Office of Advanced Cyberinfrastructure (OAC): Research Core Program

PROGRAM SOLICITATION
NSF 18-567

National Science Foundation

Directorate for Computer & Information Science & Engineering
Office of Advanced Cyberinfrastructure

Submission Window Date(s) (due by 5 p.m. submitter's local time):

November 01, 2018 - November 15, 2018

SMALL projects

October 31, 2019 - November 14, 2019

SMALL projects

IMPORTANT INFORMATION AND REVISION NOTES

The Office of Advanced Cyberinfrastructure (OAC) is now part of CISE's coordinated solicitations, along with core program solicitations for the CISE Divisions of Computing and Communication Foundations (CCF), Computer and Network Systems (CNS) and Information and Intelligent Systems (IIS).

- OAC will accept only Small proposals this year under this solicitation.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 18-1), which is effective for proposals submitted, or due, on or after January 29, 2018.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Office of Advanced Cyberinfrastructure (OAC): Research Core Program

Synopsis of Program:

The Office of Advanced Cyberinfrastructure (OAC) supports translational research and education activities in all aspects of advanced cyberinfrastructure (CI) that lead to deployable, scalable, and sustainable systems capable of transforming science and engineering research. Advanced CI includes the spectrum of computational, data, software, networking, and security resources, tools, and services, along with the computational and data skills and expertise, that individually and collectively can transform science and engineering. OAC supports advanced CI research to address new CI frontiers for discovery leading to major innovations, and supports the development and deployment processes, as well as expert services, necessary for realizing the research CI that is critical to the advancement of all areas of science and engineering research and education.

OAC research investments are characterized by their translational nature, i.e., building on basic research results and spanning the design to practice stages. They are further characterized by one or more of the following key attributes: multi-disciplinary, extreme-scale, driven by science and engineering research, end-to-end, and deployable as robust research CI. Areas of translational research supported by OAC include systems architecture and middleware for extreme-scale systems, scalable algorithms and applications, and the advanced CI ecosystem. Principal investigators (PIs) are *strongly encouraged* to contact an OAC cognizant program director listed in this solicitation with a 1-page project summary for further guidance. For foundational computer and information science and engineering research, PIs are referred to the core research programs of the Computer and Communication Foundations (CCF), Computer and Network Systems (CNS), and Information and Intelligent Systems (IIS) divisions of CISE.

Proposers are invited to submit proposals in one project class, which is defined as follows:

Small Projects - up to $500,000 total budget with durations up to three years.

A more complete description of this project class can be found in *Section II. Program Description* of this solicitation.

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.

- Sushil K. Prasad, telephone: (703) 292-5059, email: sprasad@nsf.gov
- Vipin Chaudhary, telephone: (703) 292-2254, email: vipchaud@nsf.gov
- Stefan A. Robila, telephone: (703) 292-2303, email: srobila@nsf.gov

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

- 47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 10 to 15

awards will be made each year

Anticipated Funding Amount: $5,000,000 to $7,500,000

per year, dependent upon the availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- 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.

Who May Serve as PI:

As of the submission deadline, PIs, co-PIs, or other senior project personnel must hold primary, full-time, paid appointments in research or teaching positions at US-based campuses/offices of organizations eligible to submit to this solicitation (see above), with exceptions granted for family or medical leave, as determined by the submitting institution. Individuals with primary appointments at for-profit, non-academic organizations, or overseas branch campuses of US IHEs are not eligible, even if they also have an appointment at a US campus.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 2

In any contiguous September through November period, an individual may participate as PI, co-PI or Senior Personnel in **no more than two** proposals across all size classes submitted in response to the *coordinated solicitations (where coordinated solicitations are defined to include the Computer and Network Systems (CNS): Core Programs, Computing and Communication Foundations (CCF): Core Programs, Information and Intelligent Systems (IIS): Core Programs, and the Office of Advanced Cyberinfrastructure (OAC): Core Program* solicitations). For example, between September 2018 and November 2018, an individual may participate as PI, co-PI or Senior Personnel in one proposal submitted to a core program in OAC and in a second proposal submitted to a core program in CNS, or an individual may participate as PI, co-PI or Senior Personnel in two proposals submitted to an IIS core program, etc.

These eligibility constraints will be strictly enforced in order to treat everyone fairly and consistently. In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on earliest date and time of proposal submission (i.e., the first two proposals received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

The limit on the number of proposals per PI, co-PI or Senior Personnel applies only to the *coordinated solicitations.*

Proposal Preparation and Submission Instructions

A. **Proposal Preparation Instructions**
- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
  - 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: https://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:**

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

C. **Due Dates**
- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):
- November 01, 2018 - November 15, 2018

  SMALL projects
- October 31, 2019 - November 14, 2019

  SMALL projects

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Office of Advanced Cyberinfrastructure (OAC) supports translational research and education activities in advanced cyberinfrastructure (CI) that lead to deployable, scalable, and sustainable systems capable of transforming science and engineering research. OAC seeks to foster the development of new knowledge in the innovative design, development, and utilization of robust research CI.

II. PROGRAM DESCRIPTION

OAC supports translational research and education to expand the future capabilities of CI specific to science and engineering research. By fostering a vibrant ecosystem of technologies and a skilled workforce of researchers, developers, staff, and users, OAC serves the growing community of scientists and engineers, across all disciplines, whose work relies on the power of advanced research CI. In pursuit of this mission, OAC supports the exploration, development, and deployment of a wide range of CI technologies within a highly interoperable and collaborative ecosystem. These include: advanced computing, networks, and services for computational and data-intensive science and engineering research; trustworthy, reusable, and sustainable community software for science and engineering; and robust and reusable data tools to aid all research communities in their management and use of digital information. In these efforts, OAC collaborates with all NSF directorates and offices to develop innovative models, prototypes, and approaches to research CI that open new frontiers for discovery, furthering the mission of NSF and national science and engineering priorities.

This solicitation aims to address the CI research challenges that significantly impact the future capabilities of advanced research CI by engaging the diverse community of computer and computational science and engineering researchers, scientists, faculty, and students. The context is the emerging translational research challenges as highlighted by various recent priorities and reports. For example, the National Strategic Computing Initiative (NSCI) states, “High-performance computing (HPC) is essential to the Nation’s global economic competitiveness, scientific discovery, and security.” Likewise, the Federal Big Data Research and Development Strategic Plan states, “A national Big Data innovation ecosystem is essential to enabling knowledge discovery from and confident action informed by the vast resource of new and diverse datasets that are rapidly becoming available in nearly every aspect of life.” The 2017 National Academies' report on Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017-2020 recognizes that “large-scale simulation and the accumulation and analysis of massive amounts of data are revolutionizing many areas of science and engineering research.”

The OAC core research program seeks innovative proposals for translational research on the design, development, deployment, experimentation, and application of advanced research CI. OAC research investments are further characterized by one or more of the following key attributes: multi-disciplinary, extreme-scale, driven by science and engineering research, end-to-end, and deployable as robust research CI. Multi-disciplinary computational and data-driven science and engineering research require leveraging techniques from multiple disciplines and may require collaboration among investigators from relevant disciplines/sub-disciplines (e.g., computer science and physics; operating systems and computer architecture, etc.). Extreme-scale CI research includes exploration of pathways to leading-edge, leadership-scale research CI, from architecture to algorithms to models. CI research driven by science and engineering research explores scalable models, algorithms, techniques and tools needed for fundamentally new scientific and engineering advances. End-to-end CI solutions include integrated systems in novel ways to support complete research workflows. Deployable CI research explores seamless pathways for integration into robust CI systems or operational scientific and engineering research applications.

As part of this investment, this solicitation seeks to broaden participation by a wide range of scientific disciplines and institutions, and by harnessing the capabilities of larger segments of diverse underrepresented groups. Proposals from, and in partnership with, the aforementioned communities are especially encouraged. For a multi-disciplinary project requiring CI and domain expertise, the proposal must include at least one funded or unfunded collaborator with expertise relevant to the targeted research discipline.

OAC Core Research Program Focus Areas

OAC projects must address new CI frontiers for discovery and lead to major innovations. The OAC core research areas include architectures and middleware for extreme-scale systems, scalable algorithms and applications, and the advanced CI ecosystem. Examples of research topics supported by OAC include (but are not limited to) the following:

- Research in architecture for extreme-scale systems may include design, benchmarking, and analysis of extreme-scale systems for performance, programmability, and usability; storage, networks, and input/output (I/O); data centers and extreme-scale networked systems; and next-generation architectures; Research in middleware may include resource management, monitoring, fault tolerance, and cybersecurity;
- Research in scalable algorithms and applications shall be driven by science and engineering applications and may include numerical and high-performance scientific computing methods; data, software and visualization; and modeling and simulation; and
- Research in the advanced CI ecosystem may include research in programming languages, libraries, and environments; performance tuning and interoperability tools; shared cyberinfrastructures, e.g., platforms and gateways; and sociotechnical aspects relevant to the advanced CI ecosystem, e.g., best practices, standards, policies, and virtual organizations.

Such translational CI research should be aimed towards realizing the next-generation extreme-scale research CI. Research in next-generation hardware and software systems should aim to increase coherence between the technology base used for modeling and simulation and that used for data analytics, allowing dynamic interaction between analysis and simulation. OAC core research should also aim to enable an enduring national advanced CI ecosystem allowing dynamic interaction of computation with other elements of the CI, such as scientific instruments, large data repositories, and mobile devices; integrating security and privacy as foundational elements; and significantly enhancing productivity in the development and use of parallel HPC applications.

The OAC core research program supports and sustains advancements in multiple disciplinary areas spanning computer as well as computational and data-driven science and engineering with advanced CI thrusts.

PIs are *strongly encouraged* to contact an OAC cognizant program director listed on this solicitation with a 1-page project summary for further guidance. PIs interested in the OAC core research program may also wish to consider the: (i) Software and Hardware Foundations (SHF) program in the CCF division for foundational research in algorithms, device-level architectures, and software engineering; (ii) CNS Core program, which includes advances in computing systems and programming that are particular to an application domain or a specific hardware platform; (iii) Information Integration and Informatics (III) program in the IIS division for foundational research related to data, information, and knowledge; (iv) Computational and Data-Enabled Science and Engineering (CDS&E) cross-cutting program; and (v) various computational and data-driven research programs in other NSF directorates that have their own disciplinary foci, including in the Directorates for Biological Sciences (BIO), Engineering (ENG), Geosciences (GEO), Mathematical & Physical Sciences (MPS), and Social, Behavioral & Economic Sciences (SBE).

Proposals on parallelism and scalability are supported through the Scalable Parallelism in the Extreme (SPX) program. SPX is particularly interested in "clean-slate" approaches that re-evaluate and possibly re-design the traditional hardware and software stack and typically require crossing multiple sub-disciplines in computing.

Proposals that address hardware and/or software security and thus provide the basis for designing, building, and operating a CI with improved resistance to malicious behavior may be in scope for the Secure and Trustworthy Cyberspace (SaTC) program.

For overlapping research agendas, PIs may choose the OAC core program as the primary program and another program as a secondary program on the cover page. Also see the section on Proposals for Consideration by Multiple CISE Programs below.

Validation or Transition-to-Practice Plan: OAC proposers are strongly encouraged to include a validation plan or a transition-to-practice plan for their proposed research in the Project Description. A validation plan may include setup, mechanisms, metrics, and exploration of leading-edge production systems (or equivalent simulated, emulated, or experimental systems). Transition-to-practice entails planning for incorporation of research results into production research CI.

Results Dissemination Plan: Proposals submitted to this solicitation must describe plans to ensure that the research results produced will be made available to the extent necessary to validate the findings independently, as indicated in PAPPG Chapter XI.D.4.

PROJECT CLASSES

Proposals submitted to this solicitation must be consistent with the class defined below.

- **SMALL Projects**

  Small Projects, with total budgets up to $500,000 for durations of up to three years, are well suited to one or two investigators (PI and one co-PI or other Senior Personnel) and at least one student and/or postdoc. A Collaboration Plan (up to 2 pages) **may** be provided under Supplementary Documents. Please see *Proposal Preparation Instructions* Section V.A for additional submission guidelines.

EVALUATION PLANS

PIs should include a plan to evaluate the approaches developed as part of the Project Description. Evaluation methods will depend on the research area; examples include results from development of theories, applications of techniques to specific domains, efficacy studies, scalability on local or global scales, generalization, quantifiable usability, robustness, reliability in benign or hostile environments, compatibility with existing environments, performance measures on benchmark datasets, and other such activities. The plan should be appropriate for the size and scope of the project.

BROADENING PARTICIPATION IN COMPUTING

CISE has long been committed to Broadening Participation in Computing (BPC). The under-representation of many groups—including women, African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons with disabilities—in computing deprives large segments of the population of the opportunity to be creators of technology and not only consumers. Ending underrepresentation will require a range of measures, including institutional programs and activities as well as culture change across colleges, departments, classes, and research groups.

With this solicitation, CISE is expanding a pilot effort started last year encouraging the research community to engage in meaningful BPC activities. This new activity builds on many of the programs, research, and resources created in CISE's long history of support for BPC, and it aligns with the recommendations of the Strategic Plan for Broadening Participation produced by the CISE Advisory

Committee in 2011. Specifically:

- Medium and Large projects submitted to other CISE core program solicitations must, by the time of award, have in place an approved BPC plan. In this ongoing pilot phase, CISE will work with the PI team following merit review and prior to making an award to ensure that plans are meaningful and include concrete metrics for success. CISE will also provide opportunities for PIs to share BPC experiences and innovations through program PI meetings.

- PIs submitting to this solicitation should note that CISE intends to conduct an evaluation of the effectiveness of the above approach and determine appropriate next steps, including potential further expansion of this effort to Small proposals in future years. PIs are therefore strongly encouraged to include plans, or begin preparing to include plans, for broadening participation activities in their proposals.

More information, including examples of BPC activities and metrics, can be found at: https://www.nsf.gov/cise/bpc/.

PROPOSALS FOR CONSIDERATION BY MULTIPLE CISE PROGRAMS

Proposals that intersect more than one CISE research program are welcome. In such cases, PIs must identify the most relevant programs in the proposal submission process (for information about submission and how to identify such proposals, see *Proposal Preparation Instructions* later in this document). CISE Program Officers will ensure that these proposals are co-reviewed as appropriate.

IMPORTANT PROJECT CHARACTERISTICS

The submission of far-reaching, creative research and education projects is encouraged. Funds will be used to support potentially transformative research with high-impact potential. In this way, CISE will catalyze exciting new research activities with the potential to make significant advances in the state of the art.

Interdisciplinary, international, and/or academic-industry collaborations that promise to result in major science or engineering advances are welcome. The directorate hopes to attract proposals from faculty at a broad range of academic institutions, including faculty at minority-serving and predominantly undergraduate institutions.

Proposals submitted should demonstrate that rich learning experiences will be provided for a diverse population of students and may propose the development of innovative curricula or educational materials that advance literacy about and expertise in areas supported by CISE.

Scientific progress often results by considering a special case of a general problem. If the proposed research falls into this category, PIs can help the reviewers and NSF staff better understand the intellectual merit and/or broader impacts of the proposal by discussing to what extent the findings are likely to generalize.

In the interest of completeness and transparency, PIs are strongly encouraged to describe, as part of their Data Management Plans, how they will provide access to well-documented datasets, modeling and/or simulation tools, and codebases to support reproducibility of their methods. For more information, see the Dear Colleague Letter “Encouraging Reproducibility in Computing and Communications Research” available at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17022.

START DATES

In order to avoid overdue reports blocking award actions during the end of a fiscal year, institutions are discouraged from seeking project start dates between July 2 and September 30 of a given year. Awardee institutions may incur allowable pre-award costs within the 90-day period immediately preceding the start date of the grant subject to the conditions specified in the PAPPG; this will allow support for students or other relevant activities to begin over this period.

III. AWARD INFORMATION

Up to $7.5 million each year will support up to 15 awards, pending the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- 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.

Who May Serve as PI:

As of the submission deadline, PIs, co-PIs, or other senior project personnel must hold primary, full-time, paid appointments in research or teaching positions at US-based campuses/offices of organizations eligible to submit to this solicitation (see above), with exceptions granted for family or medical leave, as determined by the submitting institution. Individuals with primary appointments at for-profit, non-academic organizations, or overseas branch campuses of US IHEs are not eligible, even if they also have an appointment at a US campus.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 2

In any contiguous September through November period, an individual may participate as PI, co-PI or Senior Personnel in **no more than two** proposals across all size classes submitted in response to the *coordinated solicitations (where coordinated solicitations are defined to include the Computer and Network Systems (CNS): Core Programs, Computing and Communication Foundations (CCF): Core Programs, Information and Intelligent Systems (IIS): Core Programs, and the Office of Advanced Cyberinfrastructure (OAC): Core Program* solicitations). For example, between September 2018 and November 2018, an individual may participate as PI, co-PI or Senior Personnel in one proposal submitted to a core program in OAC and in a second proposal submitted to a core program in CNS, or an individual may participate as PI, co-PI or Senior Personnel in two proposals submitted to an IIS core program, etc.

These eligibility constraints will be strictly enforced in order to treat everyone fairly and consistently. In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on earliest date and time of proposal submission (i.e., the first two proposals received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

The limit on the number of proposals per PI, co-PI or Senior Personnel applies only to the *coordinated solicitations.*

Additional Eligibility Info:

Subawards are not permitted to overseas branch campuses/offices of US-based proposing organizations eligible to submit to this solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

The following information SUPPLEMENTS (note that it does NOT replace) the guidelines provided in the NSF *Proposal & Award Policies & Procedures Guide (PAPPG)*.

Cover Sheet: PIs submitting Grant Opportunities for Academic Liaison with Industry (GOALI) proposals should select “GOALI” from the

Type of Proposal drop down list in the Proposal Preparation module in FastLane or Grants.gov. Please see Chapter II.E.4 of the PAPPG for additional information about preparing a GOALI proposal: https://www.nsf.gov/pubs/policydocs/pappg17_1/pappg_2.jsp#IIE4.

Proposal Titles:

Proposal titles should begin with "OAC Core" followed by a colon, then the project class ("Small") followed by a colon, then the title of your project, for example, **OAC Core: Small: Title**.

If you submit a proposal as part of a set of collaborative proposals, the title of the proposal should begin with "OAC Core" followed by a colon, then the project class ("Small") followed by a colon, followed by "Collaborative Research" followed by a colon, and the title. For example, if you are submitting a collaborative set of proposals the title of each would be **OAC Core: Small: Collaborative Research: Title.**

Proposals from PIs in institutions that have RUI (Research in Undergraduate Institutions) eligibility should have a proposal title of the proposal title that begins with "OAC Core" followed by a colon, then the project class ("Small") followed by a colon, followed by "RUI", followed by a colon and then the title, for example, **OAC Core: Small: RUI: Title.**

PIs submitting GOALI proposals should have a proposal title that begins with "OAC Core", followed by a colon then the project class ("Small"), followed by a colon then "GOALI", followed by a colon and then the title, for example, **OAC Core: Small: GOALI: Title**.

Proposals that extend beyond the scope of one CISE core program or area, or beyond CISE core programs, are welcome. Proposals should be submitted in response to the solicitation for the CISE division (CCF, CNS, IIS, or OAC) that includes the most relevant core program. In such cases, PIs should identify the acronym for the **most relevant** core program or area, followed by any other relevant program acronym(s) separated by colons (for example, **OAC Core: CHS: Small: Title**). In this case, the proposal would be submitted to the OAC solicitation but would be considered by OAC Core and IIS/Cyber-Human Systems (CHS) programs. CISE Program Officers will work with their NSF and CISE colleagues to ensure that these proposals are appropriately reviewed and considered for funding. Please see the coordinated CCF, CNS, and IIS solicitations for information on other CISE core programs and the corresponding acronyms.

Medium and Large proposals may not be submitted to the OAC Core program. Medium or Large proposals submitted simultaneously to any other CISE core program and the OAC core program will be returned without review (RWR).

Project Summary:

The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, a statement on the broader impacts of the proposed activity, and a set of keywords.

Please provide between 2 and 6 sets of keywords. CISE personnel will use this information in implementing the merit review process. The keywords should describe the main scientific/engineering areas explored in the proposal. Keywords should be prefaced with "Keywords" followed by a colon and each keyword set should be separated by semi-colons. Keywords should be of the type used to describe research in a journal submission, and may include technical areas of expertise necessary to review the proposal.

The list of keywords should be the last paragraph of the Overview section of the Project Summary, and might appear, for example, as **Keywords:** Geometric Modeling Tools; GPU-Accelerated Finite Element Analysis; Scientific Computations; Automated Framework; Information Visualization.

Project Description:

Length of Project Description - Describe the research and education activities to be undertaken in **up to 15 pages. Proposals that exceed these limits will be returned without review.**

PIs submitting to this solicitation should note that CISE intends to conduct an evaluation of the effectiveness of the BPC pilot approach and determine appropriate next steps, including potential further expansion of this effort in future years. PIs are therefore strongly encouraged to include plans, or begin preparing to include plans, for broadening participation activities in the Broader Impacts sections of their proposals.

Supplementary Documents:

In the Supplementary Documents section, upload the following information where relevant:

1. *A list of Project Personnel and Partner Institutions (Note: In collaborative proposals, the lead institution should provide this information for all participants):*

   Provide current, accurate information for all personnel and institutions involved in the project. NSF staff will use this information in the merit review process to manage reviewer selection. The list **must** include all PIs, Co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, and project-level advisory committee members. This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:

   1. Mary Smith; XYZ University; PI
   2. John Jones; University of PQR; Senior Personnel
   3. Jane Brown; XYZ University; Postdoc
   4. Bob Adams; ABC Community College; Paid Consultant
   5. Susan White; DEF Corporation; Unpaid Collaborator
   6. Tim Green; ZZZ University; Subawardee

2. *Collaboration Plans (optional for Small projects):*

   Note: In collaborative proposals, the lead institution should provide this information for all participants.

Since the success of collaborative research efforts are known to depend on thoughtful coordination mechanisms that regularly bring together the various participants of the project, the proposals that include more than one investigator may include a Collaboration Plan of up to 2 pages. The length of and degree of detail provided in the Collaboration Plan should be commensurate with the complexity of the proposed project. Where appropriate, the Collaboration Plan might include: 1) the specific roles of the project participants in all organizations involved; 2) information on how the project will be managed across all the investigators, institutions, and/or disciplines; 3) identification of the specific coordination mechanisms that will enable cross-investigator, cross-institution, and/or cross-discipline scientific integration (e.g., yearly conferences, graduate student exchange, project meetings at conferences, use of the grid for videoconferences, software repositories, etc.); and 4) specific references to the budget line items that support collaboration and coordination mechanisms.

3. *Data Management Plan (required):*

   Proposals must include a Supplementary Document of no more than two pages labeled "Data Management Plan." This Supplementary Document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. The Data Management Plan must also describe steps to ensure that relevant software and hardware artifacts, data and the results are available (for a reasonable time) beyond the end of the project lifecycle.

   See Chapter II.C.2.j of the PAPPG for full policy implementation.

   For additional information on the Dissemination and Sharing of Research Results, see: https://www.nsf.gov/bfa/dias/policy/dmp.jsp.

   For specific guidance for Data Management Plans submitted to the Directorate for Computer and Information Science and Engineering (CISE) see: https://www.nsf.gov/cise/cise_dmp.jsp.

4. *Results Dissemination Plan (required):*

   Proposals submitted to this solicitation must describe plans to ensure that the research results produced will be made available to the extent necessary to validate the findings independently, as indicated in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter XI.D.4.

5. *Documentation of collaborative arrangements of significance to the proposal through Letters of Collaboration:*

   There are two types of collaboration, one involving individuals/organizations that are included in the budget, and the other involving individuals/organizations that are not included in the budget. Collaborations that are included in the budget should be described in the Project Description. Any substantial collaboration with individuals/organizations not included in the budget should be described in the Facilities, Equipment and Other Resources section of the proposal (see PAPPG Chapter II.C.2.i). In either case, whether or not the collaborator is included in the budget, **a letter of collaboration from each named participating organization *other than the submitting lead, non-lead, and/or subawardee institutions* should be provided at the time of submission of the proposal. Such letters should explicitly state the nature of the collaboration, appear on the organization's letterhead and be signed by the appropriate organizational representative. These letters must not otherwise deviate from the restrictions and requirements set forth in the PAPPG, Chapter II.C.2.j.**

   Please note that letters of support may not be submitted. Such letters do not document collaborative arrangements of significance to the project, but primarily convey a sense of enthusiasm for the project and/or highlight the qualifications of the PI or co-PI. **Reviewers will be instructed not to consider these letters of support in reviewing the merits of the proposal.**

6. *Other specialized information:*

   RUI Proposals: PIs from predominantly undergraduate institutions should include a Research in Undergraduate Institutions (RUI) Impact Statement and Certification of RUI Eligibility in this section.

   GOALI proposals: PIs submitting GOALI proposals should include industry-university agreement letters on intellectual property in this section.

   No other Supplementary Documents, except as permitted by the NSF PAPPG, are allowed.

Single Copy Documents:

Collaborators and Other Affiliations Information:

Proposers should follow the guidance specified in Chapter II.C.1.e of the NSF PAPPG.

Note the distinction to item (1) under Supplementary Documents above: the listing of all project participants is collected by the project lead and entered as a Supplementary Document, which is then automatically included with all proposals in a project. The Collaborators and Other Affiliations are entered for each participant within each proposal and, as Single Copy Documents, are available only to NSF staff.

Collaborators and Other Affiliations due to participants listed on item (1) under Supplementary Documents above who are not PIs, co-PIs, or Senior Personnel can be uploaded under Additional Single Copy Documents using Transfer File.

Submission Checklist:

In an effort to assist proposal preparation, the following checklist is provided as a reminder of the items that should be checked before submitting a proposal to this solicitation. These are a summary of the requirements described above. For the items marked with (RWR), the proposal will be returned without review if the required item is noncompliant at the submission deadline.

All proposals:

- Should include a Results Dissemination Plan and Data Management Plan.
- The last line of the Overview section of the Project Summary should consist of the word “Keywords” followed by a colon and between 2-6 keyword sets, separated by semi-colons.
- The title should start with one of the following strings (submissions intended for OAC and also additional core programs described in the CCF, IIS, or CNS core solicitations should follow a similar pattern):

    - OAC Core: Small:
    - OAC Core: Small: Collaborative:

- In addition to the above title prefixes, proposals from PIs in institutions that have RUI (Research in Undergraduate Institutions) eligibility should include "RUI:" immediately before the proposal title, for example, **OAC Core: Small: RUI: Title**, and should include a Research in Undergraduate Institutions Impact Statement and Certification of RUI Eligibility. Similarly, PIs submitting Grant Opportunities for Academic Liaison with Industry (GOALI) proposals should select “GOALI” from the Type of Proposal drop down list in the Proposal Preparation module in FastLane or Grants.gov; and include "GOALI:" immediately before the proposal title, for example, **OAC Core: Small: GOALI: Title.**
- (RWR) Maximum budget shown on the Cover Sheet and on the budget pages must not exceed $500,000, including all institutions in a collaborative proposal, plus funds for embedded REU supplements.
- (RWR) The Project Description is limited to no more than 15 pages.
- A Collaboration Plan (up to 2 pages) **may** be provided as a Supplementary Document. If provided, the collaboration plan should include all institutions participating, not a separate plan for each institution.

Proposals that do not comply with the requirements marked as RWR will be returned without review.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Budgets must comply with the range limitations specified for Small project class.

C. Due Dates

- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):

    November 01, 2018 - November 15, 2018

        SMALL projects

    October 31, 2019 - November 14, 2019

        SMALL projects

D. FastLane / Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

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://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational

Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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 PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. 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 strategic objectives 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 must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of 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

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. (PAPPG 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 PAPPG 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.

B. Review and Selection Process

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

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. 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 strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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. After an administrative review has occurred, Grants and Agreements Officers perform 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, 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.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, 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 notice; (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 notice. 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 https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 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, 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 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. 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 Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Sushil K. Prasad, telephone: (703) 292-5059, email: sprasad@nsf.gov
- Vipin Chaudhary, telephone: (703) 292-2254, email: vipchaud@nsf.gov
- Stefan A. Robila, telephone: (703) 292-2303, email: srobila@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system 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 Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

NSF receives approximately 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 (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 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 https://www.nsf.gov

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

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

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act

of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314