



**U.S. NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314**

NSF 24-131

Dear Colleague Letter: Advancing Research at the intersection of Biology and Artificial Intelligence (AI)/Machine Learning (ML)

September 17, 2024

Dear Colleagues:

The U.S. National Science Foundation's (NSF) Directorate for Biological Sciences (BIO) encourages the submission of proposals that advance biological research using Artificial Intelligence/Machine Learning (AI/ML) or AI/ML methods using biological data and systems.

To tackle grand challenge problems across the biological sciences, researchers increasingly are turning to the development and adoption of AI/ML methods. AI/ML includes any computational tool that mimics intelligence and the ability to learn from data to derive inferences. These methods are powerful tools for analyzing, synthesizing, and integrating large and complex datasets, developing predictive models, and designing and deploying bio-inspired innovations. Unique aspects of information processing in biological systems and the complexity of biological data can also inform and inspire new developments in AI/ML. In addition, AI-enabled research requires a trained workforce prepared to use, develop, and validate appropriate AI/ML approaches and supporting technologies tailored for biological systems.

To promote research that benefits from AI/ML and reduces barriers to its use in the biological sciences, BIO welcomes proposals that incorporate or advance AI/ML approaches across the research supported in all the Divisions of the BIO Directorate. Proposals in response to this DCL must advance one or more goals represented by NSF biological sciences programs through incorporating or developing AI/ML approaches. Proposers are encouraged to include partnerships between biologists and experts in AI/ML from academia, industry, or other organizations.

Areas where AI/ML approaches may be used include, but are not limited to:

- Implementing existing AI/ML methods to solve pressing questions in biology
- Developing new AI/ML models to derive biological insights

- Validating and/or comparing results from AI/ML methods against results from traditional analytical methods, theoretical models, and/or experimental approaches

Proposals that advance both biological discovery and AI/ML research are especially encouraged. Activities, such as generating well-curated and labeled, publicly available AI/ML training datasets, creating software and tools openly available to the scientific community, and developing a workforce trained and conversant in AI/ML approaches may be incorporated as elements relevant to the Intellectual Merit and/or Broader Impacts of proposals in response to this call. Proposals solely aimed at generating new data are not encouraged.

NSF offers access to computing resources through the [National Artificial Intelligence Research Resource \(NAIRR\) Pilot](#) for the research community to request access to a set of computing, model, platform, and educational resources for projects related to advancing AI research.

HOW TO SUBMIT

This is not a special competition or new program. Relevant proposals should be submitted to an existing BIO program, according to that program's solicitation and submission guidelines. Proposal titles should begin with "**BIO-AI:**" followed by any other relevant prefixes and the project name. Before submission, PIs are encouraged to contact cognizant program directors in the program(s) within the Divisions of Molecular and Cellular Biosciences, Integrative Organismal Systems, Environmental Biology, or Biological Infrastructure that are most relevant to their projects to discuss the appropriate mechanism for submission.

Proposals will be evaluated by the relevant BIO programs alongside other proposals submitted to the respective program and therefore must be responsive to those programs' solicitation. Proposals must also describe the AI/ML methods and justify how these methods address a scientific challenge or question that was previously intractable. The project team must have appropriate expertise in AI/ML, which can be demonstrated through previous experience with proposed methods, collaboration with relevant experts, and/or pathways for training students and other researchers in AI/ML.

BIO encourages input and participation from the full spectrum of diverse talent that society has to offer, which includes underrepresented and underserved communities as described in the [NSF Proposal and Award Policies and Procedures Guide](#) (PAPPG). Proposals from EPSCoR jurisdictions are especially encouraged.

General questions about this Dear Colleague Letter may be submitted to bio-ai@nsf.gov. Specific questions about fit of the research to this funding opportunity should be directed to the individual BIO program(s).

Sincerely,

Susan Marqusee
Assistant Director for Biological Sciences