Unraveling the Complex Heterogeneity of Mitochondrial Function Using High-throughput Single Cell Imaging
August 6, 2018 | 11:45 AM-12:45 PM
Li Ka Shing Learning and Knowledge Center, Room #120

Diseases which affect mitochondria are a major cause of pediatric disease, yet our understanding of their mechanisms is incomplete. Until now, methods for assessment of mitochondrial function have required either isolating mitochondria, thus disrupting cell architecture and signaling pathways, or using fluorescent indicators in intact cells, which average measurements over an entire population of cells, eliminating the ability to distinguish cell-to-cell heterogeneity and risking the loss of information. To address this limitation, Dr. Daniel Bernstein and his research team have developed a high-throughput imaging platform that allows them to assess mitochondrial structure and function in individual live cells in real-time, as well as in individual mitochondrial within a single cell. They have uncovered dramatic alterations in mitochondrial function during stress that have been totally missed using prior imaging methods that rely on averaging cell populations. This platform will be useful for the study of myriad diseases where cell heterogeneity may play an important role.

SPEAKER
DANIEL BERNSTEIN, MD
Dr. Bernstein is the Alfred Woodley Salter and Mabel G. Salter Endowed Professor of Pediatrics and the Associate Dean for Medical Student Curriculum and Scholarship at the Stanford School of Medicine. His recent work has focused on the connection between β-adrenergic receptors and mitochondrial function and dynamics, and on the molecular mechanisms of right ventricular failure, a critical issue for children with congenital heart disease. He currently is co-PI on Stanford’s NIH/NIAID-funded CTOT multi-center clinical research program, conducting a multi-center clinical trial on biomarkers for post-transplant lymphoproliferative disorders in children. Dr. Bernstein is a recipient of several CHRI awards and serves as a review panel chair for one of the funding programs.

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