Hosted by the NSF-CREST Center for Cellular and Biomolecular Machines
&
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Professor Dennis E. Discher

Robert D. Bent Chaired Professor
Director of National Cancer Institute - Physical Sciences Oncology Center
University of Pennsylvania, Philadelphia, PA

Friday, October 12, 2018

9:15 AM - 10:15 AM, SE2-224

"From Macrophage Attack of Solid Tumors to Matrix Elasticity Effects in Differentiation"

Macrophages are motile immune cells that attack foreign microbes as well as implanted materials, but they fail to eradicate tumors in part because tumors arise from "self." We describe an approach to overcome the latter issue, but further show that macrophages mechanosense the stiffness of their tissue and tumor micro-environments which affects their function. A "use it or lose it" mathematical model will be shown to capture some aspects of matrix elasticity effects on differentiation of macrophages, stem cells, and embryonic cardiomyocytes. Physics, materials, and mathematics approaches all help to deepen the understanding (and application) of the basic biological processes.

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DISCHER BIO

Discher began at Penn in 1996, and is a member of the US National Academy of Engineering, the US National Academy of Medicine, and the American Association for the Advancement of Science. His lab focused first on physics of cell membranes and then discovered matrix elasticity effects on stem cell differentiation and the nucleus, but recent efforts are now mostly on (i) mechanobiology of DNA damage and genome variation in cancer and development, and (ii) macrophage engineering to attack solid tumors. He earned his PhD from UC Berkeley & UC San Francisco in membrane biophysics and splicing biochemistry, was an NSF International Fellow in computational biophysics at University of British Columbia & Simon Fraser University, and holds appointments at Penn in Engineering & Applied Science as well as Graduate Groups in Physics and Pharmacology. Additional honors and service include the Friedrich Wilhelm Bessel Award from the Humboldt Foundation of Germany, past Chair of the NIH Gene & Drug Delivery Study Section, and member of the Editorial Board of *Science*.

coffee & tea served

For more information, contact CCBM Executive Director, Carrie Kouadio
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