



NATIONAL SCIENCE FOUNDATION
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NSF 16-016

Dear Colleague Letter: Submission of proposals to NSF programs that address the interdisciplinary topic of theoretical physics approaches to cancer biology

October 26, 2015

Dear Colleague:

The field of cancer biology is one that has been dominated, historically, by researchers with classical training in the basic and clinical life sciences. More recently, the field has expanded to include physical and engineering scientists, whose background and expertise are complementary to those possessed by life scientists, leading to the recognition that significant advancements in the fundamental understanding of cancer diseases are possible through multidisciplinary research that involves experts in physics, chemistry, applied mathematics, materials science, and engineering disciplines.

Emerging and burgeoning opportunities for collaborative research using theoretical physical approaches to the life sciences have been identified through several NSF workshops (<http://physicsoflivingsystems.org/>) over the past few years, such as *Physics of Cancer Metastasis Workshop* in 2010, *Physics and Cancer II: Theoretical Foundations of Drug and Immune Resistance in Cancer* in 2012, *Kavli Institute for Theoretical Physics" Physics and Mathematics of Cancer* in 2012, and *Physical Principles of Human Cancer Imaging*, in 2013. In addition, the National Academies has conducted and published similar studies, including those entitled "Research at the Intersection of the Physical and Life Sciences" (http://books.nap.edu/catalog.php?record_id=12809), "A New Biology for the 21st Century" (http://www.nap.edu/catalog.php?record_id=12764), and "Inspired by Biology: From Molecules to Materials to Machines" (http://www.nap.edu/catalog.php?record_id=12159). In summary, significant advances may be expected as the result of continued investments in inter- and multi-disciplinary research at the intersection of the physical sciences and the life sciences with a focus on advancing the fundamental understanding of cancer biology to underpin translational research that promotes the prevention, detection, and treatment of cancer diseases. In that respect, theoretical physics is expected to bring a fundamental conceptual framework to the life sciences.

The Physics Division, through the Physics of Living Systems program, accepts and reviews investigator-initiated proposals on the interdisciplinary topic of theoretical physics in cancer biology. Proposals may involve joint efforts between investigators from theoretical physics and researchers from the biomedical community, although the focus of the project must be on the role that physics plays in the effort. To capitalize on this cross-disciplinary potential the National Cancer Institute (NCI) will consider contributing to funding of proposals at this interface. The Physics Division will provide the NCI the opportunity to look at proposals that are submitted and unattributed reviews of these proposals in order to reach a decision on whether or not to provide this joint support.

Proposals should be submitted to the Physics of Living Systems program in the Physics Division in response to NSF 15-579 http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf15579. The scope of submitted proposals should be commensurate with that which is typical for proposals entertained by

these programs involving a single Principal Investigator (PI) or multiple investigators. Merit review of submitted proposals will follow standard NSF practices and procedures.

The primary contact for this activity within the Physics Division is:

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Sincerely,

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