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BIOENGINEERING

PRESENTS

Using light to measure the mechanical behavior of tissue

THURSDAY, MAY 4, 2017
12:00 – 1:00 PM
2101 ENGINEERING V

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ABSTRACT:

Understanding the mechanical behavior of biological materials is immensely complex due to the heterogeneity of the architecture at both the nano- and microscale. For example, in a tissue slice, cells are connected by the extracellular matrix (ECM). While it is clear that the ECM and the cells have different stiffness values, recent results show an inter-dependence between the two systems. However, it is not clear if the cells change in response to changes in ECM stiffness or vice versa. The nature of this dependence is of particular importance in tissue where the structure and mechanical properties directly determine the physiological behavior. Therefore, understanding the cause and effect has the potential to inform treatment; for example, understanding resistance to therapies, organ rejection, and disease progression. However, measuring the sample stiffness in unprocessed tissue is a particularly complex task. We have recently demonstrated a fully integrated polarimetric elastography instrument for characterizing the mechanical properties of visco-elastic materials, including tissue. This portable system shows promise for rapid testing and characterization of animal and human tissue samples, enabling numerous types of research investigations.

BIOGRAPHY:

Dr. Andrea Armani received her BA in physics from the University of Chicago and her PhD in applied physics with a minor in biology from the California Institute of Technology. She is currently the Fluor Early Career Chair in Engineering and an Associate Professor of Chemical Engineering and Materials Science at the University of Southern California. She is a Topical Editor of Optics Letters, and a senior member of IEEE, OSA, and SPIE. She has received several awards, including the ONR Young Investigator Award, the PECASE, and the NIH Director's New Innovator Award, and she was named a Young Global Leader by the World Economic Forum.