



U.S. NATIONAL SCIENCE FOUNDATION
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ALEXANDRIA, VIRGINIA 22314

NSF 24-044

Dear Colleague Letter: Neurobiology in Changing Ecosystems (NiCE)

December 22, 2023

Dear Colleague:

Understanding the neurobiological mechanisms that underlie neural, physiological, and behavioral responses to anthropogenic environmental change is of vital importance in today's rapidly evolving world. The nervous system serves as an interface between an organism and its environment, and through it, perceives, responds, and adapts to change. Anthropogenic stressors such as noise pollution, ocean acidification, chemical pollution, temperature fluctuation and other human-generated environmental perturbations pose severe threats to organisms, thereby affecting biodiversity and ecosystem services. Research in the area of neurobiology in changing ecosystems holds promise to reveal novel scientific insights that will contribute to understanding neural adaptation and resilience at molecular, biophysical, cellular, and circuit level (Michaël and Bernard 2022; O'Donnell 2018). To investigate the dynamic relationship between the nervous system and environments in flux, it is essential that research combines multidisciplinary expertise. Collaboration between neuroscientists, environmental scientists, molecular biologists, animal behaviorists, marine biologists, ecologists, and climate scientists will promote an integrative and comprehensive approach to understanding neurobiological processes that mediate organismal adaptation and resilience.

Opportunities for investigation of neurobiology and changing ecosystems specifically cover modulatory, homeostatic, adaptive, and/or evolutionary mechanisms that impact neurophysiology in response to anthropogenic environmental influence. To address an unmet need, a focus on fundamental basic research topics in cell and circuit-based approaches is required, rather than on environmental sustainability applications, ecological impacts or human health outcomes – which, while critical, are being addressed through other funding mechanisms.

With this Dear Colleague Letter (DCL), programs in the National Science Foundation's (NSF) Directorate for Biological Sciences' (BIO) Division for Integrative Organismal Systems (IOS) and The Kavli Foundation's Neurobiology and Changing Ecosystems Initiative encourage

submission of research proposals that advance the field of neurobiology in changing ecosystems during fiscal year 2024 (through September 30, 2024). The opportunity described in this DCL encourages proposals that emphasize interdisciplinary collaborations and integrate diverse methodologies, including environmental monitoring techniques, behavioral and physiological experiments, ecological and evolutionary modeling, combined with traditional approaches in neuroscience investigation.

NiCE proposals should explicitly address the following three criteria:

- The importance, extent, or urgency of the anthropogenic environmental change being investigated.
- The relationship between the neural mechanisms under investigation and the organism's fitness in the changing environment.
- How the results of the project will inform or predict resilience in related neural mechanisms, organisms, or environments.

SUBMISSION INSTRUCTIONS

NiCE research proposals should be prepared and submitted following the guidance in the [IOS Core Programs](#) solicitation (currently [NSF 23-547](#)) after consulting with an NSF program director regarding the suitability of the project for a particular program or cluster. Proposals for conferences or solely focused on tool development are not permitted in response to the opportunity described in this DCL. Proposal titles must start with "NiCE", after any solicitation specific title requirements.

NSF will manage the review of NiCE proposals in consultation with The Kavli Foundation. The NiCE proposals will be reviewed in competition with other proposals received for the same funding round of the program to which the proposal is submitted, using NSF's merit review process. Copies of NiCE proposals, unattributed reviews, and panel summaries will be shared with official representatives from The Kavli Foundation via secure file transfer, as appropriate.

If a NiCE proposal is recommended for funding, the Principal Investigator (PI) will be asked to submit a revised budget to NSF and submit a budget to The Kavli Foundation according to each organization's funding contribution to the award.

Those NiCE proposals selected for funding by NSF will be handled in accordance with standard NSF procedures. The Kavli Foundation component of the recommended funding will be awarded in accordance with its policies and terms and conditions.

POST-AWARD CONSIDERATIONS

Recipients must comply with the award conditions and reporting requirements of the

organizations from which they receive funding.

Recipients are required to acknowledge both NSF and The Kavli Foundation in any reports or publications resulting from the award.

General questions concerning this opportunity should be directed to Susan Renn at ios-nice@nsf.gov.

Sincerely,

Dr. Susan Marqusee, Assistant Director
Directorate for Biological Sciences (BIO)

References:

Michaiel, A.M. & Bernard, A. (2022) Neurobiology and changing ecosystems: Toward understanding the impact of anthropogenic influences on neurons and circuits. *Front. Neural Circuits* 16:995354. doi: 10.3389/fncir.2022.995354

O'Donnell, S. (2018). The neurobiology of climate change. *Sci. Nat.* 105:11. doi: 10.1007/s00114-017-1538-5