

Hosted by the NSF-CREST Center for Cellular and Biomolecular Machines

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NSF STC Center for Engineering MechanoBiology

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ASSOIAN LAB

My laboratory is interested in understanding how extracellular microenvironments regulate cell function. Within this broad area, we study how information encoded within the composition and stiffness of the extracellular matrix (ECM) is transduced into the cell to regulate cellular decisions and fate. We showed that cell adhesion to substratum controls the cell cycle, and over the next years we contributed significantly to the elucidation of ECM-integrin signaling pathways that regulate the G1 phase cyclin-cdk network, an area we continue to study today. During the past several years, I have placed an increasing emphasis on mechanisms of ECM remodeling and the consequence for mechanotransduction. Our work concentrates on vascular smooth muscle cells in aging and cardiovascular disease. We have developed in vitro systems and mouse models that can assess the importance of changes in ECM and tissue stiffness for smooth muscle cell proliferation, motility, survival and differentiation. We use biochemistry, molecular biology, genomics/proteomics, and mouse genetics to establish causal relationships between ECM remodeling, stiffness signaling and cell function. Our biomechanics methods include deformable substrata, micropatterning/microcontact printing, atomic force microscopy and pressure myography. Our in vivo work focuses on arterial stiffening with age, vascular injury, and atherosclerosis.



2:00 PM - 3:00 PM

Career Pathways Student Session

This informal Q&A session will inform students about the range of careers relevant to mechanobiology. I will outline the developing program in the CEMB that is preparing trainees for career opportunities in start-ups and biotech. Career paths in teaching and research can also be discussed, depending on the interests of the group.

3:00 PM - 3:45 PM

NSF STC Center for Engineering MechanoBiology (CEMB)

The CEMB is an NSF Science and Technology Center network. We are a multi-institutional center with a mission to study the role of forces in biology. Our work covers a range of length scales from molecules to cells to tissues. We also incorporate computation and modeling. Finally, we study both animal and plants and are very interested in identifying mechanically common principles working in the two kingdoms. CEMB has a highly interactive faculty with opportunities for interdisciplinary and cross-institution collaborations.

3:45 PM - 4:15 PM

Graduate Study at CEMB Universities (including Penn & WashU)

The CEMB supports graduate study at all of our institutions. Study for the PhD is available in several engineering disciplines and several biological/biomedical disciplines. We are not directly engaged in the admissions process, but students apply to individual programs and should state their potential interest in the CEMB. CEMB graduate trainees are brought into our program after they have joined one of the CEMB PI laboratories. The opportunities for interdisciplinary and collaborative study in mechanobiology are unrivaled.

CEMB Research Experiences for Undergraduates (REU) Program

The CEMB offers a 10-week REU program at Penn and Washington University St. Louis each summer. Participating laboratories have active research programs across the spectrum of mechanobiology, from computation/modeling to engineering to biology. Additionally, REU students participate in a summer boot-camp designed to give everyone a common scientific background and language. In addition to the research experience, these REU programs allow students to explore a new part of the country, particularly in Philadelphia, with its easy access to New York and Washington, DC.

PIZZA PROVIDED @ 3:45 PM

COFFEE & TEA AVAILABLE FOR ATTENDEES, ALL SESSIONS

Friday, October 12, 2018 - SSB 130

For more information, contact CCBM Executive Director, Carrie Kouadio

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