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SEMINAR ANNOUNCEMENT

SPEAKER: Professor Nathan Sniadecki
Mechanical Engineering
University of Washington
Seattle, Washington

TOPIC: Cell Mechanics, Mechanotransduction, and Mechanical Signatures

DATE: Tuesday, October 6, 2009

TIME: 3:30 p.m.

PLACE: 138 DeBartolo Hall

Abstract

Cells are sensitive to mechanical factors such as adhesivity, stiffness, stresses, strains, and boundary conditions. Recent findings have implicated that these factors can affect cells in a physiological and pathological manner. It is important to understand how cells sense and respond to mechanical factors, but it has been difficult to characterize cell mechanics and mechanotransduction thus far because of shortcomings in the current techniques to characterize cells at the micro- and nano-scale. In my presentation, I will discuss the engineering approaches we are using to make precision measurements of cellular forces and to control mechanical factors in our microdevices. We focus our studies on cells in the cardiovascular system and are specifically interested in the role that mechanical factors play in hemostasis, thrombosis, and atherosclerosis. One of our goals is to detect and identify the mechanical signatures that cells make with their actin-myosin forces. We use 1) micro- and nano-fabricated arrays of flexible post force-sensors to measure and apply forces, 2) bio-functional materials to control the physiochemical presentation to cells, and 3) computational approaches for image analysis and cell mechanics models. Together these engineering approaches help to advance a pathway towards understanding how cells operate in a physical world and how detection of mechanical changes can be early indicators of pathological conditions.