



NATIONAL SCIENCE FOUNDATION
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NSF 21-017

Dear Colleague Letter: Conferences to Prepare for the Transformation of Molecular and Cellular Biosciences Research through Information Synthesis and Integration

October 26, 2020

Dear Colleagues:

The ever-expanding sphere of information generated by scientists in the molecular and cellular biosciences, and the essential cross-disciplinary nature of modern science, present new challenges and opportunities to shape the future of many fields of research. NSF recognizes the importance of promoting wider access to this information and enabling the synthesis of data, concepts, and knowledge to stimulate novel questions, discoveries, and solutions that will transform our understanding of biology.

NSF has a history of supporting information synthesis at key junctures in scientific disciplines, for example, through the National Evolutionary Synthesis Center ([NESCent](#)) and the National Socio-Environmental Synthesis Center ([SESYNC](#)). Both NESCent and SESYNC have engaged more than a thousand investigators over the 10-year NSF investment period, forging new connections in these communities that have led to striking progress in evolutionary science and environmental and social sciences, respectively ([1](#), [2](#), [3](#)). The broad field of molecular and cellular biosciences is at such a juncture; multiple disciplines are awash in distributed information on cellular parts and processes gained from recent advances in biophysical, -omics, and imaging technologies, among others. The work of synthesizing this information, such as harmonizing and collectively interpreting divergent datasets, developing new analytical approaches and tools, building models and theories, and integrating knowledge from within and across various disciplines can have a distinctive impact on all of biology.

Through this Dear Colleague Letter (DCL), NSF Division of Molecular and Cellular Biosciences (MCB) invites proposals for conferences that enable the science community to plan and begin building networks of scientists to synthesize available information in creative ways that advance research in the molecular and cellular biosciences. These networks

should organize people with diverse skills and perspectives around a complex scientific theme that draws existing knowledge from a broad spectrum of disciplines.

Examples of complex scientific themes that could benefit from synthesis over a 5- to 10-year period and engage a large community of scientists through a synthesis center include, but are not limited to:

- Understanding the Genome - the known and unknown genome/epigenome and its expression into cellular form and function.
- Cellular Interactions - the nature of interactions within and between cells in space and time and their relationships to cellular fate.
- Limits of Life - the principles and properties that define and set the bounds of molecular and cellular function.

While the themes available for synthesis centers are open, responsive proposals should address topics that fall within the scope of science supported by [MCB](#).

With this DCL, NSF anticipates funding about 10 conference proposals to build communities of scientists around themes encompassing molecular and cellular processes. The proposals should include activities aimed at formulating ideas and organizing people to plan for a synthesis center. These activities may occur over the course of one or more meetings. The following challenges must be considered:

- What scientific goals could be achieved through a synthesis center-scale investment that would not otherwise be realized?
- What novel modes of organization and engagement will the community explore to catalyze new ideas, research directions, and discoveries in a time of rapid change?
- What types of resources, including computational expertise and cyber-infrastructure, will the community need to best advance the science and meet its goals for broader impacts?
- How will the community ensure that individuals and groups who are not regular participants due to disciplinary barriers, cultural differences, or resource limitations are included in this opportunity?
- In what ways will the community recruit, train, and nurture new talent to seed paradigm-shifting discoveries in the future?
- How will the outcomes of the community's efforts serve the wider scientific community?

The conference activities and resulting outcomes report should position the community to respond to future funding opportunities that support information synthesis and integration in the molecular and cellular biosciences.

MCB is particularly interested in increasing the participation of underrepresented groups in biological research and education such as women, persons with disabilities, and

underrepresented minorities ⁴, ⁵, and those from geographically underrepresented areas in science, technology, engineering, and mathematics (STEM). Proposals submitted in response to this DCL are strongly encouraged to involve PIs, co-PIs, postdoctoral fellows, students, and other personnel who are members of these groups. Proposers are also strongly encouraged to consider involving veterans of the U.S. Armed Forces as part of NSF's broader effort to promote veteran involvement in STEM research and education.

Prior to submitting a proposal, PIs are strongly encouraged to contact one of the Program Officers listed below to ensure that the proposal fits the goals of this DCL. Proposals should be prepared and submitted as per guidance provided in the NSF Proposal & Award Policies & Procedures Guide ([PAPPG](#)) and the Molecular and Cellular Biosciences (MCB) core solicitation [NSF 21-509](#). The budget should be limited to \$100,000 and should be well-justified. All proposals submitted in response to this DCL must include the prefix "MoCeIS-DCL:" in front of the title. Proposals responsive to this DCL should be received prior to April 1, 2021 to be considered for FY 2021 funding and will be reviewed and awarded on a rolling basis.

Inquiries about this DCL may be directed to any of the following Program Officers:

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¹ <https://doi.org/10.1093/biosci/bix053>

² <https://doi.org/10.1371/journal.pbio.1001468>

³ <https://www.sciencedirect.com/science/article/pii/S0048733320301475>

⁴ <https://nces.nsf.gov/pubs/nsf19304/digest/introduction>

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https://www.nsf.gov/od/oia/activities/ceose/reports/CEOSE_ReportToCongress_RP_FVmp_508.pdf