

Cell-based Systems, Bio-fabrication, and Cellular Machines

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Abstract

Development of increasingly complex cellular systems will be a major challenge for the next decade and beyond, as we use the knowledge gained from the sub-disciplines of tissue engineering, synthetic biology, micro-fabrication and nanotechnology, systems biology, and developmental biology. In this presentation, we will describe the current state-of-the-art in the context of cellular synthetic biology, cellular differentiation, 3-d printing and biofabrication, and the possibilities of combining multiple cell types to produce greater functionality. As these “biological machines” increase in capabilities, exhibit emergent behavior, and potentially reveal the ability for self-assembly, self-repair, and even self-replication, questions arise regarding the ethical implications of this work. Future prospects as well as ways of addressing these complex ethical questions will be addressed.