Advanced Chip Engineering Design and Fabrication (ACED Fab)

NSF Directorate for Engineering and Taiwan NSTC Department of Engineering and Technology Collaborative Research Opportunities

PROGRAM SOLICITATION

NSF 22-636

National Science Foundation

Directorate for Engineering
Division of Electrical, Communications and Cyber Systems
Division of Chemical, Bioengineering, Environmental and Transport Systems
Division of Civil, Mechanical and Manufacturing Innovation
Engineering Education and Centers

Office of International Science and Engineering

National Science and Technology Council, Taiwan

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

January 17, 2023

A Research Concept Outline (RCO) must be submitted to nsf-acedfab@nsf.gov no later than December 13, 2022. Please see Special Instructions for RCO submission in the full text of this solicitation.

IMPORTANT INFORMATION AND REVISION NOTES

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in Important Notice No. 147. In support of these efforts, proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov and may not be prepared or submitted via FastLane.

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) that is in effect for the relevant due date to which the proposal is being submitted. The NSF PAPPG is regularly revised and it is the responsibility of the proposer to ensure that the proposal meets the requirements specified in this solicitation and the applicable version of the PAPPG. Submitting a proposal prior to a specified deadline does not negate this requirement.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Advanced Chip Engineering Design and Fabrication (ACED Fab)
NSF Directorate for Engineering and NSTC Department of Engineering and Technologies Semiconductor Collaboration Research Opportunities

Synopsis of Program:

The Directorate for Engineering (ENG), Division of Electrical, Communications and Cyber Systems (ECCS), Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), Division of Civil, Mechanical and Manufacturing Innovation (CMMI), Division of Engineering Education and Centers (EEC), and The Office of International Science and Engineering (OISE) of the National Science Foundation (NSF) and the Department of Engineering and Technologies (DET) of the Taiwan National Science and Technology Council (NSTC) are pleased to announce and launch an NSF-NSTC semiconductor collaboration program titled “Advanced Chip Engineering Design and Fabrication (ACED Fab)”. This program aims to leverage the complementary academic talent and engineering strengths of semiconductor research in the U.S. and Taiwan to enable chip design and fabrication to advance semiconductor science, engineering, and education.

This partnership program is guided by the Memorandum of Understanding (MOU) and Implementing Arrangement for Cooperation in Advanced Semiconductor Chip Design and Fabrication signed by the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office in the United States (TECRO). The MOU provides guidelines for a collaborative arrangement whereby U.S. researchers may receive funding from NSF and Taiwan researchers may receive funding from the Taiwan National Science and Technology Council

(NSTC). Through a lead agency model, NSF and NSTC, as AIT and TECRO's Designated Representatives under the MOU, respectively, invite U.S. and Taiwan researchers to submit a single collaborative proposal that will undergo a single review process at NSF, which will be the lead agency. NSTC will honor the NSF merit review process and will coordinate with NSF on award decisions. Awards to researchers in the U.S. and Taiwan will be issued in parallel by NSF and NSTC, respectively.

The ACED Fab supports innovative design and fabrication projects of semiconductor chips utilizing advanced technologies of Taiwan's semiconductor foundries. Proposals are encouraged to target emerging applications (but not limited to): High-performance, low-power circuits and systems; Edge-AI sensing, computing, and communication; Quantum computing and communication chips; and Emerging semiconductor heterogeneous integration.

An ACED Fab proposal must be an integrated collaborative effort between the U.S. and Taiwan researchers. The research project must aim to bring a specific innovation to integrated circuit prototypes that demonstrate advanced functionality and utilize advanced fabrication technology as differentiators. The scope of an ACED Fab proposal must include at least one semiconductor chip design for tape-out utilizing fabrication process technologies of Taiwan's semiconductor foundries via multi-project wafer runs within the duration of the project.

General and specific inquiries regarding this funding opportunity are directed to email: nsf-acedfab@nsf.gov.

Taiwan researchers are invited to read the NSTC announcement at https://www.nstc.gov.tw/folksonomy/rfpList?l=ch. The NSTC website indicates the funding limits for Taiwan researchers in this ACED Fab collaborative program. NSTC's support for Taiwan researchers will be for the duration approved by NSF for the U.S. grantees of the same team.

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.

- Jenshan Lin, Division of Electrical, Communications and Cyber Systems (ECCS), telephone: (703) 292-7360, email: nsf-acedfab@nsf.gov
- Premjeet Chahal, Division of Electrical, Communications and Cyber Systems (ECCS), telephone: (703) 292-7264, email: nsf-acedfab@nsf.gov
- Rosa Lukaszew, telephone: (703) 292-8103, email: rlukasze@nsf.gov
- Catherine Walker, Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), telephone: (703) 292-7125, email: nsf-acedfab@nsf.gov
- Thomas F. Kuech, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI), telephone: (703) 292-2218, email: nsf-acedfab@nsf.gov
- Nadia A. El-Masry, Division of Engineering Education and Centers (EEC), telephone: (703) 292-4975, email: nsf-acedfab@nsf.gov
- Bridget M. Turaga, Office of International Science & Engineering (OISE), telephone: (703) 292-7320, email: bturaga@nsf.gov
- Kea-Tiong (Samuel) Tang, Department of Engineering and Technologies, NSTC, telephone: +886(03)5162-1785, email: kttang@ee.nthu.edu.tw
- Yen-Hui Liang, Department of Engineering and Technologies, NSTC, telephone: +886(02)2737-7525, email: yhliang@nstc.gov.tw
- Hwey-Ying (Vivien) Lee, Department of International Cooperation and Science Education, NSTC, telephone: +886(02)2737-7150, email: vvlee@nstc.gov.tw

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

- 47.041 --- Engineering
- 47.079 --- Office of International Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 5 to 7

The NSF and NSTC expect to award 5-7 Awards under this program solicitation. Each award provides up to three-year project support.

Anticipated Funding Amount: $6,000,000

Anticipated Total Funding Amount by NSF and NSTC: $6,000,000

The number of awards and average award size/duration will depend on proposal responsiveness to this solicitation and is subject to 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.

Who May Serve as PI:

U.S. PIs must hold primary, full-time, paid appointments in research or teaching positions at U.S.-based campuses/offices of IHEs eligible to submit to this solicitation.

Each proposal must include at least one U.S.-eligible researcher as lead PI and at least one Taiwan-eligible researcher as senior personnel (non-funded).

PIs, co-PIs, and senior personnel of a Research Coordination Network award designated to support this program (see priority A in NSF 22-116) are not eligible to submit proposals under this proposal cycle of the ACED Fab program.

Limit on Number of Proposals per Organization:

None.

Limit on Number of Proposals per PI or co-PI: 1

An individual may appear as PI, co-PI, senior personnel, or Consultant on only one proposal submitted in response to this solicitation. In the event an individual exceeds this limit, the first proposal received prior to the deadline will be accepted and the remainder will be returned without review. This limitation includes proposals submitted by a lead organization and any subawards or contracts included as part of a collaborative proposal involving multiple institutions.

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 Research.gov: *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

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

  January 17, 2023

  A Research Concept Outline (RCO) must be submitted to nsf-acedfab@nsf.gov no later than December 13, 2022. Please see Special Instructions for RCO submission in the full text of this solicitation.

Proposal Review Information Criteria

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

Award Conditions:

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

Reporting Requirements:

Standard NSF reporting requirements apply.

TABLE OF CONTENTS

I. INTRODUCTION

Semiconductor technology plays a critical role in society's prosperity, national security, and economic competitiveness. Modern semiconductor chip engineering design and fabrication are incredibly complex and global processes involving sophisticated expertise and dedicated facilities. The technical and cost barriers for advancing semiconductor technologies also continue to grow with every technology generation. A lack of affordable access to state-of-the-art chip design and fabrication capabilities has been a bottleneck for a more rapid advancement of research into manufacturing, impeding both the innovation stream and training of the next generation semiconductor workforce.

The ACED Fab program is a partnership between NSF and NSTC to accelerate innovations in semiconductor research by facilitating academic researchers' access to advanced semiconductor foundry technologies and by enabling U.S. and Taiwan researchers to work together in a joint chip design and fabrication process. Through the engagement of faculty and students, the program is to stimulate academic research and education and to enhance the semiconductor technology innovation ecosystem.

II. PROGRAM DESCRIPTION

The Advanced Chip Engineering Design and Fabrication (ACED Fab) program aims to accelerate discoveries and innovations in semiconductor research by overcoming chip design and fabrication barriers through an international partnership. The ACED Fab program will support, based on its collaborative agreement, the cost of chip fabrication using managed multi-project wafer (MPW) services. The ACED Fab program also emphasizes the importance of providing hands-on experiences for faculty and students in the entire cycle of conception, design, fabrication, testing, and functional evaluation of semiconductor chips. Furthermore, ACED Fab will support a collaborative cloud-based virtual design environment and encourage exchange and visiting activities among faculty and students from both sides of the collaborating teams.

An ACED Fab proposal must describe an integrated collaborative effort between the U.S. and Taiwan researchers focusing on bringing a specific innovation to integrated circuit prototypes. The project must aim to demonstrate cutting-edge functionality utilizing advanced fabrication technology as differentiators. The scope of an ACED Fab proposal must include at least one, but not more than three, semiconductor chip designs for tape-out utilizing fabrication process technologies of Taiwan's semiconductor foundries via multi-project wafer runs within the duration of the project.

The proposed ACED Fab research may target a wide range of applications including but not limited to, those listed below:

- Energy-efficient circuits and systems: low latency and high performance at lower power for sensing, computing, and communication.
- Edge-AI sensing, computing, and communication: edge-intelligence system-on-chip (SoC) development.
- Quantum chips: essential building blocks of very compact form factors and great scalability for quantum computers and quantum communications.
- Emerging semiconductor heterogeneous integration: enabling beyond 5G and E-car.

The proposed collaborative research should emphasize the dramatic energy consumption reduction of existing computation and communication systems, reduce the environmental impacts of device and system manufacturing processes, and increase performance such as speed, capacity, and security.

It is expected that ACED Fab projects will integrate state-of-the-art experimental and computational approaches using advanced electronic design automation (EDA) tools in modeling and verification. They should offer hands-on training opportunities on design, fabrication, and testing to students and postdoctoral researchers engaged in the project. The proposal should articulate the intellectual merit and broader impacts of the proposed international collaboration.

NSF intends to establish a Research Coordination Network (RCN) for semiconductor foundry technology access (see priority A in NSF 22-116) that serves as the interface between foundries and the academic researchers funded by the ACED Fab program. The goals of the designated RCN are to lower the barrier for accessing advanced technology nodes at participating foundries, accommodate collaborative design teams including international partnerships, and enhance faculty and students' hands-on experiences in semiconductor chip design, fabrication, and evaluation. The RCN will provide ACED Fab teams one-stop service and uniform design support, such as handling legal processes, issuing design packages, facilitating a cloud design environment, validation of error-free designs, and distribution of foundry wafers to users, through embedded technology service provider(s) of the designated RCN. Collaborating teams awarded by this program become members of the designated RCN.

In tandem with the NSF RCN specified above, the Taiwan Semiconductor Research Institute (TSRI) will provide support for all funded ACED Fab teams on their tape-out submissions to the participating foundries. Prior to tape-out fabrication, TSRI expects to conduct design rule validation on the designs developed by the collaborative research teams. Applications, including uploading of layout and verification files, for chip tape-out under the joint projects are expected to be submitted to TSRI by the Taiwan principal investigator's account.

A collaborating team responding to this solicitation should develop and submit a single proposal. It is the responsibility of the U.S. proposer to submit the joint proposal to the NSF ACED Fab program for review. Proposers are expected to designate investigators from the U.S. and Taiwan to coordinate with NSF and NSTC and to serve as the Principal Investigators to their respective agencies. The joint proposal submitted to NSF must identify one U.S.-eligible PI as the lead and at least one Taiwan-eligible collaborator as senior personnel (non-funded). The proposals may leverage prior or existing NSF supported projects by extending novel concept in device/circuit/system/architecture to chip-level design, fabrication, and evaluation. Projects that extend fundamental research frontiers by the integration of advanced materials, devices, architectures, interconnect, and packaging solutions in chip design and fabrication are strongly encouraged. Although no prior tape-out experiences are required, the proposing team is expected to address readiness to access foundry fabrication, which is enabled by the proposed synergistic collaboration.

III. AWARD INFORMATION

NSF and NSTC will jointly fund the collaborative projects in response to this solicitation, including their respective share of multi-project wafer fabrication costs as part of the award budget. Funds are intended to cover costs of the awarded research and education activities, including related exchanges, and visiting activities among the team members. Estimated program budget, number of awards and average award size/duration are subject to 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.

Who May Serve as PI:

U.S. PIs must hold primary, full-time, paid appointments in research or teaching positions at U.S.-based campuses/offices of IHEs eligible to submit to this solicitation.

Each proposal must include at least one U.S.-eligible researcher as lead PI and at least one Taiwan-eligible researcher as senior personnel (non-funded).

PIs, co-PIs, and senior personnel of a Research Coordination Network award designated to support this program (see priority A in NSF 22-116) are not eligible to submit proposals under this proposal cycle of the ACED Fab program.

Limit on Number of Proposals per Organization:

None.

Limit on Number of Proposals per PI or co-PI: 1

An individual may appear as PI, co-PI, senior personnel, or Consultant on only one proposal submitted in response to this solicitation. In the event an individual exceeds this limit, the first proposal received prior to the deadline will be accepted and the remainder will be returned without review. This limitation includes proposals submitted by a lead organization and any subawards or contracts included as part of a collaborative proposal involving multiple institutions.

Additional Eligibility Info:

Taiwan Institutions (i.e., research conducting institutions) shall be approved by NSTC to be eligible recipients of subsidization in accordance with the Operation Guidelines for Institutions Applying for NSTC Grants.

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 Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and 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) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- 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) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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.

Special guidelines for proposal preparation:

Joint ACED Fab Workshop: Shortly after release of the ACED Fab solicitation, NSF and NSTC plan to hold a joint workshop to address questions related to this collaborative program and to offer an opportunity for networking and team building. The date and registration information for the workshop will be posted on the NSF ACED Fab program homepage. Interested researchers may inquire information by emailing nsf-acedfab@nsf.gov.

Collaborative Proposals: All collaborative proposals submitted must be a single proposal with subaward(s) administered by the submitting organization. The type of collaborative proposals by a simultaneous submission from multiple U.S. organizations with each organization requesting a separate award will not be accepted. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

Submission Responsibilities: It is the responsibility of the U.S. PI of the collaborating team to submit the joint proposal to the NSF ACED Fab program for review. In parallel, the Taiwan collaborative PI is required to provide the necessary information to NSTC using the Forms found on the NSTC webpages (https://www.nstc.gov.tw/folksonomy/rfpList?l=ch) following ACED Fab Program announcement.

Special Instructions for RCO submission:

Prior to submitting an ACED Fab proposal to NSF, the U.S. PI is required to submit a Research Concept Outline (RCO). The RCO must be emailed to nsf-acedfab@nsf.gov no later than December 13, 2022. The document submitted should not exceed 5000 characters, including spaces. This document will be shared with the NSTC to verify the eligibility for submission by Taiwan institutions. The RCO should contain:

- The names and affiliations of the researchers - note each proposal must include one U.S.-eligible collaborator as lead PI and at least one Taiwan-eligible collaborator as senior personnel (non-funded),
- A brief description of the proposed research – the nature of the collaboration and a breakdown of the U.S. and Taiwan components,
- The semiconductor foundries technology node(s) targeted for chip design and fabrication – the multi-project wafer (MPW) runs currently supported include TN16FFC, TN28HPC+, TN40G, and other earlier technology nodes. The newest technology nodes (such as 12nm or 7nm) are not included until further notice.
- A rough order of magnitude budget estimate of total funding (including indirect costs and chip fabrication cost for specified minimum design area) to be requested from NSF and NSTC, respectively (a detailed budget is not required at this time).

If the proposed project is consistent with the ACED Fab program, the PIs may expect to have a follow-up communication with the NSF program directors. A copy of the email response from the NSF program directors to the submitted RCO must be included as a supplementary document with the full proposal submission. **A proposal without a previously discussed RCO will be returned without review.**

Special Instructions for Full Proposal Submissions on the following:

Proposal Set-Up: Select "Prepare New Full Proposal" in Research.gov. Search for and select this solicitation title in Step 1 of the Full Proposal wizard. In the Proposal Details section (Step 4), select "Single proposal (with or without subawards). Separately submitted collaborative proposals will be returned without review. The title for the proposed project should begin with "ACED Fab:" The title should state clearly and succinctly the major theme(s) of the project.

Cover Sheet

“Taiwan” should be selected on the Cover Sheet after checking the box for "International Activities" If additional countries/regions are involved outside of the U.S. and Taiwan, please include those here as well.

Project Description (15-page limit):

The project description must adhere to the requirements defined in Chapter II of the PAPPG. Proposals should clearly describe the work that will be accomplished by the entire team, including the Taiwan investigators. Please note that Taiwan investigators are exempt from the Results from Prior NSF Support section requirement.

In addition to the requirements in the PAPPG, including a separate section labeled "**Broader Impacts**," the Project Description must contain a separate section of less than a page labeled "**Response to Solicitation-Specific Review Criteria**." This section should provide a description of how the ACED Fab solicitation-specific review criteria are addressed in the proposal and include references to other relevant sections in the proposal for additional details. **Proposals not meeting this requirement will be returned without review.**

Budget and Justification

Funds may be requested to support design, fabrication, testing, and functional evaluation of proposed ACED Fab project. Proposals may request cost of electronic design automation (EDA) or electronic computer-aided design (ECAD) tools and cost for acquiring usage-justified securely design in the cloud environment, which may be necessary for accessing certain Taiwan semiconductor foundries' technology nodes, TN16FFC for example. Well-justified activities that fulfill the objectives of the ACED Fab program will be considered.

The budget and budget justification should ONLY include the costs for the U.S. investigators. **Taiwan budget and budget justification must be included as a supplementary document**. The Taiwan budget and budget justification should ONLY include the costs for the Taiwan investigators.

Facilities, Equipment, and Other Resources

This section should contain an aggregated description of both U.S. and Taiwan facilities, equipment, and other resources including but are not limited to existing EDA tools, intellectual property agreement or foundry agreements, and any unpaid collaborators and industry/non-profit partners (if applicable), for example.

Senior Personnel Documents

The Taiwan investigators should be listed as "Senior Personnel" (non-funded) ONLY. Do NOT list a Taiwan investigator as a PI or co-PI. Note: To indicate Senior Personnel as non-funded, you must manually remove their name by clicking "Manage" in section A of the Budget.

- **Biographical Sketches:** All U.S. PIs, co-PIs, and senior personnel and Taiwan senior personnel (non-funded) must have a Biographical Sketch provided with a format that conforms to the NSF PAPPG guidelines. Additional information about NSF-approved formats for the biographical sketch is available at https://www.nsf.gov/bfa/dias/policy/biosketch.jsp.
- **Current and Pending Support:** This section must be included for all U.S. PIs, co-PIs and senior personnel. Taiwan collaborative investigators are exempt for this requirement unless they have funding from a U.S. government organization. Since this is a required section of an NSF proposal, however, please use the NSF fillable PDF form to indicate for each Taiwan investigator designated as Senior Personnel (non-funded) that Current and Pending Support information is not required. Additional information about NSF-approved formats for current and pending support is available at: https://www.nsf.gov/bfa/dias/policy/cps.jsp.
- **Collaborators and Other Affiliations (COA) Information:** Per the guidance in the PAPPG, COA information must be included as a Single Copy Document in this section for all U.S. PIs, co-PIs, and senior personnel and Taiwan senior personnel (non-funded).

Data Management Plan (**required** – up to 2 pages)

All proposals must include a Data Management Plan. This plan should describe issues related to information exchange, intellectual property rights, derived products, databases, software, model output, and materials/chips sharing. The "Data Management Plan" should also address plans for determining authorship or proper attribution of credit for peer-reviewed or other publications, internet resources, etc. that may be expected to result from the activity. See Chapter II.C.2.j of the PAPPG for further information about the implementation of this requirement. For Directorate specific guidance on Data Management Plans see https://www.nsf.gov/bfa/dias/policy/dmp.jsp.

Postdoctoral Researcher Mentoring Plan for U.S.-supported postdoctoral scholars (if Applicable - up to 1 page)

Proposals that request funding to support postdoctoral researchers at any of the participating U.S. organizations must include a Postdoctoral Researcher Mentoring Plan as supplementary documentation. One single-page mentoring plan is allowed per proposal even if multiple postdoctoral researchers from different organizations are involved. Thus, the postdoctoral researcher mentoring plan will be an additional means of providing cross-disciplinary mentoring across organizations and the project as a whole. See Chapter II.C.2.j of the PAPPG for further information about the implementation of this requirement.

SUPPLEMENTARY DOCUMENTS

Supplementary documents are required and listed below. They should be uploaded into the Other Supplementary Documents Section. No additional supplementary materials are allowed. **Proposals that do not contain all specified supplementary documents will be returned without review.**

Other Supplementary Documents

1. **Management and Coordination Plan** (required – up to 2 pages): A "Management and Coordination Plan" must be submitted as a Supplementary Document. The document must be labeled "Management and Coordination Plan." The plan must describe specific steps the project team plans to take to achieve the goals of the proposed joint research. This includes specifying team members' responsibility for tasks of the planned project, the team's plan to manage the overall collaborative effort including integrations of any unpaid collaborators and industry/non-profit partners (if applicable). For specific activities such as exchange visit, if applicable, the Plan should specify the mechanisms and benefits to the project, especially for students/postdoctoral researchers involved.
2. **Taiwan Budget and Budget Justification**: Taiwan budget and budget justification must be included as a supplementary document using the Forms (or extracted contents from the Forms) found on the NSTC webpages of ACED Fab Program announcement (https://www.nstc.gov.tw/folksonomy/rfpList?l=ch). The Taiwan budget and budget justification should ONLY include the costs for the Taiwan investigators.
3. **An email copy of NSF Program Officer Response to RCO:** It should be entitled "RCO – Program Officer Correspondence Email".

Letter(s) of Collaboration: For substantial collaborations and engagements not included in the budget with partner institutions, Letters of Collaboration are strongly encouraged. These should be provided in the Other Supplementary Documents section of the proposal and follow the format instructions specified in the NSF PAPPG. Letters of Collaboration cannot contain endorsements or evaluation of the proposed project or any other past projects. This includes any statement about the value of the project to the partner institution. One acceptable format for a letter of collaboration is as follows:

"If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment or Other Resources section of the proposal."

Proposals with Letters of Collaboration that contain any endorsement or evaluation of the proposed project will be returned without review.

Collaborative activities that are identified in the budget should follow the instructions in the NSF PAPPG.

Single Copy Documents

Single Copy Documents are used by NSF staff, but are not available to the reviewers. In addition to the COA Information required for all senior personnel, the

Single Copy Documents section may include:

- Suggested Reviewers and Reviewers Not to Include (optional).

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Taiwan researchers are invited to read the NSTC announcement. The NSTC website indicates the funding limits for Taiwan researchers in this ACED Fab collaborative program. NSTC's support for Taiwan researchers will be for the duration approved by NSF for the U.S. grantees of the same team.

C. Due Dates

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

  January 17, 2023

  A Research Concept Outline (RCO) must be submitted to nsf-acedfab@nsf.gov no later than December 13, 2022. Please see Special Instructions for RCO submission in the full text of this solicitation.

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov 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: 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. 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 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 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 *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026* . 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 other underrepresented groups 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

The required section in Project Description on “Response to Solicitation-Specific Review Criteria” and the supplemental documentation on “Management and Coordination Plan” will be considered and the reviewers will be asked to comment on:

- How critical to the success of the proposed project is the access to the requested advanced fabrication technology?
- To what extent is the proposed project commensurate with the program, in terms of the budget and duration, to accomplish the objectives proposed?
- Are the design, fabrication, or exchange opportunities the proposed project creates significant for students/postdoctoral researchers/faculty? and
- To what degree would the collaborating team work synergistically to accomplish the project objectives?

B. Review and Selection Process

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

Proposals submitted in response to this program solicitation will be evaluated according to the standard NSF merit review criteria of intellectual merit and broader impacts using disciplinary or, as appropriate, multidisciplinary, panels and, as needed, ad hoc reviews.

The selection and participation of panelists, ad hoc reviewers, and panel observers are expected to be subject to NSF merit review processes, policies, and procedures, including NSF confidentiality policies, NSF conflict of interest rules, and use of NSF Conflict-of-Interest and Confidentiality Statement (NSF Form 1230P) for all panel reviewers and non-NSF observers. NSF intends to invite NSTC recommendations for potential panelists and ad hoc reviewers, as needed, but has ultimate responsibility for selecting panelists and reviewers. NSF will invite one or more designated representative(s) of NSTC to attend review panels as an observer(s).

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria of intellectual merit and broader impacts. Additional solicitation-specific review criteria are required as specified (see VI.A.2). 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. Such recommendation, along with the unattributed reviews and, unattributed panel summary, if applicable, for the proposals recommended, will be shared with designated representative(s) of NSTC. Award decisions are recommended and coordinated by NSF but awards are issued separately in parallel by NSF and NSTC.

Prior to award issuance, the collaborating institutions of the proposal recommended for potential funding will be notified and their names shared with the designated RCN. The recommended teams must (a) submit to the NSF a signed agreement between the institutions on protection and distribution of intellectual property (IP) and rights of use resulting from the recommended ACED Fab project, and (b) enter non-disclosure agreement and other agreements such as relevant foundry-university technology usage agreements facilitated by the designated RCN. Neither NSF nor NSTC is a party to the aforementioned agreements. NSF will review the said IP agreement to ensure that the graduation of students will not be unduly affected.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements or the Division of Acquisition and Cooperative Support 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 an NSF Grants and Agreements Officer. 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) 292-8134 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.

Administrative and National Policy Requirements

Build America, Buy America

As expressed in Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers (86 FR 7475), it is the policy of the executive branch to use terms and conditions of Federal financial assistance awards to maximize, consistent with law, the use of goods, products, and materials produced in, and services offered in, the United States.

Consistent with the requirements of the Build America, Buy America Act (Pub. L. 117-58, Division G, Title IX, Subtitle A, November 15, 2021), no funding made available through this funding opportunity may be obligated for an award unless all iron, steel, manufactured products, and construction materials used in the project are produced in the United States. For additional information, visit NSF's Build America, Buy America webpage.

Special Award Conditions:

Award decisions are to be coordinated between NSF and NSTC but made and issued separately and in parallel by NSF and NSTC. Please see the full text of this solicitation for further information.

Collaborating teams awarded by ACED Fab program will be members of the designated RCN. One or more project representatives (PI/co-PI/Senior Personnel or NSF-approved replacement) must attend annual meetings organized by the designated RCN throughout the duration of the grant.

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:

- Jenshan Lin, Division of Electrical, Communications and Cyber Systems (ECCS), telephone: (703) 292-7360, email: nsf-acedfab@nsf.gov
- Premjeet Chahal, Division of Electrical, Communications and Cyber Systems (ECCS), telephone: (703) 292-7264, email: nsf-acedfab@nsf.gov
- Rosa Lukaszew, telephone: (703) 292-8103, email: rlukasze@nsf.gov
- Catherine Walker, Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), telephone: (703) 292-7125, email: nsf-acedfab@nsf.gov
- Thomas F. Kuech, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI), telephone: (703) 292-2218, email: nsf-acedfab@nsf.gov
- Nadia A. El-Masry, Division of Engineering Education and Centers (EEC), telephone: (703) 292-4975, email: nsf-acedfab@nsf.gov
- Bridget M. Turaga, Office of International Science & Engineering (OISE), telephone: (703) 292-7320, email: bturaga@nsf.gov
- Kea-Tiong (Samuel) Tang, Department of Engineering and Technologies, NSTC, telephone: +886(03)5162-1785, email: kttang@ee.nthu.edu.tw
- Yen-Hui Liang, Department of Engineering and Technologies, NSTC, telephone: +886(02)2737-7525, email: yhliang@nstc.gov.tw
- Hwey-Ying (Vivien) Lee, Department of International Cooperation and Science Education, NSTC, telephone: +886(02)2737-7150, email:

vvlee@nstc.gov.tw

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
- Research.gov Help Desk e-mail: 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.

For questions regarding international collaboration aspects of this solicitation, please contact:

- Bridget Turaga, Office of International Science and Engineering (OISE), telephone: (703) 292-7320, email: bturaga@nsf.gov

For Taiwan NSTC Program Officers, please contact:

- Kea-Tiong (Samuel) Tang, Department of Engineering and Technologies, NSTC, telephone: +886(03)5162-1785, email: kttang@ee.nthu.edu.tw
- Yen-Hui Liang, Department of Engineering and Technologies, NSTC, telephone: +886(02)2737-7525, email: yhliang@nstc.gov.tw
- Hwey-Ying (Vivien) Lee, Department of International Cooperation and Science Education, NSTC, telephone: +886(02)2737-7150, email: vvlee@nstc.gov.tw

General and specific inquiries regarding this funding opportunity are directed to email: nsf-acedfab@nsf.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 https://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) 292-8143

- **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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