



# Research In Progress Seminar

**Tuesday, November  
1, 2016  
2:00PM**

**Location: The Fishbowl,  
2120 Biological Sciences 3**

## **Speaker:**

Dustin Maurer,  
MCSB PhD Program

## **Talk Title:**

Gene Regulatory Network  
Modeling with Neural  
Network ODEs

## **Abstract:**

Gene regulatory networks (GRNs) have long been sought after descriptions of control systems of cellular processes. Historically, the elucidation of such networks has been reliant on generation or observation of mutant phenotypes. These mutants offer clues about the presence or absence of network connections. However, many key aspects of the network, such as spatial and temporal dynamics as well as quantification of interaction strengths, remain challenging. With the proliferation of high-throughput sequencing technologies, such as RNA-seq, ChIP-seq, and ATAC-seq, we can begin to gain a deeper insight into network interactions as well as make progress towards precisely characterizing interaction strengths. Our work focuses on the development of a pipeline for assimilating relevant high-throughput data into dynamical GRN models that are designed to be predictive, causal, and biophysically mechanistic. The pipeline output includes the most likely interactions to include in the GRN, a meaningful quantification of the sign and magnitude of the interaction as well as predicted consequences of perturbations. Here we present the pipeline and outline its limitations in both sampling frequency and tolerance to noise.

## **Questions:**

Please contact Naomi  
Carreon at:

[ncarreon@uci.edu](mailto:ncarreon@uci.edu) or

Kerrigan Blake at:

[kerrigab@uci.edu](mailto:kerrigab@uci.edu)