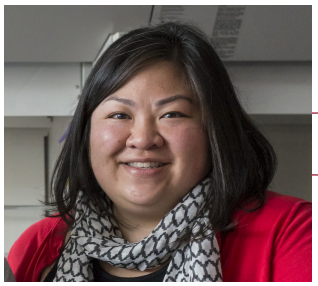
Stephenson School of Biomedical Engineering Seminar Series Presents

SPATIALLY ORGANIZED BIOMATERIALS TO DIRECT OSTEOCHONDRAL TISSUE REGENERATION



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Friday, Oct. 1, 2021 | 1:30 p.m.

zoom
Meeting ID: 964 0790 5078
Passcode: 37917981

ABSTRACT

Biological tissues are complex composite materials where the spatial arrangement of multiple extracellular matrix (ECM) components is intimately linked to tissue function. Disrupting this organization affects normal tissue properties, even if the overall composition remains the same. For example, the osteochondral interface between bone and cartilage contains biochemical, structural, and mechanical gradients that are critical for load transfer and joint movement. Current techniques to repair this tissue typically result in poorly organized tissues that fail to restore biomechanical function. Inspired by native tissues, the Chow Lab focuses on developing strategies to combine and organize multiple bioactive components within a continuous biomaterial. Our overarching goal is to fabricate scaffolds that direct heterogeneous tissue formation and organization, leading to engineered constructs with properties that more closely match their native counterparts. To achieve this, we developed a versatile biomaterials-based platform where end-functionalized polymer conjugates are 3D printed into user-defined patterns. The conjugate's functional groups (i.e., peptides, bioorthogonal chemistries) become displayed on the surface during fabrication to generate functionalized scaffolds in a single step. Multiple chemistries can therefore be spatially organized within a continuous material using different conjugates and multiple printer heads. In parallel, scaffold architecture can be independently and simultaneously controlled by changing the print pattern. This seminar will describe our platform and discuss how we are using this modular strategy to fabricate scaffolds to regenerate osteochondral tissues.

BIO

Dr. Lesley Chow is a Frank Hook Assistant Professor jointly appointed in the Departments of Materials Science and Engineering and Bioengineering at Lehigh University. She leads the Modular Biomaterials Laboratory, which focuses on developing molecular building blocks to construct multicomponent materials for tissue regeneration. She has received several awards for her scholarship, teaching, and service, including the Harold Chambers Junior Professorship, NSF CAREER Award, Rossin Award for Equity, Inclusion, and Diversity, and the Early-Career Undergraduate Research Mentoring Award (ECURMA) by the Engineering Division of the Council on Undergraduate Research (CUR). She joined Lehigh following her postdoctoral training at Imperial College London in the Departments of Materials and Bioengineering. She received her B.S. in Materials Science and Engineering from the University of Florida and her Ph.D. in Materials Science and Engineering from Northwestern University.