



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 19-045

Dear Colleague Letter: Genetic Underpinnings for Life in Antarctica (LIA)

February 28, 2019

Dear Colleagues:

The Antarctic Organisms and Ecosystems (AOE) Program within the National Science Foundation's (NSF) Office of Polar Programs (OPP) is encouraging submission of proposals that advance understanding of **how Antarctic biota evolve and adapt to unique and ever-changing Antarctic environments**. Proposals should focus on understanding the genetic underpinnings of organismal adaptations to their current environment and ways in which extant biota and ecosystems respond to changing conditions over different spatial and temporal scales. Research results should provide insight into understanding the emergence of complex properties in biological systems, and/or help reveal the existence of general principles across a spectrum of biological phenomena.

BACKGROUND

The AOE Program is seeking to accelerate work that will help solve one of the greatest challenges in understanding the living world - namely, predicting how the set of observable characteristics (phenotype) arises from the genetic makeup of individuals in concert with environmental factors acting at diverse spatial and temporal scales. This Dear Colleague Letter (DCL) encourages submission of proposals that address the National Academy of Sciences' strategic direction to focus support research activities that address the [genetic basis and adaptations for life in Antarctica](#), as well as NSF Big Ideas emphases on Understanding the Rules of Life, Harnessing the Data Revolution and Convergent Research. These [Big Ideas themes](#) emphasize integration across disciplines inspired by powerful scientific questions and/or pressing societal needs.

Discoveries regarding the "Rules of Life" in Antarctica and beyond are likely to be accelerated by work at the junctions between the biological sciences and other fields, such as research in computer and information sciences, engineering, geosciences, and mathematical and physical sciences. Investments by NSF in this area should have the potential to transform

understanding of living systems and to benefit the public through broader impacts on society.

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

Proposals submitted in response to this DCL should focus on using genomic and other bioinformatic tools, approaches, and associated infrastructure to directly test hypotheses about gene function in Antarctica and not simply describe species presence or construct genomes. This DCL also aims to increase the capacity of the research communities to test cause-and-effect hypotheses about genes and phenotypes over a broad range of Antarctic organisms.

Participation of graduate students and/or postdoctoral fellows is encouraged in all proposals. Additionally, proposals that include efforts to broaden participation and, as appropriate, education and outreach surrounding the themes of adaptation to unique polar environments, are encouraged.

Proposals must be submitted to the Antarctic Research solicitation ([NSF 18-530](#)) with "ANT LIA" at the start of the title. Proposals must be prepared and submitted in accordance with the guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* and the Antarctic Research solicitation. In addition to standard research proposals, the program is also interested in catalytic and synthetic work that goes beyond studies of one organism's specific adaptation or evolutionary path. Proposals that make use of existing data, information or archived samples without the need for field work in the Antarctic are highly encouraged.

As such, the following types of proposals also will be considered:

- Conferences that engage the research and research infrastructure communities in identifying and developing potential new areas of research and technology development as they pertain to biological systems in the Antarctic (see the guidance in PAPPG Chapter II.E.7).
- EARly-concept Grants for Exploratory Research (EAGER) projects to develop and test new concepts (see the guidance in PAPPG Chapter II.E.2).
- Research Coordination Network (RCN) projects that engage multidisciplinary teams in innovative approaches to examine the underpinnings for life in Antarctica (see the guidance in the RCN solicitation, [NSF 17-594](#)).
- Research Advanced by Interdisciplinary Science and Engineering (RAISE) projects to support bold interdisciplinary activities with lines of research that promise transformational advances and lie in great part outside the scope of a single program or discipline (see the guidance in PAPPG Chapter II.E.3).

Inquiries about this DCL should be directed to Program Directors [Karla Heidelberg](#) and [Jenn Burns](#).

Sincerely,

William E. Easterling
Assistant Director for Geosciences