



# Introduction to Selected Funding Opportunities:

- Organismal Response to Climate Change (ORCC)
- Biodiversity on a Changing Planet (BoCP)
- Enabling Discovery through GENomics (EDGE)
- Technology, Innovation and Partnerships (TIP)
- Ecology and Evolution of Infectious Diseases (EEID)
- Building Synthetic Microbial Communities for Biology, Mitigating Climate Change, Sustainability, and Biotechnology (Synthetic Communities)



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Division of Integrative Organismal Systems Core Programs (IOS)

# Organismal Response to Climate Change (ORCC)

Program Directors:

*Courtney Jahn* ([cjahn@nsf.gov](mailto:cjahn@nsf.gov))

Working Group: Chris Balakrishnan (DEB), Irwin Forseth (IOS), Courtney Jahn (IOS), Ted Morgan (IOS), Mamta Rawat (IOS), Jayne Gardiner (BioOce)

# Description of Research Scope

## The ORCC Program was designed to support:

- **Mechanistic studies of organismal response to climate change** as a foundation that, when integrated with research at other levels of organization, leads to a deeper understanding and better predictions of the integrity, resilience, and adaptation of biological systems to climate change.
- **Encourage collaborative teams that use cross-disciplinary approaches** to understand adaptive and maladaptive organismal responses to future and novel environmental conditions.



# Description of Research Scope

## ORCC solicitation had three solicitation specific criteria.

1. Does the proposal describe an overarching question that is addressed through hypothesis-driven research aimed at expanding knowledge and understanding of the **mechanisms of response of organisms to climate change**?
2. Does the proposal integrate **mechanistic insights at the organismal level with eco-evolutionary approaches** to produce **synergistic** research outcomes that may lead to novel, unexpected, or major advances in understanding of biological responses to climate change?
3. Do the broader impacts describe a **plan or a predictive framework** for how the research can be **used to address societal challenges** in dealing with climate change?



# Examples of Awarded Projects

**IOS-2220927 Collaborative Research: ORCC:RUI: Integrating evolutionary and migratory potential of *Chamaecrista fasciculata* into forecasts of range-wide population dynamics under climate change.**

*Jill Anderson, Megan DeMarche (UGA), Jennifer Cruse-Sanders (Georgia State Botanic Garden), Seema Sheth (NCSU), Emily Josephs (MSU), Susana Wadgyamar (Davidson)*



**IOS-2222475 Collaborative Research: ORCC: The role of bioenergetic budgets in defining elevation limits and modeling geographic ranges of species.**

*Matthew Troia (UTSA), Xingli Giam (UT)*



# Scientific Conferences We Often Attend

**Organismal Response to Climate Change is broad—so we are at lots of meetings!**

## **A few examples:**

- Society for Integrative & Comparative Biology (SICB)
- American Society of Plant Biologists (ASPB)
- Evolution
- ASM Microbe
- Ecological Society of America



# Tips from our program about transitioning from a Postdoc to a Principal Investigator

- **The most common weaknesses in lower rated proposals were a failure to satisfy solicitation specific criteria** – *Talk to your program directors for guidance!*
- Attend Scientific Conferences and meet with NSF program directors there
- Develop a one-page summary of the project, hypotheses to be tested, general experimental plan, gap in research to be filled, etc.
- Volunteer as an NSF reviewer



# Organismal Response to Climate Change (ORCC)

View guidelines

22-513

<https://new.nsf.gov/funding/opportunities/organismal-response-climate-change-orcc>

## Contact Information

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# Biodiversity on a Changing Planet (BoCP)

*NSF 23-542 Deadline Sept 5, 2024;  
first Thurs in Sept thereafter*  
**biodiversity@nsf.gov**

# Biodiversity on a Changing Planet – Partnerships

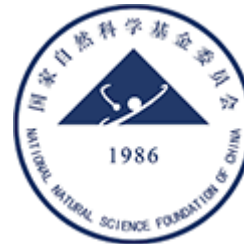
## NSF Directorate for Biological Sciences International Funding Agencies

- Division of Environmental Biology
- Division of Integrative Organismal Systems
- Division of Biological Infrastructure

- National Natural Science Foundation China
- FAPESP (São Paulo, Brazil)
- National Research Foundation South Africa

## NSF Directorate for Geosciences

- Division of Earth Sciences
- Office of Polar Programs
- Division of Ocean Sciences



# BoCP: Biodiversity on a Changing Planet

**The connection between functional biodiversity and biodiversity dynamics on a changing planet** is the main focus of the Biodiversity on a Changing Planet (BoCP) program. The program encourages proposals that integrate pattern- and process-based research approaches in the context of the constant gain, loss, and reorganization of biodiversity on a changing planet.

Successful BoCP proposals will test novel hypotheses about functional biodiversity and its connections to shifting biodiversity dynamics on a changing planet, with an emphasis on integrative research into the complex intersections among climatic, geological, paleontological, and biological processes. Integrative research is likely to combine multiple perspectives--including organismal, species, ecological, evolutionary, phylogenetic, geological, and/or paleontological approaches-- at various scales.



# BoCP: Biodiversity on a Changing Planet



**Projects must propose an integrative approach to understand the connections between biodiversity dynamics and functional biodiversity under changing environmental conditions, including climate conditions.**

**Biodiversity dynamics** refer to shifts in scope, structure, and interactions of biodiversity.

**Functional biodiversity** refers to the numerous roles of traits, organisms, species, communities, and ecosystem processes in natural systems. As well as the roles of emergent properties and processes across all levels of biological organization.

# BoCP: Biodiversity on a Changing Planet

## The program supports work in two tracks:

**Design track:** Projects up to \$500,000 and 3 years to building new teams with no prior collaborative track record through specific team building activities that promote the development of creative research and technical approaches that start to address critical, but perhaps untested, novel, or high-risk aspects of the functional axes of biodiversity in the context of a changing planet.

**Implementation track:** Projects up to \$2.5M over a maximum of 5 years that enable diverse collaborative teams at a more developed research stage, ready to implement a large-scale project addressing functional biodiversity on a changing planet.







Division of Integrative Organismal Systems Core Programs (IOS)  
**Enabling Discovery through  
Genomics (EDGE)**

Program Directors:

*Ted Morgan (tmorgan@nsf.gov) – BIO/IOS*

*Steve Ellis (stellis@nsf.gov) – BIO/DBI*

*Matt Fujita (mfujita@nsf.gov) – BIO/DEB*

*Courtney Jahn (cjahn@nsf.gov) – BIO/IOS*

*Suzy Renn (srenn@nsf.gov) – BIO/IOS*

*Cliff Weil (cweil@nsf.gov) – BIO/MCB*

*Xander Arguello (alexander.arguello@nih.gov) – NIH/NHGRI*

**Contact: [bioedge@nsf.gov](mailto:bioedge@nsf.gov)**



# EDGE supports genome to phenome research and tool development

Supports the development of **genomic tools** and **research** to uncover the relationships between genes and phenotypes across contexts.

## Complex Multigenic Traits (CMT)

Hypothesis-driven **research** that tests cause-and-effect relations between genotype(s) and phenotypes **in diverse organisms within the context in which they function.**

Results of proposals must **demonstrate the generalizability**

## Functional Genomic Tools (FGT)

**Tool development** that enables research communities to test gene function in diverse **species for which such tools are presently unavailable.**

**Rapid dissemination** to the research community is required.





# EDGE is a BIO partnership with NIH



Biological Sciences (BIO)



National Human Genome  
Research Institute

Deadline: 15 February 2024

Solicitation: NSF 21-546

Email: **bioedge@nsf.gov**







National Science Foundation  
Directorate for Technology, Innovation  
and Partnerships

# Accelerating Research to Impact

**Edda “Floh” Thiels**

*Convergence Accelerator, Program Director on detail*

13 September 2023

# TIP Directorate Mission



TIP harnesses the nation's vast and diverse talent pool to **advance critical and emerging technologies, address pressing societal** and economic challenges, and accelerate the translation of research results from lab to market and society. TIP improves U.S. competitiveness, growing the U.S. economy and training a diverse workforce for future, high-wage jobs.

# NSF programs power technology breakthroughs



Public Funds

**TIP bridges the gap**

RAMP OF OPPORTUNITY

*Valley of Death*



Private Funds

**LAB**

**SOCIETY**

Foundational Research

Use-Inspired Research

Proofs-of-Concept

Prototype Development

Product/Solution Development

National and Societal Impact, Commercialization

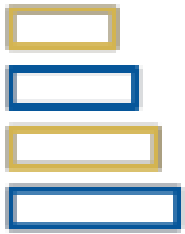
# TIP: Accelerating Research To Impact



## **Fostering Innovation and Technology Ecosystems**

Nurtures regional and national innovation and technology ecosystems to support researchers and innovators.

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## **Establishing Translation Pathways**

Supports startups through a lab-to-market platform and establishes new pathways for translating research results.

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## **Partnering to Engage the Nation's Diverse Talent**

Advances and deepens public and private partnerships across all areas of science, engineering and education.





Through a \$20 million cooperative agreement, the **Entrepreneurial Fellowships** run by the non-profit, Activate.org, support researchers from a variety of backgrounds and geographies to move technologies from lab to market.

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**2** years of training

At least **\$350,000** in direct support, plus specialized research facilities and equipment

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Opportunity available to:

- Individual Researchers



**America's Seed Fund powered by NSF** provides up to **\$2 million** in research and development funding for startups to develop transformative, deep tech, high-impact technologies.

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Phases:	<b>PHASE I</b> 6-12 months Up to <b>\$275,000</b>	<b>PHASE II</b> 2 years Up to <b>\$1 million</b>	<b>PHASE IIB</b> Up to <b>\$500,000</b>
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Opportunity available to:

- Academia
- Business & Industry



**Innovation Corps (I-Corps™)** provides experiential entrepreneurial education to further the nation's innovation ecosystem. Hubs implements the I-Corps™ program by creating a network of universities that help researchers learn how to translate fundamental research to the marketplace.

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**I-Corps Hubs** Funding for up to **\$3 million** per year for **5 years**

**10 I-Corps Hubs** involving nearly 100 universities

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**I-Corps Teams** Funding for **\$50,000** for **7 weeks**

Opportunity available to:

- Academia



**Partnerships for Innovation (PFI)** program offers researchers a technology testbed to gain market insights, launch a commercial application or facilitate industry adoption. PFI helps researchers translate basic research into technologies and spurs university spinoff companies.

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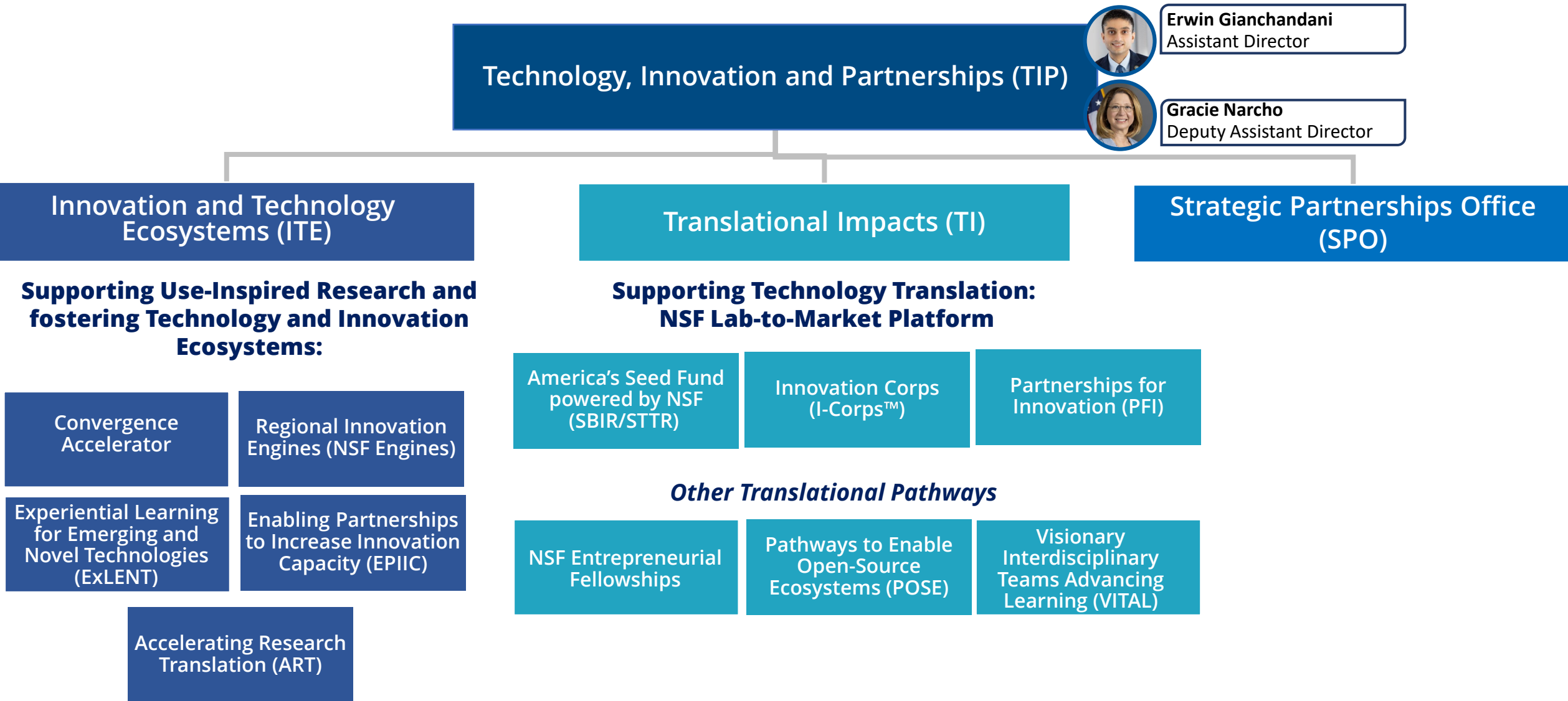
Two Tracks:	<b>TECHNOLOGY TRANSLATION</b>	<b>RESEARCH PARTNERSHIPS</b>
	2 years	3 years
	Up to <b>\$550,000</b>	Up to <b>\$1 million</b>

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Opportunity available to:

- Academia
- Nonprofits

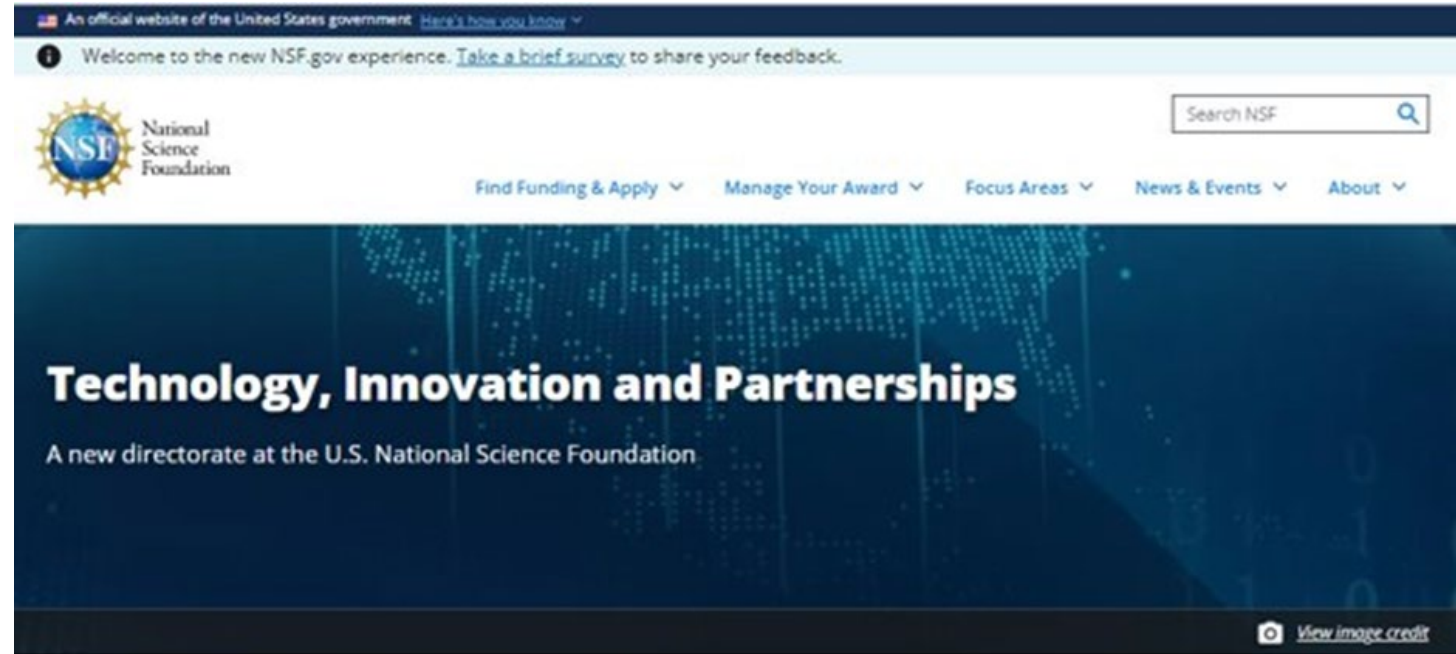
# NSF Technology, Innovation and Partnerships Focus Areas



# LEARN ABOUT TIP

- Funding opportunities
- Sign up for our newsletter
- Resources and upcoming events

[new.nsf.gov/tip/latest](https://new.nsf.gov/tip/latest)



# Tips from our program about transitioning from a Postdoc to a Principal Investigator

1. The EDGE program is about **generalizable** advances in the understanding of genotype to phenotype via research and tool development. Please reach out to the working group about the fit of your idea to either track.
2. Don't mix the FGT and CMT tracks in a single proposal

**[bioedge@nsf.gov](mailto:bioedge@nsf.gov)**









# Ecology and Evolution of Infectious Disease (EEID)

*NSF 23-616 Deadline Nov 15, 2023;  
third Weds in Nov thereafter*

# Ecology and Evolution of Infections Disease-Partnerships

## NSF Directorates

- Biological Sciences
- Geosciences
- Mathematical and Physical Sciences (MPS)
- Social, Behavioral and Economic Sciences (SBE)

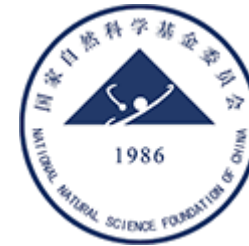
## US Government Agencies

- National Institute for Health
- US Department of Agriculture



## International Funding Agencies

- National Natural Science Foundation China
- United Kingdom Research and Innovation
- United States-Israel Binational Science Foundation



UK Research  
and Innovation



# EEID: Ecology & Evolution of Infectious Disease

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**. Multidisciplinary research teams are expected.

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.

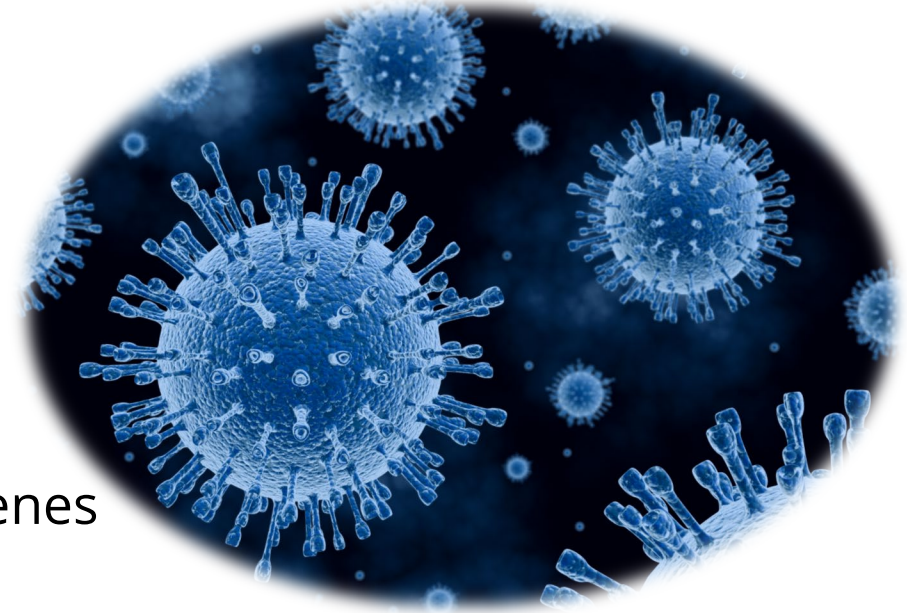
Projects should be broad, interdisciplinary efforts that go beyond the scope of typical studies. Research may be on zoonotic, environmentally-borne, vector-borne, enteric, or respiratory pathogens of either terrestrial, aquatic, or marine systems and organisms, including diseases of animals and plants, at any scale from specific pathogens to inclusive environmental systems.



# EEID: Ecology & Evolution of Infectious Disease

## Projects that are not supported focus solely on:

- genetic patterns of evolutionary change
- human diseases without considering the broader ecological context
- pathogen discovery
- within-host biological processes
- vector species ecology
- antimicrobial resistance or transmission of resistance genes without considering pathogen transmission dynamics



## As well as those

- that have no pre-identified pathogenic organism that will be the focus of the study
- that would fall under the US government policy on life sciences dual use research of concern (DURC) (i.e., research that uses one of 15 select agents, produces one of 7 effects that lead to "gain-of-function", and has the potential to be misused)



To familiarize yourself with work supported in this program, visit recent conference pages.







# **NSF 22-607: Building Synthetic Microbial Communities for Biology, Mitigating Climate Change, Sustainability and Biotechnology**

Program Directors:

*Mamta Rawat (IOS)*

*Courtney Jahn (IOS)*

*Anthony Garza (MCB)*

*Andrea Porrás-Alfaro (DEB)*

*Cathy Aimee (DEB)*

# Description of Research Scope

Supports research into synthetic microbial communities, including how they form and evolve, how to use them to address biological questions, and/or how to build them for biotechnology or bioengineering applications.

**When:** August 1, 2024, and every other year thereafter





# Synthetic microbial communities

Mixtures of microbes or strains from multiple phyla and kingdoms, including bacteria, archaea, and eukaryotes such as fungi and microalgae:

that are not naturally occurring and have novel characteristics

Or

have been rationally designed genetically and/or metabolically to have a particular capability



# Proposal Review

- Dedicated panels with reviewers from across the spectrum of microbiome research
- NSF Merit review criteria
  - Intellectual Merit
  - Broader Impacts
- Solicitation-specific criteria
  1. Does the proposal use a synthetic microbial community as defined in the solicitation?
  2. Does the proposal address one or more of the themes identified in the solicitation?
  3. Does the proposal address social, ethical, biosafety or biosecurity implications of the research if appropriate?
  4. Does the proposal ensure reproducibility and replicability via adherence to or advancement of best practices in the field?



# Awards

2300136: Engineering host-associated synthetic consortia based on ecological modules.

2300123: Synthetic mycorrhizal community and parasitism management in rhizosphere ecosystems guided by systems biology of mycoparasitism.



## **NSF 22-607**

# **Building Synthetic Microbial Communities for Biology, Mitigating Climate Change, Sustainability, and Biotechnology (Synthetic Communities) (nsf22607) | NSF - National Science Foundation**

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