



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 21-057

Dear Colleague Letter: Tool Development for Cell Biology (Tools4Cells)

March 16, 2021

Dear Colleagues:

As scientists' abilities to open new frontiers in cell biological research continue to be limited by current technologies, there is still a need for the development of new tools and methods to advance our understanding of cells, especially using interdisciplinary approaches that can leverage advances in other fields and apply them to cell biology. Technological advancements have had a profound and catalytic influence on the field of cell biology, either through the application of existing technologies to the study of cellular processes in new and creative ways, or through the development of novel technologies to study areas not previously possible. Relatively recent examples of such advances include: methods of molecular dynamics simulations to study membrane protein signal transmission; gene-editing technologies such as CRISPR/Cas9 applied to probe gene localization; development of new single molecule fluorescence/microscopy techniques to enable in vivo single cell dynamic measurements; single cell sequencing; and the application of cryo-EM and x-ray free electron lasers to the study of protein structure and dynamics.

The purpose of this Dear Colleague Letter (DCL) is to encourage submission of proposals to develop novel tools and methods that improve scientists' abilities to manipulate, control, analyze, or measure critical aspects of cells and their functions in order to open new areas of study in cell biology.

SUMMARY OF OPPORTUNITY

Proposals for new tools or methods developments in cell biology can include, but are not limited to the general areas of **bioinformatics, instrumentation, or laboratory or field-based research methods**. Proposals should be submitted to one of two Divisions in the Directorate for Biological Sciences (BIO) depending on the range of applicability of the tool or method and its connection to a specific research question rather than a general topical area. The research cluster and program within the two BIO divisions that seek proposals in this

area are:

- *Cellular Dynamics and Function Cluster* in BIO's Division of Molecular and Cellular Biology (MCB) if the proposed tool or method addresses a specific research question or hypothesis defined by and to be used by an individual user or group of researchers. Such a project would be evaluated on the **importance of the research question or hypothesis** and the **potential of the tool or method** to improve scientists' ability to study cells or their function related to the question or hypothesis. In addition, for some efforts, the research community is encouraged to take risks in exploring new tools or methods with the potential to change understanding of how cells work.
- *Infrastructure Innovation for Biological Research Program* in BIO's Division of Biological Infrastructure (DBI) if the proposed tool or method is applicable to a broad class of biological research questions or topics and will meet the needs of a well-defined community of researchers. Such a project would be evaluated on its **responsiveness to a well-defined research question in BIO, the specific BIO-funded research community that would benefit**, a clear **demonstration of how the innovation represents an advance over currently available tools or methods**, and the quality of the **project management description**. Although this DCL is encouraging submissions related to cell biology, this program and all other DBI programs invite proposals on any area of biology that fit within its guidelines.

INSTRUCTIONS FOR SUBMISSION:

Proposals responsive to this DCL should be submitted as follows based on the above criteria:

- [Cellular Dynamics and Function Cluster](#) via the MCB core solicitation (currently [NSF 21-509](#)). However, for the projects that are "high-risk/high-payoff", investigators should consider the Early-Concept Grants for Exploratory Research (EAGER) type of proposal which allows requests for up to \$300,000 over two years. Specific instructions for preparation and submission of EAGER proposals can be found in Chapter II.E.2 of the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG).
- [Infrastructure Innovation for Biological Research Program](#) via the DBI solicitation (currently [NSF 21-502](#)).

The title of any proposal submitted to either division in response to this call should begin with "Tools4Cells:". Proposals may be submitted at any time.

POINTS OF CONTACT:

mcb-cdf@nsf.gov
innovation@nsf.gov

Sincerely,

Joanne S. Tornow
Assistant Director
Directorate for Biological Sciences