CARNEGIE MELLON UNIVERSITY
BME 2020 SUMMER SEMINAR SERIES

Cell Signaling and Engineering its Spatial Control

PRESENTED BY

Phil Campbell Ph.D.
Research Professor
Biomedical Engineering,
Engineering Research Accelerator,
Biological Sciences, and Materials
Science & Engineering
Carnegie Mellon University

SCHEDULE

Tuesday, July 21 2020
(9:00 AM-10:00AM)

Cell-to-cell communication begins after the first mitotic division of a fertilized ovum, continues during embryonic development, then over the lifetime of the individual. Presentation of cell signaling molecules into specific patterns insures spatial control of cell fates resulting in the formation of anatomically correct tissues and organs, and is essential in both health and disease. Engineering spatial control strategies is extremely challenging, especially with regard to soluble, diffusible signaling molecules. However, in nature signaling molecules also occur in immobilized, stable patterns within the extracellular environment. Here, I will present bioprinting-based engineering approaches toward recapitulating persistent biological relevant cell signaling patterns. Development and implementation of these approaches includes maintaining and rigorously assessing their biological and physiological relevance, while also addressing practical issues of reliability, scalability, and delivery. These bioprinting strategies enable the spatial control cell fates in vitro, spatially direct tissue formation in vivo, and provide a path toward translation of engineering spatial control of signaling molecules into practical applications with a particular focus on tissue engineering/regenerative medicine.

BIOMEDICAL ENGINEERING
Carnegie Mellon University