Research Experiences for Undergraduates (REU) Sites and Supplements

PROGRAM SOLICITATION
NSF 13-542

REPLACES DOCUMENT(S):
NSF 12-569

National Science Foundation

Directorate for Biological Sciences

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

Directorate for Education & Human Resources

Directorate for Engineering

Directorate for Geosciences
Office of Polar Programs

Directorate for Mathematical & Physical Sciences

Directorate for Social, Behavioral & Economic Sciences

Office of Integrative Activities

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

May 24, 2013

Fourth Friday in May, Annually Thereafter

Deadline for REU Site proposals requiring access to Antarctica. All other REU Site proposals must be submitted to the August REU deadline.

August 28, 2013

Fourth Wednesday in August, Annually Thereafter

Deadline for REU Site proposals except those requiring access to Antarctica

IMPORTANT INFORMATION AND REVISION NOTES

[June 2018:] The first sentence of the third paragraph of Section III. AWARD INFORMATION has been revised for consistency with 2 CFR § 200 (*Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*).

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 17-1), which is effective for proposals submitted, or due, on or after January 30, 2017.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Research Experiences for Undergraduates (REU)
Sites and Supplements

Synopsis of Program:

The Research Experiences for Undergraduates (REU) program supports active research participation by undergraduate students in any of the areas of research funded by the National Science Foundation. REU projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program. This solicitation features two mechanisms for support of student research: (1) *REU Sites* are based on independent proposals to initiate and conduct projects that engage a number of students in research. REU Sites may be based in a single discipline or academic department or may offer interdisciplinary or multi-department research opportunities with a coherent intellectual theme. Proposals with an international dimension are welcome. (2) *REU Supplements* may be included as a component of proposals for new or renewal NSF grants or cooperative agreements or may be requested for ongoing NSF-funded research projects.

Undergraduate student participants in either REU Sites or REU Supplements must be U.S. citizens, U.S. nationals, or permanent residents of the United States.

Students do not apply to NSF to participate in REU activities. Students apply directly to REU Sites or to NSF-funded investigators who receive REU Supplements. To identify appropriate REU Sites, students should consult the directory of active REU Sites on the Web at https://www.nsf.gov/crssprgm/reu/reu_search.cfm.

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.

- NSF REU Site Contacts: https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)

Award Information

Anticipated Type of Award:

Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 1,750 to 1,800

This estimate includes approximately 180 new Site awards and 1,600 new Supplement awards each year.

Anticipated Funding Amount: $68,400,000

in FY2013 -- This estimate includes both Sites and Supplements, pending availability of funds.

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E.

Who May Serve as PI:

For REU Site proposals, a single individual may be designated as the Principal Investigator. This individual will be responsible for overseeing all aspects of the award. However, one additional person may be designated as Co-Principal Investigator if developing and operating the REU Site would involve such shared responsibility. Other anticipated research supervisors should be listed as Non-Co-PI Senior Personnel. *After a proposal is awarded*, some NSF units may allow the addition of more Co-PIs if an exceptional case can be made for why the management of the REU Site must be distributed.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

  Recovery of indirect costs (F&A) is prohibited on Participant Support Costs in REU Site proposals and REU Supplemental funding requests.

- **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):

  May 24, 2013

  Fourth Friday in May, Annually Thereafter

  Deadline for REU Site proposals requiring access to Antarctica. All other REU Site proposals must be submitted to the August REU deadline.

  August 28, 2013

  Fourth Wednesday in August, Annually Thereafter

  Deadline for REU Site proposals except those requiring access to Antarctica

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

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

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I. INTRODUCTION

Research Experiences for Undergraduates (REU) is a Foundation-wide program that supports active participation in science, engineering, and education research by undergraduate students. REU proposals are welcome in any of the research areas supported by NSF (see https://www.nsf.gov/funding/aboutfunding.jsp), including the priority areas (https://www.nsf.gov/news/priority_areas/) and cross-cutting areas (https://www.nsf.gov/funding/pgm_list.jsp?type=xcut) that NSF has identified for its programs.

The REU program seeks to expand student participation in all kinds of research--both disciplinary and interdisciplinary--encompassing efforts by individual investigators, groups, centers, national facilities, and others. It draws on the integration of research and education to attract a diverse pool of talented students into careers in science and engineering, including teaching and education research related to science and engineering, and to help ensure that these students receive the best education possible.

This solicitation features two mechanisms for support of student research: REU Sites and REU Supplements.

II. PROGRAM DESCRIPTION

Research experience is one of the most effective avenues for attracting students to and retaining them in science and engineering, and for preparing them for careers in these fields. The REU program, through both Sites and Supplements, aims to provide appropriate and valuable educational experiences for undergraduate students through participation in research. REU projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program. REU projects feature high-quality interaction of students with faculty and/or other research mentors and access to appropriate facilities and professional development opportunities.

REU projects offer an opportunity to tap the nation's diverse student talent pool and broaden participation in science and engineering. NSF is particularly interested in increasing the numbers of women, underrepresented minorities, and persons with disabilities in research. REU projects are strongly encouraged to involve students who are members of these groups. (Underrepresented minorities are African Americans, Hispanics, American Indians, Alaska Natives, and Native Hawaiians or Other Pacific Islanders.) When designing recruitment plans, REU projects are also encouraged to consider students who are veterans of the U.S. Armed Services.

Historically, the vast majority of REU participants have been junior- or senior-level undergraduates--students who have typically already committed to a major in science or engineering. So that the REU program can succeed in attracting students into science and engineering who might not otherwise consider those majors and careers, projects are also encouraged to involve students at earlier stages in their college experience. Some REU projects effectively engage first-year and second-year undergraduates by developing partnerships with community colleges.

REU projects may be carried out during the summer months, during the academic year, or both. Three years is the typical duration for REU Site awards in most NSF directorates; however, a duration of up to five years may be allowed in some cases. The term of REU Supplements may not exceed that of the underlying research project.

REU Sites

REU Sites are based on independent proposals, submitted for an annual deadline date, to initiate and conduct projects that engage a number of undergraduate students in research. Proposals for the establishment of an REU Site may be submitted to any of NSF's directorates, the Office of Polar Programs, and the Office of Cyberinfrastructure. The Office of International Science and Engineering

will consider co-funding relevant REU Sites that are primarily managed by other NSF units. Proposers are encouraged to communicate with the NSF REU point-of-contact in their disciplinary area; see https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp.

REU Sites must have a well-defined common focus that enables a cohort experience for students. Sites may be based in a single discipline or academic department or may offer interdisciplinary or multi-department research opportunities with a coherent intellectual theme. (Although interdisciplinary or multi-department proposals must be submitted to a single NSF disciplinary unit, these proposals are often reviewed by two or more NSF units, at the discretion of the NSF program officer who manages the proposal.) A proposal should reflect the unique combination of the proposing organization's interests and capabilities and those of any partnering organizations. Cooperative arrangements among organizations and research settings may be considered so that a project can increase the quality or availability of undergraduate research experiences. To extend research opportunities to a larger number of undergraduates, proposers are welcome to incorporate approaches that make use of cyberinfrastructure or other advanced technologies that facilitate research, learning, and collaboration over distances ("virtual projects").

REU Sites are an important means for extending high-quality research environments and mentoring to diverse groups of students. In addition to increasing the participation of underrepresented groups in research, the program aims to involve students in research who might not otherwise have the opportunity, particularly those from academic institutions where research programs in STEM are limited. Thus, a significant fraction of the student participants at an REU Site must come from outside the host institution or organization, and at least half of the student participants must be recruited from academic institutions where research opportunities in STEM are limited (including two-year colleges).

High-quality mentoring for the student participants is very important in REU Sites. Investigators are encouraged to provide appropriate training for new research mentors. They should also encourage continued interaction of mentors with students during the academic year, to the extent practicable, to help connect students' research experiences to their overall course of study and to help the students achieve success in courses of study leading to a baccalaureate degree in a STEM field.

Although proposals for the renewal of successful REU Sites are welcome, investigators are reminded that such proposals will be reviewed through the normal merit review process and there is no guarantee that a renewal grant will be awarded.

REU Supplements

An REU Supplement typically provides support for one or two undergraduate students to participate in research as part of a new or ongoing NSF-funded research project. However, centers or large research efforts may request support for a number of students commensurate with the size and nature of the project. REU Supplements are supported by the various research programs throughout the Foundation, including programs such as Small Business Innovation Research (SBIR).

High-quality mentoring is important in REU Supplements, just as it is in REU Sites, and investigators should give serious attention not only to developing students' research skills but also to involving them in the culture of research in the discipline and connecting their research experience with their overall course of study.

Investigators are reminded that support for undergraduate students involved in carrying out research under NSF awards should be included as part of the research proposal itself instead of as a post-award supplement to the research proposal, unless such undergraduate participation was not foreseeable at the time of the original proposal.

A request for an REU Supplement may be submitted in either of two ways: (1) Proposers may include an REU Supplement activity as a component of a new (or renewal) research proposal to NSF. For guidance, contact the program officer who manages the research program to which the proposal would be submitted. (2) Investigators holding an existing NSF research award may submit a post-award request for supplemental funding. For guidance, contact the cognizant program officer for the NSF grant or cooperative agreement that would be supplemented.

Special Opportunities

Some applicants might be interested in the following opportunities as elements of their REU projects. These are *optional;* proposals are not required to respond to any of them.

Partnership with the Department of Defense

NSF engages in a partnership with the Department of Defense (DoD) to expand undergraduate research opportunities in DoD-relevant research areas through the REU Sites program. The DoD activity is called *Awards to Stimulate and Support Undergraduate Research Experiences* (ASSURE; http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842050/afosr-funding-opportunities/). Any proposal submitted to NSF for the REU Sites program that is recommended for funding through the NSF merit review process will be considered by DoD representatives for possible support through ASSURE. Proposals that are selected for the DoD funding will involve DoD-relevant research and may come from any of the NSF directorates or offices that handle REU Site proposals. A proposer to the NSF REU Sites program does not need to take any additional steps to be considered for funding through ASSURE.

Partnership with the Department of Energy's Geothermal Technologies Program

The U.S. Department of Energy's Geothermal Technologies Program (GTP) intends to expand undergraduate research opportunities in the area of geothermal energy by providing funds to NSF for meritorious REU Site proposals with that focus. The goal of this collaboration between DoE's GTP and NSF's REU program is to introduce more undergraduate students to renewable energy research and the many opportunities in science and engineering related to geothermal energy. GTP is interested in proposals aimed at a range of geothermal technologies, including geothermal heat pumps, binary cycle electricity generation systems, direct use, conventional hydrothermal, and Enhanced Geothermal Systems (EGS). REU Site proposals with a focus on geothermal energy will automatically be considered for GTP funding.

International Projects

The REU program encourages projects with an international dimension. Appropriate REU Site and REU Supplement proposals can be considered for co-funding by NSF's Office of International Science and Engineering (OISE). International projects typically involve partnering a U.S. REU project with one or more international collaborators in a specific institution or organization. Successful international REU projects include (1) true intellectual collaboration with a foreign partner and (2) benefits that are realized from the

expertise, specialized skills, facilities, phenomena, or other resources that the foreign collaborator or research environment provides.

Due to higher travel costs, REU projects with an international dimension are typically expected to cost more per student than domestic projects. Such higher costs are offset by the value that NSF places on developing a globally engaged workforce and on providing U.S. undergraduates, as well as K-12 teachers of science and mathematics, with the benefits of international research experience. Projects with an international dimension also often have more complex logistics and a more complex mentoring arrangement than domestic projects. Proposals should provide sufficient detail to demonstrate the feasibility of such arrangements.

Proposals should include a description of the foreign collaborator's role in the project, a two-page Biographical Sketch for the foreign collaborator, and a letter of commitment from the foreign institution or organization, which assures that the foreign institution or organization is committed to the collaboration and will give students appropriate access to facilities.

Useful guidance for those planning international research experiences for undergraduates can be found in the report *Looking Beyond the Borders: A Project Director's Handbook of Best Practices for International Research Experiences for Undergraduates* (NSF 06-204). In all cases, those planning a project with an international dimension should discuss their idea with a program officer in OISE (see the list of contacts by country and region at https://www.nsf.gov/od/oise/country-list.jsp), as well as with the appropriate disciplinary program officer for REU.

Research Experiences for Teachers

NSF encourages research experiences for K-12 teachers of science, technology, engineering, and mathematics and the coordination of these experiences with REU projects. Most directorates support Research Experiences for Teachers (RET) as a formal activity and announce their specific interests (e.g., RET Sites, RET Supplements) either in solicitations, in "Dear Colleague" letters, or on directorate/division Websites. Other NSF units have no formal announcement but respond to requests for RET support on a case-by-case basis or permit the inclusion of an RET component (with a distinct description and cost breakdown) as part of an REU proposal. Teachers may also be included in an international REU project. Applicants who wish to include an RET component in an REU proposal may wish to contact the appropriate REU program officer for guidance.

III. AWARD INFORMATION

An REU activity may be funded as a standard or continuing grant (for REU Sites), as a supplement to an existing award, or as a component of a new or renewal grant or cooperative agreement. REU Sites and Supplements are funded by various disciplinary and education research programs throughout NSF, and the number of awards made varies across the Foundation from year to year, as does the amount of funds invested. In FY2013, NSF anticipates investing approximately $68.4 million (pending availability of funds) in approximately 180 new Site awards and 1,600 new Supplement awards.

Three years is the typical duration for REU Site awards in most NSF directorates; however, a duration of up to five years may be allowed in some cases. The typical REU Site hosts 8-10 students per year. The typical funding amount is $70,000-$120,000 per year, although NSF does not dictate a firm upper (or lower) limit for the amount, which depends on the number of students hosted and the number of weeks.

The REU experience is a research training experience paid via a stipend, not employment (work) paid with a salary or wage. In this case, the student's training consists of closely mentored independent research. For administrative convenience, organizations may choose to issue payments to REU students using their normal payroll system. The funds received by students may be taxable income under the Internal Revenue Code of 1986 and may also be subject to state or local taxes. Please consult the Internal Revenue Service (IRS) for additional information. Students might find the IRS's "Tax Information for Students" website (https://www.irs.gov/individuals/students/students-page-higher-education) to be particularly helpful.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E.

Who May Serve as PI:

For REU Site proposals, a single individual may be designated as the Principal Investigator. This individual will be responsible for overseeing all aspects of the award. However, one additional person may be designated as Co-Principal Investigator if developing and operating the REU Site would involve such shared responsibility. Other anticipated research supervisors should be listed as Non-Co-PI Senior Personnel. *After a proposal is awarded*, some NSF units may allow the addition of more Co-PIs if an exceptional case can be made for why the management of the REU Site must be distributed.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

Additional Eligibility Info:

Eligible Student Participants: Undergraduate student participants supported with NSF funds in either REU Supplements or REU Sites must be U.S. citizens, U.S. nationals, or permanent residents of the United States. An undergraduate student is a student who is enrolled in a degree program (part-time or full-time) leading to a baccalaureate or associate degree. Students who are transferring from one college or university to another and are enrolled at neither institution during the intervening summer may participate. High school graduates who have been accepted at an undergraduate institution but who have not yet started their undergraduate study are also eligible to participate. Students who have received their bachelor's degrees and are no longer enrolled as undergraduates are generally not eligible to participate. For REU Sites, a significant fraction of the student participants should come from outside the host institution or organization. Some NSF directorates encourage inclusion in the REU program of K-12 teachers of science, technology, engineering, and mathematics. Please contact the appropriate disciplinary program officer for guidance. Within the framework of the basic eligibility guidelines outlined here, most REU Sites and Supplements further define recruitment and selection criteria, based on the nature of the particular research and other factors.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

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

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

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

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

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

PROPOSAL FOR REU SITE

The following instructions supplement those found in the PAPPG or NSF Grants.gov Application Guide.

Cover Sheet. When preparing the Cover Sheet in FastLane's Proposal Preparation module, select the Program Announcement/Solicitation No. for this solicitation from the pull-down list. (Grants.gov users: The program solicitation will be pre-populated by Grants.gov on the NSF Grant Application Cover Page.) Select the Division(s) to which the proposal is directed. If the proposal has a cross-disciplinary research focus, choose the Division(s) that seems most relevant (often this is the Division corresponding to the departmental affiliation of the Principal Investigator), and NSF staff will ensure that the proposal is reviewed by people who have expertise that is appropriate to the proposal's content. (Often such proposals are co-reviewed by two or more NSF disciplinary units.) The REU-associated program within the Division(s) that you selected will appear automatically in the "Current List of NSF Selected Units" at the bottom of the screen. (Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration.) Begin the title of the proposed project with the label "REU Site:" and carefully choose a project title that will permit prospective student participants to easily identify the focus of the site. A single individual should be designated as the Principal Investigator (PI). This individual will be responsible for overseeing all aspects of the REU Site award. However, one additional person may be designated as Co-PI if developing and operating the REU Site would involve such shared responsibility. Other anticipated research supervisors should be designated as Non-Co-PI Senior Personnel and are not listed on the Cover Sheet.

Project Summary (limited to one page). So that program officers can sort proposals efficiently and accurately for review, please begin

the "Overview" section of the Project Summary with the following list of "Project Elements":

- *PROJECT ELEMENTS:*
  - New REU Site, or renewal of previously funded REU Site (provide previous NSF Award No.)?:
  - Project title (as shown on Cover Sheet): "REU Site: ..."
  - Principal Investigator:
  - Submitting organization:
  - Other organizations involved in the project's operation:
  - Location(s) (universities, national labs, field stations, etc.) at which the proposed undergraduate research will occur:
  - Main field(s) and sub-field(s) of the research:
  - No. of undergraduate participants per year:
  - Summer REU Site, or academic year REU Site?:
  - No. of weeks per year that the students will participate:
  - Does the project include an international component or an RET component?:
  - Name, phone number, and e-mail address of point-of-contact for student applicants:
  - Web address (URL) for information about the REU Site (if known):

In the remainder of the Project Summary, briefly describe the project's objectives, activities, students to be recruited, and intended impact. Provide separate statements on the intellectual merit and broader impacts of the proposed activity, as required by the PAPPG.

Project Description. Address items "(a)" through "(g)" below. The Project Description must not exceed 15 pages.

a. *Overview.* Provide a brief description of the objectives of the proposed REU Site, targeted student participants, intellectual focus, organizational structure, timetable, and participating organizations' commitment to the REU activity.
b. *Nature of Student Activities*. Proposals should address the approach to undergraduate research training being taken and should provide detailed descriptions of examples of research projects that students will pursue. So that reviewers can evaluate intellectual merit, this discussion should indicate the significance of the research area and, when appropriate, the underlying theoretical framework, hypotheses, research questions, etc. NSF believes that undergraduate research experiences have their greatest impact in situations that lead the participants from a relatively dependent status to as independent a status as their competence warrants. Proposals must present plans that will ensure the development of student-faculty interaction and student-student communication. Development of collegial relationships and interactions is an important part of the project.
c. *The Research Environment*. This subsection should describe the experience, and the record of the involvement with undergraduate research, of the PI, the faculty who may serve as research mentors, and the institution(s) or organization(s) where the research will occur. The description should include information on the record of faculty/mentors in publishing work involving undergraduate authors and in providing professional development opportunities for student researchers. This subsection should also discuss the diversity of the mentor pool; any training, mentoring, or monitoring that mentors have received or will receive to help them mentor students effectively during the research experience; and any plans by which mentoring relationships will be sustained after students leave the REU Site.
d. *Student Recruitment and Selection*. The overall quality of the student recruitment and selection processes and criteria will be an important element in the evaluation of the proposal. The recruitment plan should be described with as much specificity as possible, including the types and/or names of academic institutions where students will be recruited and the efforts that will be made to attract members of underrepresented groups (women, minorities, and persons with disabilities).

   A significant fraction of the student participants at an REU Site must come from outside the host institution or organization, and at least half of the student participants must be recruited from academic institutions where research opportunities in STEM are limited (including two-year colleges). The number of students per project should be appropriate to the institutional or organizational setting and to the manner in which research is conducted in the discipline. (The typical REU Site hosts 8-10 students per year.) Proposals involving fewer than six students per year are discouraged.

   Undergraduate student participants supported with NSF funds in either REU Sites or REU Supplements must be U.S. citizens, U.S. nationals, or permanent residents of the United States.

e. *Project Evaluation and Reporting*. Describe the plan to measure qualitatively and quantitatively the success of the project in achieving its goals, particularly the degree to which students have learned and their perspectives on science, engineering, or education research related to these disciplines have been expanded. Evaluation may involve periodic measures throughout the project to ensure that it is progressing satisfactorily according to the project plan, and may involve pre-project and post-project measures aimed at determining the degree of student learning that has been achieved. In addition, it is highly desirable to have a structured means of tracking participating students beyond graduation, with the aim of gauging the degree to which the REU Site experience has been a lasting influence in the students' career paths. Proposers may wish to consult *The 2010 User-Friendly Handbook for Project Evaluation* (http://www.evalu-ate.org/resources/doc-2010-nsfhandbook/) for guidance on the elements in a good evaluation plan. Although not required, REU Site PIs may wish to engage specialists in education research (from their organization or another one) in planning and implementing the project evaluation.

   PIs are required to submit annual project reports through Fastlane's Project Reports System. When preparing these reports, REU Site PIs should follow the guidelines in the publication *REU Site Awards: Guidelines for Use of NSF FastLane Project Reports System* (NSF 01-124; https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf01124). The data needed for the project report should feed into the project evaluation plan.

f. *Broader Impacts*. As specified in the PAPPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities.
g. *Results from Prior NSF Support (if applicable)*. If the submitting organization has received prior support through an REU Site award in the disciplinary area(s) of the proposal, the Project Description must include a subsection entitled "Results from Prior NSF Support," which may occupy up to five pages of the 15-page Project Description. This subsection must describe the earlier REU project(s) and outcomes in sufficient detail to permit reviewers to reach an informed conclusion regarding the value of the results achieved. Valuable information typically includes results from the project evaluation; summary information about recruiting efforts and the number of applicants, the demographic make-up of participants and their home institutions, and career choices of participants; and a list of publications or reports (already published or to be submitted) resulting from the NSF award.

References Cited. A list of bibliographic citations relevant to the proposal must be included.

Biographical Sketches. Provide Biographical Sketches for all Senior Personnel, up to a total of 12 people. Senior Personnel include the PI, the Co-PI (if one has been designated), and other faculty/professionals who are anticipated to serve as research mentors. Biographical Sketches should follow the PAPPG's standard specifications for format and length but should include, if applicable, any publications with undergraduate co-authors (with the student labeled by an asterisk) and other activities or accomplishments relevant to a successful REU Site.

Budget. The focus of REU Sites is the student experience, and the budget must reflect this principle. *Project costs must be predominantly for student support*, which usually includes such items as participant stipends, housing, meals, travel, and laboratory use fees. Costs in budget categories outside Participant Support must be modest and reasonable. For example, for summer REU Sites, many NSF units consider up to one month of salary for the PI, or distributed among the PI and other research mentors, to be appropriate for time spent administering and coordinating the REU Site, training mentors, and similar operational activities. (NSF expects that research mentors will be supported with appropriate salary for their research activities, though not necessarily through the REU grant.) Some budgets include costs for limited travel by project personnel and for various activities that enhance students' professional development.

An REU Site may not charge students an application fee. An REU Site may not charge students tuition, or include tuition in the proposal budget, as a *requirement* for participation (although it is permissible to offer students the *option* of earning academic credit for participation). An REU Site may not charge students for access to common campus facilities such as libraries or athletic facilities.

Student stipends for summer REU Sites are expected to be approximately $500 per student per week. Other student costs include housing, meals, travel, and laboratory use fees and usually vary depending on the location of the site. Amounts for academic-year REU Sites should be comparable on a pro rata basis. All student costs should be entered as Participant Support Costs (Line F on the FastLane budget form and Field E on the Grants.gov budget form). Indirect costs (F&A) are not allowed on Participant Support Costs in REU Site or REU Supplement budgets.

Total project costs--including all direct costs and indirect costs--are generally expected not to exceed $1,200 per student per week. However, REU Sites that involve international activities, field work in remote locations, a Research Experiences for Teachers (RET) component, or other exceptional circumstances may exceed this limit.

The Budget Justification (limited to three pages) should explain and justify all major cost items and any unusual items or situations, such as field work or international collaborations, and should address the cost-effectiveness of the project. As noted above, projects that involve an international component or field work in remote locations often have larger budgets than other projects. This feature is understandable, but the extra costs, with detailed breakdown, should be described in the Budget Justification.

When preparing proposals, PIs are encouraged to contact the appropriate disciplinary REU program officer (see https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp) with any questions about the budget or the appropriateness of charges in it.

So as not to create a financial hardship for students, REU Sites are encouraged to pay students their stipend and living expenses on a regular basis or at least on an incremental basis--not, for example, in a lump sum at the end of the summer.

Although the informal seminars, field trips, and similar gatherings through which students interact and become attuned to the culture of research and their discipline are often vital to the success of undergraduate research experiences, applicants are reminded that costs of entertainment, amusement, diversion, and social activities, and any expenses directly associated with such activities (such as meals, lodging, rentals, transportation, and gratuities), are unallowable in the proposal budget. Federal/NSF funds may not be used to support these expenses. However, costs of "working meals" at seminars and other events at which student participation is required and for which there is a formal agenda are generally allowable. See PAPPG Chapter X.C.

Current and Pending Support. Provide this information for all Senior Personnel, up to a total of 12 people. Senior Personnel include the PI, the Co-PI (if one has been designated), and other faculty/professionals who are anticipated to serve as research mentors.

Facilities, Equipment, and Other Resources. Previous editions of the REU solicitation instructed applicants to omit this section and include the relevant information in the Project Description. Now this section is required and must be completed in accordance with the instructions in the PAPPG.

Supplementary Documentation. In addition to the Postdoctoral Researcher Mentoring Plan (if applicable) and the Data Management Plan, the proposal may include up to five signed letters of commitment documenting collaborative arrangements of significance to the proposal. These may be scanned and uploaded into the Supplementary Documents section. Letters may be relevant where the awardee and performing organizations are different, where faculty or facilities at more than one institution or organization are to be employed, or where international activities are planned. Other letters--for example, letters of endorsement--are not permitted.

REQUEST FOR REU SUPPLEMENT

Many of the research programs throughout the Foundation support REU activities that are requested either (1) as a component of a new (or renewal) research proposal or (2) as a post-award supplement to an existing grant or cooperative agreement. Specific guidance for the use of either mechanism is given in the last two paragraphs of this section (below).

Investigators are reminded that support for undergraduate students involved in carrying out research under NSF awards should be included as part of the research proposal itself instead of as a post-award supplement to the research proposal, unless such undergraduate participation was not foreseeable at the time of the original proposal.

Contacts: For guidance about preparing an REU Supplement request as a component of a new (or renewal) research proposal, contact the program officer who manages the relevant research program. For guidance about preparing an REU Supplement request for an existing NSF award, contact the program officer assigned to the NSF award that would be supplemented. Do *not* contact the list of disciplinary REU program officers at https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp about REU Supplements.

Regardless of which mechanism is used to request an REU Supplement, the description of the REU activity should discuss the following: (1) the nature of each prospective student's involvement in the research project; (2) the experience of the PI (or other prospective research mentors) in involving undergraduates in research, including any previous REU Supplement support and the

outcomes from that support; (3) the nature of the mentoring that the student(s) will receive; and (4) the process and criteria for selecting the student(s). If the student has been pre-selected (as might be true in the case of a supplement for an ongoing award), then the grounds for selection and a brief biographical sketch of the student should be included.

Normally, funds may be requested for up to two students, but exceptions will be considered for training additional qualified students who are members of underrepresented groups (women, minorities, and persons with disabilities). Centers or large research efforts may request support for a number of students commensurate with the size and nature of the project.

Student stipends for summer projects are expected to be comparable to those of REU Site participants, approximately $500 per student per week. Other student costs include housing, meals, travel, and laboratory use fees and usually vary depending on location. Amounts for academic-year projects should be comparable on a pro rata basis.

Total costs for a summer--including all direct costs and indirect costs--are generally expected not to exceed $1,200 per student per week. However, projects that involve international activities, field work in remote locations, or other exceptional circumstances may exceed this limit.

Results from any REU Supplement activities must be included in the annual project report for the associated award. The term of an REU Supplement may not exceed that of the associated award.

A request for an REU Supplement as part of a proposal for a new or renewal grant or cooperative agreement should be embedded in the proposal as follows. Enter the description of the REU activity (namely, the information described above in the fourth paragraph under the subheading "REQUEST FOR REU SUPPLEMENT") in the section for Supplementary Documentation. Limit this description to three pages. Include the budget for the REU activity in the yearly project budget. Enter all student costs under Participant Support Costs (Line F on the FastLane budget form and Field E on the Grants.gov budget form). (Indirect costs [F&A] are not allowed on Participant Support Costs in REU Site or REU Supplement budgets.) As part of the Budget Justification, provide a separate explanation of the REU Supplement request, with the proposed student costs itemized and justified and a total given for the items plus associated indirect costs. If the intent is to engage students as technicians, then an REU Supplement is not the appropriate support mechanism; instead, support should be entered on the Undergraduate Students line of the proposal budget.

A request for an REU Supplement to an existing NSF award should be submitted if the need for the undergraduate student support was not foreseen at the time of the original proposal submission, and should be prepared by the PI in FastLane in accordance with the guidelines found in the PAPPG. The following instructions supplement those found in the PAPPG. After logging into FastLane, choose "Award and Reporting Functions," and then "Supplemental Funding Request." Next, choose the award to be supplemented. In the form entitled "Summary of Proposed Work," state that this is a request for an REU Supplement. In the form entitled "Justification for Supplement," include the information described above in the fourth paragraph under the subheading "REQUEST FOR REU SUPPLEMENT"; limit your response to three pages. If an REU student has been pre-selected, you may place a brief biographical sketch in Supplementary Documents. Prepare a budget, including a justification of the funds requested for student support and their proposed use. All student costs should be entered as Participant Support Costs (Line F) in the proposal budget. (Indirect costs [F&A] are not allowed on Participant Support Costs in REU Site or REU Supplement budgets.) After you have prepared the request for supplemental funding, forward it to your organization's Sponsored Research Office (SRO), which will submit the request to NSF.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Indirect Cost (F&A) Limitations:

Recovery of indirect costs (F&A) is prohibited on Participant Support Costs in REU Site proposals and REU Supplemental funding requests.

Other Budgetary Limitations:

For summer REU projects, the total budget request--including all direct costs and indirect costs--is generally expected not to exceed $1,200 per student per week. (The budget request for an academic-year REU project should be comparable on a pro rata basis.) However, projects that involve international activities, field work in remote locations, a Research Experience for Teachers (RET) component, or other exceptional circumstances may exceed this limit.

C. Due Dates

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

  May 24, 2013

  Fourth Friday in May, Annually Thereafter

  Deadline for REU Site proposals requiring access to Antarctica. All other REU Site proposals must be submitted to the August REU deadline.

  August 28, 2013

  Fourth Wednesday in August, Annually Thereafter

  Deadline for REU Site proposals except those requiring access to Antarctica

D. FastLane / Grants.gov Requirements

For Proposals Submitted Via FastLane:

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

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to

support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

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

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

Additional Solicitation Specific Review Criteria

Reviewers will be asked to interpret the two basic NSF review criteria in the context of the REU program. In addition, they will be asked to place emphasis on the following considerations:

1. Appropriateness and value of the educational experience for the student participants, particularly the appropriateness of the research project(s) for undergraduate involvement and the nature of the students' participation in these activities.
2. Quality of the research environment, including the facilities, the preparedness of the research mentor(s) to guide undergraduate research, and the professional development opportunities for the students.
3. Appropriateness of the student recruitment and selection plans, including those for involving students from underrepresented groups, from outside the host institution, and from academic institutions with limited research opportunities in STEM.
4. Quality of plans for student preparation and for follow-through designed to promote continuation of student interest and involvement in research.
5. Appropriateness and cost-effectiveness of the budget, effectiveness of the plans for managing the project and evaluating the outcomes, and commitment of partners, if relevant.
6. For renewals of previously funded REU Sites: effectiveness of the previous site.

B. Review and Selection Process

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

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF

Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

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

Demographic data on REU student participants are required as part of annual and final project reports. For details, see the publication *REU Site Awards: Guidelines for Use of NSF FastLane Project Reports System* (NSF 01-124; https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf01124). PIs of REU Sites may also be required to provide information that enables NSF to track students beyond the period of their participation in the site.

REU Site awardees are expected to establish a Website for the recruitment of students and dissemination of information about the REU Site and to maintain the Website for the duration of the award. PIs are required to furnish the URL for the Website to the cognizant NSF program officer no later than 90 days after receiving notification of the award.

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:

- NSF REU Site Contacts: https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

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

Some NSF directorates/offices/divisions that manage REU Site proposals post discipline-specific REU Web pages or fund an awardee to host a Website providing information for the community of REU awardees in the discipline. These discipline-specific Websites are listed, along with the NSF REU point-of-contact for each discipline, on the Web page

at https://www.nsf.gov/crssprgm/reu/reu_contacts.jsp.

The following resources summarize research on the impact of undergraduate research experiences and might be helpful when considering the evaluation of REU projects and the assessment of student learning gains:

- Brownell, Jayne E., and Lynn E. Swaner. *Five High-Impact Practices: Research on Learning, Outcomes, Completion, and Quality*; Chapter 4: "Undergraduate Research." Washington, DC: Association of American Colleges and Universities, 2010. Surveys published research on the effectiveness and outcomes of undergraduate research.
- Crowe, Mary, and David Brakke. "Assessing the Impact of Undergraduate-Research Experiences on Students: An Overview of Current Literature." *CUR Quarterly*, Vol. 28, Issue 4 (Summer 2008), pp. 43-50. Available online at https://www.cur.org/assets/1/7/summer08CroweBrakke1.pdf. Annotated bibliography summarizing research on the impact of research experiences on students.
- Laursen, Sandra, et al. *Undergraduate Research in the Sciences: Engaging Students in Real Science*. San Francisco: Jossey-Bass, 2010. Examines what is known about the benefits of undergraduate research, and provides advice for designing and evaluating these experiences.
- Lopatto, David. *Science in Solution: The Impact of Undergraduate Research on Student Learning*. Tucson, AZ: Research Corporation for Science Advancement, 2009. Available online at http://web.grinnell.edu/sureiii/Science_in_Solution_Lopatto.pdf. Findings from the author's pioneering surveys exploring the benefits of undergraduate research.
- Taraban, Roman, and Richard L. Blanton, eds. *Creating Effective Undergraduate Research Programs in Science: The Transformation from Student to Scientist*. New York: Teachers College Press, 2008. Collection of essays examining assessments and evaluations of undergraduate research experiences and their benefits for students, faculty, and institutions.
- Russell, Susan H., Mary P. Hancock, and James McCullough. "Benefits of Undergraduate Research Experiences." *Science*, Vol. 316, No. 5824 (27 April 2007), pp. 548-549. Available online at http://www.sciencemag.org/content/316/5824/548.summary. Summary of a large-scale, NSF-funded evaluation of undergraduate research opportunities conducted by SRI International between 2002 and 2006. The study included undergraduate research opportunities sponsored by the REU program and other NSF programs.
- Evaluation of NSF Support for Undergraduate Research Opportunities (UROs), https://www.sri.com/. Reports and supporting materials from SRI International's large-scale, NSF-funded evaluation of undergraduate research opportunities.
- Survey of Participant Experiences in NSF's Research Experiences for Undergraduates (REU) Program, https://www.sri.com/. Reports and supporting material from an examination of the activities, outcomes, and impacts of REU Site and Supplement awards funded by NSF's Directorate for Engineering. Based on surveys of former REU students, investigators, and faculty mentors conducted by SRI International between 2007 and 2009, this study complements SRI International's earlier study of undergraduate research opportunities across a full range of disciplines.

Several additional resources might also be helpful to investigators planning REU projects:

- Loretz, Christopher A., ed. *Looking Beyond the Borders: A Project Director's Handbook of Best Practices for International Research Experiences for Undergraduates* (NSF 06-204). Arlington, VA: National Science Foundation, 2002. General information for investigators planning to take students abroad, produced by the NSF Workshop on Best Practices for Managing International REU Site Programs, April 9-10 and November 8-9, 2001.
- Online Ethics Center, http://www.onlineethics.org/. NSF-funded project that provides a wealth of information, references, and case studies for exploring ethics in engineering and science. Investigators may find this site helpful for designing activities to introduce students to the responsible conduct of research.
- Evaluation Tools for Undergraduate Research: Undergraduate Research Student Self-Assessment (URSSA), https://www.colorado.edu/eer/research-areas/undergraduate-research/evaluation-tools-undergraduate-research-student-self. NSF-funded online survey instrument for use in evaluating student outcomes of undergraduate research experiences. Some REU Sites use this tool or a variant of it (see, for example, http://bioreu.org/node/29) to assess student learning gains. Other REU Sites use other tools or follow a different approach; NSF does not prescribe any one approach to evaluation and assessment for REU Sites.

A number of NSF programs provide research experiences for students or teachers. Prospective investigators may wish to explore these in addition to the REU program:

- Cooperative Activity with Department of Energy Programs for Education and Human Resource Development
- Engineering Research Centers (ERC)
- Engineering Research Experiences for Veterans (EREV)
- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)
- International Research Experiences for Students (IRES)
- I/UCRC Research Experiences for Veterans
- Louis Stokes Alliances for Minority Participation (LSAMP)
- Materials Research Centers and Teams
- Nanotechnology Undergraduate Education (NUE) in Engineering
- Research Assistantships for High School Students (RAHSS): Directorate for Biological Sciences
- Research Experiences for Teachers (RET): Directorate for Biological Sciences
- Research Experiences for Teachers (RET) in Engineering and Computer Science
- Research Experiences for Veterans/Teachers (REV/T): Directorate for Engineering
- Research in Undergraduate Institutions (RUI)
- Research Training Groups in the Mathematical Sciences (RTG)
- Science and Technology Centers (STC)
- Tribal Colleges and Universities Program (TCUP)

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

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