



NATIONAL SCIENCE FOUNDATION  
2415 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22314

NSF 20-044

## Dear Colleague Letter: IMAGiNE 2020: Organisms in a Dynamic Environment

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February 14, 2020

Dear Colleagues:

With this Dear Colleague Letter (DCL), the Division of Integrative Organismal Systems (IOS) in the Directorate for Biological Sciences (BIO) of the National Science Foundation (NSF) encourages submission of proposals to its core programs focused on **IMAGiNE: Integrating Mechanisms of Adaptation with Genes in Networks and across Environments**. This DCL encourages integrated studies that will investigate how genomes, phenomes, and the environment interact to influence the development, expression and evolution of complex traits.

**Understanding the mechanisms underlying organism-environment interactions is key to understanding organismal function.** Behavior, development, morphology, and physiology are complex traits that emerge from interactions among the genetic makeup of an organism, the dynamic expression of this genotype (phenotype) and the biotic and abiotic environment of the organism. Resilience and robustness in maintaining functional processes and organismal performance are emergent properties seen in response to environmental challenges. With this DCL, IOS programs encourage submission of proposals that address how organism-environment interactions determine the emergence of complex traits. Proposals should explicitly discuss the environmental scale across time and space, and any environmental variables used in the research.

Fundamental questions in organismal biology -- such as how organism-environment interactions contribute to local and global biodiversity, plasticity, and resilience in the face of environmental change -- can now be addressed at a systems level with the rapid accumulation of extensive genomic and phenomic datasets. In addition, the investment of NSF/BIO in continental-scale environmental data opens up new avenues of research to understand how organisms grow, function, behave, and respond across diverse natural environments. Leveraging publicly available data generated by continental-scale environmental monitoring platforms such as, but not limited to, the [National Ecological](#)

Observatory Network (NEON) and the Ocean Observatories Initiative (OOI) is encouraged.

IOS encourages submission of the following types of proposals:

- **Research proposals** to support fundamental research relevant to the core programs in IOS that investigates how genomes, phenomes, and the environment interact to influence the development, expression, and evolution of complex traits. The environment in this context is meant to encompass either abiotic or biotic factors, or a combination of both factors.
- **Conference proposals** that would bring together teams of scientists to address key challenges to advancing the goals of IMAGiNE.
- **Research Coordination Network (RCN) proposals** to build collaborative networks of scientists in diverse disciplines to coordinate and expand avenues of research addressing the goals of IMAGiNE.

Research proposals should be submitted to the IOS program most-closely related to the proposed activities through the IOS core programs solicitation [NSF 20-536](#), the PBI solicitation [NSF 18-590](#), or the PGRP solicitation [NSF 18-579](#). Proposals for RCNs should be prepared and submitted consistent with the guidelines in the RCN solicitation ([NSF 17-594](#)). Proposals for conferences must be prepared and submitted in accordance with the guidance for Conference Proposals contained in Chapter II.E.7 of the [NSF Proposal and Award Policies and Procedures Guide](#) (PAPPG).

After any solicitation or PAPPG specific requirements, titles should include "IMAGiNE:"

Researchers are strongly encouraged to consult with IOS Program Directors prior to submitting a proposal.

Joanne S. Tornow  
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