

Science at the Edge Seminar Series

**Quantitative Biology Graduate Program/
Gene Expression in Development and Disease**

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Biosignatures Discovery for Human Health

Everyone has the goal of living a long, healthy life. Our society aspires to chronic health. Biosignatures would foster a dramatically new health care system: one that focuses on keeping healthy people healthy and reducing the time sick people spend in hospitals and in clinical care. The goal is to enable the prediction of disease risk-vectors and the prevention of disease, with pre-symptomatic diagnosis and interventional therapeutic treatment of individuals based upon their personal biosignature – all the information about an individual (genomic, proteomic, cellomic, imaging, behavior, and other information) that enables prediction of disease predisposition and future health status.

This presentation will address the key challenges to discovering and implementing biosignatures in a nation-wide health care program. Specifics will be provided on single-cell biosignatures, including the quantification of physiological and morphological manifestation of underlying gene and protein alterations in disease. Novel technologies presented include 3D single-cell optical computed tomography, the Cell-CT, and a high-throughput microfluidic array for single-cell metabolic measurements, the Cellarium. Examples will be provided for lung cancer and esophageal cancer. Successful implementation of biosignatures in a nation-wide health care program will require high-throughput automation for biosignature discovery, clinical validation, standardization, and qualification for use in pre-symptomatic diagnoses, drug development research, commercialization, and patient management for healthy patient outcomes.

Friday, December 11, 2015 at 11:30a.m.

Room 1400 BPS

Refreshments at 11:15