Division of Environmental Biology (core programs) (DEB)

PROGRAM SOLICITATION
NSF 17-512

REPLACES DOCUMENT(S):
NSF 15-609

National Science Foundation

Directorate for Biological Sciences
    Division of Environmental Biology

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

January 23, 2017

January 23, Annually Thereafter

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

August 02, 2017

August 2, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

Instructions for submission of collaborative proposals that seek co-funding by the Natural Environment Research Council (NERC) of the United Kingdom or the U.S.-Israel Binational Science Foundation (BSF) are incorporated.

The budget cap for the Small Grants (SG) option is increased to $200,000.

The window for submission by email of a Personnel List Spreadsheet is limited to 1 business day after proposal submission.

The definition of eligible institutions is clarified.

The purpose and applicability of full proposal submission deferral are clarified.

The requirement to report on results of prior NSF support in full proposals is clarified.

Preliminary Proposals submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 16-1).

Invited Full Proposals submitted in response to this solicitation should be submitted in accordance with the revised NSF 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:

Division of Environmental Biology (DEB)
Core programs

Synopsis of Program:

The Division of Environmental Biology (DEB) supports fundamental research on populations, species, communities, and ecosystems. Scientific emphases range across many evolutionary and ecological patterns and processes at all spatial and temporal scales. Areas of research include biodiversity, phylogenetic systematics, molecular evolution, life history evolution, natural selection, ecology, biogeography, ecosystem structure, function and services, conservation biology, global change, and biogeochemical cycles. Research on organismal origins, functions, relationships, interactions, and evolutionary history may incorporate field, laboratory, or collection-based approaches; observational or manipulative experiments; synthesis activities; as well as theoretical approaches involving analytical, statistical, or computational modeling.

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.

- Division of Environmental Biology, telephone: (703) 292-8480, email: debquestions@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: 200 each year pending availability of funds.

Anticipated Funding Amount: $72,000,000 for new awards each year pending availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

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: 2

In a given year, an individual may participate as a PI, co-PI, or PI of a subaward on **no more than two** preliminary proposals submitted in response to this solicitation. Preliminary proposals in excess of the limit for any person will be returned without review in the reverse order received. "PI, co-PI, or PI of a subaward" refer to how an individual would appear on a cover page or budget of a full proposal including all parts of a collaborative proposal. Exercised options to defer an Invited Full Proposal submission or bypass subsequent Preliminary Proposal submission count against this limit. Proposals submitted to this solicitation for joint consideration with the Natural Environment Research Council (NERC) of the United Kingdom or the U.S.–Israel Binational Science Foundation (BSF) count against this limit. Participating in a proposal as other senior personnel does not count against this limit. **It is the responsibility of the submitters to confirm that the entire team is within the eligibility guidelines.** Changes to the team post-submission to meet the eligibility limits will not be allowed.

This limit does not include proposals to other solicitations [e.g., Research Coordination Networks (RCN), Opportunities for Promoting Understanding through Synthesis (OPUS), Ecology and Evolution of Infectious Diseases (EEID), Dynamics of Coupled Natural and Human Systems (CNH), Doctoral Dissertation Improvement Grants (DDIG), Genealogy of Life (GoLife), Dimensions of Biodiversity, Long-Term Ecological Research (LTER), Faculty Early Career Development Program (CAREER)] or to core programs in other BIO Divisions [Molecular and Cellular Biosciences (MCB), Integrative Organismal Systems (IOS) and Division of Biological Infrastructure (DBI)]. However other solicitations may have their own limit guidelines so be sure to review those carefully for details.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

    - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
    - 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:**

  Not Applicable

C. Due Dates

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

  January 23, 2017

  January 23, Annually Thereafter

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

  August 02, 2017

  August 2, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Division of Environmental Biology (DEB) supports fundamental research on populations, species, communities, and ecosystems. Scientific emphases range across many evolutionary and ecological patterns and processes at all spatial and temporal scales. Areas

of research include biodiversity, phylogenetic systematics, molecular evolution, life history evolution, natural selection, ecology, biogeography, ecosystem structure, function and services, conservation biology, global change, and biogeochemical cycles. Research on organismal origins, functions, relationships, interactions, and evolutionary history may incorporate field, laboratory, or collection-based approaches; observational or manipulative experiments; synthesis activities; as well as theoretical approaches involving analytical, statistical, or computational modeling.

II. PROGRAM DESCRIPTION

Proposals are welcome in all areas of science supported by the Division of Environmental Biology.

Ecosystem Science Cluster: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503663

- Ecosystem Studies Program

Evolutionary Processes Cluster: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503664

- Evolutionary Ecology Program
- Evolutionary Genetics Program

Population and Community Ecology Cluster: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503665

- Population and Community Ecology Program

Systematics and Biodiversity Science Cluster: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503666

- Biodiversity: Discovery and Analysis
- Phylogenetic Systematics

Special Categories

1) Small Grants

The Division welcomes proposals for Small Grants to the core programs via this solicitation. Projects intending total budgets of $200,000 or less should be identified as such with the designation "SG:" as a prefix to the project title in the preliminary proposal and, if invited, the full proposal. These awards are intended to support full-fledged research projects that simply require smaller budgets. Small Grant projects will be assessed based on the same merit review criteria as all other proposals. Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), and Research Assistantships for High School Students (RAHSS) projects can be requested as part of the full proposal for a Small Grant as long as the total request remains within the $200,000 cap. Small Grants are also eligible to request post-award supplements for REU, RET and RAHSS projects in excess of the cap.

2) Research in Undergraduate Institutions (RUI)

Preliminary proposals for RUIs must be submitted to the core programs via this DEB solicitation by the listed deadlines. Invited full RUI proposals should comply with the instructions in this solicitation, include the required RUI documentation and be submitted to the current RUI solicitation. If the invited full proposal is a collaborative, only the undergraduate institution(s) should submit to the RUI solicitation, other institutions should submit to this DEB solicitation. Additional information on the scope of RUI projects and the additional, specific content and format requirements of those proposals can be found at (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5518). Please note: Neither preliminary nor full proposals from RUI-eligible institutions are required to use the RUI designation. An invited full proposal from an RUI-eligible institution may choose to submit through the RUI solicitation or not regardless of whether the preliminary proposal was identified as an RUI.

3) Long Term Research in Environmental Biology (LTREB)

New LTREB proposals require a preliminary proposal. All preliminary, invited full, and renewal LTREB proposals must be submitted via the separate LTREB solicitation by the listed deadlines (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13544). LTREB proposals must address the additional review criteria as described in the LTREB solicitation.

4) NERC and BSF International Collaborative Proposals

The core programs will accept preliminary proposals for international collaborative research under two separate agreements for single review processes between: 1) NSF and the Natural Environment Research Council (NERC) of the U.K. and 2) NSF and the U.S.-Israel Binational Science Foundation (BSF). These opportunities were previously announced under separate Dear Colleague Letters and are now incorporated in this solicitation. Submission instructions for both opportunities are detailed below.

International collaborative proposals are expected to adhere to the eligibility requirements, remit, funding limits, and grant durations for the agency from which funding is sought (NSF, BSF or NERC) and must represent an integrated collaborative effort. These international collaborative proposal submissions (whether reviewed by NSF or international partners) will be subject to the submission limits in this solicitation for any PI, co-PI, or PI of a subaward on the proposal.

If an international collaborative proposal is awarded, the U.S. researchers will receive funding from NSF and the international researchers will receive funding from the international partner agency. Questions regarding these activities can be directed to NSFDEB-NERC@nsf.gov or NSFDEB-BSF@nsf.gov respectively. These agreements do not preclude other international collaborations.

- *Submission of NSF & NERC Collaborative proposals*: Proposers designate a "lead" agency, either NSF or NERC, based on where the largest proportion of the research lies. The lead agency will carry out the review. While not identical, both the NSF and NERC ask reviewers to evaluate proposed projects on the basis of scientific/intellectual merit as well as broader societal impacts. Proposers are encouraged to confirm their lead agency designation by contacting the prospective lead agency at international@nerc.ac.uk for NERC and NSFDEB-NERC@nsf.gov for NSF/DEB. Proposers follow the submission guidelines and deadlines for the lead agency. If NSF is the lead agency a DEB preliminary proposal is required under this DEB Core Programs solicitation. NERC-lead proposals are accepted under either the Standard Research Grants or Large

Research Grants scheme for NERC Discovery Science and should follow the NERC guidelines for applicants (http://www.nerc.ac.uk/funding/available/researchgrants/international/). For Standard Research Grants applicants are required to submit a letter of intent to international@nerc.ac.uk 3-months ahead of the July standard grant full proposal closing date to which the applicants plan to submit. For Large Research Grants an outline proposal must be submitted via the Je-S system in accordance with usual large grant outline closing date and requirements. Note: For both NERC-lead Standard and Large Research Grant proposals, the NSF (non-lead) portion of the project budget cannot exceed $500,000.

- *Submission of NSF & BSF Collaborative proposals*: NSF is always designated as the "lead" agency and NSF will conduct the review of these submissions. A DEB preliminary proposal is required under this DEB Core Programs solicitation. The Israeli investigator(s) must submit a parallel proposal to BSF in accordance with BSF guidelines for applicants (http://www.bsf.org.il/ElectronicSubmission/GatewayFormsAndGuidelines.aspx).

All NERC-Collaborative and BSF-Collaborative submissions to DEB will be reviewed alongside other proposals received in the same funding cycle.

Review Process

A two-stage review process will be used by all Division core programs for the opportunities described above.

Preliminary Proposals: All proposers must submit a preliminary proposal that outlines the major goals of the project including the components described below. Preliminary proposals typically will be reviewed by a panel of outside experts. The Program Officers will communicate the decision to Invite/Do Not Invite full proposals via FastLane and those decisions will be based on the panel recommendations and additional portfolio considerations. Invite/Do not Invite decisions are binding.

Full Proposals: Invited full proposals will receive panel review and *ad hoc* review at the discretion of the program as described in Section VI of this Solicitation. Full proposals that were not invited at the preliminary proposal stage will be returned without review.

Deferred Full Proposal Submission: The invitation to submit a full proposal refers to the upcoming August submission deadline; deferring submission to a later year is not generally allowed. However, if a serious and unexpected situation arises that would prevent timely submission of an invited full proposal, the PI may contact the managing Program Officer and request permission to defer submission until the next full proposal deadline. If the request is well-justified, the Program Officer may grant a deferral. All deferral requests must be received prior to the full proposal deadline and should be initiated at the earliest opportunity. Only in an emergency would a deferral be granted on short notice. A deferred full proposal counts as 1 against the limit of 2 preliminary proposal submissions for each PI, co-PI, or PI of a subaward at the next preliminary proposal deadline. The lead PI must submit an updated Personnel List, using the original preliminary proposal number, at the next preliminary proposal deadline. Deferred full proposals must follow the full proposal submission instructions in the most current version of this solicitation.

Preliminary Proposal Bypass: A proposal that a panel ranks in the top category at the full proposal stage (e.g., High Priority), but that is not recommended by the program for funding may exercise a one-time bypass of the preliminary proposal stage of the next review cycle and be submitted as an invited full proposal at the next full proposal deadline, using the original preliminary proposal number. The bypass submission counts as 1 against the limit of 2 preliminary proposal submissions for each PI, co-PI, or PI of a subaward at the bypassed stage. The lead PI must notify the managing Program Officer of intent to exercise the bypass before the next preliminary proposal deadline and confirm this by submission of a new Personnel List, using the original preliminary proposal number, for the bypassed deadline. The option to exercise a bypass is limited to the preliminary proposal deadline immediately following the invited full proposal review and may not be deferred. Submitters exercising a bypass must follow the full proposal submission instructions in the most current version of this solicitation.

Additional Funding Opportunities

The Division welcomes proposals to the four programmatic clusters via the following opportunities *not* subject to the submission limits in this solicitation for any PI, co-PI, or PI of a subaward on the proposal:

1) Research Coordination Network (RCN) Proposals

RCN proposals should be submitted to the clusters for the August full proposal deadline via the RCN solicitation. Information on the scope of RCN projects and the format of those proposals can be found at (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=11691).

2) Opportunities for Promoting Understanding through Synthesis (OPUS) Proposals

OPUS proposals should be submitted to the clusters for the August full proposal deadline via the OPUS solicitation. Information on the scope of OPUS projects and the format of those proposals can be found at (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13403).

3) Special Guidelines in the PAPPG

Proposals for conferences, requests for supplemental funding, and RAPID or EAGER proposals should be submitted by selecting the PAPPG for the Program Announcement field on the proposal coversheet and then selecting the appropriate cluster. All of these submissions should follow the specific Special Guidelines in the PAPPG.

4) Other Solicitations

The guidelines in this solicitation do not apply to proposals submitted through any other solicitations, such as Doctoral Dissertation Improvement Grants (DDIG) and Faculty Early Career Development Program (CAREER). For a full listing of potentially relevant solicitations, see the DEB Funding Opportunities webpage (https://www.nsf.gov/funding/pgm_list.jsp?org=DEB).

III. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. For FY17, it is estimated that $72 million will be available to fund approximately 200 new awards.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

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: 2

In a given year, an individual may participate as a PI, co-PI, or PI of a subaward on **no more than two** preliminary proposals submitted in response to this solicitation. Preliminary proposals in excess of the limit for any person will be returned without review in the reverse order received. "PI, co-PI, or PI of a subaward" refer to how an individual would appear on a cover page or budget of a full proposal including all parts of a collaborative proposal. Exercised options to defer an Invited Full Proposal submission or bypass subsequent Preliminary Proposal submission count against this limit. Proposals submitted to this solicitation for joint consideration with the Natural Environment Research Council (NERC) of the United Kingdom or the U.S.–Israel Binational Science Foundation (BSF) count against this limit. Participating in a proposal as other senior personnel does not count against this limit. **It is the responsibility of the submitters to confirm that the entire team is within the eligibility guidelines.** Changes to the team post-submission to meet the eligibility limits will not be allowed.

This limit does not include proposals to other solicitations [e.g., Research Coordination Networks (RCN), Opportunities for Promoting Understanding through Synthesis (OPUS), Ecology and Evolution of Infectious Diseases (EEID), Dynamics of Coupled Natural and Human Systems (CNH), Doctoral Dissertation Improvement Grants (DDIG), Genealogy of Life (GoLife), Dimensions of Biodiversity, Long-Term Ecological Research (LTER), Faculty Early Career Development Program (CAREER)] or to core programs in other BIO Divisions [Molecular and Cellular Biosciences (MCB), Integrative Organismal Systems (IOS) and Division of Biological Infrastructure (DBI)]. However other solicitations may have their own limit guidelines so be sure to review those carefully for details.

Additional Eligibility Info:

Full proposals may be submitted only at the invitation of the program except as noted under Additional Funding Opportunities.

Note that institution types, other than those listed in the "Who May Submit Proposals" section, are allowed to receive subawards through an eligible institution, but there are limitations on what can be supported by those subawards. The PI should discuss with a program officer any plans to incorporate a subaward to an institution not eligible to submit directly to this solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals *(required)*: Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

The following exceptions and additions to the PAPPG guidelines apply to preliminary proposals submitted to this solicitation:

Submission of a preliminary proposal is required to be eligible for invitation for a full proposal. Preliminary proposals that are not compliant with the guidelines will be returned without review. It is the submitting organization's responsibility to ensure that the proposal is compliant with all applicable guidelines.

For collaborative proposals, a single preliminary proposal should be submitted by ONLY the lead institution. This single preliminary proposal must include documentation from all collaborative partners (e.g., all project personnel should be indicated on the list of personnel in the project description and provide required documents). See instructions for each preliminary proposal section below.

Preliminary proposals must contain the items listed below and strictly adhere to the specified page limitations. No additional information may be provided as an appendix or by links to Web pages. Figures and tables must be included within the applicable page limit. All elements of the proposal, including legends and tables, must meet the formatting requirements for font size, characters per inch, margins, etc. as specified in the PAPPG.

Results from prior support and responses to prior reviewer comments are neither required in, nor excluded from preliminary proposals. It is up to the individual submitters to determine if either represents an efficient use of the limited Project Description space in support of their request.

Preliminary proposals should contain an overview of the proposed research with sufficient detail to allow assessment of the major ideas and approaches to be used. Preliminary proposals must include the following components.

- **Cover Sheet:** Select the program solicitation number from the pull-down list. The DEB Programs will automatically appear. Check the box indicated for the preliminary proposal. Entries on the Cover Sheet are limited to the Principal Investigator and a maximum of four co-Principal Investigators. Beginning Investigators (individuals who have not been a Principal Investigator [PI] or co-Principal Investigator [co-PI] on a Federally-funded award with the exception of doctoral dissertation, postdoctoral fellowship or research planning grants) listed as Lead PI must check the box for "Beginning Investigator" on the proposal Cover Sheet. Leave blank the fields for Requested Amount, Requested Duration and Start Date for the grant. For more FastLane instructions, see section V.D. below.

- **Title of Proposed Project:** Title should begin with the prefix "Preliminary Proposal:" and additional acronyms for Small Grants "SG:", Accomplishments Based Renewal "ABR:", Research in Undergraduate Institutions "RUI:", DEB-led NERC collaborations "NSFDEB-NERC:", or DEB-led BSF collaborations "NSFDEB-BSF:" if applicable.

- **Project Summary (1 page):** Provide an overview of the proposed research, addressing separately the intellectual merit and broader impacts. The summary should be written in the third person, informative to those working in the same or related field(s), and understandable to a scientifically or technically literate reader. **Preliminary proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review**. Note: Project Summaries entered in the FastLane form are displayed with standardized formatting and subject to a one-page limit for the three sections.

- **Project Description.** Maximum 5 pages total, containing the two following sections:

I. Personnel (This section is limited to one page. Any remaining space should be left blank.) Provide a list of project personnel; any individual for whom a biographical sketch is included in the preliminary proposal must be included. Indicate the institutional affiliation for each individual, and provide a minimal description of that person's role(s) in the project. The description of role(s) may not exceed two lines per person and cannot include external links. You should not list students or technicians. Divide the list into two sections:

The **first section** of the list should be labeled "Key personnel" and must contain all PIs, co-PIs, and PIs of intended subawards for what is envisioned to be the full proposal, including those from all parts of a collaborative proposal. This constitutes the list of key personnel subject to the submission cap of no more than two preliminary proposals. If submitting a NERC or BSF collaborative preliminary proposal, the U.K. or Israeli collaborators should be included in the Personnel page under "Key personnel.

The **second section** of the list should be labeled "All other personnel" and must contain any other personnel whose biosketches are included in the preliminary proposal (i.e., other senior personnel or postdoctoral scholars).This section of the list should not include any individual that will be listed on the cover page of the full proposal submission or cover pages of any associated non-lead collaborative full proposal submissions (i.e., no PIs or co-PIs should be listed). This section should also not include any individual who will be receiving a subaward through the planned budget of the full proposal (i.e., PI on a subaward).

The individuals listed on the personnel page should match the listing of personnel submitted by email using the debpersonnellist.xlsx template (see below). If there is any discrepancy between the listing of personnel on the submitted template and the proposal personnel page, the template listing will be considered definitive for purposes of enforcing the individual cap on preliminary proposal submissions and for the allowed role of individuals on the full proposal submission. If researchers are at different institutions, consider carefully the planned collaborative mechanism – collaborative proposal, subaward, or consultant services – as that will affect the described role – PI or co-PI, PI of a subaward, or other senior personnel, respectively. A change in role from the preliminary proposal to the full proposal requires prior Program Officer approval and will be allowed only in rare circumstances. Please note that the only mechanisms by which to fund someone in a full proposal who was listed on a preliminary proposal as other senior personnel are through the senior personnel salary & wages (Budget Line A) or consultant services (Budget Line G3) of a budget where a different individual is listed as PI. Any other mechanism would be an unapproved change to their role on the full proposal and cause the full proposal to be returned without review. Please keep in mind that preliminary proposals in excess of the submission cap for any person will be returned without review in the reverse order received. It is the responsibility of the submitters to confirm that the entire team is within the eligibility guidelines. Changes to the team post-submission to meet the eligibility limits will not be allowed.

II. Project (This section is limited to four pages and must address separately both the intellectual merit and broader impacts. We suggest the use of the sub-sections listed below, organized as appropriate. For the purposes of DEB Core Programs, sub-sections 1 through 4 are equivalent to an explicit "intellectual merit" header.)

1. "Conceptual Framework" or "Objectives" or "Specific Aims"
2. "Rationale and Significance" or "Background"
3. "Research Question(s)" or "Hypotheses"
4. "Research Approach" or "Experimental Plan"
5. "Broader Impacts"

Note: NERC or BSF collaborative proposals must describe the full scope of work, including that of the international partner.

- **References Cited** are limited to 3 pages, see PAPPG for format.

- **Biographical Sketches** (2-page limit for each) should be included for each person listed on the Personnel page. Each biographical sketch must be uploaded separately. Biographical sketches should **follow the standard format described in the PAPPG.** Note: Do not bundle Biographical Sketches for multiple individuals into a single file. Use the "Add/Delete Non-Co-PI Senior Personnel" button on the FastLane proposal preparation screen to enable submission of separate files for individuals not listed on the cover page.

- **No budget or budget justification should be submitted.** Please leave blank the Requested Amount box on the FastLane Cover Sheet.

- **Collaborators & Other Affiliations Information**. The following information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this preliminary proposal. This information is to be uploaded under **Single Copy Documents.** If you have correctly added biographical sketches for all persons, there should be a separate space within Single Copy Documents to upload each individual's file. For each person include, as described in the PAPPG, (1) Collaborators and Co-Editors, (2) Graduate Advisors and Postdoctoral Sponsors, and (3) Thesis Advisor

and Postgraduate-Scholar Sponsor. In addition, this document should list other potential conflicts including (4) spouse or other relative, and (5) any other individuals with whom or institutions with which the senior personnel (PI, co-PIs, and any named personnel) have financial ties, including advisory committees, boards of directors, or prospective employers (specify type). Note: Collaborations involving junior authorship on a multi-authored papers (>5 authors) may be limited to the senior author. Note: This document may be organized in text or table forms as long as it is clear to which person the collaborators and other affiliations are linked. This information is used in the selection of reviewers to help identify potential conflicts or bias.

- **Personnel List Spreadsheet.** The template found at https://www.nsf.gov/bio/deb/debpersonnellist.xlsx, contains a single tab. Please read the instructions carefully and follow guidance. In particular, if researchers are at different institutions, consider carefully the collaborative mechanism that will be used in the full proposal: collaborative proposal, subaward, or consultant contract when assigning a role of PI or co-PI, PI of a subaward, or other senior personnel, respectively. Using the template, compile an Excel Workbook that provides information for all persons listed on the Personnel page of the project description. The completed file **must include the FastLane proposal ID (Not the Temporary ID #) assigned after submission of your proposal.** The completed file should be submitted by email to debtemplate@nsf.gov **within one business day** of proposal submission.

- **For NERC or BSF Collaborative preliminary proposals**, two documents must be submitted as Single Copy Documents:

  1) A bottom line budget estimate of funding for the entire project including a bottom line budget estimate that will be requested from the non-lead agency, NERC or BSF. Bottom line budget estimates for the non-lead agency must adhere to the budget limits specified by NERC and BSF (see each agency's guidelines for additional information http://www.nerc.ac.uk/funding/available/researchgrants/international/ and http://www.bsf.org.il/ElectronicSubmission/GatewayFormsAndGuidelines.aspx).

  2) Consent for sharing of unattributed reviews: Unattributed reviews will be shared with the funding agency partner, NERC or BSF. The following text must be signed by the lead investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact.

  Template to be used for consent:

  > "On behalf of the proposal investigators, I, _____ (insert Lead PI Name), consent that the Preliminary or Full proposal as well as its unattributed reviews will be shared with the DEB partner funding agency.
  >
  > Signed: _____
  >
  > Organization: _____
  >
  > Date:_____"

Proposers must include the above documents (prepared in accordance with standard NSF formatting guidelines).

Proposers must complete the Proposal Classification Form. The Proposal Classification Form is required for all submissions to BIO; FastLane will not allow processing of the proposal without it.

No other items, appendices or supplementary documents are permitted for preliminary proposals.

Preliminary Proposal Checklist For Compliance

Prior to submission, please review your preliminary proposal against this checklist to ensure that it is fully compliant with the guidelines provided in this solicitation:

- On the Cover Page, nothing is entered into the Requested Amount or start date boxes; the Beginning Investigator box is checked if applicable. The Preliminary Proposal box is checked.
- The Title begins with the prefix "Preliminary Proposal:" followed by any additional acronyms (e.g. RUI, ABR, SG, NSFDEB-NERC, NSFDEB-BSF), if applicable.
- The Project Summary is limited to 1 page, includes as separate sections an Overview, the Intellectual Merit, and the Broader Impacts of the proposed activity.
- The Project Description is limited to 5 pages, addresses both the Intellectual Merit and Broader Impacts of the proposed research as separate sections, and the first page of which contains only a list of project personnel, including institution, planned status (e.g., PI, co-PI, PI of subaward, other senior personnel), and no more than a 2 line description of role(s) in the project.
- The References Cited is limited to 3 pages and conforms to the PAPPG format.
- Properly formatted 2-page Biographical Sketches for all individuals on the Personnel list.
- Collaborators Other Affiliations Information lists are included in Single Copy Documents.
- A Personnel List Spreadsheet is prepared using the provided template and emailed to debtemplate@nsf.gov within one business day of proposal submission.
- For NERC or BSF Collaborative preliminary proposals, two single copy documents are uploaded: a bottom line budget for the non-lead agency that adheres to the specific maximum, and a signed consent form for NSF to share unattributed reviews with the partner agency.

Items that should NOT be included in a Preliminary Proposal:

> Budget, Budget Justification, Facilities, Equipment and Other Resources, Current and Pending Support, Letters of Collaboration, Data Management Plan, Postdoctoral Mentoring Plan, RUI Impact Statement, Certification of RUI Eligibility, or any other Supplementary Documents.

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 Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG 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. Chapter II, Section D.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the GPG 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 GPG instructions.

- **Full proposals will be accepted only from PIs who have submitted preliminary proposals and have been invited to submit a full proposal except as noted under Additional Funding Opportunities**. See "Special Categories" above for submission of invited, full Research in Undergraduate Institutions (RUI) proposals.

- The full proposal should not deviate substantially from the preliminary proposal in the scope of the project. But PIs may incorporate responses to the preliminary proposal panel summary.

- Results of Prior NSF Support. Results of prior NSF support must be reported for each PI or co-PI identified on the proposal who has received any NSF funding with a start date in the past five years, regardless of whether the support was directly related to this proposal or not. Funding includes not just salary support, but any funding awarded by NSF. Results of prior NSF support must follow the format described in the PAPPG.

- Changes to senior personnel (names and roles) from the preliminary proposal stage are generally not allowed except to remove a person, to replace a person rendered incapable of participating, to recognize the promotion of a post-doctoral fellow to a faculty position, or to account for institutional changes by senior personnel. Any changes to senior personnel require approval from the cognizant PO. No changes are allowed that result in a person exceeding the individual submission limit on participation as PI, co-PI, or PI of a subaward established at the preliminary proposal stage. By making a request, the PI takes responsibility that all personnel remain within the eligibility guidelines. Proposals with unapproved changes and/or changes in excess of an individual's submission limit will be returned without review. Reminder: the only mechanisms by which to fund someone in a full proposal who was listed on a preliminary proposal as other senior personnel are through the senior personnel salary & wages (Budget Line A) or consultant services (Budget Line G3) of a budget where a different individual is listed as PI. Any other mechanism would be an unapproved change to their role on the full proposal and cause the full proposal to be returned without review.

- **Research Experiences for Undergraduates**. Projects anticipating the inclusion of undergraduate research experiences are encouraged to include those as part of the research proposal itself, rather than as a supplemental request. Such requests should follow the guidelines for REU supplement requests in the REU solicitation (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517). REU projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU student. If the intent is to engage students as technicians, then an REU is not the appropriate support mechanism; instead, salary support should be entered on the Undergraduate Students line of the proposal budget.

- **REU, RET and RAHSS funds**. If Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET) or Research Assistantships for High School Students (RAHSS) funds are requested as part of the full proposal, descriptions of those activities should be included in Supplementary Documents. The description is limited to 3 pages in all circumstances. For example, if funds are requested for multiple categories of activity (REU, RET, RAHSS) or if multiple institutions on a collaborative proposal are requesting funds for one or more categories, the 3 page limit still applies. The entire budget for these activities should be included in Participant Support Costs, including stipends, travel, and supplies. A detailed breakdown of the budget for each separate category of request must be explained in the budget justification. Budgets for REU activities are generally under $7,500 per student. Budgets for RET activities are generally under $15,000 per teacher. Budgets for RAHSS activities are generally under $6,000 per student.

- **Small Grants**. Full proposals invited from preliminary proposals using the Small Grants designation should include the "SG:" designation in the project title. Projects that were reviewed as Small Grants at the preliminary proposal stage but request full proposal total budgets exceeding the $200,000 limit will be returned without review. REU, RET, and RAHSS projects can be included in full Small Grant proposals as long as the total request remains within the $200,000 cap; however, post-award supplements for REU, RET and RAHSS projects can be requested in excess of the cap.

- **Biographical Sketches and Current and Pending Support**. Biographical sketches and Current and Pending Support Statements should be submitted for all senior personnel in the full proposal, including U.K. or Israeli investigators if submitting a NERC or BSF collaborative proposal. Biographical sketches should **follow the format described in the PAPPG.** All senior personnel biographical sketches should be placed in that section of the proposal. Biographical sketches for post-doctoral fellows can optionally be included, but if included, must be added as Non PI/Co-PI Senior Personnel. No biographical sketches should be included in supplementary documents. Biographical sketches should not be included for anyone providing a "Letter of Collaboration". Please note: Do not bundle Biographical Sketches or Current and Pending Support documents for multiple individuals into a single file. Use the "Add/Delete Non-Co-PI Senior Personnel" button on the FastLane proposal preparation screen to enable submission of separate files for individuals not listed on the cover page.

- **Collaborators & Other Affiliations Information**. The following information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. This information is to be uploaded under Single Copy Documents. If you have correctly added biographical sketches for all persons, there should be a separate space within Single Copy Documents to upload each individual's file. For each person include, as described in the PAPPG, (1) Collaborators and Co-Editors, (2) Graduate Advisors and Postdoctoral Sponsors, and (3) Ph.D. Advisor. In

addition, this document should list other potential conflicts including (4) spouse or other relative, and (5) any other individuals with whom or institutions with which the senior personnel (PI, co-PIs, and any named personnel) have financial ties, including advisory committees, boards of directors, or prospective employers (specify type). Note: Collaborations involving junior authorship on a multi-authored papers (>5 authors) may be limited to the senior author. Note: This document may be organized in text or table format. This information is used in the selection of reviewers to help identify potential conflicts or bias.

Please note: Do not bundle Biographical Sketches or Current and Pending Support documents for multiple individuals into a single file. Use the "Add/Delete Non-Co-PI Senior Personnel" button on the FastLane proposal preparation screen to enable submission of separate files for individuals not listed on the cover page.

- **Data Management Plan**. The PAPPG requires the inclusion of a Data Management Plan with all full proposal submissions. The Data Management Plan can be no longer than 2 pages and must be inclusive of the entire project. The Directorate for Biological Sciences provides additional context and guidance to PIs on the preparation of Data Management Plans here: https://www.nsf.gov/bio/biodmp.jsp. All projects must ensure that data and biological materials are collected, archived, digitized, and made available using methods that allow current and future investigators to address new questions as they arise. Funded projects must disseminate project data broadly, using widely accepted electronic data standards. Investigators are strongly encouraged to make use of appropriate community infrastructure for data management.

- **Letters of Collaboration**. Supplementary Documents may include letters of collaboration from individuals or organizations that are integral to the proposed project but are neither senior personnel nor supported by subawards. This may include subsidiary involvement in some aspect of the project, cooperation on outreach efforts, or documentation of permission to access materials or data. Letters of collaboration must focus solely on affirming that the individual or organization is willing to collaborate on the project as specified in the Project Description or Facilities, Equipment and Other Resources section of the proposal. No endorsements of the potential value or significance of the project may be included. Each letter of collaboration **must** be signed by the designated collaborator. Requests to collaborators for letters of collaboration should be made by the PI well in advance of the proposal submission deadline, because they **must** be included at the time of the proposal submission. The recommended template for& letters of collaboration is provided below:

　　　To: NSF _____ *(Program Title)*_____ Program

　　　From: _____
　　　(*Printed name of the individual collaborator or name of the organization and name and position of the official submitting this memo*)

　　　By signing below (or substitute: transmitting electronically), I acknowledge that I am listed as a collaborator (or substitute: contributor) on this proposal, entitled "_____(*proposal title*)_____," with _____(*PI name*)_____ as the Principal Investigator. I agree to _____ (*description up to 140 characters*)_____, as described in the Project Description or Facilities, Equipment and Other Resources section of the proposal.

　　　Signed: _____
　　　Organization: _____
　　　Date: _____

Please note that inclusion of extra description of the collaborative activities is not allowed.

Please note that general letters of support are not allowed.

- **For NERC or BSF Collaborative full proposals two Supplementary documents and one Single Copy Document must be submitted.**

　Two Supplementary Documents:

　1) Funding requested from non-lead agency: A detailed breakdown of funding requested from non-lead agency, using the non-lead agency's budget form.

　　　a. For NERC complete and attach the form found at:
　　　　http://www.nerc.ac.uk/funding/available/researchgrants/international/uk-budget-form
　　　b. For BSF complete and attach the form found at:
　　　　http://www.bsf.org.il/data/FormsToDownload/Budget_Page_NSF.xlsx. Important: The Israeli partners must also submit this information online as part of the parallel submission to BSF. Completing this form does not replace the requirement to submit a budget when using the BSF system.

　2) Institutional endorsement: An institutional acknowledgement of the submission must be a signed letter from an authorized institutional representative from the non-lead partner's country with the following text.

　　　Template to be used for institutional endorsement:

　　　"I confirm on behalf of _____ (insert name of institution) that the _____ (pick one: U.S.-U.K. or U.S.-Israel) Collaborative proposal between _____(insert the name of lead agency PI and institution) and _____ (insert the name of the non-lead PI and institution) is endorsed and has been submitted by _____(insert name of Research Office), thereby acknowledging the proposed collaboration."

　One Single Copy Document:

　1) Consent for sharing of unattributed reviews: Unattributed reviews will be shared with the funding agency partner, NERC or BSF. The following text must be signed by the lead investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact.

　　　Template to be used for consent:

　　　"On behalf of the proposal investigators, I, _____ (insert Lead PI Name), consent that the Preliminary or Full proposal as well as its unattributed reviews will be shared with the DEB partner funding agency.

```
Signed: _____
Organization: _____
Date:_____  "
```

- **Personnel List Spreadsheet**. The template found at https://www.nsf.gov/bio/deb/debpersonnellist.xlsx, contains a single tab. Please read the instructions carefully and follow guidance. Using the template, compile an Excel file that provides information for all persons identified as PI, co-PI, PI of any subaward, Other Senior Personnel, or Post-doctoral fellow in the full proposal, including all parts of multi-institutional collaborative proposals. The completed file **must include the FastLane proposal ID (Not the Temporary ID # or Grants.gov ID #) assigned after submission of your proposal**. The completed file should be submitted by email to debtemplate@nsf.gov **within one business day** of proposal submission.

Invited Full Proposal Checklist For Compliance

Prior to submission, please review your invited full proposal against this checklist to ensure that it is fully compliant with the guidelines provided in this solicitation:

- The invited full proposal must be submitted to this Program Solicitation or the RUI Solicitation if eligible and providing required documentation. Do not submit this full proposal to the PAPPG. After selecting the solicitation, from the pull-down menu, select the Program that reviewed the Preliminary Proposal.

- Project Summary (maximum 1 page) includes as separate sections an Overview, 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.

- Biographical Sketches (maximum 2 pages, each) for all senior personnel - **do not** bundle multiple biographical sketches into a single file, and do not put biographical sketches in Supplementary Documents.

- The Data Management Plan (maximum 2 pages), and where applicable, the Postdoctoral Mentoring Plan (maximum 1 page) have been uploaded into Supplementary Documents.

- REU, RET, and RAHSS activities, if planned, are described in 3 pages maximum, uploaded into Supplementary Documents, and included in the budget request.

- Letters of Collaboration focus solely on affirming the collaboration and are loaded into Supplementary Documents. General letters of support are not allowed.

- Contact a cognizant Program Officer if you have questions about these or other Supplementary Documents that you plan to upload.

- Collaborators & Other Affiliations Information lists have been included as Single Copy Documents.

- It is recommended that a list of suggested reviewers be submitted as a Single Copy Document in FastLane, including the individuals' names, institutions, and areas of expertise, email addresses, and URLs if available.

- Personnel List Spreadsheet is prepared according to the provided template and emailed to debtemplate@nsf.gov within one business day of submission.

- For NERC or BSF Collaborative full proposals, ensure 1) a detailed non-lead agency budget and 2) an institutional endorsement letter are uploaded as Supplementary Documents. And, 3) ensure a signed consent form for NSF to share unattributed reviews with the partner agency is uploaded as a Single Copy Document.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

    January 23, 2017

    January 23, Annually Thereafter

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

    August 02, 2017

    August 2, Annually Thereafter

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 the GPG as 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 *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. 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. (GPG 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 GPG Chapter II.C.2.d.i., prior to the review of a proposal.

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

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

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

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

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

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

B. Review and Selection Process

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

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

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

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

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

reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

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

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

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 *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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:

- Division of Environmental Biology, telephone: (703) 292-8480, email: debquestions@nsf.gov

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

General inquiries regarding this program should be made to:

- Ecosystem Science Cluster, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503663
- Evolutionary Processes Cluster, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503664
- Population and Community Ecology Cluster, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503665
- Systematics and Biodiversity Science, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503666

Inquiries regarding U.K.-Collaborative proposals (NSFDEB-NERC) should be made to:

- For questions related to NERC led submissions email: international@nerc.ac.uk
- For questions related to DEB led submissions email: NSFDEB-NERC@nsf.gov

Inquiries regarding Israeli-Collaborative proposals (NSFDEB-BSF) should be made to:

- For questions related to the BSF submission email: Mrs. Yael Dressler (yael@bsf.org.il; 972 2 5828239)
- For questions related to DEB submission email: NSFDEB-BSF@nsf.gov

IX. OTHER INFORMATION

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

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

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

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

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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The National Science Foundation Information Center may be reached at (703) 292-5111.

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- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center)**:** (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**

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    or telephone: (703) 292-7827

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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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