

# Biomedical Discussion Group

## Microscale tissue-on-chip technologies: watching biology in high-definition

Wednesday January 17, 2018

2:30 –3:30 pm, Engineering 5 (E5-6006)

Coffee and Timbits available - RSVP required



[Dr. Christopher Moraes](#)

**Canada Research Chair in Advanced Cellular Microenvironments**

**Assistant Professor, Dept. of Chemical Engineering**

**Associate member, Dept. of Biomedical Engineering**

**Goodman Cancer Research Center, McGill University**

**Abstract:** In addition to genes and proteins, physical factors in the microenvironment play a pivotal role in driving cell and tissue function. Ignoring these complex factors in conventional tissue culture systems makes the translational utility of in vitro cultures uncertain. Our lab focuses on reconstructing realistic miniature versions of biological tissues, using a variety of microengineering technologies. These ‘on-a-chip’ systems may

ultimately be used to predict disease progression, stratify patient risk groups, and identify potential therapeutic strategies. More immediately however, the throughput, precision and dimensions of tissues engineered at this length scale provide a remarkable capacity to ‘watch’ biology happen in unique ways. For example, mechanical forces are now known to play a pivotal role in tissue homeostasis and disease progression, but our technical capacity to ‘watch’ mechanics evolve in 3D tissues undergoing complex remodeling is severely limited. In this talk, I will describe recent and ongoing work in which we develop novel strategies to recreate the 3D tissue microenvironment, and construct dynamic ‘maps’ of tissue mechanics during morphogenetic disease programs.

**Biosketch:** Chris Moraes is an Assistant Professor in the Department of Chemical Engineering, Biomedical Engineering, and the Goodman Cancer Center at McGill University; and a Canada Research Chair (II) in Advanced Cellular Microenvironments. He initially trained in nanoengineering, before conducting graduate research in mechanical and biomedical Engineering (U. Toronto), and holding a Banting postdoctoral fellowship at the University of Michigan’s Biointerfaces Institute. His research program makes use of this broad background to study the interface between engineering, biology and medicine, and he is particularly curious about the role microenvironmental biomechanical forces play in driving disease and development. Recent honours include the NSERC Howard Alper postdoctoral prize, and the Leyerle-CIFAR prize for interdisciplinary research.

*Keywords: tissue, cellular microenvironment, microengineering technology, therapeutics, imaging, mechanobiology, drug discovery, next generation screening platforms, biomaterials*



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