

# **CARNEGIE MELLON UNIVERSITY**

## **BME 2021 SPRING SEMINAR SERIES**

### **TSTRUCTURE-FUNCTION CORRELATION OF SOFT TISSUES: A MECHANICS AND MATERIALS PERSPECTIVE**



#### **PRESENTED BY**

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#### **SCHEDULE**

**Thursday,  
May 6, 2021  
(10:45AM-11:45AM)**

The highly complex, hierarchical nature of biological materials lend to their unique functions. In evaluating the changes of mechanical properties of these materials, it is critical to characterize the resulting changes in tissue microstructure at each length scale.

Changes in the microenvironment of biological systems have immense potential in altering its intended function at the macroscale level. Williams team is working toward answering the following research questions: “Is it feasible to quantify soft tissue damage at multiple length scales and target processes where there is irreversible repair? and Can we correlate biological tissue irreversible repair threshold levels with mechanical insult to understand the ‘real time’ physiological responses of the microenvironment to damage while engaging the macroscale system?” Williams Tissue Mechanics, Microstructure, and Modeling (TM3) group initial approach to these questions came by studying simplified systems such as the parallel fibered composite structures of muscle and tendon. They have moved toward increased complexity by correlating structure and function in organs-- brain, liver and lungs. This length scale approach to studying the mechanics and damage in biological materials can provide an in-depth assessment, which may inform the development of diagnostics and therapeutics as well as aid in and the design of safety countermeasures.



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