Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Spring 2020 Seminar Series

Engineering the cell-matrix interface—understanding and guiding cell function

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The native extracellular microenvironment is dynamic, as cells synthesize, assemble, and remodel their surroundings during tissue development, injury, and repair. Hydrogels have evolved as valuable tools to both study mechanisms of cell-extracellular matrix (ECM) interactions (e.g., mechanobiology) and to guide desired cell behavior towards the development of new therapies (e.g., tissue repair/regeneration); however, the dynamic nature of the cell-ECM interface has been underappreciated. To address this, we are utilizing metabolic labeling techniques to visualize secreted matrix proteins to better understand how this nascent matrix influences cellular function and we are designing viscoelastic hydrogels that harness dynamic cell-hydrogel interactions. I have used these techniques to explore questions related to cellular mechanosensing in 3D, to better understand the evolution of matrix in modifying the cell-hydrogel interface in the engineering of tissues (e.g., cartilage), and to develop microengineered hydrogel platforms for the culture of organoids (e.g., lung) towards cellular therapies and as in vitro models of tissue repair. Our evolving understanding of this interface will not only open up new avenues for understanding biological mechanisms, but will allow us to design better systems for biomedical therapies.

ABOUT the SPEAKER

Claudia Loebel is currently a postdoctoral fellow in the laboratory of Professor Jason Burdick at the University of Pennsylvania. She obtained her MD (2011) at the Martin-Luther University Halle-Wittenberg in Germany and completed her PhD (2016) at ETH Zurich (Switzerland) under Professor Marcy Zenobi-Wong and the AO Research Institute under Dr. David Eglin. She has been awarded the Silver Medal of ETH and postdoctoral fellowships by the Swiss National Science Foundation and IBSA Foundation. Her research interests are on the development of biomaterial platforms to characterize and uncover the role of nascent microenvironments on cellular function. Her ultimate goal is to work at the interface between bioengineering and fundamental biology to address specific problems related to tissue repair and therapeutic treatment.

Monday, February 24 at noon
1003 Engineering Centers (Tong Auditorium)