

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Aiiso Yufeng Li Family Department of
Chemical and Nano Engineering

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DEPARTMENT SEMINAR

Wednesday, October 2nd, 2024

11:00 AM - 12:00 PM

SME 248



Dr. Mark Skylar-Scott, PhD

“Scaling up 3D bioprinting towards whole organ engineering”

Assistant Professor

Bioengineering

Stanford University

Abstract: Heart failure is a major cause of death in the United States, and challenges in sourcing Biomanufacturing a de novo whole human organs on demand offers a tantalizing future without donor organ shortages or the need for lifelong immunosuppression. Despite this enormous potential, tissue engineering has struggled to reproduce human scale solid organs with the requisite cell number, cellular density, micro- and macroarchitecture, and vasculature necessary to reproduce physiological function. In this talk, I will highlight recent advances in bioprinting that are unlocking the third dimension of tissue engineering, enabling tissues that are thick, viable, and replete with vascular networks. Finally, I will describe our efforts towards scaling up cell and organoid production in automated liter-scale bioreactors and their rheological behavior when these organoids are compacted into a printable paste. This large-scale cell manufacturing, bioprinting, and tissue vascularization offers a pathway towards organ-scale production of tissue.

Bio: Mark Skylar-Scott is an Assistant Professor of Bioengineering at Stanford, a member of the Basic Science and Engineering Initiative at the Children’s Heart Center and a Chan-Zuckerberg Biohub Investigator. His laboratory focuses on the scaling-up of 3D bioprinting technologies with applications in cardiac tissue engineering to cure congenital heart defects. His approaches emphasize scaling stem cell production and differentiation and tissue vascularization and maturation to bring tissue engineering from microscopic tissues in the Petri dish towards kilograms of viable and functional organs. He has received the NIH Director’s New Innovator Award and an ARPA-H Award to support the development of new 3D printing hardware, wetware, and software to accelerate cardiovascular tissue engineering.

Seminar Host: Shaochen Chen