NSF 24-592: Ecology and Evolution of Infectious Diseases (EEID)

Program Solicitation

Document Information

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U.S. National Science Foundation
Directorate for Biological Sciences
Directorate for Social, Behavioral and Economic Sciences
Directorate for Geosciences

National Institutes of Health
John E. Fogarty International Center
National Institute of General Medical Sciences
National Institute of Allergy and Infectious Diseases

National Institute of Food and Agriculture

United Kingdom Research and Innovation

Department for Environment Food & Rural Affairs

United States-Israel Binational Science Foundation

National Natural Science Foundation of China

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

November 20, 2024

Third Wednesday in November, Annually Thereafter

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Important Information And Revision Notes

This revision adds a new international partner: The Department for Environment, Food & Rural Affairs (Defra) in the U.K.

The EEID program will now accept Planning Proposals.

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

Summary Of Program Requirements

General Information

Program Title:

Ecology and Evolution of Infectious Diseases (EEID)

Synopsis of Program:

The multi-agency Ecology and Evolution of Infectious Diseases program supports research on the ecological, evolutionary, organismal, and social drivers that influence the transmission dynamics of infectious diseases. The central theme of submitted projects must be the quantitative, mathematical, or computational understanding of pathogen transmission dynamics. The intent is discovery of principles of infectious disease (re)emergence and transmission and testing mathematical or computational models that elucidate infectious disease systems. Projects should be broad, interdisciplinary efforts that go beyond the scope of typical studies. They should focus on the determinants and interactions of (re)emergence and transmission among any host species, including but not limited to humans, non-human animals, and/or plants. This includes, for example, the spread of pathogens; the influence of environmental factors such as climate; the population dynamics and genetics of vectors and reservoir species or hosts; how the physiology or behavior of the pathogen, vector, or host species biology affects transmission dynamics; the feedback between ecological transmission and evolutionary dynamics; and the cultural, social, behavioral, and economic dimensions of pathogen transmission and disease. Research may be on zoonotic, environmentally-borne, vector-borne, enteric, or respiratory pathogens of either terrestrial, aquatic, or marine systems and organisms, including diseases of animals and plants, at any scale from specific pathogens to inclusive environmental systems. Proposals for research on disease systems of public health concern to Low- or Middle-Income Countries (LMICs) are strongly encouraged, as are disease systems of concern in agricultural systems. Investigators are encouraged to develop the appropriate multidisciplinary team, including for example, anthropologists, modelers, ecologists, bioinformaticians, genomics researchers, social scientists, economists, oceanographers, mathematical scientists, behaviorists, epidemiologists, evolutionary biologists, entomologists, immunologists, parasitologists, microbiologists, bacteriologists, virologists, pathologists or veterinarians, with the goal of integrating knowledge across disciplines to enhance our ability to predict and control infectious diseases.

Broadening Participation In Stem:

NSF recognizes the unique lived experiences of individuals from communities that are underrepresented and/or underserved in science, technology, engineering, and mathematics (STEM) and the barriers to inclusion and access to STEM education and careers. NSF highly encourages the leadership, partnership, and contributions in all NSF opportunities of individuals who are members of such communities supported by NSF. This includes leading and designing STEM research and education proposals for funding; serving as peer reviewers, advisory committee members, and/or committee of visitor members; and serving as NSF leadership, program, and/or administrative staff. NSF also highly encourages demographically diverse institutions of higher education (IHEs) to lead, partner, and contribute to NSF opportunities on behalf of their research and education communities. NSF expects that all individuals, including those who are members of groups that are underrepresented and/or underserved in STEM, are treated equitably and inclusively in the Foundation's proposal and award process.

NSF encourages IHEs that enroll, educate, graduate, and employ individuals who are members of groups underrepresented and/or underserved in STEM education programs and careers to lead, partner, and contribute to NSF opportunities, including leading and designing STEM research and education proposals for funding. Such IHEs include, but may not be limited to, community colleges and two-year institutions, mission-based institutions such as Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), women's colleges, and institutions that primarily serve persons with disabilities, as well as institutions defined by enrollment such as Predominantly Undergraduate Institutions (PUIs), Minority-Serving Institutions (MSIs), and Hispanic Serving Institutions (HSIs).

"Broadening participation in STEM" is the comprehensive phrase used by NSF to refer to the Foundation's goal of increasing the representation and diversity of individuals, organizations, and geographic regions that contribute to STEM teaching, research, and innovation. To broaden participation in STEM, it is necessary to address issues of equity, inclusion, and access in STEM education, training, and careers. Whereas all NSF programs might support broadening participation components, some programs primarily focus on supporting broadening participation research and projects. Examples can be found on the NSF Broadening Participation in STEM website.

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.

- Andrea Porras-Alfaro, Program Director, NSF/BIO, telephone: (703) 292-2944, email: aporrasa@nsf.gov
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- Colette M. St. Mary, Program Director, NSF/BIO, telephone: (703) 292-4332, email: cstmary@nsf.gov
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- Joanne Haney, Senior Portfolio Manager, UKRI/BBSRC, telephone: 44 1793-413200, email: eeid@bbsrc.ukri.org
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- Ronald Adkins, Program Director, NIH/NIGMS, telephone: (301) 451-3825, email: ronald.adkins@nih.gov
- Stephanie Coomes, Health Scientist Administrator, NIH/NIAID, telephone: (301) 761-6855, email: stephanie.coomes@nih.gov
- Timothy Sullivan, National Program Leader, USDA/NIFA, telephone: (816) 527-5434, email: timothy.sullivan@usda.gov
- Rachel (Heni) Haring, Deputy Executive Director, BSF, telephone: 972 2 5828239, email: heni@bsf.org.il
- Jing Chen, Deputy Director, NSFC, telephone: 86 10-62326877, email: chenjing@nsfc.gov.cn
- Sadhana Sharma, Head of Bioscience for an Integrated Understanding of Health, UKRI/BBSRC, telephone: 44 1793-413200, email: eeid@bbsrc.ukri.org
- Jingyu Luo, Program Officer, NSFC, telephone: 86 10 62326479, email: luojy@nsfc.gov.cn

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

- 10.310 --- USDA-NIFA Agriculture and Food Research Initiative

- 47.050 --- Geosciences
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 93.859 --- National Institute of General Medical Sciences
- 93.989 --- John E. Fogarty International Center

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 10

Anticipated Funding Amount: $32,000,000

in FY 2025, pending the availability of funds. That amount includes approximately $13.5M from NSF for new standard or continuing awards, approximately $7.5M from the National Institutes of Health (NIH) for new or continuing awards, and $11.0M from the National Institute of Food and Agriculture (NIFA) for new awards. The expected funding from United Kingdom Research and Innovation (UKRI) and Defra for the UK component of the US-UK Collaborative Projects will be a maximum of £4.0M. The expected funding from the Israel Binational Science Foundation (BSF) for the Israeli component of the US-Israel Collaborative Projects will be approximately $1.5M. The expected funding from the National Natural Science Foundation of China (NSFC) for the Chinese component of the US-China Collaborative Projects will be a maximum of ¥9M.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.
- Tribal Nations: An American Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a federally recognized tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. §§ 5130-5131.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

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 subaward lead on no more than **two** proposals submitted in response to this solicitation. **This limit does not include Research Coordination Networks (RCN) proposals.** In addition, an individual from Israel may participate in no more than **two** US-BSF proposals and an individual from China may participate in no more than **one** US-China proposal. Proposals in excess of the limit for any person will be returned without review in the reverse order received. Participating in a proposal as other senior personnel does not count in this limit. Changes in investigator roles post-submission to meet the eligibility limits will not be allowed. **It is the responsibility of the submitters to confirm that the entire team is within the eligibility guidelines.**

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

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

  November 20, 2024

  Third Wednesday in November, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

I. Introduction

The past twenty-five years have seen a dramatic increase in our awareness of the need to understand the ecological and evolutionary drivers of disease emergence and transmission dynamics. While our knowledge has increased about specific systems and the basic principles of simple systems, understanding of complex systems and translation of those principles into ecosystem, public health, and agricultural health management tools remains challenging. System complexity includes such factors as multiple interacting species of hosts, pathogens, reservoirs, and/or vectors; interactions among pathogenic and non-pathogenic microbes; host behavior and social structure; interactions between biological, cultural, and social factors; effects of spatial and temporal structure; and evolutionary dynamics.

The emergence and the re-emergence of numerous infectious diseases around the world have coincided with unprecedented rates of change in the structure and diversity of the environment and human social and economic systems. Nearly all of the world's terrestrial, aquatic, and marine ecosystems have undergone dramatic changes due to a variety of human activities such as habitat transformation, human displacement and relocation, urbanization, rapid long-distance transport and increased international trade, species invasions, deliberate introduction of infectious diseases for biological control, wildlife trafficking, use of antimicrobial agents in agriculture and medicine, and climate change. The coincidence of broad scale environmental changes, the expansion of human social and economic networks, and the emergence and re-emergence of infectious diseases may point to underlying predictable ecological and eco-evolutionary relationships.

We have improved our ability to define the molecular identity and dynamics of pathogens and have greatly increased our understanding of host defense systems. We are able to apply genetic knowledge to understand the evolutionary dynamics of infectious diseases. These improvements have contributed significantly to our knowledge of the epidemiology and transmission patterns of diseases. However, the relationship of these factors to the biotic and structural complexity of ecological, agricultural, and social systems in which transmission occurs remains poorly understood. For example, little is known about the transmission dynamics of interacting pathogens and non-pathogens within a common host, how the host immune system influences disease dynamics, or how the behavior and social structure of hosts influences transmission. In addition, although these dynamics take place over evolutionary time for pathogens and in the context of human social systems, insufficient attention has been given to integrating ecological, epidemiological, evolutionary, oceanographic, and socio-economic dynamics.

At present, basic and applied research in infectious disease ecology and evolution are not well integrated. The potential benefits of an interdisciplinary research program in this area include:

- development of disease transmission theory,
- improved understanding of how diseases (re)emerge,
- increased understanding of how key host or pathogen physiological processes allow or prevent transmission,
- improved understanding of host population and ecosystem effects on disease transmission,
- increased capacity to forecast and respond to outbreaks,
- improved understanding of unintended health effects of development projects affecting terrestrial, freshwater, and marine systems,
- enhanced safety of food supplies, and
- improved strategies to control or prevent infectious diseases and enhance biosecurity.

An understudied aspect of disease transmission is the importance of socio-ecological factors and processes. Important new insights into the drivers and control of infectious diseases in humans and other species can only be achieved by integrated approaches that take into account the ways in which the natural and social environments affect the emergence and spread of infectious disease. This concept, often called "one health," links medical, veterinary, social, and environmental sciences by drawing on a common pool of knowledge between the three sectors in order to exploit the potential of animal disease research to provide insights into ecosystem, agricultural, and human health.

This activity is a continuation of the previous EEID competition; information on past NSF awards can be found at EEID Awards. Additional information for NIH can be found at http://www.fic.nih.gov/Programs/Pages/ecology-infectious-diseases.aspx and for NIFA at https://nifa.usda.gov/funding-opportunity/ecology-and-evolution-infectious-diseases.

II. Program Description

The goal of the Ecology and Evolution of Infectious Diseases (EEID) program is to support important and innovative research on the ecological, evolutionary, behavioral, physiological, oceanographic, and socio-ecological principles that influence the transmission dynamics of infectious diseases. The program's focus is on the discovery of general principles and processes and on building and testing models that elucidate these principles. **Projects must address the quantitative, mathematical, or computational understanding of pathogen transmission dynamics.** Research in EEID is expected to be an interdisciplinary effort that goes beyond the scope of typical studies funded by the standing programs of the partner agencies. Projects should bring together such areas as anthropology, behavior, bioinformatics, computational science, ecology, economics, epidemiology, evolution, food science, genomics, geography, global health, immunology, mathematics, medicine, microbiology, oceanography, plant science, population biology, sociology, physical environmental sciences, systems science, and veterinary medicine. Research within EEID is expected to generate rigorously characterized and tested models that are of value to the scientific community, and also may be useful in decision making. **The history of the EEID program has shown that the most competitive proposals are those that advance broad, conceptual knowledge that reaches beyond the specific system under study and that may be useful for understanding public, agricultural or ecosystem health, natural resource use and wildlife management, and/or economic development. Such proposals are typically interdisciplinary in their approach and/or the nature of the question(s) being addressed.**

Infectious disease transmission reflects complex, dynamic relationships that occur on varying spatial and temporal landscapes, are created by ecological, evolutionary, and host behavioral or physiological processes, and are revealed in genome architecture, physiological systems, population dynamics, and community structure, as well as behavioral and social dynamics. The interactions between disease-causing organisms, their reservoirs, vectors, and their host(s) are embedded within much larger networks of interacting systems, including other microorganisms that may or may not cause disease, one or more vector species, and multiple host or reservoir species. Analysis of environmental influences (biological, geophysical, economic, and social) on individual and population susceptibility is fundamental to understanding these complex systems of infectious diseases. Research into the ecology (population, community, evolutionary, and social) and biology of infectious diseases will contribute to a deeper understanding of these complex infectious disease systems, to the development of well characterized and tested models, and to the elucidation of general ecological, evolutionary, behavioral, and physiological principles.

Insights into the dynamics of infectious disease systems may require integration across several temporal, spatial, and functional scales including molecular, individual, population, societal, and ecosystem levels. Similarly, they may require integration across biological, socio-economic, and geophysical domains. The field of evolutionary ecology, which focuses on both the importance of ecological context in studies of evolution and the importance of evolutionary change for ecological systems, may also provide important insights into infectious disease systems. The interplay of evolution, ecology, and host and pathogen behavior and physiology has implications for understanding how infectious agents emerge as pathogens, adapt to one or more hosts, interact with other microbial communities (e.g., microbiome), and are transmitted among hosts.

A critical goal of research supported by this program is the generation of principles and conceptual frameworks that organize and inform the research and that lead to mathematical, computational, and statistical models of infectious

disease dynamics. Diverse modeling approaches are appropriate, including, but not limited to, mathematical equations, computational simulations, geospatial algorithms, and statistical models. **For the EEID program, the most competitive proposals are organized around an overarching conceptual framework that leads to such a model.** Models should aim to be explanatory beyond the specific system under study and must be well-characterized and rigorously tested. Proposals must describe how models will be developed, evaluated, and disseminated. Proposals must identify which individual(s) will oversee the quantitative approaches and provide evidence of demonstrated expertise in mathematical, computational, or statistical modeling and/or data analysis. Likewise, strategies for data collection must be well designed to contribute to and test model design. Proposals must include plans for dissemination of data, models, and tools developed by this program.

A variety of *topics, questions, systems, and approaches* are appropriate. Among the areas of particular interest are: the role of social influences on the susceptibility of individuals or populations; multiway interactions between pathogenic and non-pathogenic organisms and their mutual hosts and vectors; the role of medical, agricultural or environmental practices on pathogen emergence and transmission; emergence of pathogens from non-pathogenic populations; host switching; innate or acquired immune responses that allow or hinder pathogen transmission; the role of animal movement and social structure in shaping transmission dynamics; evolutionary dynamics in an ecological context such as disease control interventions and drug resistance. These topics have significant ecological and evolutionary components that should be studied as a system, not in isolation. Depending on the hypotheses or research questions being addressed, investigations might entail some combination of laboratory experiments, field observations or manipulations, public health interventions (although clinical trials are beyond the scope of the EEID program), analysis of social and cultural processes, or ethnographic studies. Research may also focus on novel analyses of existing data and/or theoretical investigations of ecological and evolutionary dynamics. Investigations may focus on model infectious disease systems in natural (terrestrial, freshwater, or marine) or laboratory settings where those systems elucidate general principles.

Research may use a variety of study systems. The organism(s) or system(s) selected for study should be justified with respect to its suitability to study questions of ecology and/or evolutionary ecology. Research may involve a variety of infectious agents, individual diseases, or groups of diseases, and might involve one or more social systems, regions, habitats, or groups of organisms. Proposals may focus on terrestrial, aquatic, or marine systems and organisms and may include infectious diseases of humans, non-human animals, or plants. **Regardless of the system or approach taken, a proposal must have a significant focus on the ecology of pathogen transmission to be eligible for funding.**

Because of the complexity of studies on the ecology and evolutionary ecology of infectious diseases, multidisciplinary teams of domestic and international collaborators with expertise from diverse disciplines are likely to be most effective. Investigators are encouraged to develop collaborations with public health research communities where that is appropriate. Collaborative teams could include, for example: ecologists, epidemiologists, medical scientists, veterinary scientists, oceanographers, evolutionary biologists, social and behavioral scientists, entomologists, food scientists, microbiologists, pathologists, parasitologists, geologists, oceanographers, hydrologists, geospatial analysts, and mathematical scientists. The research plan should indicate how multiple disciplines will be integrated and how new investigators in U.S. and collaborating foreign institutions will be prepared to further this research.

The EEID program is not intended to be the only avenue of support by the participating agencies for supporting research on infectious diseases. Specifically, proposals submitted in response to this solicitation must address ecological dynamics and among-host transmission, even when evolutionary studies are a substantive part of the proposal. Investigations that are outside the scope of this EEID announcement include:

- those limited solely to genetic patterns of evolutionary change (e.g., comparative genomics),
- those that focus solely on human diseases without considering the broader ecological context,
- those that focus solely on pathogen discovery,
- those that focus solely on within-host biological processes,
- those that focus solely on vector species ecology,
- those that have not pre-identified at least one pathogenic organism that will be the focus of the study,

- those that focus on antimicrobial resistance or transmission of resistance genes without considering pathogen transmission dynamics, and
- those that would fall under US government policy on potential enhanced pandemic pathogens. NSF acknowledges the rapidly evolving nature of computational biology and the advances in artificial intelligence in biology, and the potential that such technologies can both contribute to the advancement of science, and the production of dual–use biological knowledge, technology and products. As such, all proposals that are recommended for funding will be reviewed for compliance with best practices and standards as set out by the US AI Safety Institute[1] and US government policies and guidelines on biosafety, biosecurity[2], dual use research in the life sciences[3], potential enhanced pandemic pathogen research, and safe and responsible use of AI[4].

1 AI Risk Management Framework | NIST

2 Framework for Nucleic Acid Synthesis Screening | OSTP | The White House

3 USG-Policy-for-Oversight-of-DURC-and-PEPP.pdf (whitehouse.gov)

4 Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence | The White House

The EEID competition broadly welcomes, but does not require, that projects include international collaborators. Four specific forms of collaboration (US-UK Collaborative Projects, US-Israel Collaborative Projects, and US-China Collaborative Projects) are described below. These specific activities do not preclude other international collaborations. Applications involving research in Low- and Middle-Income Countries (LMICs) should reflect true LMIC research collaboration with LMIC-investigator(s) in a leadership role on the proposed research.

EEID Partner Interests

Fogarty International Center

The Fogarty International Center (FIC) is dedicated to advancing the mission of the National Institutes of Health (NIH) by supporting and facilitating global health research conducted by U.S. and international investigators, building partnerships between health research institutions in the U.S. and abroad, and training the next generation of scientists to address global health needs. The FIC is interested in EEID applications that include explicit plans for capacity building in Low- or Middle-Income Countries (LMICs), as defined by the World Bank and encourages applications that are focused on significant and/or emerging infectious disease threats, including zoonotic disease threats, to human health in LMICs. To be considered for FIC support, EEID applications must demonstrate true LMIC research collaboration with LMIC investigator(s) in a leadership role on the proposed research. The FIC will consider supporting meritorious EEID research applications that address the above priorities and/or meritorious EEID Research Coordination Network (RCN) applications aimed at capacity building in LMICs.

National Institute of General Medical Sciences

The National Institute of General Medical Sciences (NIGMS) supports basic research that improves understanding of biological processes and lays the foundation for advances in disease diagnoses, prevention, and treatment. NIGMS also has a strong interest in training and support of the nation's scientific workforce. NIGMS is interested in EEID applications that address the evolution of hosts, pathogens, and their interactions as well as basic biology and population genetics of hosts and pathogens as they relate to disease transmission and prevention. NIGMS will consider supporting meritorious EEID research applications as single-PI or multi-PI research program grants.

National Institute of Allergy and Infectious Diseases

The National Institute of Allergy and Infectious Diseases (NIAID) conducts and supports basic and applied research to better understand, treat, and ultimately prevent infectious, immunologic, and allergic diseases. NIAID supports research on nearly 300 infectious agents and investigates the biological properties of these pathogens and the immune system's responses to them. Findings from this research are vital to NIAID efforts to create vaccines, drugs, and diagnostic tools to better diagnose, prevent, and treat infectious diseases.

USDA/NIFA

The National Institute of Food and Agriculture (NIFA) supports research, education, and extension work that addresses key problems of national, regional, and multi-state importance in sustaining all components of food and agriculture, including farm efficiency and profitability, ranching, bioenergy, forestry (both urban and agroforestry), aquaculture, rural communities and entrepreneurship, human nutrition, food safety, physical and social sciences, home economics and rural human ecology, biotechnology, and conventional breeding, and including both conventional and organic food production systems.

Proposers may submit proposals that support one or more of the six USDA's strategic goals for FY2022-2026: https://www.usda.gov/sites/default/files/documents/usda-fy-2022-2026-strategic-plan.pdf. Any such activity proposed (e.g., partnerships, exchanges, training, and/or travel), must first and foremost support NIFA's domestic program goals. Proposers must clearly describe and demonstrate how the international activities proposed will contribute to and support advances in U.S. agriculture.

US-UK Collaborative Proposals

Recognizing the potential for international collaboration to advance EEID research and education objectives, NSF has partnered for this solicitation with UK Research and Innovation (UKRI). This partnership will facilitate coordinated funding of US and UK research collaboration within the EEID program. UKRI encourages proposals that focus on the impact of environment (e.g. climate change, pollution) on infectious disease transmission, vector borne pathogens, avian influenza, coinfection and plant health, although other topics are still eligible.

Researchers affiliated with a UK entity submitting under this heading must either meet UKRI eligibility requirements for managed mode calls and must apply through an institution eligible to receive UKRI funding or meet Defra requirements as stated in the research and development terms and conditions. Please see UKRI funding rules (https://www.ukri.org/councils/bbsrc/guidance-for-applicants) and Defra research and development terms and conditions (https://www.gov.uk/government/publications/defra-terms-and-conditions-for-goods-and-services/research-and-developm

PIs are **strongly encouraged** to contact the relevant cognizant Program Officer to confirm that the UK component meets either UKRI or Defra requirements. Proposals with non-eligible UK partners will not be considered for funding as a US-UK Collaborative Projects.

US-Israel Collaborative Proposals

Recognizing the potential for international collaboration to advance EEID research and education objectives, NSF has partnered for this solicitation with the U.S.-Israel Binational Science Foundation (BSF), which is an organization owned by the two governments with the aim of facilitating scientific relations between them. The Israeli component of the US-Israel Collaborative Projects will be funded by the BSF using special funds provided by the Israeli government.

Researchers affiliated with an Israeli entity submitting under this heading must meet BSF eligibility requirements and must apply through an institution eligible to receive BSF funding. Please see BSF eligibility rules: https://www.bsf.org.il/funding-opportunities/nsf-bsf-joint-research-grants/the-programs/ .

US-China Collaborative Proposals

Recognizing the potential for international collaboration to advance EEID research and education objectives, NSF has partnered for this solicitation with the National Natural Science Foundation of China (NSFC). The Chinese component of the US-China Collaborative Projects will be funded by the NSFC using funds provided by the Chinese government.

Researchers affiliated with a Chinese entity submitting under this heading must meet NSFC eligibility requirements and must apply through an institution eligible to receive NSFC funding. Please see NSFC eligibility rules: https://www.nsfc.gov.cn/publish/portal0/tab1503/ . Proposals with non-eligible China partners will not be considered for funding as a US-China Collaborative Project.

Multi-country Collaborative Proposals

Multinational collaborative research projects that involve researchers from the US and any combination of the UK, Israel and/or China are also welcome. Any such projects must meet the requirements of each of the NSF, UKRI, BSF, and the NSFC, as appropriate.

Research Coordination Network (RCN) Proposals

The EEID program will accept proposals to establish Research Coordination Networks that focus on issues involving infectious disease ecology, socio-ecology, and evolution. RCN projects are also eligible to be submitted as US-UK, US-China, or US-UK-China Collaborative Projects. Information on the scope of RCN projects and the format of those proposals can be found at https://new.nsf.gov/funding/opportunities/research-coordination-networks. Such RCN proposals should be submitted under the EEID solicitation and deadline.

Planning Proposals

The EEID program will accept planning proposals (PAPPG II.F.1) for specific areas of interest. Such proposals have no deadline. Prior to submission, researchers **MUST** contact an NSF program officer about what areas of interest are currently being considered.

III. Award Information

Award size: Under this solicitation, the maximum total award size for all years for the US component is $3.0 million, including indirect costs. The minimum award size is $1.5 million total project costs for all years, except for international collaborative projects (US-UK, US-Israel, and US-China Collaborative Proposals) that have a minimum award size of $1.0 million for the US component total project costs for all years. Those collaborative projects can request additional funding from the international partner agency for the international component of the project. For US-Israel Collaborative Proposals, the maximum award size for the Israeli portion is $710,000 total project costs for all years. For US-China Collaborative Proposals, the maximum award size for the Chinese portion is ¥4.5M total project costs for all years.

Award duration: The maximum award duration is five years.

RCN proposals: The maximum award size for RCN proposals is $600,000 total project costs for all years. For international Collaborative RCN proposals, the maximum award size for the US component is $600,000 total project costs for all years.

Award number: Approximately 10 new awards are anticipated in FY 2025, depending on the quality of submissions and the availability of funds; the expected funding will be $32.0 million. That amount includes approximately $13.5M from the NSF for new standard or continuing awards, approximately $7.5M from the NIH for new or continuing awards, and $14.0M from the NIFA for new awards. Of those 10 awards, up to 4 are anticipated to be US-UK Collaborative Proposals, depending on the quality of submissions and the availability of funds; the expected funding from UKRI and Defra for this call is up to £4.0M. This amount reflects 80% of the full economic costs in the U.K. Of those 10 awards, there is no limit on the number of US-Israel Collaborative Proposal awards, depending on the quality of submissions and the availability of funds; the expected funding from the BSF for the Israeli component of each US-Israel Collaborative Proposal will be a maximum of $95,000/year for one PI or $142,000/year for two or more PIs. Of those 10 awards, up to 2 are anticipated to be US-China Collaborative Proposals for a total of ¥9M, depending on the quality of the submissions and the availability of funds.

Upon conclusion of the review process, meritorious proposals may be recommended for funding by either NSF, NIH, or USDA, at the option of the agencies, not the proposing organizations. Unattributed reviews and the panel summary will be shared with NIH or USDA. Proposals selected for funding by NIH or USDA will need to be reformatted and resubmitted to that agency. Subsequent submission and grant administration procedures will be in accordance with the individual policies of the awarding agency. Further information will be provided to these applicants after selection.

Proposals selected for funding consideration by the NIH will be invited to resubmit to the Division of Receipt and Referral (DRR) in NIH's Center for Scientific Review (CSR) (see Section VI.B). PIs submitting to the NIH must be registered in eRA

Commons and the applicant's organization must be registered with SAM, Grants.gov and eRA Commons. In addition, all individuals designated as Senior/Key Personnel must provide a valid eRA Commons username (Commons ID). PIs should therefore ensure that all registrations required for NIH submission are in place before the NIH receipt deadline.

USDA/NIFA Legislative Authority: The USDA authority for this RFA is 7 USC 3157 Competitive, Special, and Facilities Research Grant Act to authorize the Secretary of Agriculture to establish the Agriculture and Food Research Initiative (AFRI); a competitive grant program to provide funding for fundamental and applied research, extension, and education to address food and agricultural sciences. AFRI is subject to the provisions found at 7 CFR Part 3430.

For international collaborative projects, any UK component of the collaboration will be awarded through UKRI or Defra in accordance with their policies. Any Israeli component of the collaboration will be awarded through the BSF in accordance with its policies and regulations; the collaborative proposal must be submitted to the BSF by the Israeli scientist by the BSF-established deadline. Any Chinese component of the collaboration will be awarded through the NSFC in accordance with its policies and regulations; the collaborative proposal must be submitted to the NSFC application submission system by the Chinese scientists by the NSFC-established deadline.

IV. Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research laboratories, professional societies and similar organizations located in the U.S. that are directly associated with educational or research activities.
- Tribal Nations: An American Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a federally recognized tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. §§ 5130-5131.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

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 subaward lead on no more than **two** proposals submitted in response to this solicitation. **This limit does not include Research Coordination Networks (RCN) proposals.** In addition, an individual from Israel may participate in no more than **two** US-BSF proposals and an individual from China may participate in no more than **one** US-China proposal. Proposals in excess of the limit for any person will be returned without review in the reverse order received. Participating in a proposal as other senior personnel does not count in this limit. Changes in

investigator roles post-submission to meet the eligibility limits will not be allowed. **It is the responsibility of the submitters to confirm that the entire team is within the eligibility guidelines.**

Additional Eligibility Info:

NIH Eligibility: Clinical trials are not allowed. The NIH will only consider applications that do not propose clinical trials. Individuals who are considering submitting a proposal in response to this solicitation should review https://grants.nih.gov/ct-decision/ in determining whether the project meets the NIH definition of a Clinical Trial. Institutions eligible for awards by the NIH's Fogarty International Center include foreign institutions in low- and middle-income countries (LMICs), as defined by the World Bank (foreign institutions in high-income countries are not eligible for FIC awards).

USDA/NIFA Eligibility: Eligible entities for award include, (1) State agricultural experiment stations; (2) colleges and universities (including junior colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nations, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

V. Proposal Preparation And Submission Instructions

A. Proposal Preparation Instructions

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

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

Special Information and Supplementary Documentation in addition to that required in the PAPPG:

- **Proposals Involving Multiple US Organizations**. Of the two types of collaborative proposal formats described in the PAPPG, this solicitation allows only a single proposal submission with subawards administered by that lead organization. In the case of proposals involving multiple organizations, a single organization **must** be identified as the lead, and **a single proposal** describing the entire project must be submitted by that organization. Funds may be distributed among partner organizations via subawards from the lead organization. A budget utilizing the standard NSF budget format should be submitted for each subrecipient. The requirement for a single

organization to submit the sole proposal for a project is designed to facilitate effective coordination among participating organizations and to avoid difficulties that ensue in funded projects when individuals change organizations and/or cease to fulfill project responsibilities.

- **Research Experience Educational Activities:** Proposals can include requests for four types of educational activities: Research Experiences for Undergraduates (REU), Research Experiences for Post-Baccalaureate Students (REPS), Research Experiences for Teachers (RET), and Research Assistantships for High School Students (RAHSS). When such activities are anticipated, requests should be included in the proposal at the time of submission. The request for each type of educational activity is limited to three pages as a Supplementary Document. If multiple institutions of a collaborative proposal are requesting funds for a given type of activity, all activities must be included in one 3-page supplementary document. Details about the requirements and budgets for these types of activities can be found on the Division of Environmental Biology supplemental request website: https://www.nsf.gov/bio/deb/suppopp.jsp. Post-award supplements may be available if such activities were unforeseen at the time of proposal submission.

- **Senior/Key Personnel List Spreadsheet.** An additional spreadsheet listing all senior/key personnel involved in the project **must** be submitted. This spreadsheet is separate from the spreadsheet that lists collaborators and other affiliations (COA) information. The spreadsheet template can be found at https://www.nsf.gov/bio/deb/debpersonnellist.xlsx. Please read the instructions carefully. Using the template, compile an Excel file that provides information for all persons identified in the proposal as: "PI or co-PI" (i.e., those listed on the Cover Sheet); "Other Senior/Key Personnel/Subrecipient"; or "Other Personnel" who have a biographical sketch included in the proposal, including all international collaborators. Only one spreadsheet should be submitted per project. The file **must** include the proposal ID assigned after submission of your proposal (i.e., not the Temporary ID # or Grants.gov ID #). Once completed, the file should be submitted by email to debtemplate@nsf.gov within one business day of proposal submission.

- **Data Management and Sharing Plan.** The PAPPG requires the inclusion of a Data Management and Sharing Plan with all full proposal submissions. The Data Management and Sharing Plan can be no longer than two pages and must be inclusive of the entire project. It **must** include two sections: (1) *Data Plans*, and (2) *Intellectual Property (IP) Plans*. Those sections **must** address the following points:

  1) *Data Plans*. 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 access data and material. Funded projects must disseminate project data broadly in a timely and responsible manner, using widely accepted electronic data standards, a named community-accepted, publicly-accessible data repository and with as few restrictions as possible. 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 the primary data;
  - Timetable of release of ALL data, consistent with privacy and other concerns regarding sensitive information;
  - Public repository to be used;
  - License for use, with an emphasis on open source licenses such as MIT and GPL;
  - Any constraints on release, which must be clearly justified; and
  - Person(s) responsible for the release.

  All software and code must be in a versioned code repository (e.g., GitHub, BitBucket). 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/or in Containers (e.g., Docker/DockerHub). Published results should always include information on how to access the supporting data.

Additional guidance about the development of Data Management and Sharing Plans, including domain-specific guidance, is provided by the Directorate for Biological Sciences, the Directorate for Social, Behavioral and Economic Sciences, the Division of Ocean Sciences, and UKRI.

2) *Intellectual Property Plans*. The Data Management and Sharing Plan MUST provide a protocol and timeline for the development of intellectual property agreements. The agreement should indicate:

- Who are the owners of any data or other intellectual property;
- How financial benefits of the intellectual property will be allocated;
- How authorship of publications will be determined; and
- How IP disputes will be adjudicated.

A reasonable charge for community resources is permissible, but the fee structure must be outlined clearly in the IP plan. If a Material Transfer Agreement is required, 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 IP plan.

For multi-organizational projects, the lead organization is responsible for coordinating and managing the intellectual property resulting from the award. A complete IP agreement MUST be included with the first annual report of the project.

- **Polar and/or Marine Fieldwork Logistics, Assignable Assets.** Projects including facilities, logistics, or assignable asset costs (e.g., NEON, Arctic Research Support and Logistics, SME for use of Academic Research Fleet) must provide evidence showing that requests have been submitted for appropriate support and use. Proposals centered on Polar and/or Marine habitats need to be discussed prior to submission with a Cognizant EEID program officer for additional guidance and logistics requirements.

  PIs are responsible for filing the appropriate requests for major research platforms; a copy of the request must be submitted as a Supplementary Document. Any science support provided by third-party organizations must be described in a 1–2-page Supplementary Document that outlines the scope of support and a cost estimate. Please allow service providers 4-6 weeks to prepare Supplementary Documents to include in proposals and initiate the request far in advance of proposal submission. For any instrument or infrastructure deployed to the field, investigators should include the scope and cost for the demobilization or other disposal of the property.

  Proposals requesting support for polar and/or marine fieldwork should expect to go to the field no sooner than 12 months after proposal submission, or 18 months for proposals requesting ship time from the Academic Research Fleet (https://www.unols.org/), to allow time to plan, budget, and complete environmental compliance documentation. Per the NSF PAPPG, awardees are responsible for acquiring and complying with all permits necessary for their work and are responsible for all activities conducted under the award. NSF is not responsible for costs associated with medical evacuations or other interruptions to scheduled fieldwork and reserves the right to seek reimbursement for costs incurred for search, rescue, or medical evacuation. Proposers should ensure all members of the field team are covered by institutional medical evacuation insurance or request funds to purchase medical evacuation insurance, which is an allowable grant cost. All investigators should have a risk management plan for their fieldwork including a plan for emergencies.

- **Safe and Inclusive Fieldwork (SAIF) Plan**

  All proposals submitted to this solicitation that include research that will be conducted off-campus or off-site must submit a plan for safe and inclusive fieldwork as a Supplementary Document that will be considered under the broader impacts review criterion. This supplemental document is in lieu of the required plan associated with the certification called for in Chapter II.E.9 of the PAPPG. More information regarding review of the plan is provided under Solicitation Specific Review Criteria.

It is NSF policy to foster safe and harassment-free environments wherever science is conducted. Work conducted off-campus or off-site should be an enriching experience for everyone and help draw researchers to biological and geological sciences research. By requiring advanced planning and attention to maintaining an inclusive environment, NSF is working to ensure that off-campus or off-site research is safe and inclusive for all participants.

Off-campus or off-site research is defined as data/information/samples being collected off-campus or off-site, such as fieldwork and research activities on vessels and aircraft. **The SAIF plan must be no more than two pages and include**:

- a brief description of the field setting and unique challenges for the team;
- the steps the proposing organization will take to nurture an inclusive off-campus or off-site working environment, including processes to establish shared team definitions of roles, responsibilities, and culture, e.g., codes of conduct, trainings, mentor/mentee mechanisms and field support that might include regular check-ins, and/or developmental events;
- communication processes within the off-site team and to the organization(s) that minimize singular points within the communication pathway (e.g., there should not be a single person overseeing access to a single satellite phone); and
- the organizational mechanisms that will be used for reporting, responding to, and resolving issues of harassment if they arise.

- **Letters of Collaboration.** Supplementary Documents may include letters of collaboration from individuals or organizations that are integral parts of the proposed project but are not listed as PI, co-PI, or other Senior/Key Personnel on the main proposal or any subaward. Such involvement 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 should focus solely on affirming that the individual or organization is willing to collaborate on the project as specified in the project description. No additional text, especially elaboration of the nature of activities to be undertaken by the collaborator and endorsements of the potential value or significance of the project for the collaborator, may be included. The template that **must** be used for the preparation of letters of collaboration is provided below.

Letters of collaboration should not be provided from any individual designated as a Principal Investigator or as Senior/Key Personnel, nor are letters of collaboration required from any organization that will be a subrecipient in the proposal budget.

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 proposal submission. **Letters deviating from this template will not be accepted and may be grounds for returning the proposal without review.**

Template to be used for letters of collaboration

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 transmitting electronically), I acknowledge that I am listed as a collaborator on this proposal, entitled "____(*proposal title*)_____," with _____(*PI name*)_____ as the Principal Investigator. I agree to undertake the tasks assigned to me or my organization, as described in the project description of the proposal, and I commit to provide or make available the resources specified therein.

Signed: _____

Organization: _____

Date: _____

Research Coordination Network proposals

The titles of these proposals should begin with "**RCN:**" and follow the proposal preparation instructions in the RCN solicitation (https://new.nsf.gov/funding/opportunities/research-coordination-networks).

For international collaborative proposals, **DO NOT** check the collaborative proposal box on the cover sheet.

US-UK Collaborative proposals

For full application: The titles of these proposals should begin with "**US-UK Collab:**". Collaborative RCN proposal titles should begin with "**US-UK Collab: RCN**:" Information for the UK portion of US-UK Collaborative Proposals should be included as Supplementary Documents or as a single copy document as specified below. That information should include the following, and **ONLY** the following:

A. Supplementary Documents

1. Biographical sketches of UK Senior/Key Personnel: Those biographical sketches must conform to NSF format and limitations.

2. UK budget: Costs for the UK component of the project should be submitted through the UKRI The Funding Service (TFS). A PDF version of the form should be saved and sent to the US lead PI for inclusion as a Supplementary Document in the proposal submitted to NSF. The main UK Cognizant Program Officer at UKRI should be contacted to discuss the remit of any proposal prior to submission.

3. Letters of collaboration: Letters of collaboration from UK scientists are required. These letters must be restricted to a statement of intent to collaborate only as described above. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.

4. Institutional endorsement: An institutional certification of the submission must be a signed letter from an authorized UK institutional representative with the following text **and only that text**:

"I confirm on behalf of [*insert name of institution*] that the US-UK Collaborative proposal between [*insert name of US PI and institution*] and [*insert name of UK PI*] is endorsed and has been submitted by [*name of Research Office*]."

B. Single Copy Documents

1. Sharing of unattributed reviews: Unattributed reviews will be shared with UKRI. The following text must be included and signed by the lead US investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact.

On behalf of the proposal investigators, I, _____ (*insert US Lead PI Name*), consent that the proposal as well as its unattributed reviews will be shared with the EEID partner-funding agencies.

Signed: _____

Organization: _____

Date: _____

2. Collaborators and other affiliations. An NSF-format COA document must be submitted for each UK Senior/Key Personnel for whom a biographical sketch is included.

US-Israel Collaborative proposals

The titles of these proposals should begin with "**US-Israel Collab**:". Information for the Israel portion of the US-Israel Collaborative Proposals should be included as Supplementary Documents or as a single copy document as specified below. That information should include the following, and **only** the following:

A. Supplementary Documents

1. Biographical sketches of Israeli PIs: Those biographical sketches must conform to NSF format and limitations.

2. Israeli budget: Costs for the Israeli component should be copied from the BSF submission of the proposal using the BSF format: http://www.bsf.org.il/data/FormsToDownload/BSF-NSF_EEID_Call.pdf.

3. Letters of collaboration: Letters of collaboration from scientists on the Israeli component are required. These letters must be restricted to a statement of intent to collaborate only as described above. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.

4. Institutional endorsement: An institutional certification of the submission must be a signed letter from an authorized Israeli institutional representative and included in supplemental documents with the following text **and only that text**:

"I confirm on behalf of [*insert name of institution*] that the U.S.-Israel Collaborative proposal between [*insert name of US PI and institution*] and [*insert name of Israeli PI*] is endorsed and has been submitted by [*name of Research Office*]."

B. Single Copy Documents

1. Sharing of unattributed reviews: Unattributed reviews will be shared with BSF. The following text must be signed by the lead US investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact.

On behalf of the proposal investigators, I, _____ (*insert US Lead PI Name)*, consent that the proposal as well as its unattributed reviews will be shared with the EEID partner-funding agencies.

Signed: _____

Organization: _____

Date: _____

2. Collaborators and other affiliations. An NSF-format COA document must be submitted for each Israeli Senior/Key Personnel for whom a biographical sketch is included.

Full proposals that include an Israeli collaboration must be also submitted to BSF by the Israeli partner. The BSF submission system can accessed by using the login button on the BSF homepage at http://www.bsf.org.il. Additional information can be found at:
https://www.bsf.org.il/funding-opportunities/nsf-bsf-joint-research-grants/the-programs/.

US-China Collaborative proposals

The titles of these proposals should begin with "**US-China Collab**:". Collaborative RCN proposal titles should begin with "**US-China Collab: RCN**:" Information for the China portion of the US-China Collaborative Proposals should be included as Supplementary Documents or as a single copy document as specified below. That information should include the following, and **only** the following:

A. Supplementary Documents

1. Biographical sketches of Chinese PIs: Those biographical sketches must conform to NSF format and limitations.

2. Chinese budget: Costs for the Chinese component should be copied from the Chinese submission of the proposal using the NSFC format.

3. Letters of collaboration: Letters of collaboration from scientists on the Chinese component are required. These letters must be restricted to a statement of intent to collaborate only as described above. Additional information on the nature of the collaboration and the roles of the investigators should be included in the Project Description.

4. Institutional endorsement: An institutional certification of the submission must be a signed letter from an authorized Chinese institutional representative with the following text **and only that text**:

"I confirm on behalf of [*insert name of institution*] that the U.S.-China Collaborative proposal between [*insert name of US PI and institution*] and [*insert name of Chinese PI*] is endorsed and has been submitted by [*name of Research Office*]."

B. Single Copy Documents

1. Sharing of unattributed reviews: Unattributed reviews will be shared with the NSFC. The following text must be signed by the lead US investigator, confirming that the investigators involved in the proposal acknowledge and confirm this fact.

On behalf of the proposal investigators, I, (*insert US Lead PI Name*), consent that the proposal as well as its unattributed reviews will be shared with the EEID partner-funding agencies.

Signed: _____

Organization: _____

Date: _____

2. Collaborators and other affiliations. An NSF-format COA document must be submitted for each Chinese Senior/Key Personnel for whom a biographical sketch is included.

Full proposals that include a Chinese collaboration must be also submitted to the NSFC by the Chinese partner as supplementary documents, including the Letters of Collaboration, to their online applications, using the NSFC application submission system: https://grants.nsfc.gov.cn/pmpweb/login.

Multi-country Collaborative proposals

These proposals can include any combination of the U.S. and the U.K., Israel and/or China. The titles of these proposals should begin with **"US-[other countries] Collab:"** as appropriate. Collaborative RCN proposal titles should begin with "**US-[other countries] Collab: RCN**:" as appropriate. Information for the other country portions should be included as Supplementary Documents as described above.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

EEID projects must have a minimum budget of $1,500,000 in total project costs for all years, except that International Collaborative Proposals must have a minimum US budget of $1,000,000 in total project costs for all years. Research that falls within the scope of the EEID initiative but with project aims that do not require budgets of this magnitude should be directed to the appropriate NSF core program.

Budget Preparation Instructions:

Subawards

In accordance with the applicable award terms and conditions, proposers are reminded of their responsibilities with regard to subrecipients. Should an award be made, the primary recipient is responsible for ensuring compliance with the appropriate terms and conditions to, as well as the management and oversight of, any subrecipients on the project, including any foreign subrecipients.

C. Due Dates

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

  November 20, 2024

  Third Wednesday in November, Annually Thereafter

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationa For Research.gov user support, call the NSF Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The NSF Help Desk answers general technical questions related to the use of the Research.gov and FastLane 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 Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF Proposal Processing And Review Procedures

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are

especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

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

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.

- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

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

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

2. Merit Review Criteria

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

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.D.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.D.2.d(i), prior to the review of a proposal.

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

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

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

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

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other

underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

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

Additional Solicitation Specific Review Criteria

Reviewers will be instructed to evaluate the Safe and Inclusive Fieldwork (SAIF) Plan within the Broader Impacts review criterion, specifically:

- Is there a compelling plan (including the procedures, trainings, and communication processes) to establish, nurture, and maintain inclusive off-campus or off-site working environment(s)?
- Does the proposed plan identify and adequately address the unique challenges for the team and the specific off-campus or off-site setting(s)?
- Are the organizational mechanisms to be used for reporting, responding to, and resolving issues of harassment, should they occur, clearly outlined?

NIH Information

Reviewers may be requested to provide numeric NIH overall impact scores from 1 (highest) to 9 (lowest) based upon their evaluations of the intellectual merits and broader impacts of the applications.

Overall Impact is the likelihood for the project to exert a sustained, powerful influence on the research field(s) involved, in consideration of the following core review criteria and the relevant additional review criteria.

NIH Core Review Criteria

Factor 1. Importance of the Research

Significance

- Evaluate the importance of the proposed research in the context of current scientific challenges and opportunities, either for advancing knowledge within the field, or more broadly. Assess whether the application addresses an important gap in knowledge in the field, would solve a critical problem, or create a valuable conceptual or technical advance.
- Evaluate the rationale for undertaking the study, the rigor of the scientific background for the work (e.g., prior literature and/or preliminary data) and whether the scientific background justifies the proposed study.

Innovation

- Evaluate the extent to which innovation influences the importance of undertaking the proposed research. Note that while technical or conceptual innovation can influence the importance of the proposed research, a project that is not applying novel concepts or approaches may be of critical importance for the field.
- Evaluate whether the proposed work applies novel concepts, methods or technologies or uses existing concepts, methods, technologies in novel ways, to enhance the overall impact of the project.

Factor 2. Rigor and Feasibility

Approach

- Evaluate the scientific quality of the proposed work. Evaluate the likelihood that compelling, reproducible findings will result (rigor) and assess whether the proposed studies can be done well and within the timeframes proposed (feasibility).

Rigor

- Evaluate the potential to produce unbiased, reproducible, robust data.
- Evaluate the rigor of experimental design and whether appropriate controls are in place.
- Evaluate whether the sample size is sufficient and well-justified.
- Assess the quality of the plans for analysis, interpretation, and reporting of results.
- Evaluate whether the investigators presented adequate plans to address relevant biological variables, such as sex or age, in the design, analysis, and reporting.
- For applications involving human subjects or vertebrate animals, also evaluate:
    - the rigor of the intervention or study manipulation (if applicable to the study design).
    - whether outcome variables are justified.
    - whether the results will be generalizable or, in the case of a rare disease/special group, relevant to the particular subgroup.
    - whether the sample is appropriate and sufficiently diverse to address the proposed question(s).
- For applications involving human subjects, including clinical trials, assess the adequacy of inclusion plans as appropriate for the scientific goals of the research. Considerations of appropriateness may include disease/condition/behavior incidence, prevalence, or population burden, population representation, and/or current state of the science.

Feasibility

- Evaluate whether the proposed approach is sound and achievable, including plans to address problems or new challenges that emerge in the work. For proposed studies in which feasibility may be less certain, evaluate whether the uncertainty is balanced by the potential for major advances.
- For applications involving human subjects, including clinical trials, evaluate the adequacy and feasibility of the plan to recruit and retain an appropriately diverse population of participants. Additionally, evaluate the likelihood of successfully achieving the proposed enrollment based on age, racial, ethnic, and sex/gender categories.

Factor 3. Expertise and Resources

Investigator(s)

- Evaluate whether the investigator(s) have demonstrated background, training, and expertise, as appropriate for their career stage, to conduct the proposed work. For Multiple Principal Investigator (MPI) applications, assess the quality of the leadership plan to facilitate coordination and collaboration.

Environment

- Evaluate whether the institutional resources are appropriate to ensure the successful execution of the proposed work.

NIH Additional Review Criteria

As applicable to the proposed project, the following additional review criteria will be addressed and considered in the determination of scientific merit and rating as part of the Overall Impact score.

Protections for Human Subjects**.** To be considered human subjects research, the participating individuals must be living and identifiable, and the data and/or specimens are specifically obtained for the proposed research. For research that

involves human subjects but does not involve one of the categories of research that are exempt under 45 CFR Part 46.104, the committee will evaluate the justification for involvement of human subjects and the proposed protections from research risk relating to their participation according to the following review criteria: 1) risk to subjects, 2) adequacy of protection against risks, 3) potential benefits to the subjects and others, and 4) importance of the knowledge to be gained. For research that involves human subjects and meets the criteria for one or more of the eight categories of research that are exempt under 45 CFR Part 46.104, the committee will evaluate: 1) the justification for the exemption, 2) human subjects involvement and characteristics, and 3) sources of materials.

Inclusion of Women, Minorities, and Individuals Across the Lifespan. When the proposed project involves human subjects and/or NIH-defined clinical research, the committee will evaluate the proposed plans for the inclusion (or exclusion) of individuals on the basis of sex/gender, race/ethnicity or if non-US residents, as well as the inclusion (or exclusion) of individuals of all ages including children (under18 years old), adults (18 to 64 years old) and older adults (over 64 years old) to determine if it is justified in terms of the scientific goals and research strategy proposed.

Vertebrate Animals. The committee will evaluate the involvement of live vertebrate animals as part of the scientific assessment according to the following criteria: (1) a concise description of proposed procedures involving animals, including identifying the species, strains, ages, sex, and total number to be used and if involved, the sources of dogs or cats; (2) the justifications that the species are appropriate for the proposed research and explaining why the research goals cannot be accomplished using an alternative model (e.g., computational, human, invertebrate, in vitro); (3) the interventions to minimize discomfort, distress, pain and injury; and (4) the justification for euthanasia method if NOT consistent with the American Veterinary Medical Association Guidelines for the Euthanasia of Animals. Reviewers will assess the use of chimpanzees as they would any other application proposing the use of vertebrate animals.

Biohazards. Reviewers will identify potential biohazards (biological organisms or their products, such as toxins, that pose a threat to human health) and other hazards (such as radioactivity, dangerous chemicals, or recombinant DNA) that are known in their professional community to pose a particularly significant risk to research personnel and/or the environment. Reviewers will assess whether materials or procedures proposed are potentially hazardous to research personnel and/or the environment, and if needed, determine whether adequate protection is proposed.

NIH Review Considerations

As applicable for the proposed project, reviewers will address each of the following review considerations, but will not consider them in providing an NIH Overall Impact score.

Authentication of Key Biological and/or Chemical Resources. Reviewers will comment on the brief plans proposed for identifying and ensuring the validity of key biological and/or chemical resources which are those that may differ from lab to lab or over time, and could influence the research data, and are integral to the proposed research. Examples include cell lines, specialty chemicals, antibodies, & other biologics, non-standard lab reagents.

Budget and Period of Support. Reviewers will consider whether the budget and the requested period of support are fully justified, appropriate, realistic, and reasonable in relation to the proposed research.

International Collaborations and Expenditures

For all proposals involving international collaborations, reviewers will consider: mutual benefits, true intellectual collaboration with the foreign partner(s), benefits to be realized from the expertise and specialized skills, facilities, sites and/or resources of the international counterpart, and active research engagement of U.S. students and early-career researchers, where such individuals are engaged in the research. Furthermore, the justification for U.S. funding for an international branch campus of a US IHE, or involvement of a foreign organization (e.g., through use of subawards or consultant arrangements in the proposal submitted to NSF), as described in PAPPG Chapter I.E, will be specifically reviewed to assure that conditions for the justification of such expenditures have been met.

US-UK, US-Israel, and US-China Collaborative Projects will also be reviewed with respect to the extent which they demonstrate a substantial collaboration between the US and foreign partners and enhance research on infectious disease transmission.

B. Review and Selection Process

NSF will manage the review of proposals in consultation with NIH and USDA, and in the case of US-UK, US-Israel or US-China Collaborative Projects, UKRI, BSF or NSFC, respectively. Copies of proposals and unattributed reviews will be shared with the partner funding organizations, as appropriate. Upon conclusion of the review process, meritorious projects may be recommended for funding by any of the partner funding organizations at the option of the agencies, not the proposing organizations.

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.

NSF Process: Those proposals selected for funding by NSF will be handled in accordance with standard NSF procedures. 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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, 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.

In all cases, 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 and 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.

NIH Process: Proposals selected for funding consideration by NIH will be invited to submit reformatted applications to the Division of Receipt and Referral (DRR) in NIH's Center for Scientific Review (CSR). A receipt date of approximately March 15 annually is in effect for the NIH formatted applications. Following the initial peer review, recommended applications that have been resubmitted to the NIH are required to go to second level review by the Advisory Council or Advisory Board of the awarding Institute or Center. The following will be considered in making funding decisions:

- Scientific and technical merit of the proposed project as determined by scientific peer review.
- Availability of funds.
- Relevance of the proposed project to program priorities.

Subsequent award processing and grant administration procedures will be in accordance with NIH policies and procedures.

USDA/NIFA Process: Applicants submitting proposals selected for funding by USDA/NIFA will receive specific instructions outlining what additional information is needed in accordance with the policies of the agency. USDA/NIFA will make final funding decisions based on the results of the peer review process. Applications selected for funding by NIFA will be forwarded to the USDA/NIFA Awards Management Division for award processing in accordance with the USDA/NIFA procedures. All proposals selected for funding by USDA/NIFA will be limited to a 30 percent indirect cost rate (7 USC

3310). Therefore, the recovery of indirect costs on awards made by NIFA under this program area may not exceed the lesser of the institution's official negotiated indirect cost rate or the equivalent of 30 percent of total Federal funds awarded. If the limitation of indirect costs changes, the applicant will be notified.

US-UK Collaborative Projects: The UK component of the collaboration will be awarded through UKRI in accordance with the policies of that agency. If UKRI selects an application for funding, the costs for the UK element of the proposal must be submitted via UKRI's funding application submission system before final sign-off. UK collaborators should therefore ensure they are registered users before the proposal is submitted.

US-Israel Collaborative Projects: The Israeli component of the collaboration will be awarded through the BSF in accordance with its policies and regulations. The collaborative proposal must also be submitted to the BSF by the Israeli scientists and include the US scientists' information, after being submitted to the NSF.

US-China Collaborative Projects: The Chinese component of the collaboration will be awarded through the NSFC in accordance with its policies and regulations. The collaborative proposal must be submitted by the Chinese scientists to the NSFC as a supplementary document to their online applications by the NSFC-established deadline.

VII. Award Administration Information

A. Notification of the Award

NSF Process: 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.)

NIH Process: If the application is under consideration for NIH funding, NIH will request "just-in-time" information from the applicant as described in the NIH Grants Policy Statement.

A formal notification in the form of a Notice of Award (NoA) will be provided to the applicant organization for successful applications. The NoA signed by the grants management officer is the authorizing document and will be sent via email to the grantee's business official.

NIFA Process: Notification of a recommended award is made to the submitting PI by a National Program Leader at NIFA. Verbatim copies of reviews, not including the identity of the reviewers, will be provided to the Principal Investigator at the time of the award recommendation notification.

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

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

Administrative and National Policy Requirements

Build America, Buy America

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

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

Special Award Conditions:

Proposals funded by NIH:

Selection of an application for award is not an authorization to begin performance. Any costs incurred before receipt of the Notice of Award are at the recipient's risk. These costs may be reimbursed only to the extent considered allowable pre-award costs.

Any application awarded by NIH in response to this solicitation will be subject to NIH grants policies as described in the *NIH Grants Policy Statement*.

All NIH grant and cooperative agreement awards include the *NIH Grants Policy Statement* as part of the NoA. For these terms of award, see the NIH Grants Policy Statement Part II: Terms and Conditions of NIH Grant Awards, Subpart A: General and Part II: Terms and Conditions of NIH Grant Awards, Subpart B: Terms and Conditions for Specific Types of Grants, Grantees, and Activities. More information is provided at Award Conditions and Information for NIH Grants.

Proposals funded by USDA/NIFA:

Awards issued as a result of this RFA will have designated the Automated Standard Applications for Payment System (ASAP), operated by the Department of Treasury's Bureau of the Fiscal Service, as the payment system for funds. For more information see https://www.fiscal.treasury.gov/asap/.

Several federal statutes and regulations apply to grant applications considered for review and to project grants awarded under this program. These may include, but are not limited to, the ones listed on the NIFA web page - http://nifa.usda.gov/federal-regulations.

NIFA Research Terms and Conditions will apply to all awards made under this solicitation. https://www.nifa.usda.gov/grants/regulations-and-guidelines/terms-conditions.

NIFA Federal Assistance Policy Guide—a compendium of basic NIFA policies and procedures that apply to all NIFA awards, unless there are statutory, regulatory, or award-specific requirements to the contrary is available at https://www.nifa.usda.gov/nifa-federal-assistance-policy-guide.

Other Requirements

USDA/NIFA:

1. Delegation of Fiscal Responsibility

Unless the terms and conditions of the grant state otherwise, the grantee may not, in whole or in part, delegate or transfer to another person, institution, or organization the responsibility for use or expenditure of grant funds.

2. Changes in Project Plans

The permissible changes by the grantee, PD(s), or other key project personnel in the approved project grant shall be limited to changes in methodology, techniques, or other similar aspects of the project to expedite achievement of the project's approved goals. If the grantee or the PD(s) is uncertain as to whether a change complies with this provision, the question must be referred to the Authorized Departmental Officer (ADO) for a final determination. The ADO is the signatory of the award document, not the program contact.

- Changes in approved goals or objectives shall be requested by the grantee and approved in writing by the ADO prior to effecting such changes. In no event shall requests for such changes be approved which are outside the scope of the original approved project.
- Changes in approved project leadership or the replacement or reassignment of other key project personnel shall be requested by the grantee and approved in writing by the ADO prior to effecting such changes.
- Transfers of actual performance of the substantive programmatic work in whole or in part and provisions for payment of funds, whether or not Federal funds are involved, shall be requested by the grantee and approved in writing by the ADO prior to effecting such transfers, unless prescribed otherwise in the terms and conditions of the grant.
- Changes in Project Period: The project period may be extended by USDA/NIFA without additional financial support, for such additional period(s) as the ADO determines may be necessary to complete or fulfill the purposes of an approved project, but in no case shall the total project period exceed ten years. Any extension of time shall be conditioned upon prior request by the grantee and approval in writing by the ADO, unless prescribed otherwise in the terms and conditions of a grant.
- Changes in Approved Budget: Changes in an approved budget must be requested by the grantee and approved in writing by the ADO prior to instituting such changes if the revision will involve transfers or expenditures of amounts requiring prior approval as set forth in the applicable Federal cost principles, Departmental regulations, or grant award.

3. Cost Sharing Requirements for awards made by NIFA:

Matching funds requirements may be found at 7 U.S.C. 3157 (b)(9). If an applied Research or Integrated Project with an applied research component, is commodity-specific and not of national scope, the grant recipient is required to match the USDA funds awarded on a dollar-for-dollar basis from non-federal sources with cash and/or in-kind contributions.

NIFA may waive the matching funds requirement if based on supporting documentation we can determine that:

- The results of the project, while of particular benefit to a specific agricultural commodity, are likely to be applicable to agricultural commodities generally; or
- The project involves a minor commodity, the project deals with scientifically important research, and the grant recipient is unable to satisfy the matching funds requirement.

US-UK Collaborative projects:

UKRI Awardees are subject to UKRI reporting and administration requirements as appropriate and outlined in the Research Funding Guide at https://www.ukri.org/manage-your-award/reporting-your-projects-outcomes/#contents-list. Defra Awardees are subject to Defra reporting and administration requirements as appropriate and outlined in https://www.gov.uk/government/publications/defra-terms-and-conditions-for-goods-and-services/research-and-developm US-UK Collaborative Projects should report on activities of the entire collaborative effort and submit that information to both NSF and UKRI or Defra as part of the annual and final reports.

US-Israel Collaborative projects:

BSF Awardees are subject to BSF reporting and administration requirements as appropriate and outlined in the BSF website: http://www.bsf.org.il/BSFPublic/DefaultPage1.aspx?PageId=41&innerTextID=41 US-Israel Collaborative

Projects should report on activities of the entire collaborative effort and submit that information to both NSF and BSF as part of the annual and final reports.

US-China Collaborative projects:

NSFC Awardees are subject to NSFC reporting and administration requirements as appropriate and outlined in the NSFC website: http://www.nsfc.gov.cn/publish/portal2/tab475/info70247.htm. US-China Collaborative Projects should report on activities of the entire collaborative effort and submit that information to both NSF and NSFC as part of the annual and final reports.

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 annual project report, and a project outcomes report for the general public.

Failure to provide the required annual or final annual 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 annual 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.

For multi-organizational projects, the lead organization is responsible for coordinating and managing the intellectual property resulting from the award. A complete IP agreement MUST be included with the first annual report of the project.

Reporting on NIH Awards:

Awardees will be required to submit the Research Performance Progress Report (RPPR) annually and financial statements as required in the NIH Grants Policy Statement.

A final progress report, invention statement, and the expenditure data portion of the Federal Financial Report are required for closeout of an award, as described in the *NIH Grants Policy Statement*.

The Federal Funding Accountability and Transparency Act of 2006 (Transparency Act), includes a requirement for awardees of Federal grants to report information about first-tier subawards and executive compensation under Federal assistance awards issued in FY2011 or later. All awardees of applicable NIH grants and cooperative agreements are required to report to the Federal Subaward Reporting System (FSRS) available at www.fsrs.gov on all subawards over $30,000. See the NIH Grants Policy Statement for additional information on this reporting requirement.

Reporting on USDA Awards:
Grantees are to submit initial project information and annual summary reports to NIFA's electronic, Web-based inventory system that facilitates both grantee submissions of project outcomes and public access to information on Federally-funded projects. The details of these reporting requirements are included in the award terms and conditions.

Any additional reporting requirements will be identified in the terms and conditions of the award (see Part VII, B. above for a link to view the NIFA award terms and conditions).

For informational purposes, the "Federal Financial Report," Form SF-425, consolidates into a single report the former Financial Status Report (SF-269 and SF-269A) and the Federal Cash Transactions Report (SF-272 and SF-272A). The NIFA Agency-specific Terms and Conditions include the requirement that Form SF-425 is due on an **annual basis no later than 90 days following the award's anniversary date *(i.e.*, one year following the month and day of which the project period begins and each year thereafter up until a final report is required). A final "Federal Financial Report," Form SF-425, is due 120 days after the expiration date of this award.**

US-UK Collaborative projects:

UKRI Awardees are subject to UKRI reporting requirements as outlined in the Research Funding Guide at https://bbsrc.ukri.org/documents/grants-guide/ . US-UK Collaborative Projects should report on activities of the entire collaborative effort and submit that information to both NSF and UKRI as part of the annual and final reports.

US-Israel Collaborative projects:

BSF Awardees are subject to BSF reporting and administration requirements as appropriate and outlined in the BSF website: http://www.bsf.org.il/BSFPublic/DefaultPage1.aspx?PageId=41&innerTextID=41 . US-Israel Collaborative Projects should report on activities of the entire collaborative effort and submit that information to both NSF and BSF as part of the annual and final reports.

US-China Collaborative projects:

NSFC Awardees are subject to NSFC reporting and administration requirements as appropriate and outlined in the NSFC website: https://www.nsfc.gov.cn/publish/portal0/tab475/info70247.htm . US-China Collaborative Projects should report on activities of the entire collaborative effort and submit that information to both NSF and NSFC as part of the annual and final reports.

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:

- Andrea Porras-Alfaro, Program Director, NSF/BIO, telephone: (703) 292-2944, email: aporrasa@nsf.gov
- Christine Jessup, Program Director, NIH/FIC, telephone: (301) 496-1653, fax: (301) 402-0779, email: christine.jessup@nih.gov
- Colette M. St. Mary, Program Director, NSF/BIO, telephone: (703) 292-4332, email: cstmary@nsf.gov
- May Yuan, Program Director, NSF/SBE, telephone: (703) 292-2206, email: mayuan@nsf.gov
- Daniel J. Thornhill, Program Director, NSF/GEO, telephone: (703) 292-8143, email: dthornhi@nsf.gov
- Joanne Haney, Senior Portfolio Manager, UKRI/BBSRC, telephone: 44 1793-413200, email: eeid@bbsrc.ukri.org
- Thomas Erritt, Animal Health Science Coordinator, Defra, telephone: +44 7714 2349, email: thomas.erritt@defra.gov.uk
- Ronald Adkins, Program Director, NIH/NIGMS, telephone: (301) 451-3825, email: ronald.adkins@nih.gov

- Stephanie Coomes, Health Scientist Administrator, NIH/NIAID, telephone: (301) 761-6855, email: stephanie.coomes@nih.gov
- Timothy Sullivan, National Program Leader, USDA/NIFA, telephone: (816) 527-5434, email: timothy.sullivan@usda.gov
- Rachel (Heni) Haring, Deputy Executive Director, BSF, telephone: 972 2 5828239, email: heni@bsf.org.il
- Jing Chen, Deputy Director, NSFC, telephone: 86 10-62326877, email: chenjing@nsfc.gov.cn
- Sadhana Sharma, Head of Bioscience for an Integrated Understanding of Health, UKRI/BBSRC, telephone: 44 1793-413200, email: eeid@bbsrc.ukri.org
- Jingyu Luo, Program Officer, NSFC, telephone: 86 10 62326479, email: luojy@nsfc.gov.cn

For questions related to the use of NSF systems contact:

- NSF Help Desk: 1-800-381-1532
- 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.

> A notice on the Ecology and Evolution of Infectious Disease research initiative and this announcement is also posted in the NIH Guide to Grants and Contracts http://grants.nih.gov/grants/guide/index.htmll along with all NIH opportunities.

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

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- **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) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

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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 proposers 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 proposers or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See System of Record Notices, NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and

Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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