DISTINGUISHED LECTURE in BIOLOGICAL ENGINEERING

“Engineering 3D Culture Models of Physiology and Disease: How Simple is Complex Enough?”

Monday, January 21, 2019, 12h15
EPFL – room SV1717

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Host: Prof. Andy Oates

Abstract:
Multicellular ecosystems such as biofilms, tissues, and whole organisms operate as highly integrated systems that link physical structure and biological function. In mammalian tissues, structure determines the effectiveness by which muscles generate force, lungs oxygenate blood, or glandular organs produce bile, milk, or saliva. Even at the level of single cells, tissue structure constrains how cells interact with surrounding extracellular matrix, neighboring cells, and physical forces, and these “microenvironmental” cues in turn regulate cell function at a fundamental level. Here, I will describe our efforts to design and generate functional tissue architectures most relevant to the cardiovascular system, using a variety of fabrication and cell-driven assembly approaches. We will present ongoing efforts to build \textit{in vitro} organotypic models that mimic native tissue functions, studies to examine integration of engineered structures \textit{in vivo}, and discuss opportunities and challenges for how to connect these insights to the ultimate translational objectives set by regenerative medicine.

Sandwiches will be provided

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