

第 76 回「工学とバイオ」セミナー  
76th Engineering in Medicine and Biology Seminar

**Dr. Yubing Sun**

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University of Massachusetts Amherst

**Engineered Systems for Understanding  
Neurodevelopment**

**Date:** June 17<sup>th</sup> (Tue), 2025

**Time:** 2:00 – 3:00 PM

**Room:** As313



**Abstract**

Biological systems are complex, autonomous, and deeply coupled, making it challenging to tease out the key regulators of biological processes. Designing engineered systems that precisely control the mechanical and biochemical microenvironment of cells and tissues offers unique opportunities to study fundamental cell biology and create physiologically relevant models. In this talk, I will present our recent work in modeling human neurodevelopment using engineered 2D and 3D models. I will first discuss how mechanical cues, including matrix stiffness and geometrical constraints regulate human pluripotent stem cell differentiation and cell fate patterning. Next, I will discuss our recently developed engineered systems that regulate reaction-diffusion of endogenous and exogenous morphogens, enabling cell fate patterning and regionalization in both 2D neuroectoderm microtissues and 3D neural organoids.

**Short Bio**

Yubing Sun is an Associate Professor in the Department of Mechanical and Industrial Engineering at the University of Massachusetts Amherst, with an adjunct appointment in the Department of Biomedical Engineering. He received his Ph.D. degree from the Department of Mechanical Engineering at the University of Michigan, Ann Arbor in 2015, and his B.S. degree in Materials Science and Engineering from the University of Science and Technology of China. Dr. Sun has been recognized by NIH-NIGMS MIRA Award, NSF CAREER Award and Outstanding Junior Faculty Award at UMass. His current research interests include neural organoid engineering, stem cell biology, mechanobiology, cell migration, lab-on-chip, and biosensing.

Host: Yoshiho Ikeuchi

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