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PRECISE MANUFACTURING OF MULTI-LINEAGE TISSUES BY INTEGRATING SYNTHETIC CELL RECEPTORS, PATTERNED BIOMATERIALS, AND ORGANOIDS

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Abstract: The fundamental goal of tissue engineering is to design and spatially control the patterning of gene expression, cell architecture, and matrix composition within multi-cellular constructs. Two approaches for achieving this today are: (1) Scaffold-based tissue engineering, which can control cell architecture but cannot drive complex multi-lineage differentiation; and (2) Organoid technologies, which can generate multi-lineage tissues with advanced maturity but with highly unpredictable architecture. To overcome these limitations, our group is developing new approaches for precisely engineering multi-lineage tissues by integrating synthetic cell receptors, spatially patterned biomaterials, organoids, and microfabricated culture devices.

Bio: Megan L. McCain, PhD, is the PI of the Laboratory for Living Systems Engineering, a research group that develops and integrates tunable biomaterials, microfabrication technologies, and human cells to engineer “Organ on Chip” models of healthy and diseased tissues, with a focus on muscle. Megan has been recognized as a NSF CAREER Awardee, a BMES Young Innovator of Cellular and Molecular Bioengineering, and a Fellow of AIMBE. She received her PhD and postdoctoral training in Engineering Sciences from Harvard University and the Wyss Institute for Biologically Inspired Engineering.