Plant Genome Research Program (PGRP)

PROGRAM SOLICITATION
NSF 18-579

REPLACES DOCUMENT(S):
NSF 16-614

National Science Foundation

Directorate for Biological Sciences
Division of Integrative Organismal Systems

Full Proposal Deadline(s):

Proposals Accepted Anytime

IMPORTANT INFORMATION AND REVISION NOTES

This revision continues no deadline full proposal review for PGRP: proposals may be submitted any day, any time.

The solicitation includes two tracks for submission including a RESEARCH-PGR Track and TRTech-PGR Track.

There will be **no limits** on the number of proposals an investigator can submit as PI or co-PI.

The Early Career Award (ECA) Track is no longer available. The Mid-Career Track is available; submissions must conform to IOS Core Programs requirements.

The MINE and TRANSFORM Challenge Grants are now included in the TRTech Track and are no longer available as separate tracks.

Important Reminders:

Requests for funding for expected REU, RET, RAHSS or ROA activities may be included in the proposal at submission. Post-award requests for supplemental funding are expected to reflect unanticipated opportunities that arise after an award is made.

A consortium of organizations **must** submit a single proposal with one eligible organization serving as the lead and all other organizations as subawardees. Separately submitted collaborative proposals will be **returned without review.**

International subawards are permitted if justified by unique opportunities and capabilities not available in the U.S.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1), which is effective for proposals submitted, or due, on or after January 29, 2018.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Plant Genome Research Program (PGRP)

Synopsis of Program:

The Plant Genome Research Program (PGRP) supports genome-scale research that addresses challenging questions of biological, societal and economic importance. PGRP encourages the development of innovative tools, technologies and resources that empower a broad plant research community to answer scientific questions on a genome-wide scale. Emphasis is placed on the scale and depth of the question being addressed and the creativity of the approach. Data produced by plant genomics should be usable, accessible, integrated across scales and of high impact across biology. Training, broadening participation, and career development are essential to scientific progress and should be integrated in all PGRP-funded projects.

Two funding tracks are currently available:

1. **RESEARCH-PGR TRACK**: Genome-scale plant research to address fundamental biological questions in biology, including economically important processes of societal importance.

2. **TRTech-PGR TRACK**: Tools, resources and technology breakthroughs that further enable functional plant genomics.

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.

- Gerald Schoenknecht, Program Director, E12337, telephone: (703) 292-5076, email: gschoenk@nsf.gov
- R. Kelly Dawe, E12325, telephone: (703) 292-2429, email: rdawe@nsf.gov
- Diane J. Okamuro, E12344, telephone: (703) 292-4508, email: dokamuro@nsf.gov
- Clifford Weil, E12317, telephone: (703) 292-8712, email: cweil@nsf.gov

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

- 47.074 --- Biological Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 10 to 15

Anticipated Funding Amount: $20,000,000

Approximately $20,000,000 will be available for new and continuing awards in FY 2019. Estimated program budget, number of awards and average award number, size/duration are subject to the availability of funds.

Limitation of Awards

PGRP proposal budget requests may not exceed $5 million to support up to a 5-year project plan, although most projects are expected to require less.

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. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

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 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)**:

  Proposals Accepted Anytime

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:

Standard NSF reporting requirements apply.

TABLE OF CONTENTS

I. INTRODUCTION

Plants are of fundamental importance to society and are the basis of our carbon economy. Over the years, progress in plant genomics has improved our capacity to address basic biological questions, including those of economic and societal importance. This trajectory continues as knowledge from basic plant genomics research continues to solve pressing global problems through both individual projects and broad collaborative projects that surpass disciplinary boundaries. PGRP supports research that uncovers fundamental biological principles, contributes to deciphering the Rules of Life, and develops the cutting-edge tools and resources to do so. Over the last 20 years, PGRP-funded research has generated basic knowledge that can be applied to agriculture under the guidance of the National Plant Genome Initiative (NPGI). With low cost, high output sequencing technologies expanding at breakneck pace, the current challenge is to integrate, mine, and fully interrogate massive –omic wide datasets, and to leverage the new technologies to solve long-standing and all-new questions in plant biology. PGRP-funded research should be forward-thinking and focused on future societal and scientific impacts.

The overarching goals of the PGRP are: (1) to support cutting edge research that investigates the structure and function of plant genomes, focusing on

generating and integrating large scale datasets to investigate basic biological processes of societal importance and (2) to develop innovative tools, technologies and resources that are essential to drive plant functional genomics forward.

II. PROGRAM DESCRIPTION

The Plant Genome Research Program (PGRP) supports genome-scale research at the frontier of plant biology and of importance to society. Breakthroughs in tools, technologies and resources are still needed to understand how plant genomes, and their interactions with other genomes and with the environment, give rise to the myriad of phenotypes that make up life on earth. Plants are also critical to sustaining society and hold solutions to global challenges from hunger and food insecurity to environmental change. Basic knowledge is an essential step toward improving plant health and agriculture and, by extension, national security and well-being. To achieve these goals, large scale data sets need to be assimilated into a comprehensive framework. There remain pressing needs to refine the questions being asked, and to generate new tools, resources and capabilities to carry out functional and structural studies of plant genomes. The goals of PGRP are thus to provide tools and knowledge to solve intractable, challenging biological questions, revolutionize agriculture, address fundamental societal issues, and build a scientifically engaged population.

PGRP accepts proposals into two tracks.

Track 1: Genome-scale research (RESEARCH-PGR): *Genome-scale plant research to address fundamental biological questions in plants and processes of societal importance.* PGRP continues to support projects that emphasize hypothesis-driven research and that help to decipher the Rules of Life from a genome-wide perspective. Functional genomics and data synthesis are integral to PGRP-funded projects. Proposals should be innovative and explore new scientific territory, and should articulate the problem, question, hypothesis, or grand challenge of the omics-related topic. Holistic approaches, as well as transdisciplinary engagement, are highly encouraged. For this track, areas of interest could include, but are not limited to the study of:

- Multi-genome/epigenome interactions with the environment,
- Biotic and abiotic interactions among plants and partner organisms,
- High throughput phenotyping to link genomes to phenomes,
- Incorporation of engineering and machine learning into research activities,
- Building bridges across scientific disciplines including plant physiology, ecology and evolution, plant development or across agencies, the private sector or international borders, and
- Linking basic research to applied outcomes relevant to agriculture.

Track 2: Tools, Resources and Technology Advances (TRTech-PGR*: Tools, resources and technology breakthroughs that further enable functional plant genomics*. Capacity is needed to build functional genomics toolkits, advance -omic technologies and to synthesize large datasets into meaningful outcomes. Genome-enabled research requires improvement in large scale sequencing resources, assemblies and annotations in plants. Generation of sequence and other high throughput datasets often surpass the rate of data analysis. Therefore, large publicly available datasets often remain untapped resources that can be analyzed in new ways and re-purposed to yield new information. In the process, novel analytical tools and methods can be developed. For this track, areas of interest could include, but are not limited to generating

- New –omic datasets and the tools to improve and refine them, from single cell approaches to pan-genomes,
- Functional genomic resources and toolkits,
- New methods, tools, or techniques to overcome bottlenecks to plant transformation, especially those that improve plant regeneration or circumvent tissue culture, and facilitate ease of transformation in the public sector,
- Technologies for advancing genome/epigenome editing technologies,
- Data and analytical workflows that can be mined, re-used and potentially reconfigured from already available large datasets,
- Machine learning methods and tools of artificial intelligence to generate and analyze datasets, and
- Imaging and data visualization advances that can be applied to existing or new datasets.

For both of the submission tracks, the following information should be considered:

- Participation can vary from single investigators, to small groups, or consortia of investigators,
- Optimally organized teams are efficient and minimal with well justified members that are essential to achieving the goals of the project.
- Budgets that are commensurate with the scientific problem and approach are essential. Note that budgets should not exceed $5 million for large consortia. It is expected that many research projects that include functional genomics, mining existing data or developing proof-of-concept technologies will be smaller grants in the range of $500,000 to $2 million. *PGRP expects to make awards covering the full range of budget requests commensurate with the scale and scope of each project and retains the ability to decrease budgets deemed outsized relative to the scope of the project.*

ADDITIONAL CONSIDERATIONS FOR PGRP PROPOSAL SUBMISSIONS

All proposals submitted under this solicitation should be aligned with the goals of PGRP, as articulated herein. Applicants are encouraged to contact PGRP Program Directors prior to submission with any questions about research ideas, budgets, and submissions. A one-page summary of proposal ideas to the Program Directors prior to submission to discuss fit to the program is highly encouraged. To facilitate proposal planning, the following **Hallmarks of Successful PGRP Proposals** may be useful:

1. ***The proposed research tackles questions of biological and societal importance****.* Societal needs are changing as rapidly as research is progressing. PGRP remains committed to supporting basic research that is needed to address agricultural challenges, environmental change, and resource redistribution.
2. ***Genome-wide research questions and approaches are used.*** Proposals should focus on genome-wide research questions and approaches, consistent with the scope described in this solicitation. Proposals focused on individual genes or gene families are more appropriate for funding through other BIO programs and should be submitted there.
3. ***Transdisciplinarity is included, when appropriate.*** Breakthroughs in approach often develop from teams that transcend discipline boundaries. Fields such as engineering, computational science and modeling, artificial intelligence, physics, mathematics and biomechanics already have an impact on genomics, and there remains a need for transdisciplinary synergy to solve overarching biological problems.
4. ***Investigative teams are optimally configured.*** While single investigator proposals are welcome, PGRP investigators have established a highly collaborative culture that values and benefits from shared research and multi-disciplinary training. All kinds of multi-investigator teams are encouraged, and should be well-justified, including single- or multi-institutional teams. Teams should be optimally designed to achieve the goals of the proposed work, and budgets should be commensurate with manageable project goals.

5. ***Public access and timely data release is routine.*** Data products generated from PGRP-supported research are diverse and continue to be produced in massive quantities. Data products include sequences of all types, seeds, diversity populations, biological materials, genetic maps, genome browsers, informatics tools, images, software, publications, videos and movies, teaching curricula, etc. All data products must be fully released within a reasonable time consistent with community standards, as articulated in the Supplementary documents of the proposal (Appendix A-1). Annual reports are expected to update progress regarding release of all data products.
6. ***International cooperation must be fully justified.*** It is expected that non-U.S. participants will secure support from their own national programs. However, international subawards may be included if international investigators bring unique expertise and/or resources not available in the U.S. Information about international subawards is available in the PAPPG.
7. ***Broadening participation is inherent to the project.*** Public access to PGRP research outcomes should enable any institution to participate in plant genomics research. To broaden participation, PGRP encourages applications from EPSCoR jurisdictions, Primarily Undergraduate Institutions, Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges and Universities. Investigators are encouraged to think beyond their immediate colleague network to incorporate diversity in their scientific endeavors. All projects are expected to explain how project participation will be diversified and broadened as part of their Broader Impacts activities.
8. ***Training, education and communication is strong and fully integrated.*** Research ideas and endeavors are rejuvenated by new participants. Training, outreach and education should be fully integrated into research. Activities that will successfully penetrate societal communication barriers are encouraged. Efforts could include, but are not limited to, training for translational research by including breeders in genomics projects and developing citizen science activities or other public outreach. For additional guidance please see the NSF's Perspective on Broader Impacts (www.nsf.gov/od/iia/publications/Broader_Impacts.pdf).

ADDITIONAL INFORMATION FOR OTHER TYPES OF PROPOSALS SUBMITTED TO THIS SOLICITATION:

Research in Undergraduate Institutions (RUI) Proposals

Research in Undergraduate Institutions (RUI) proposals may be submitted in response to this solicitation. Information on the scope of RUI projects and the format of these proposals, including the additional RUI statement, can be found on the RUI/ROA program page .

Mid-Career Investigator Awards in Integrative Organismal Biology (MCA-PGR).

MCA-IOS-PGR activities may be included in full proposals submitted to this solicitation. A "mid-career" investigator is defined here as any researcher who is post-tenure and not retired. The MCA-PGR opportunity provides support for mid-career researchers/scientists to acquire new skills to use genomics and bioinformatics tools and/or novel technologies to answer organismal questions. Requests for support may include support for research visits, for participation in training opportunities in other laboratories, and for the use of genome research facilities not available at the applicant's institution. Support can be requested for an investigator's own activities or to host an eligible mid-career investigator and can include a request for salary support during periods of training. Investigators interested in the MCA-PGR activity are strongly encouraged to contact a Program Director for further guidance prior to submission of a proposal containing these activities.

Research Coordination Network (RCN) Proposals

This solicitation will accept Research Coordination Network (RCN) Proposals. RCN proposals should be submitted to the appropriate program in the Core Programs Track. Information on the scope of RCN projects and the format of these proposals can be found on the RCN program page.

Accomplishment Based Renewal (ABR) Proposals

This solicitation will accept Accomplishment Based Renewal (ABR) Proposals. ABR proposals should be submitted to the appropriate program in the Core Programs Track. Information on eligibility and the scope and format for ABR submissions can be found in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) . If you are considering an ABR submission you MUST contact a Program Director in the relevant cluster prior to submission. Failure to do so may result in your proposal being returned without review.

ADDITIONAL INFORMATION FOR OTHER PROPOSALS CONSIDERED BY PGRP:

PGRP reviews proposals submitted to the Faculty Early Career Development Program (CAREER) Note that CAREER proposals are not covered by this solicitation. CAREER proposals should be submitted by the deadline for BIO submission indicated in the CAREER Solicitation (NSF 17-537). Additional information and Directorate and Division Contacts for CAREER can be found on the CAREER program page.

Additional funding opportunities are reviewed by PGRP, but are not submitted directly to this solicitation. These include conferences, symposia and workshops, requests for supplemental funding, Grants for Rapid Response Research (RAPID) or EArly-concept Grants for Exploratory Research (EAGER) proposals. These opportunities must be submitted according to instructions in the PAPPG. PGRP Program Directors must be contacted by email in advance of submitting the request. If approved, proposal submission is in these categories are submitted to the PAPPG using the Program Announcement field on the proposal coversheet, selecting 1) the type of proposal, 2) the Division of Integrative Organismal Systems and 3) Plant Genome Research Program. Interested PIs are directed to the IOS Core Programs Solicitation for more information. More details about these opportunities can be found in the IOS Core Solicitation and the PAPPG.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 10 to 15

Anticipated Funding Amount: $20,000,000

Approximately $20,000,000 will be available for new and continuing awards in FY 2019. Estimated program budget, number of awards and average award number, size/duration are subject to the availability of funds.

Limitation of Awards

PGRP proposal budget requests may not exceed $5 million to support up to a 5-year project plan, although most projects are expected to require less.

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. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

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.

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.

ADDITIONAL PROPOSAL PREPARATION INSTRUCTIONS

1. ***Proposal Cover Sheet:*** **Titles must start with the acronyms for the appropriate Track:**
   - "RESEARCH-PGR:" for proposals submitted to genome-scale plant research Track 1.
   - "TRTech-PGR:" for proposals submitted to the Tools, Resources and Technology Track 2.

   Note: A maximum of four Co-PIs can be listed on the cover sheet. **ALL Co-PIs and other Senior Personnel and their home institutions must be included in a complete list in the Overview Section of the Project Summary.**

2. **Project Summary**: As per the PAPPG, Project Summaries **MUST** include three sections:
   - Overview : This section **must include a list of all senior personnel (PI, Co- PIs, key collaborators) along with their home institutions;**
   - Intellectual Merit : Identify clearly the specific aims of the project
   - Broader Impacts : Identify benefits to society with achievable, specific desired societal outcomes

   Note: The summary should be written in the third person and directed to a technically literate reader. *Proposals that do not separately and explicitly address the overview, and both intellectual merit and broader impacts in the Project Summary may not be accepted or will be returned without review.*

3. ***Project Description*** (maximum 15 pages, including figures and tables): The standard description of the Project Description in the PAPPG should be followed. Additional information is provided here:
   - **Results from prior NSF support** (maximum 5 pages): Only the most relevant prior NSF awards (PGRP or non-PGRP) should be listed in this section for the PI and all Co-PIs. Results from closely related awards from other federal agencies should be described, if applicable.
   - **Statement (with designated heading) of the biological question being addressed, hypothesis tested and/or the tool/resource/technology (and its purpose) being developed:** All proposals must include a brief explanation with an identifiable heading in

the proposal.
    - **Research plan**: Describe the goals of the project, including the necessary background for scientific, technical and informatics approaches, along with expected outcomes. Descriptions must be sufficiently detailed to allow adequate review. In addition, if a letter of collaboration is provided as a Supplementary Document, the project description should also include a detailed description of the nature of any collaboration(s), the role of collaborator(s), and the expected outcomes/deliverables from the collaboration.
    - **Deliverables (with designated heading)** should be included.
    - **Broader Impacts**: As per guidance in the PAPPG, the **Project Description must contain a heading labeled "Broader Impacts of the Proposed Work"** followed by a significant description of the activities planned. This section must convey how the research will ultimately benefit society and achieve specific, desired societal outcomes. All PGRP projects are expected to broaden participation in research, educational and outreach activities. Additional creative and relevant activities should be proposed. Goals and expected outcomes for the proposed activities should be articulated and achievable. The scale of the activities should be commensurate with the scale and scope of the proposed research and should be integrated with the research objectives.
4. ***References Cited:*** Indicate with an asterisk any cited publications that resulted from prior research funded by NSF for PI/Co-PIs.
5. ***Biographical Sketches***: Biosketches must follow the PAPPG guidelines as separate documents for the PI, Co-PIs and *each of the Senior Personnel listed on the Project Summary page.* Biosketches for Post-doctoral fellows are **not** required. Biographical sketches should **not** be included for anyone providing a "Letter of Collaboration."
6. ***Proposal Budget:*** Provide a summary budget and a yearly budget for the duration of the proposed project, including any subawards for co-PIs, if applicable. A Budget Justification should be provided for each budget submitted. *It is recommended the Budget Justifications be structured with the same headings and subheadings as the Budget sheet.* Funds for facility support, construction or renovation may not be requested. Funds to cover the cost of attendance of the PI at each year's annual awardee meeting in Alexandria, VA should be included in the budget.
7. ***Current and Pending Support:*** Current and Pending Support following the PAPPG guidelines must be listed for the PI, Co-PIs and *each of the Senior Personnel and Key Collaborators listed on the Project Summary page.*
8. ***Facilities, Equipment and Other Resources:*** Provide a description of available facilities. For projects requiring additional equipment, justify the need for these resources in the context of the innovative work proposed.

SUPPLEMENTARY INFORMATION REQUIRED BY PGRP

PGRP requires additional information that should be labeled clearly and included in the **Supplementary Documents** section of FastLane or Grants.gov. Provide only the allowable and applicable items, as noted in the PAPPG or NSF Grants.gov Application Guide and this section. Proposals that contain any material not specifically requested, or in excess of the page allowances, will be considered non-compliant and may be returned without review. Supplementary documents in this section should include the information described:

(A-1) Data Release, Sharing and Management (maximum 2 pages covering all PIs and co-PIs): Describe the management of intellectual property rights, including plans for sharing data, code, digital designs, information, and materials resulting from the award. Data and digital products should be identified, and the following described for *each* of them:

- Format and standard of primary data;
- Metadata to be collected and disseminated with primary data (e.g., tissue type, developmental stage);
- Timetable of release;
- Public repository used;
- License for use (emphasis on open source licenses such as MIT and GPL);
- Constraints on release; and
- Person responsible for release;

PIs should consult with current data standardization procedures as described by public sites such as DataONE and follow the "The Fair Guiding Principles for Data Management and Stewardship and those articulated in "*Best Practices for Scientific Computing*.

The guidelines provided here follow recommendations of the community-driven ***Toronto International Data Release Workshop*** The proposed plan must take into consideration the following conditions where applicable:

- Genome-wide sequence data (including transcriptomes, methylomes, small RNA data, proteomic and/or metabolomic data, etc.) must be uploaded to a public database, such as NCBI GenBank, **at the pre-publication stage** as soon as they are assembled and quality checked following currently accepted community standards (e.g. Bermuda/Ft. Lauderdale agreement, see PGRP website.). Release and dissemination of raw and processed sequence data must be described. **Initial release of these sequences to project websites is acceptable, but project websites sometimes have limited longevity; therefore, evidence of release to public repositories is required. The timing of release should be stated clearly in the proposal. The public databases where the data will be deposited should be clearly indicated.**

- Small-scale sequence data are required to be released to a public database (e.g., NCBI GenBank) at the time of publication or before the end of the project, whichever comes first. These data are required to meet acceptable quality standards and should include metadata.

- All software and code must be in a versioned code repository (e.g., GitHub/BitBucket) and released immediately. Code should be well documented for others to reuse. We strongly encourage release of ready-to-use software and code through integration with computing resources (e.g., Galaxy, CyVerse), in Virtual Machines (e.g., AWS, JetStream), and in Containers (e.g., Docker/DockerHub).

- Other digital products including, but not limited to, 3D models for printing, circuit boards designs, phenotyping data, image data, and machine learning models must be included in the data management plan.

- Biological materials, including seeds, constructs and similar community resources must be made available in a timely manner to the scientific community, including industry. These materials should be checked for quality according to specified standards. Resource projects may develop authorship arrangements as appropriate for the project and should explain expected collaborative authorship.

- Projects must provide a sustainability plan to maintain the resources post-award. The sustainability plan cannot include seeking additional Program funds for maintenance. Outlets such as GitHub, DRYAD and other public repositories could be included as part of the sustainability plan.

- A reasonable charge for community resources is permissible, but the fee structure must be outlined clearly in the proposal. For this reason, budgeting and planning for short-term and long-term distribution of the project outcomes must be described. Any charge or access differences between industry and the academic community must be clearly spelled out. If a Material Transfer Agreement is required for release of project outcomes, the terms must be described in detail. No reach-through rights are allowed. Data or materials resulting from NSF-funded research obtained with proprietary materials must be readily available without any restrictions to the users. For this reason, the terms of any usage agreements should be stated clearly in the

proposal.

- **Letters of commitment should be provided from databases or stock centers that agree to distribute project outcomes, including the actions planned and funds needed (if any) for the distribution.**

- In case of a multi-institutional proposal, the lead institution is responsible for coordinating and managing the intellectual property resulting from the PGRP award. Institutions participating in multi-institutional projects should formulate a coherent plan for the project prior to submission of the proposal.

(A-2) Project Management Plan (***maximum 5 pages***): Projects involving more than one investigator must provide a description of the management plan for coordinating the project.

- This description should include plans for communication, coordination of data and information management, evaluation and assessment of progress, allocation of funds and personnel, interaction with the customers in a service project, and other specific issues relevant to the proposed activities.
- A table summarizing the role of each investigator is required for multi-investigator proposals. The exact time commitment of each key project member should be indicated, regardless of any salary request from NSF. Community resource projects should include a timetable with yearly goals, each with benchmarks for the major anticipated outcomes and expected dates for their release.
- Proposals that include distribution of community research resources should include a management plan. This plan should include: methods to make the community aware of the available services or resources including conditions for access, methods for quality control, and ways to solicit feedback from the community. The plan should also document institutional commitment to the facility, user fees if anticipated, and plans for long-term support after the end of the project. Appointment of a project manager and/or administrator is feasible in some cases.
- Management of educational, outreach or training activities should be included.

(A-3) Coordination with Outside Groups (maximum 2 pages): Projects with activities that are part of a national or international collaboration should describe the relationship of the proposed activities and how the components will be coordinated.

(A-4) Responses to Prior Reviewer Comments (***OPTIONAL****; maximum 1 page*): Resubmitted proposals may describe changes in response to prior reviewer comments. Use of this Appendix is optional: PIs are not required to indicate if a proposal is a resubmission or address prior reviewer comments. As per the NSF PAPPG, *a proposal that was previously reviewed and declined by NSF will be returned without review if it has not been substantially revised since the last submission. Proposals resubmitted within the same fiscal year as a declined proposal will be returned without review.*

(A-5) Mentoring for undergraduates as Research Experiences for Undergraduates (OPTIONAL if REU Activities are included; maximum 3 pages) **this document should** describe (1) the nature of prospective student's involvement in the research project; (2) the experience of the PI (or other prospective research mentors) in mentoring students; (3) the nature of the mentoring that the student(s) will receive; and (4) the process and criteria for selecting the students(s). If a student has been selected, the grounds for selection and a brief biographical sketch of the student should be included. Please note that this section should not include a project description.

(A-6) Letters of Collaboration (OPTIONAL).

Documentation of collaborative arrangements of significance to the proposal through Letters of Collaboration must follow the format specified in the NSF PAPPG. Letters of Collaboration should be limited to stating the intent to collaborate and should NOT contain endorsements or evaluation of the proposed project or PI(s). The Project Description must describe the nature of the collaboration. While Letters of Collaboration are permitted, unless required by a specific program solicitation, letters of support should not be submitted as they are not a standard component of an NSF proposal.

Full Proposal Checklist for PGRP Compliance (Both Tracks)

- The full proposal must be submitted to this Program Solicitation. Do not submit the full proposal to the PAPPG (NSF 18-1).
- The proposal is compliant with the provisions of this solicitation and the PAPPG. Where the two differ, this solicitation takes precedence. The proposal is responsive to the relevant track descriptions in this solicitation.
- **Cover sheet** – The title includes the necessary prefix (RESEARCH-PGR or TRTech-PGR). Appropriate box(es) have been checked, and requisite information has been provided.
- **Project Summary** (maximum 1 page) includes as separate sections an **Overview** *(including names and institutions of any co-PIs or senior personnel not listed in the cover sheet)*, the **Intellectual Merit**, and the **Broader Impacts** of the proposed activity.
- **Project Description** (maximum 15 pages) includes as separate sections, the Intellectual Merit and Broader Impacts of the proposed research, and the Results from Prior NSF Support, if appropriate.
- **References Cited** includes bibliographic citations only and does not provide parenthetical information outside of the 15-page Project Description.
- **Proposal Budget** format follows the PAPPG guidelines, including a Budget Justification for the proposal and any proposed subawards.
- **Biographical Sketches** for all senior personnel follow the format in the PAPPG guidelines; do not bundle multiple biographical sketches into a single file, and do not put biographical sketches in Supplementary Documents.
- **Data Management Plan** points to Supplementary Document A-1.
- **Postdoctoral Mentoring Plan**, if applicable (max 1 page for entire project) is uploaded
- **Supplementary Documents** include the following:
    - A-1 – Detailed data management plan (required)
    - A-2 – Project management plan (required if more than single investigator)
    - A-3 – Coordination with outside groups (if applicable)
    - A-4 – Response to prior review comments (optional)
    - A-5 – Undergraduate mentoring as part of REU (if applicable)
    - A-6 – Letters of Collaboration that follow the format indicated in the NSF PAPPG.
- **Single Copy Documents (required)** includes Collaborators & Other Affiliations Information for the PI, all coPIs and Senior Personnel.
- **Single Copy Documents (recommended)** includes a list of 6-12 suggested, impartial reviewers, including names, institutions, areas of expertise, email addresses, and URLs (if available).

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

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

Budget Preparation Instructions:

PGRP proposal budget requests may not exceed $5 million to support up to a 5-year project plan, although most projects are expected to require less.

C. Due Dates

- **Full Proposal Deadline(s)**:

  Proposals Accepted Anytime

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

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW 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

PGRP- SPECIFIC REVIEW CRITERIA

For proposals involving international collaborations and subawards, reviewers will be asked to assess the mutual benefits and collaboration potential among the partners. Reviewers will comment on whether the expertise and specialized skills, facilities, sites and/or resources of the international counterparts are essential to project outcomes.

For all proposals submitted, reviewers will be asked to specifically comment on the following aspects of a project:

- The data release management plan (Appendix A-1) will be evaluated for all data products to ensure that the plan for data release and access is consistent with PGRP objectives.
- Reviewers will be asked to assess plans for sustainability, continued access, maintenance and/or operation of services past the lifetime of an award, particularly for proposals submitted under the TRTech-PGR track.
- Reviewers will be asked to comment on whether the team is optimally organized and whether all co-PIs and senior personnel play specific, justified roles in the project.
- Reviewers will be asked to comment on the feasibility of time commitments for all investigators, including PI, co-PI and other senior personnel.

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) 292-8134 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.

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:

- Gerald Schoenknecht, Program Director, E12337, telephone: (703) 292-5076, email: gschoenk@nsf.gov
- R. Kelly Dawe, E12325, telephone: (703) 292-2429, email: rdawe@nsf.gov
- Diane J. Okamuro, E12344, telephone: (703) 292-4508, email: dokamuro@nsf.gov
- Clifford Weil, E12317, telephone: (703) 292-8712, email: cweil@nsf.gov

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

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

  FastLane Help Desk e-mail: fastlane@nsf.gov.

  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.

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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