Joint Department of

# BIOMEDICAL ENGINEERING

UNC CHAPEL HILL | NC STATE UNIVERSITY

**Coulter Seminar Series Presents**

# "Spatially Functionalized Biomaterials to Direct Tissue Regeneration"


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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 was recently appointed to the Harold Chambers Junior Professorship in 2019 and received the NSF CAREER Award in 2020. 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.

## 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 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 normal load transfer and joint movement. Current techniques to repair this tissue typically result in poorly organized tissues that fail to restore long-term tissue function. Inspired by native tissues, our lab focuses on developing strategies to localize 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 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 presented 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 approach to fabricate scaffolds to regenerate osteochondral tissues.


**Friday, March 26th**
**12:00 Noon**

Seminar will be presented virtually via Zoom:
https://go.unc.edu/j5W3E