



# BiophysTO Lunchtime Seminar Series

## Date

Thursday, Jan 30, 2020  
12:00 – 1:00 pm

## Location

McLennan Physical  
Laboratories  
Room MP606  
60 St. George Street

Pizza and refreshments will  
be provided

## Dr. Jonathan Rocheleau<sup>1,2,3,4</sup>

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University of Toronto; <sup>2</sup>Toronto General Hospital Research  
Institute, University Health Network,  
Toronto; <sup>3</sup>Department of Physiology, University of  
Toronto; <sup>4</sup>The Banting and Best Diabetes Centre,  
University of Toronto

## Islet-on-a-chip provides an optical window into cellular metabolism and insulin secretion

Many labs are actively exploring how beta-cell heterogeneity impacts pancreatic islet glucose-stimulated insulin secretion and type 2 diabetes. In particular, beta-cells show significant metabolic variability, yet how this variability ultimately dictates islet function is unclear. Since beta-cells are electrically coupled to one another, we hypothesize that a small fraction of over-active beta-cells dictate islet secretion and would bury an underlying phenotype that determines progression of the disease. Our goal is to simultaneously assay: (i) beta-cell metabolic heterogeneity using quantitative fluorescence microscopy (e.g. genetically encoded metabolic sensors) and (ii) pancreatic islet function using microfluidic chip fluorescence assays. Islets in our islet-on-a-chip devices are held against a glass coverslip facilitating live cell imaging with controlled non-turbulent laminar flow. My talk will summarize our efforts to build fluorescence sensors into these devices to dynamically assay oxygen consumption rate (OCR) and insulin secretion.

**Host: Wilson Zeng**



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