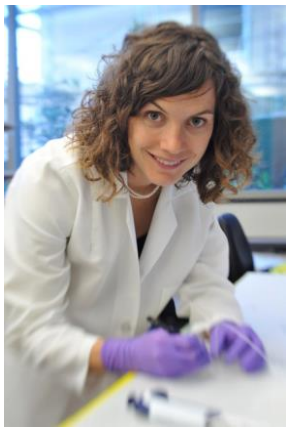
UCLA Engineering
HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

BIOENGINEERING

PRESENTS

Cancer cell mechanotype: from screening to disease biophysics



THURSDAY, JANUARY 26, 2017
12:00 – 1:00 PM
2101 ENGINEERING V

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ABSTRACT:

Cell mechanical phenotype, or 'mechanotype', determines how physical stresses are transduced into the cell, and can also signal a transformation in a cell's physiological state, such as in malignant transformation. However, the molecules that regulate cell mechanotype, and the functional consequences in disease progression remain poorly understood. If we could obtain higher throughput measurements of cell mechanotype, this would enable a deeper understanding of the molecular origins of cell mechanotype, as well as screening based on mechanotype. To address these needs, we invented a higher throughput mechanotyping platform that is based on microfluidic and microfiltration technologies. I will discuss how we are applying our mechanotyping methods to screen panels of ovarian, breast, and pancreatic cancer cells. One specific example application is our discovery that stress hormones, which promote metastasis in mice, also elicit changes in cell mechanical properties: we find that breast cancer cells treated with isoproterenol become stiffer due to actin remodeling, myosin II activity, and increased calcium. Using assays to measure cell invasion through in vitro protein networks, we found that these stiffer isoproterenol-treated breast cancer cells are more invasive. Taken together, our results provide fundamental insight into how the mechanical phenotype of cancer cells is associated with their functional behavior.

BIOGRAPHY:

Dr. Amy Rowat is an Assistant Professor of Integrative Biology and Physiology at the University of California, Los Angeles. She is also a member of the UCLA Center for Biological Physics, Jonsson Comprehensive Cancer Center, Broad Stem Cell Research Center, and Bioengineering Department. Rowat holds degrees from Mount Allison University (B.Sc. Honours Physics, 1998; B.A. Asian Studies, French, & Math, 1999), the Technical University of Denmark (M.Sc. Chemistry, 2000), and the University of Southern Denmark (Ph.D. Physics, 2005). She was a postdoctoral fellow in the Department of Physics/ Division of Engineering & Applied Science, Harvard University as well as Brigham Women's Hospital/ Harvard Medical School. She is the recipient of numerous awards and honors, such as the prestigious National Science Foundation CAREER development award, and has authored over 40 peer-reviewed publications and 4 patents.