

# Expeditions in Computing (Expeditions)

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## PROGRAM SOLICITATION NSF 20-544

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## REPLACES DOCUMENT(S): NSF 18-528

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### National Science Foundation

Directorate for Computer and Information Science and Engineering  
Division of Computing and Communication Foundations  
Division of Computer and Network Systems  
Division of Information and Intelligent Systems  
Office of Advanced Cyberinfrastructure

### Preliminary Proposal Due Date(s) (*required*) (due by 5 p.m. submitter's local time):

June 16, 2020

Expeditions

### Full Proposa Window

April 25, 2020 - April 24, 2021

April 25 - April 24, Annually Thereafter

InTrans

February 16, 2021

Expeditions

## IMPORTANT INFORMATION AND REVISION NOTES

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With this solicitation, the following changes have been made to the *Expeditions in Computing (Expeditions)* program:

- The total funding amount for each project has been increased;
- The duration of a given *Expeditions* award has been lengthened;
- Additional special award conditions have been added; and
- The *Innovation Transition (InTrans)* funding opportunity for *Expeditions*/Frontier projects has been revised to account for the above changes.

A revised version of the *NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 20-1)*, is effective for proposals submitted, or due, on or after June 1, 2020. Please be advised that, depending on the specified due date, the guidelines contained in [NSF 20-1](#) may apply to proposals submitted in response to this funding opportunity.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Expeditions in Computing (Expeditions)

#### Synopsis of Program:

The far-reaching impact and rate of innovation in the computer and information science and engineering fields has been remarkable, generating economic prosperity and enhancing the quality of life for people throughout the world.

More than a decade ago, the National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) established the *Expeditions in Computing (Expeditions)* program to build on past successes and provide the CISE research and education community with the opportunity to pursue ambitious, fundamental research agendas that promise to define the future of computing and information.

In planning **Expeditions projects**, investigators are strongly encouraged to come together within or across departments or institutions to combine their creative talents in the identification of compelling, transformative research agendas that look ahead by at least a decade and promise disruptive innovations in computer and information science and engineering for many years to come.

Now funded at levels up to \$15,000,000 for seven years, *Expeditions* projects represent some of the largest single investments currently made by the CISE directorate. Together with the Science and Technology Centers and the National Artificial Intelligence Research Institutes that CISE supports, *Expeditions* projects form the centerpiece of the directorate's center-scale award portfolio. With awards funded at levels that promote the formation of large research teams, CISE recognizes that concurrent research advances in multiple fields or sub-fields are often necessary to stimulate deep and enduring outcomes. The awards made in this program will complement research areas supported by other CISE programs, which target particular computer and information science and engineering fields.

Additionally, CISE offers **Innovation Transition (InTrans) awards** for teams nearing the end of their *Expeditions* as well as Secure and Trustworthy Cyberspace (SaTC) and Cyber-Physical Systems (CPS) Frontier projects. The goal of *InTrans* is to continue the long-term vision and objectives of CISE's center-scale projects. Through InTrans awards, CISE will provide limited funds to match industry support.

**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.

- Mitra Basu, Program Director, telephone: (703) 292-8910, email: [mbasu@nsf.gov](mailto:mbasu@nsf.gov)

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

- 47.070 --- Computer and Information Science and Engineering

## Award Information

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**Anticipated Type of Award:** Standard Grant or Continuing Grant

**Estimated Number of Awards:** 2 to 4

awards in each competition.

**Anticipated Funding Amount:** \$60,000,000

Up to \$60,000,000 total for each competition, subject to the availability of funds. *Expeditions* projects with total budgets of up to \$15,000,000 for a duration of seven years will be supported.

## Eligibility Information

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**Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) accredited in, and having a campus located in the U.S., with undergraduate, masters, and doctoral programs in computer and information science and engineering fields may submit proposals as lead or collaborative institutions. Subawardees may include two- and four-year U.S. IHEs, non-profit non-academic organizations such as independent museums, institutes, observatories, professional societies and similar organizations located in the U.S. that are directly associated with education or research activities in the computer and information science and engineering fields. Other organizations such as national laboratories, for-profit organizations and organizations in other countries may participate in the proposed activities if they have independent sources of support; they will not be supported by NSF.

**Who May Serve as PI:**

There are no restrictions or limits.

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

There are no restrictions or limits.

**Limit on Number of Proposals per PI or Co-PI: 1**

- An individual may participate in no more than one preliminary and if invited, one full *Expeditions* proposal per competition as PI, co-PI, or senior personnel.
- In the event that an individual exceeds this limit for a given deadline, any *Expeditions* proposal submitted to that deadline with this individual listed as a PI, co-PI, or senior personnel after the first proposal is received at NSF will be returned without review. No exceptions will be made.

## Proposal Preparation and Submission Instructions

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**A. Proposal Preparation Instructions**

- **Letters of Intent:** Not required
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **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](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](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:**  
Not Applicable

## C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):  
June 16, 2020  
Expeditions
- **Full Proposa Window**  
April 25, 2020 - April 24, 2021  
April 25 - April 24, Annually Thereafter  
InTrans
- February 16, 2021  
Expeditions

## Proposal Review Information Criteria

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### Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria 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:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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## I. INTRODUCTION

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The computer and information science and engineering community has made significant contributions to society over the past 50 years, generating research and education outcomes that have fueled economic growth, improved national security, and resulted in products and services that have transformed the everyday lives of people across the Nation and around the world.

More than a decade ago, NSF's CISE directorate established the *Expeditions in Computing (Expeditions)* program to build on past successes and tap the great reservoir of opportunities that fundamental research advances in computer and information science and engineering promise for the future. The program is designed to inspire the CISE research and education community to be as creative and imaginative as possible in the design of bold *Expeditions* projects that explore new scientific frontiers. Investigators in the computer and information science and engineering fields and beyond are strongly encouraged to come together within and/or across departments or institutions in the development of compelling, transformational research agendas that promise disruptive innovations at the frontiers of computer and information science and engineering for many years to come.

Based on recent community inputs, with this solicitation, CISE is modifying the *Expeditions* program to support the long-term transformational nature of research supported under this program. Specifically, CISE is increasing the funding level and lengthening the duration of *Expeditions* projects funded pursuant to this solicitation. In recent years, the nature of the frontier problems that are especially well suited for the *Expeditions* program have changed in several ways. First, these types of problems are increasingly complex, multidisciplinary, data-intensive and computationally challenging. Second, many *Expeditions* problems are increasingly driven/motivated by societal impact; in order for outcomes of such work to be societally relevant and truly effective, CISE researchers must increasingly collaborate with colleagues in other disciplines. Consequently, the success of *Expeditions* projects requires additional expertise, in the form of additional individuals, as part of the multidisciplinary teams. Given the additional complexity and the larger team sizes, *Expeditions* projects are likely to require additional time to ramp up and maximize impacts. Therefore, the maximum budgets and durations of *Expeditions* projects have been increased.

Additionally, *Innovation Transition (InTrans)* funding is available for *Expeditions* projects and Frontier projects that are in the final two years of their original awards.

*InTrans* aims to continue the long-term vision and objectives of CISE's center-scale projects by (1) enabling maturation and deployment of successful research and innovation results in industry; and (2) facilitating continued support for these projects by industry, which in turn will lead to the development of future technologies.

## II. PROGRAM DESCRIPTION

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The *Expeditions* program has three goals:

- To catalyze far-reaching research or research cyberinfrastructure explorations motivated by deep scientific questions or hard problems in the computer and information science and engineering fields and/or by compelling applications and novel technologies that promise significant scientific and/or societal benefits;
- To inspire current and future generations of Americans, especially those from under-represented groups, to pursue rewarding careers in computer and information science and engineering; and
- To stimulate significant research and education outcomes that, through effective knowledge transfer mechanisms, promise scientific, economic and/or other societal benefits.

*Expeditions* projects should be ambitious and potentially transformative. They should exploit advances in computer and information science and engineering; and/or use-driven cyberinfrastructure research that may accelerate discovery and innovation across science and engineering, while advancing the frontiers of what is believed to be possible.

Projects supported by the *Expeditions* program have the following characteristics:

- They foster research climates that nurture creativity and informed risk-taking, and value complementary research and education contributions such that the whole *Expeditions* project is greater than the sum of its parts;
- They draw upon well-integrated, diverse teams of investigators from computer and information science and engineering fields, and from other fields of science and engineering as appropriate for a given project;
- They advance the frontiers of knowledge and technology in computer and information science and engineering fields;
- They stimulate effective knowledge transfer; and
- They demonstrate experimental systems, support shared experimental facilities (including instruments, platforms and/or testbeds), and/or deploy research cyberinfrastructure to accelerate discovery and learning.

An *Expeditions* proposal should have a long-term vision, with objectives that could not be attained simply by a collection of smaller proposals provided

with similar resources. Project descriptions must be comprehensive and well-integrated, and should make a convincing case that the collaborative contributions of the project team will be greater than the sum of each of their individual contributions. Rationale must be provided to explain why a budget of this size is required to carry out the proposed work, and how the budget is apportioned among the participating team members and institutions. 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, these must be articulated in the proposal.

With this solicitation, the *Expeditions* program is affording projects up to seven years of support. By increasing the project duration, CISE aims to address the evolving nature of the proposed *Expeditions*-scale research problems. A longer runway will enable researchers to produce reasonable outcomes from these emerging multi-faceted problems and pave a path toward longer-term sustainability of the research results. PIs are strongly encouraged to avail of this longer duration in their project planning, especially by utilizing the first two years of the project term to ramp up project planning and recruitment, and using the final two years of the project term to explore stretch goals identified during the project as well as next steps for the *Expeditions* effort.

*Expeditions* projects represent some of the largest single investments made by CISE. Together with the Science and Technology Centers and the National Artificial Intelligence Research Institutes that the CISE directorate supports, *Expeditions* projects form the centerpiece of the directorate's center-scale award portfolio. At steady state, CISE supports 10 to 12 *Expeditions* projects at any given time; together, this portfolio of active projects demonstrates the tremendous potential of computer and information science and engineering innovations.

#### **New proposals from current Expeditions awardees:**

New proposals from current *Expeditions* awardees will be evaluated in an open competition with all other proposals. All *Expeditions* proposals must introduce substantially new research topics and undertake innovative research, which will be evaluated through NSF's two review criteria and additional *Expeditions* review criteria. All *Expeditions* proposals are expected to articulate prior research outcomes for project staff, which are also part of the review. It is expected that new proposals from current *Expeditions* awardees will demonstrate research excellence, significant achievements, noteworthy impacts, outreach success, and collaborations with industry and/or other partners, as appropriate, based on the corresponding current *Expeditions* projects.

#### **Innovation Transition (InTrans) for Expeditions/Frontier projects in their final two years:**

*InTrans* awards are intended for teams nearing the end of their *Expeditions* or SaTC or CPS Frontier projects.

The goal of *InTrans* is to continue the long-term vision and objectives of CISE's center-scale projects by

1. enabling maturation and deployment of successful research and innovation results in industry; and
2. facilitating continued support for these projects by industry, which in turn will lead to the development of future technologies.

*This opportunity is available to all Expeditions and Frontier projects that are in the final two years of their original awards.* For purposes of *InTrans*, a "project team" refers to the institution or group of institutions that (and the associated principal investigators (PIs) and co-PIs who) submitted a successful proposal or collaborative proposal in response to the Expeditions, SaTC Frontiers or CPS Frontiers program solicitations. Prior to submission of an *InTrans* proposal, the proposer must secure industry funding for the continuation of the research supported under the *Expeditions* or Frontier award. Industrial funding must last at least three years, and must commence prior to the original *Expeditions* or Frontier award expiration date, not accounting for any no-cost extensions.

*InTrans* proposals will be evaluated in accordance with the standard NSB-approved merit review criteria using an *ad hoc* review process. Any prospective PI is required to consult with his/her *Expeditions* or Frontier program officer prior to submission of an *InTrans* proposal.

Any software developed through an *InTrans* award is required to be released under an open source license listed by the Open Source Initiative (<http://www.opensource.org>) Researchers who develop software that has been declared as a deliverable in the *InTrans* proposal agree not to incorporate any third-party code into this software that would limit or restrict its ability to be distributed under an open source license.

#### **BROADENING PARTICIPATION**

CISE is committed to enhancing the community's awareness of and overcoming barriers to Broadening Participation in Computing (BPC), and to providing information and resources to PIs so that they can develop interest, skills, and activities in support of BPC at all levels of the CISE community (K-12, undergraduate, graduate, and postgraduate). Indeed, CISE supports meaningful actions that address the longstanding underrepresentation of various populations, including women, minorities (African Americans/Blacks, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons from economically disadvantaged backgrounds), and persons with disabilities, in the computing field. Towards this end, CISE is piloting a requirement for meaningful BPC plans in all proposals submitted to the *Expeditions* program. As noted in the Proposal Preparation Instructions below, a portion of the budget for each *Expeditions* proposal should be used to engage relevant BPC expertise to help plan, organize, coordinate and execute these activities. BPC activities should be pervasive and proportional to the breadth and scale of the project team. Additional resources and information, including examples of meaningful BPC activities and metrics, can be found on the CISE BPC webpage: <https://www.nsf.gov/cise/bpc/>.

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### **III. AWARD INFORMATION**

Estimated program budget is up to \$60,000,000 for each competition, subject to the availability of funds. Two to four new awards will be made in each competition. *Expeditions* projects with total budgets of up to \$15,000,000 for a duration of seven years will be supported.

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### **IV. ELIGIBILITY INFORMATION**

#### **Who May Submit Proposals:**

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) accredited in, and having a campus located in the U.S., with undergraduate, masters, and doctoral programs in computer and information science and engineering fields may submit proposals as lead or collaborative institutions. Subawardees may include two-and four-year U.S. IHEs, non-profit non-academic organizations such as independent museums, institutes, observatories, professional societies and similar organizations located in the U.S. that are directly associated with education or research activities in the computer and information science and engineering fields. Other organizations such as national laboratories, for-profit organizations and organizations in other countries may participate in the proposed activities if they have independent sources of support; they will not be supported by NSF.

#### Who May Serve as PI:

There are no restrictions or limits.

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

There are no restrictions or limits.

#### Limit on Number of Proposals per PI or Co-PI: 1

- An individual may participate in no more than one preliminary and if invited, one full *Expeditions* proposal per competition as PI, co- PI, or senior personnel.
- In the event that an individual exceeds this limit for a given deadline, any *Expeditions* proposal submitted to that deadline with this individual listed as a PI, co-PI, or senior personnel after the first proposal is received at NSF will be returned without review. No exceptions will be made.

#### Additional Eligibility Info:

Each *Expeditions* or Frontier project team is limited to the submission of two *InTrans* proposals over the lifetime of the award.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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**Preliminary Proposals (required):** Preliminary proposals are required and must be submitted via the NSF FastLane system.

**Preliminary Proposal Preparation Instructions (for Expeditions proposals):** When preparing a preliminary proposal, proposers are advised to review the Program Description, the Proposal Review Information and the preliminary proposal preparation instructions described below. A preliminary proposal will consist only of the following:

1. Cover Sheet. For planning purposes, enter a start date that is approximately 19 months after the preliminary proposal due date. Titles must begin with "Expeditions", followed by a colon, then the title of the project. On the cover sheet, the proposing organization must click on the "Preliminary Proposal" check box.
2. Project Summary (1 page). The Project Summary should consist of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. Provide a rationale for the *Expeditions* project, describing the unique opportunities to be pursued, and indicating its potential impact. The summary should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader. Provide a clear description of the proposed *Expeditions* project, its overarching goals, its distinguishing features and foci. The names of the collaborative institutions involved and the major contribution of each to the project must be included in the description. The *Intellectual Merit* and *Broader Impacts* merit review criteria must be addressed in separate statements (see NSF's PAPPG for additional instructions).
3. Table of Contents (automatically generated by FastLane).
4. Project Description. In addition to the requirements in the PAPPG, the Project Description must address Sections (4.a), (4.b) and (4.d) below. Section (4.c) should be addressed, where appropriate. The Project Description is **limited to 11 pages** including tables and illustrations, regardless of the number of research groups or themes. URL's may not be used (see PAPPG for additional information).
  - (4.a) Describe the overarching vision and goal(s) of the proposed *Expeditions* project. Describe the contributing research, education and knowledge transfer themes or components, emphasizing how "the whole" *Expeditions* project is greater than the sum of the individual theme or component parts. Describe how the project will contribute to realization of the *Expeditions* program goals (address all three as described in the *II. Program Description* section of this solicitation) and demonstrate the *Expeditions* characteristics (addressing all five as described in the *II. Program Description* section of this solicitation). Provide sufficient detail to allow assessment of the Intellectual Merit and Broader Impacts of the project and the necessity for support at the requested investment level.
  - (4.b) Leadership and collaboration. Describe the organizational structure of the *Expeditions* project, including plans for integrating and managing all organizations and individuals involved in all components of the *Expeditions* project to ensure the project goals are met. Explain how collaboration across individuals and organizations will be assured. Describe how effective collaboration will lead to enhanced project outcomes. Note that the leadership team should consist of an individual whose assigned function is to provide coordination for the project.
  - (4.c) Experimental systems or shared experimental facilities (where appropriate). Describe the experimental system to be demonstrated and/or shared experimental facilities (e.g., instruments, platforms, and testbeds) to be used or established and describe how these activities add value to the project.

(4.d) Broadening participation plan (1 page). All Expeditions projects must include meaningful **Broadening Participation in Computing (BPC)** plans within the Broader Impacts sections of the Project Descriptions. These plans must seek to increase the participation of underrepresented groups in computing. This plan should be clearly identifiable within the Project Description text and should represent a clear, actionable effort with an evaluation plan. A portion of the budget should be used to engage relevant BPC expertise to help plan, organize, coordinate and execute these activities. If a PI plans to become a part of an institutional broadening participation effort, then the PI must report on his/her specific contribution within that effort. Proposals that plan interventions that appeal to "all students" can be considered a broadening participation effort if the content is relevant to specific, targeted underrepresented groups within the student body. BPC activities should be pervasive and proportional to the breadth and scale of the project team. Additional resources and information, including examples of meaningful BPC activities and metrics, can be found on the CISE BPC webpage: <https://www.nsf.gov/cise/bpc/>.

5. Budget (see NSF PAPPG). Provide a one-page budget summary for the full seven-year period. This should be entered in Budget Year 1 in FastLane. (FastLane will automatically generate a cumulative budget that is identical to the full seven-year budget you entered in Year 1.) The proposed budget should be consistent with the needs and complexity of the proposed activity. The budget justification should provide some information for each year of the full seven-year period, showing how funds will be allocated to the project components during the various phases [see Full Proposal Preparation Instructions, (5) Budget], and shared facilities that will be required (where necessary).
6. References Cited (two-page limit). Use the instructions from the NSF PAPPG when observing the two-page limit.
7. Biographical Sketches (two-page limit per person). Biographical sketches are required for all key project personnel (lead PI, each co-PI, and senior personnel or their equivalent). Follow instructions provided in the NSF PAPPG. Copies of publications should not be included or sent to NSF.
8. Special Information and Required Supplementary Documents (required information to be entered in the Supplementary Documents section of FastLane except for collaborative proposals, where **only** the lead institution should provide the information described below).

Lists of Partner Institutions and Project Personnel. Provide current, accurate information for the two required lists described below. This information provides NSF and reviewers with a comprehensive list of personnel and institutions involved in the *Expeditions* project, and will be used in the merit review process to manage reviewer selection.

- o Partner Institutions. List all institutions and organizations for which there are corresponding project personnel. List all partner organizations at the time of submission of the preliminary proposal. Organize the list of institutions involved in the *Expeditions* project into the following categories, as applicable: Academic Institutions (colleges, universities), National Laboratories, Federal Government, Industry, Non-Governmental Organizations, State and Local Government, International, and Other. For each category, list the partner institutions for that category in alphabetical order.
- o Project Personnel. List all project personnel who have a role in the management, research, education, outreach, BPC and knowledge transfer components of the *Expeditions* project. Use the following format:

first name, last name, institution/organization.

9. Required information to be submitted to NSF via the FastLane Single Copy Documents Section as a PDF file/document, except for collaborative proposals, where **only** the lead institution should provide the information described below.

*Collaborators and Other Affiliations Information (required):* Information regarding collaborators and other affiliations (COA) must be separately provided for each individual identified in list (8.a). The COA information must be uploaded using the NSF COA template into the Single Copy Documents section as described in PAPPG Chapter II.C.1.e. The accuracy of this section is very important to the integrity of the Expeditions review process. Please be accurate and complete with the entries.

Note the distinction to the first item 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 individual identified as Senior Personnel within each proposal and, as Single Copy Documents, are available only to NSF staff.

No other items or appendices are to be included. Information pertaining to "Current and Pending Support", "Facilities, Equipment and Other Resources" and "Data management Plan" are not required for preliminary proposals and should not be included. Preliminary proposals containing items other than those required above will not be reviewed or considered for NSF funding.

#### Information to be submitted to NSF via email:

Lead Proposers are encouraged to contact the cognizant Program Director via email to [cise-expeditions@nsf.gov](mailto:cise-expeditions@nsf.gov) one week prior to submission with a list of prospective project personnel.

*Immediately after submission of their proposal and receipt of the proposal number from FastLane, send an email to: [cise-expeditions@nsf.gov](mailto:cise-expeditions@nsf.gov) with the below document. The subject heading of the email should note the proposal number and the lead institution.*

*A single Microsoft PowerPoint slide summarizing the vision of your Expeditions proposal.*

This slide will be used during review panel discussions. Remember to email this PowerPoint slide to:

[cise-expeditions@nsf.gov](mailto:cise-expeditions@nsf.gov); do not use FastLane.

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

- 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](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) 292-8134 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: ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](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) 292-8134 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. 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.

#### For Expeditions Full Proposals:

A full proposal may be submitted by invitation only, based on the evaluation of the preliminary proposal. Full proposals will be accepted **ONLY IF INVITED** by NSF. Full proposals **not invited** will be returned without review.

When preparing a full proposal for this competition, proposers are advised to review the Program Description and the Proposal Review Information found in this solicitation for general information pertinent to this program. Proposers are encouraged to review the most current NSF PAPPG or NSF Grants.gov Application Guide.

Every effort should be made to update information that was provided in the preliminary proposal and to fully address issues raised in the merit review of the preliminary proposal.

The following solicitation-specific exceptions and additions to the PAPPG and NSF Grants.gov Application Guide guidelines apply to proposals submitted to this solicitation.

1. **Cover Sheet.** For planning purposes, enter a start date that is approximately 11 months after the full proposal deadline. For *Expeditions* proposals: titles must begin with "Expeditions", followed by a colon, then the title of the project. The proposing organization should identify in the block entitled, "Show Related Preliminary Proposal Number", the related preliminary proposal number assigned by NSF.
2. **Project Summary** (1 page). The Project Summary should consist of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. Provide a rationale for the *Expeditions* project, describing the unique opportunities to be pursued, and indicating the potential impact of the project. The summary should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader. Provide a clear description of the proposed *Expeditions* project, its overarching goals, its distinguishing features and foci. The names of the collaborative institutions involved and the major contribution of each to the project must be included in the description. The overview should include a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed.

The *Intellectual Merit* and *Broader Impacts* merit review criteria must be addressed in separate statements (see NSF's PAPPG for additional instructions).

3. **Project Description.** In addition to the requirements in the PAPPG, the Project Description must address Sections (3.a) through (3.c), and (3.e) below. Section (3.d) should be addressed, where appropriate. The Project Description is **limited to 25 pages** including tables and illustrations, regardless of the number of research groups or themes. URL's may not be used (see PAPPG for additional information).

(3.a) Describe the overarching vision and goal(s) of the proposed *Expeditions* project. Describe the contributing research, education and knowledge transfer themes or components, emphasizing how "the whole" *Expeditions* project is greater than the sum of the individual theme or component parts. Describe how the project will contribute to realization of the *Expeditions* program goals (address all three as described in the *II. Program Description* section of this solicitation) and demonstrate the *Expeditions* characteristics (address all five as described in the *II. Program Description* section of this solicitation). Provide sufficient detail to allow assessment of the Intellectual Merit and Broader Impacts of the project and the necessity for support at the requested investment level.

(3.b) Leadership and collaboration. Describe the organizational structure of the *Expeditions* project, including plans for integrating and managing all organizations and individuals involved in all components of the *Expeditions* project to ensure the project goals are met. Explain how collaboration across individuals and organizations will be assured. Describe how effective collaboration will lead to enhanced project outcomes. Note that the leadership team should consist of an individual whose assigned function is to provide coordination for the project.

(3.c) Intellectual property and ethics (up to 1 page). Provide a clear statement of the *Expeditions* project's policies on intellectual property and ethics. Discuss the nature of the research, methodologies used, ownership and ideas, and roles and responsibilities with respect to intellectual property. Describe the program of ethics to be implemented (required), which should include all project and subawardee staff (including faculty, visiting faculty, industrial fellows, postdoctoral researchers, graduate and undergraduate students).

(3.d) Experimental systems or shared experimental facilities (where appropriate). Describe the experimental system to be demonstrated and/or shared experimental facilities (e.g., instruments, platforms, and testbeds) to be used or established and describe how these activities add value to the project.

(3.e) Broadening participation plan (up to 2 pages). All *Expeditions* projects must include meaningful **Broadening Participation in Computing (BPC)** plans within the Broader Impacts sections of the Project Descriptions. These plans must seek to increase the participation of underrepresented groups in computing. This plan should be clearly identifiable within the Project Description text and should represent a clear, actionable effort with an evaluation plan. A portion of the budget should be used to engage relevant BPC expertise to help plan, organize, coordinate and execute these activities. If a PI plans to become a part of an institutional broadening participation effort, then the PI must report on his/her specific contribution within that effort. Proposals that plan interventions that appeal to "all students" can be considered a broadening participation effort if the content is relevant to specific, targeted underrepresented groups within the student body. BPC activities should be pervasive and proportional to the breadth and scale of the project team. Additional resources and information, including examples of meaningful BPC activities and metrics, can be found on the CISE BPC webpage: <https://www.nsf.gov/cise/bpc/>.



4. **Budget** (see NSF PAPPG or Grants.gov Application Guide). Provide a detailed budget for each of the seven years, grouped into three phases: Phase 1: The Acceleration Phase – up to \$3 million total across Years 1 and 2; Phase 2: The Steady-State Phase – up to \$3 million per year for Years 3, 4 and 5, for a total of \$9 million across Years 3-5; and Phase 3: The Wrap-Up Phase – up to \$3 million total across Years 6 and 7. Note that funding for Phase 3 (Years 6 and 7) is contingent upon a successful site visit during Year 5 (see Special Award Conditions). FastLane or Grants.gov will automatically generate a cumulative budget. The budget and budget justification should account for start-up time at the commencement of the *Expeditions* project. The budget should include funds for travel to the Washington, DC, area of the essential members of the PI team and key students for one meeting of awardees. Submit a separate budget and budget justification for each subawardee institution. Identify items of equipment costing more than \$10,000, full justification of these items is required.
5. **Special Information and Required Supplementary Documents** (required information to be entered in the Supplementary Documents section of FastLane or Grants.gov except for collaborative proposals, where **only** the lead institution should provide the information described below).

(5.a) Lists of Partner Institutions and Project Personnel. Provide current, accurate information for the two required lists described below. This information provides NSF and reviewers with a comprehensive list of personnel and institutions involved in the *Expeditions* project, and will be used in the merit review process to manage reviewer selection.

- o Partner Institutions. List all institutions and organizations for which there are corresponding project personnel. List all partner organizations at the time of submission of the full proposal. Organize the list of institutions involved in the *Expeditions* project into the following categories, as applicable: Academic Institutions (colleges, universities), National Laboratories, Federal Government, Industry, Non-Governmental Organizations, State and Local Government, International, and Other. For each category, list the partner institutions for that category in alphabetical order.
- o Project Personnel. List all project personnel who have a role in the management, research, education, outreach, and knowledge transfer components of the *Expeditions* project. Use the following format:

first name, last name, institution/organization.

(5.b) Data Management Plan (see Chapter II.C.2.j of the NSF PAPPG for further information about this requirement, and also [https://www.nsf.gov/cise/cise\\_dmp.jsp](https://www.nsf.gov/cise/cise_dmp.jsp) for specific guidance for Data Management Plans submitted to CISE directorate).

6. **Single Copy Documents**. (Required information submitted to NSF via the FastLane Single Copy Documents Section) as a PDF file/document, except for collaborative proposals, where **only** the lead institution should provide the information described below.

*Collaborators and Other Affiliations Information (required)*: Information regarding collaborators and other affiliations (COA) must be separately provided for each individual identified in list (5.a). The COA information must be uploaded using the NSF [COA template](#) into the Single Copy Documents section as described in the PAPPG Chapter II.C.1.e. The accuracy of this section is very important to the integrity of the Expeditions review process. Please be accurate and complete with the entries.

Note the distinction to the first item 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 individual identified as Senior Personnel within each proposal and, as Single Copy Documents, are available only to NSF staff.

Information pertaining to Current and Pending Support is required for full proposal. Follow instructions in the NSF PAPPG.

#### Information to be submitted to NSF via email:

Lead Proposers are encouraged to contact the cognizant Program Director via email to [cise-expeditions@nsf.gov](mailto:cise-expeditions@nsf.gov) one week prior to submission with a list of prospective project personnel.

*Immediately after submission of their proposal and receipt of the proposal number from FastLane, send an email to: [cise-expeditions@nsf.gov](mailto:cise-expeditions@nsf.gov) with the below document. The subject heading of the email should note the proposal number and the lead institution.*

*A single Microsoft PowerPoint slide summarizing the vision of your Expeditions proposal.*

This slide will be used during review panel discussions. Remember to email this PowerPoint slide; do not use FastLane.

#### For InTrans Full Proposals:

Proposers must use the following guidelines in preparation of InTrans proposals:

- For InTrans proposals: titles must begin with "InTrans", followed by a colon, then the title of the project. Each Expeditions or Frontier project team is limited to the submission of two *InTrans* proposals over the lifetime of the award.
- A proposal may include a subset of the original PIs and/or institutions and may add new investigators and/or institutions, if needed.
- Research is expected to build on innovations developed within the Expedition or Frontier project. The proposal must include a collaboration plan detailing close coordination with the industry partner(s). The fundamental research results of the Expedition project must drive more applied research with the potential to enable the industry partner(s) to develop technological innovations with concrete and tangible positive impacts for society. The collaboration must also provide students opportunities to work closely with industry researchers. Industry funding should be for at least three years.
- The total of NSF funding for all InTrans awards to any one Expedition or Frontier project team must not exceed \$1.5 million. For a single InTrans proposal, the NSF budget(s) must not (in total in the case of multi-institution collaborations) exceed one-third of the total co-funding support provided by industry (excluding in-kind contributions such as collaboration of industry personnel). In addition, the yearly budget total of the NSF *InTrans* proposal cannot exceed the yearly co-funding from the industry partner(s). As an example, if an industry partner commits \$4.2 million total, the NSF *InTrans* award(s) cannot exceed \$1.4 million total for a combined total of \$5.6 million.
- Each *InTrans* proposal must include, as a Supplementary Document, a letter of commitment from each industry partner. Each letter should describe the collaboration of the industry partner and/or affirm the collaboration plan provided by the proposer, provide details regarding disposition of intellectual property, and specify the total funding anticipated to be provided. The letter must be signed by an authorized representative of the industry partner. The duration of an NSF *InTrans* award is intended to be up to two years, regardless of the duration of the

industry funding.

- Industry contributions should be specifically for the purpose of research needed for transitioning Expeditions or Frontier project results to practice, and the accompanying letter of collaboration from the industry partner(s) should clearly state that. For example, *InTrans* will NOT entertain a request to cover the matching portion of any membership fee that an industry partner pays to join a consortium or industry advisory board.
- The *InTrans* project may be reviewed via a site visit or reverse site visit at the end of the first year of the *InTrans* award as deemed necessary by NSF.

## B. Budgetary Information

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### Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

## C. Due Date

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- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):

June 16, 2020

Expeditions

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

April 25, 2020 - April 24, 2021

April 25 - April 24, Annually Thereafter

*InTrans*

February 16, 2021

Expeditions

## D. FastLane/Research.gov/Grants.gov Requirements

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### For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at:

<https://www.fastlane.nsf.gov/a1/newstan.htm>. To prepare and submit a proposal via Research.gov, see detailed technical instructions

available at: [https://www.research.gov/research-portal/appmanager/base/desktop?](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html)

[\\_nfpb=true&\\_pageLabel=research\\_node\\_display&\\_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html](https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html).

For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail

[fastlane@nsf.gov](mailto:fastlane@nsf.gov) or [rgov@nsf.gov](mailto:rgov@nsf.gov). The FastLane and Research.gov Help Desk answers general technical questions related to the use

of the FastLane and Research.gov systems. 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: <https://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](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.

Proposers that submitted via FastLane or Research.gov may use Research.gov 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 PROCEDURE

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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 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/](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

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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. (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.

#### **Additional Solicitation Specific Review Criteria**

*Value-added by funding the activity as an Expeditions project:*

- Are the identified research, education and broadening participation goals of sufficient import, scale, and/or complexity to justify this type of investment?
- Will the proposed activity contribute to realization of the *Expeditions in Computing* program goals and is it likely to demonstrate the characteristics described in the solicitation? Note, the three program goals are to (1) catalyze far-reaching research explorations motivated by deep scientific questions or hard problems in the computer and information science and engineering fields, and/or by compelling applications that promise significant societal benefits; (2) inspire current and future generations of Americans, especially those from underrepresented groups, to pursue rewarding careers in computer and information science and engineering; and (3) stimulate significant research and education outcomes that, through effective knowledge transfer mechanisms, promise scientific, economic, and/or other societal benefits.
- Does the timeline and research activities proposed in the project reflect clearly a plan that corresponds with the necessity of a 7-year project? Is it well-grounded?
- As appropriate, comment on the value of the experimental systems or shared experimental facilities proposed.

*Leadership and Collaboration Plan:*

- Does the leadership team convincingly demonstrate the goals, experience, and capacity to manage a complex, multi-faceted, and innovative research, education, and knowledge transfer enterprise?
- Does the leadership team include a project coordinator with clear description of role and responsibilities of the individual?
- What is the likely effectiveness of the proposed leadership and collaboration plan?
- Is there documentation of institutional and other commitments to the proposed activity?
- Is the requested budget appropriate for the scope and complexity of the research, education and knowledge transfer projects proposed?
- Does the proposed collaboration approach promise significant value added?

New proposals from current Expeditions awardees will be evaluated in an open competition with all other proposals. All Expeditions proposals must introduce substantially new research topics and undertake innovative research, which will be evaluated through NSF's two review criteria and additional Expeditions review criteria. All Expeditions proposals are expected to articulate prior research outcomes for project staff, which are also part of the review. It is expected that new proposals from current Expeditions awardees will demonstrate research excellence, significant achievements, noteworthy impacts, outreach success, and collaborations with industry and/or other partners, as appropriate, based on the corresponding current Expeditions projects.

## **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, or Reverse Site 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

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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 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](https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 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 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](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg).

#### Special Award Conditions:

It is anticipated that each *Expeditions* project will be merit reviewed in two site visits conducted during Year 2 and Year 5 respectively. The site visit during Year 2 will assess project progress and determine if the project warrants continued support in Years 3 through 5. The site visit during 5 will assess the project progress and determine if the project warrants support for Years 6 and 7.

In addition to the site visits during Years 2 and 5, an *Expeditions* project may be reviewed through a site-visit during Years 4 and 6 as deemed necessary by NSF. Release of future funding for the project is subject to satisfactory review of the project during each site visit noted above.

*InTrans* awards will be made as continuing grants with Year 1 funding contingent upon receipt of industry funding in Year 1, and Year 2 funding contingent upon receipt of a letter of commitment from the industry partner(s) documenting funding for Years 2 and 3. The *InTrans* project may be site visited at the end of Year 1 as deemed necessary by NSF.

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

In addition, *Expeditions* awardees must:

1. Produce one project outcome "highlights" annually for Years 4 through 7 that is prepared for a lay audience; these highlights will be used in NSF reporting and outreach;
2. Create and maintain an active project web site that shares information about the project; and

- Attend one PI meeting to share information about the project (please make provisions for travel for at least two PIs and one student to attend one PI meeting during the life of the project).

## 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:

- Mitra Basu, Program Director, telephone: (703) 292-8910, email: [mbasu@nsf.gov](mailto:mbasu@nsf.gov)

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188

FastLane Help Desk e-mail: [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

Research.gov Help Desk e-mail: [rgov@nsf.gov](mailto:rgov@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, "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 <https://www.grants.gov>.

The *Expeditions* program provides CISE investigators with access to a diverse set of CISE funding opportunities. CISE core programs provide funding for projects ranging from modest single-investigator activities through larger multi-investigator efforts funded at levels of approximately \$1,000,000 per year. *Expeditions* complement these investments, supporting ambitious, multi-investigator projects requiring investments of up to \$15,000,000 over seven years. For research and education projects with scopes that require even larger funding levels, PIs are encouraged to consider the opportunities provided by NSF's Engineering Research Center (ERC) and Science and Technology Center (STC) programs.

### ***Innovation Transition awards***

Additional funding opportunities are available for all *Expeditions* project teams in their 6th or 7th years of the original funding in the form of *Innovation Transition (InTrans)* awards, as well as Secure and Trustworthy Cyberspace (SaTC) and Cyber-Physical Systems (CPS) Frontier projects.

The goal of *InTrans* is to continue the long-term vision and objectives of the project team, to mature and deploy successful research and innovation results in industries, and to facilitate the transition of the innovations to support from industrial sponsors along with the potential to develop new technologies.

Questions regarding the *InTrans* funding opportunity should be addressed to Mitra Basu, Program Director, CISE/CCF, by email to [mbasu@nsf.gov](mailto:mbasu@nsf.gov), or by phone at 703-292-8910.

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

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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