biographical sketch should be provided for all individuals included on this list, as instructed in Section II.C.2.f of the Grant Proposal Guide.

Collaborators/Individuals with Conflicts of Interest (a text-searchable single PDF document, in FastLane, under Additional Single Copy Documents). Provide a single list, alphabetically ordered by last name and including institutional affiliation, of potential conflicts of interest, as specified in NSF's Grant Proposal Guide. The list should include conflicts for each PI, Co-PI, other Senior Personnel, and all sub-awardees who would receive funds through the SI<sup>2</sup> award. The conflicts must include all co-authors/editors and collaborators (within the past 48 months), all graduate advisors and advisees, and any other individuals or institutions with which the investigator has financial ties (please specify type).

Electronic Document. In addition to the above PDF document, proposers must send the following document immediately after submission of the proposal.

"List of Personnel, Collaborators and Affiliates": After receipt of the proposal number from FastLane, send an e-mail to [si2@nsf.gov](mailto:si2@nsf.gov). The subject heading of the e-mail should note the proposal number and the lead institution. Attach a file in CSV "flat text" format (e.g., by saving an Excel spreadsheet as a CSV file), which lists the full names and institutional affiliations of all people having conflicts of interest (COI) with any PIs, Co-PIs, and other senior personnel (SP). The columns of the spreadsheet should be "proposal number", "PI/SP Last Name", "PI/SP First Name", "PI/SP Institution", "COI Last Name", "COI First Name", "COI Institution". This list will be used by NSF to check for conflicts of interest in assembling the review community. The filename should be the proposal number (which begins with the last two digits of the fiscal year (e.g., "13"); not the temporary proposal number used during proposal preparation) followed by the three characters "coi" (for example, for a proposal number 1323456, this file name will be 1323456coi.csv). The 7-digit proposal number should appear in every row of the file. Each project participant should be listed (repeatedly) in all rows that name his/her conflicted individuals.

(There is redundancy between the Additional Single Copy Documents, which become part of the FastLane proposal file, and the



Electronic Document, which is used for automated data handling. At present, it is not technically possible for one document to perform both functions.)

NOTE: Full proposals that fail to provide the above listed electronic documents with proper information and according to the required format will be returned without review.

Letters of Commitment (Optional): Include only official letters of commitment with specific commitments of resources from participating institutions or organizations anticipated to receive subawards, or from organizations that will provide resources for the project. Scan your signed letters and upload them into the Supplementary Documents section of FastLane or Grants.gov, but do not send originals. Do not submit letters of support, which do not provide specific commitments of resources. For example, letters of endorsement and letters of a laudatory nature for the proposed project are not acceptable.

No other items or appendices are to be included. **Full proposals containing items other than those required above or by the Grant Proposal Guide (GPG) will not be reviewed.**

## B. Budgetary Information

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Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Budget Preparation Instructions:

Awardees are expected to participate in an Annual PI meeting with travel costs supported by the award. These travel costs should be included in the proposed budget.

## C. Due Dates

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- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
  - March 19, 2013
  - February 03, 2014
  - First Monday in February, Annually Thereafter

## 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 for acknowledgement and, if they meet NSF requirements, for review. 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 either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with 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. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/meritreview/>.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years \(FY\) 2011-2016](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

## A. Merit Review Principles and Criteria

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The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

### 1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

### 2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter II.C.2.d.i](#) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including [GPG Chapter II.C.2.d.i](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
  - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
  - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

#### Additional Solicitation Specific Review Criteria

- Does the proposal discuss how the proposed software will fill a recognized need and advance research capability within a significant area (or areas) of science and engineering?
- Does the proposal provide a project plan and timeline, including a proof-of-concept demonstration of any key software element and the steps necessary presented to take the software from prototype to dissemination into the community as reusable software resources?
- Are tangible metrics described to measure the success of any software that may be developed?
- Does the software engineering and development plan include and/or enable the integration of relevant research activities to ensure the software is responsive to new computing developments?
- To what extent are issues of sustainability, manageability, usability, composability, and interoperability addressed and integrated into the proposed software?
- Does the project plan include user interaction, a community-driven approach, and a timeline of new feature releases? Does it plan to extend the work to additional user communities?

## 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:

- All awardees are expected to participate in an Annual PI meeting with travel costs supported by the award.
- SSI awards are anticipated to be continuing awards and funds will be released annually subject to agreed-to milestones, and based on approval by NSF and the availability of funds.

## 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 prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following 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 all identified PIs and co-PIs on a given award. 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 [Research.gov](http://Research.gov), for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via [Research.gov](http://Research.gov) constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using [Research.gov](http://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:

- Daniel S. Katz, Program Director, OD/OCI, telephone: (703) 292-2254, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Barry I. Schneider, Program Director, OD/OCI, telephone: (703) 292-7383, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Peter H. McCartney, Program Director, BIO/DBI, telephone: (703) 292-8470, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Almadena Y. Chtchelkanova, Program Director, CISE/CCF, telephone: (703) 292-8910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Sol Greenspan, Program Director, CISE/CCF, telephone: (703) 292-8910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- John C. Cherniavsky, Senior Advisor, EHR, telephone: (703) 292-5136, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Sumanta Acharya, Program Director, ENG/CBET, telephone: (703) 292-7494, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Eduardo A. Misawa, Program Director, ENG/EEC, telephone: (703) 292-5353, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Barbara Ransom, Program Director, GEO/OCE, telephone: (703) 292-7792, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Eva Zanzerkia, Program Director, GEO/EAR, telephone: (703) 292-8556, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Thomas Statler, Program Director, MPS/AST, telephone: (703) 292-4910, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Evelyn Goldfield, Program Director, MPS/CHE, telephone: (703) 292-2173, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Daryl W. Hess, Program Director, MPS/DMR, telephone: (703) 292-4942, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Andrew D. Pollington, Program Officer, MPS/DMS, telephone: (703) 292-4878, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Jean Cottam Allen, Program Director, MPS/PHY, telephone: (703) 292-8783, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- William Y. B. Chang, Program Director, OD/OISE, telephone: (703) 292-7239, email: [SI2Queries@nsf.gov](mailto:SI2Queries@nsf.gov)
- Cheryl L. Eavey, Program Director, SBE/SES, telephone: (703) 292-7269, email: [SI2Queries@nsf.gov](mailto:SI2Queries@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>.

Related Programs:

See also:

- A Vision and Strategy for Software for Science, Engineering, and Education -- [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf12113](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12113)
- Implementation of NSF Software Vision -- [http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504817](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504817)

## 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: [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov)
  - or telephone: (703) 292-7827
- To Locate NSF Employees: (703) 292-5111

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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