

# Department of Applied and Computational Mathematics and Statistics Colloquium



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## *Modeling anomalous insulin transport and microtubule dynamics in Beta cells*

In this talk, I will discuss the role of cytoskeletal-mediated transport (by microtubules in particular) in regulating insulin dynamics in pancreatic cells. Due to the increasingly prevalence of diabetes and related disorders, understanding how individual cells regulate insulin availability and secretion in response to glucose stimulation is of utmost importance. In this talk, I will focus on the intra-cellular (rather than systemic) dynamics of insulin granules and will study three distinct but related questions related to its transport. First, I will use computational modeling to investigate how transport influences the spatial localization, and hence availability (for exocytosis) of those granules. Second, I will use quantitative modeling in conjunction image analysis (out of the lab of Irina Kaverina at VU) and parameter estimation to study the nucleation dynamics of Golgi derived microtubules, an understudied population of microtubules that are highly relevant to insulin dynamics. Finally, in light of the observation that insulin motions are strongly anomalous (e.g. not standard diffusion), I will discuss some strange, previously un-observed theoretical consequences of anomalous (Generalized Langevin in particular) particle dynamics in confined domains.

**Monday, September 16, 2019**

**4:30 PM – 5:30 PM**

**127 Hayes-Healy Center**

**Colloquium Tea 4:00 PM to 4:30 PM 101 Crowley Commons Room**