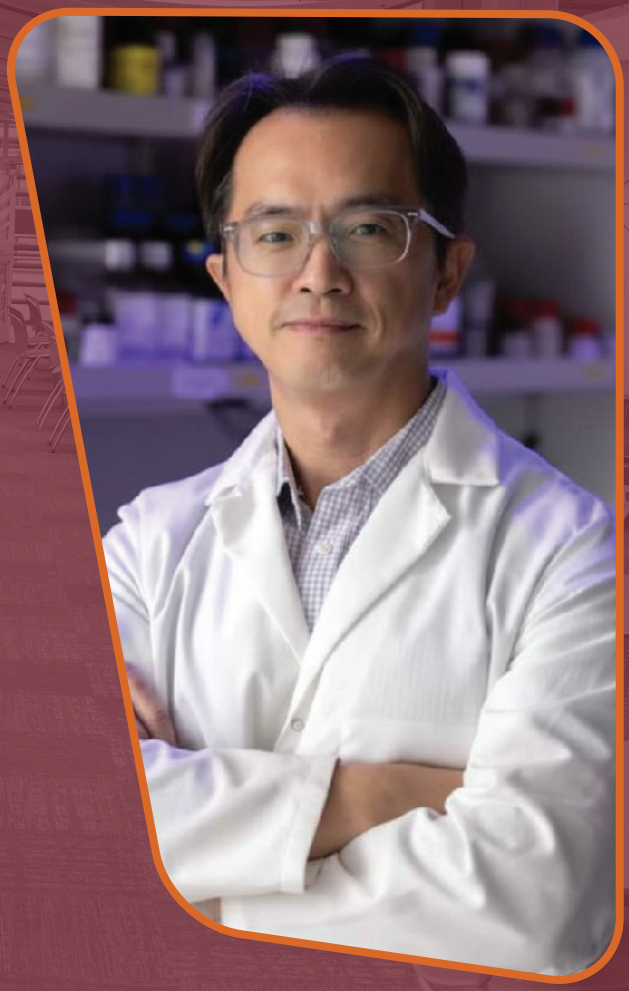
CHEMICAL & BIOMEDICAL ENGINEERING GRAD STUDENT SEMINAR

Dynamic PEG Hydrogels: From Molecular Design to Organoids and Engineered Tissues

Friday, October 16
11:00 AM
COE B221



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ABSTRACT: Poly(ethylene glycol) (PEG)-based hydrogels are powerful platforms for engineering cell-instructive microenvironments, yet their adoption is often limited by complex, lengthy, and solvent-intensive macromer synthesis. In this seminar, I will discuss our efforts to simplify the preparation of PEG-norbornene (PEGNB) without compromising the rapid, tunable network crosslinking, and cytocompatibility that make click hydrogels attractive for cell manufacturing, organoid engineering, and controlled delivery. Our early work established thiol-norbornene photopolymerization as a cytocompatible step-growth strategy that rapidly forms well-defined PEG networks, supports encapsulation of sensitive cells, and enables enzymatic recovery of functional multicellular spheroids. Systematic studies then revealed how network connectivity, crosslinker chemistry, peptide sequence, pH, and ester hydrolysis govern degradation, providing design rules for tunable gel degradation. Building on these principles, we replaced pungent norbornene acid and multistep organic synthesis with carbic anhydride-based routes that shortened reaction time, reduced hazardous solvent use, and ultimately enabled aqueous and microwave-assisted synthesis.

This event is sponsored by FAMU-FSU College of Engineering and Department of Chemical & Biomedical Engineering

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