U.S. NATIONAL SCIENCE FOUNDATION
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NSF 25-013

Dear Colleague Letter: NSF call for IUCRC (Industry-University Cooperative Research Center) Proposals for a Center Pursuing Optical Tissue-mimicking Phantoms for Biomedical Applications

October 24, 2024

Dear Colleagues:

This Dear Colleague Letter (DCL) invites submissions responsive to the Industry-University Cooperative Research Center (IUCRC) program solicitation in the broad topic area of tissue-mimicking phantoms for optical medical devices.

The U.S. National Science Foundation (NSF) Industry-University Cooperative Research Centers (IUCRC) program strives to build long-term partnerships among industry, academia, and government. Leveraging the IUCRC Program the NSF, in partnership with the National Institute of Biomedical Imaging and Bioengineering (NIBIB) at the National Institutes of Health (NIH) and the Center for Devices and Radiological Health (CDRH) at the Food and Drug Administration (FDA), is encouraging efforts to promote productive research, development and dissemination of novel tissue-mimicking phantoms for potential use in the development of future medical devices.

Research and development of tissue-mimicking phantoms as tools that can quantitatively test and characterize optical medical device performance under different operating parameters represent a unique opportunity to accelerate the pace of optical medical device innovation. These tools are intended to assist with benchmarking during the product development process and will be made freely available to innovators. Given the diversity of optical imaging and sensing devices used in biomedical applications, it is essential that measurements of the performance of novel devices accurately account for tissue optical properties and composition in a quantitative manner. It is also important that phantoms themselves be quantitively tested and produced in a manner that ensures reproducible test results over time. Currently, there is a lack of phantoms to support pre-clinical testing of many optical imaging devices.

The proposed IUCRC will seek to improve innovation in optical medical imaging devices

through research and development of state of the art, high-quality dynamic tissue-mimicking phantoms, as well as testing and curating these phantoms through industry-academic partnerships.

Research, development and validation of pre-competitive tissue-mimicking phantoms is intended to enable pre-clinical testing of innovative medical devices under different physiologically relevant conditions in a consistent manner including, but not limited to, variation in skin pigmentation, blood flow and oxygenation, shape and size of different target organs, and tissue composition.

Strong partnerships among academic scientists and government and industry partners to research and develop high-quality phantoms may help to accelerate medical product development through the public sharing of tools and approaches to assess their safety and performance.

Both the NIBIB (at the NIH) and the CDRH (at the FDA) have extensive experience in research, development, and support of biomimicking optical phantoms. Examples of previously developed phantoms can be found on FDA/CDRH's Catalog of Regulatory Science Tools. The NIBIB is currently supporting the NIST/NIBIB Medical Imaging Phantom Lending Library through which physical phantom samples are made available to the medical device development community.

Under a partnership agreement among NSF, NIBIB and FDA/CDRH, NIBIB may present and receive information and views on behalf of NIBIB to the NSF-funded IUCRC. In addition, FDA/CDRH will provide insight into the potential applicability of the phantoms to medical device development.

The proposed IUCRC will share with NIBIB and FDA/CDRH their expertise, best practices, and methodologies for phantom manufacturing. Upon completion of projects, the phantoms may be eligible, with proper validation and verification by NIBIB's National Phantom Library, for entry into this phantom library for distribution to the scientific community.

With this DCL, NSF is encouraging submissions of proposals in response to the IUCRC program solicitation. NSF plans to fund a single IUCRC to form a Phase I Center.

Background information on IUCRCs, webinars, and other relevant information can be found at https://iucrc.nsf.gov/universities/solicitation.

PROCESS

Submissions should follow the requirements and adhere to the due dates posted in the IUCRC solicitation. Proposals that are considered for co-funding by NIBIB may be shared with NIBIB staff to assess alignment with NIBIB's research interests, and the unattributed reviews and panel summaries for those proposals may also be shared with NIBIB staff. A

proposer to the NSF IUCRC solicitation does not need to take any additional steps to be considered for co-funding by NIBIB.

SUBMISSION INFORMATION

See the IUCRC program solicitation for more details and submission due dates.

POINT OF CONTACT

To discuss this opportunity, please contact Dr. Prakash Balan (pbalan@nsf.gov) or Dr. Seetha Raghavan (seraghav@nsf.gov) in the NSF Directorate for Engineering.

Sincerely,

Susan Margulies, Assistant Director
Directorate for Engineering (ENG)