



NATIONAL SCIENCE FOUNDATION  
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ALEXANDRIA, VIRGINIA 22314

NSF 18-097

## Dear Colleague Letter: Planning for New Signals in the Soils (SitS)-Themed NSF Industry/University Cooperative Research Centers (IUCRCs)

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August 6, 2018

Dear Colleague:

The National Science Foundation's (NSF) Directorate for Engineering (ENG), in collaboration with its Computer and Information Science and Engineering (CISE) and Geosciences (GEO) Directorates, aims to encourage convergent research that transforms existing capabilities in understanding dynamic near-surface processes through advances in sensor systems and dynamic models. Specifically, the goal of this Dear Colleague Letter (DCL) is to encourage planning of one or more Industry-University Cooperative Research Centers (IUCRC).

The Industry-University Cooperative Research Centers (NSF IUCRC program (<https://www.nsf.gov/eng/iip/iucrc/home.jsp>) strives to develop long-term partnerships among industry, academe, and government to promote convergent research programs of mutual interest, contribute to the nation's research infrastructure base, enhance the intellectual capacity of the engineering or science workforce through the integration of research and education, and facilitate knowledge and technology transfer. The IUCRC program seeks to achieve these goals by:

- Leveraging NSF funds with industry to support graduate students performing industrially-relevant pre-competitive research;
- Expanding the innovation capacity of our nation's competitive workforce through partnerships between industries and universities; and
- Encouraging the nation's research enterprise to remain competitive through active engagement with academic and industrial leaders throughout the world.

Preliminary proposals for IUCRC planning grants addressing SitS-themed precompetitive research areas are welcome and will be fully considered.

Faculty are encouraged to collaborate within their institutions as well as with other institutions

to bring together a multi-institution partnership towards planning a prospective center per the requirements of the IUCRC program. If the institutions planning the IUCRC can obtain letters of strong support from industry, each university may submit a planning grant proposal to NSF following the guidance in the IUCRC program solicitation ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf17516](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17516)). Preliminary Proposals are required as a pre-requisite to a full Planning Grant Proposal submission. Please refer to the [IUCRC solicitation](#) for details and applicable submission dates. SitS topic questions about this DCL should be directed to: [SitSquestions@nsf.gov](mailto:SitSquestions@nsf.gov).

## NATIONAL NEED

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Soils are the foundation of terrestrial ecosystems that support economic prosperity and provide services that are essential for humanity. Soils are complex living ecosystems containing billions of organisms that mediate a myriad of biological, chemical, and physical processes, interacting to cycle carbon and nutrients essential for plant growth, food, and fiber production, and to remove contaminants from water.

Soil is also the foundational material for all structures not supported on rock, and is by orders of magnitude the most widely-used construction material in the world. Soil ecosystems supply most of the antibiotics used to fight human diseases, control the movement of water and chemical substances between the Earth and atmosphere, and act as source and storage media for gases important to life, such as oxygen, carbon dioxide, and methane. Thus, as the Earth's population grows to nearly 10 billion by 2050, an improved understanding of soil ecosystems that have a critical role in feeding the world is necessary.

This DCL encourages the submission of planning grant proposals, through the submission process described in the [IUCRC solicitation](#), for an eventual SitS-themed IUCRC. The planning grant theme should integrate fundamental science and engineering knowledge in different disciplines with the aim of developing a next generation of sensor systems capable of in situ measurement of dynamic soil biological, physical, and chemical variables over time and space in managed and unmanaged soils. These sensor systems will also require associated advances in ground penetration, data transmission, data analytics, dynamic models, and visualization tools. If successful, these research concepts will enable scientists and engineers to advance basic understanding of dynamic processes in soils and provide the underlying science and engineering to enable others to develop new ways of studying soil properties and managing soils and natural resources. Advances in measurement systems, understanding, and models will provide new capabilities that will enable practitioners to use new sensors, models, and time series data to achieve a better understanding of soil processes and higher efficiencies of resource use; this improved understanding will in turn help meet societal goals such as less contamination of soil and water supplies and greater food security, as well as address the "National Academy of Engineering Grand Challenge" of managing the Nitrogen cycle.

## SITS-THEMED IUCRC PLANNING GRANT SUBMISSION

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For information on the appropriate SitS themes, please see the earlier NSF DCL on Signals in the Soil ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf18047](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf18047)). For submitting a SitS-Themed IUCRC planning grant preliminary proposal, please review the current IUCRC program solicitation ([https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf17516](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf17516)). That document describes the NSF requirements for these preliminary proposals and subsequent planning grants, as well as the selection process and steps following a successful planning grant award to submit a full IUCRC proposal.

For preliminary proposal planning grant submissions responding to this Dear Colleague Letter, the following additional instructions apply:

Submitters are strongly encouraged to contact IUCRC Program Officers Prakash Balan ([pbalan@nsf.gov](mailto:pbalan@nsf.gov)) or Andre Marshall ([awmarsha@nsf.gov](mailto:awmarsha@nsf.gov)) and relevant SitS Program Officers at [SitSquestions@nsf.gov](mailto:SitSquestions@nsf.gov) for guidance and topic approval prior to submitting a preliminary proposal for an IUCRC planning grant. After the submission of an IUCRC planning grant preliminary proposal, submitters will receive feedback from program staff indicating "encourage" or "discourage."

An "encourage" finding generally indicates that the preliminary proposal appears to be responsive to the IUCRC program guidelines and is a candidate for further development relative to the IUCRC program solicitation. A "discourage" finding generally indicates that the preliminary proposal is not responsive to the IUCRC program, has serious conceptual flaws, and/or requires revision prior to consideration for development as an IUCRC planning grant full proposal submission. The feedback provided pursuant to the preliminary proposal is advisory only; submitters of both "encourage" and "discourage" preliminary proposals are eligible to submit full IUCRC Planning Grant Proposals.

## FURTHER PLANNING GRANT SUBMISSION INSTRUCTIONS

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1. SitS planning grant preliminary proposals considered under this DCL must be received by the IUCRC solicitation deadlines of October 17, 2018, for the first round of consideration, or by April 17, 2019, for the second round of consideration. Proposals need to be submitted per the guidance in the IUCRC program solicitation [NSF 17-516](#).
2. The title of the planning grant preliminary proposal submission must start with "SitS:" to allow IUCRC Program Officers a way to identify submission aligned with this DCL. Questions concerning this opportunity may be emailed to [SitSquestions@nsf.gov](mailto:SitSquestions@nsf.gov).

Sincerely,

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