



NATIONAL SCIENCE FOUNDATION
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Dear Colleague Letter: National Brain Observatory: A Phased Approach for Developing a National Research Infrastructure for Neuroscience

February 19, 2016

Dear Colleagues:

With this Dear Colleague Letter (DCL), the National Science Foundation (NSF) is announcing the intention to foster the development of a national research infrastructure for neuroscience (National Brain Observatory) to support collaborative and team science for achieving a comprehensive understanding of the brain in action and context. Understanding the brain is one of the grand scientific challenges at the intersection of experimental, theoretical, and computational investigation in the biological, physical, social and behavioral sciences, education research, and engineering. Achieving a comprehensive understanding of the brain requires increased emphasis on systematic, multidisciplinary collaboration and team science to establish quantitative and predictive theories of brain structure and function that span levels of organization, spatial scales of study, and the diversity of species. This challenge necessitates the development of innovative, accessible, and shared capabilities, resources and cyberinfrastructure, along with the eventual organizing of these into a coherent national infrastructure for neuroscience research.

Large-scale collaborative efforts facilitated by shared instrumentation, communication, data representation, and workflow systems, and advanced computational and data resources have enabled transformative discoveries across the spectrum of scientific disciplines. In neuroscience, rapid proliferation of advanced measurement instrumentation and techniques has allowed researchers to study the brain, nervous system, cognition, and behavior at ever-finer physical and temporal scales, and generate very large datasets. However, integrative efforts in neuroscience research are hampered by a lack of systematic means for encouraging maximal utilization of existing resources, and for developing and disseminating new resources that can serve whole disciplines in collecting, managing, and analyzing large-scale data, and comparing those data to theoretical and computational models.

This multi-directorate effort is part of the NSF's Understanding the Brain activity, including NSF's participation in the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative (<http://www.nsf.gov/brain/>) and the National Brain Observatory (NBO) effort.

This effort will be realized through a phased approach that:

- Fosters development and dissemination/deployment of innovative research resources and instrumentation, neurotechnologies and behavioral paradigms that can be applied across the phylogenetic spectrum, theoretical and computational frameworks, and data infrastructure resources while providing greater access to existing resources where possible and serving broad communities within the brain sciences;
- Supports collaborative networks composed of neuroscientists, behavioral scientists, and theorists

working in concert with technology and cyberinfrastructure developers on a common question or theme from a variety of perspectives; and

- Facilitates the emergence of a coherent national infrastructure comprising the above shared and accessible tools, resources and networks that will allow rapid integration, analysis, and modeling of brain data associated with behaviors from multi-disciplinary projects and enable large-scale collaborative research efforts nationally and internationally that will advance our understanding of brain structure and function.

NSF plans to continue to release Dear Colleague Letters and Solicitations with refined guidance and specific funding opportunities aligned with each of the three phases described above, as this campaign continues into the future. NSF anticipates that this initiative will usher in a new frontier of brain exploration by empowering research communities to cooperatively collect, share, analyze, and model data across molecular, cellular, organismal, developmental, behavioral and evolutionary levels in order to reveal the fundamental principles of nervous system function and complex behavior. If you have questions concerning this DCL, please contact a program officer representing the program or solicitation of interest.

Sincerely,

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