



cordially invites you to an

Interdisciplinary Seminar

with

Dr. Nicholas Panchy

on

“Modeling gene expression and regulation in response to light-dark signaling”

Tuesday, January 16, 2018

3:30-5 p.m.

Reception & refreshments at 3 p.m.

Hallam Auditorium, Room 206
1122 Volunteer Boulevard



Dr. Nicholas Panchy (Ph.D. Genetics, Michigan State Univ.) is exploring the role and regulation of intermediate epithelial-to-mesenchymal transition (EMT) cell-types by modeling gene regulatory networks controlling expression across EMT.

Abstract: Although gene expression has been profiled in more than three thousand different species, the analysis of these data remains challenging in part because multiple signals effect gene regulation. In particular, endogenous (circadian) and exogenous (e.g., light-dark) cycles are prominent in biological systems, especially those that undergo photosynthesis. Using expression data from the model green algae *Chlamydomonas reinhardtii*, I found that half of the annotated genes are expressed cyclically in response to light-dark variation by using two different approaches to model cyclic expression. Among these light-dark genes, the timing of peak expression (phase) is both correlated with annotated gene function and evolutionarily constrained between duplicate pairs, indicating this cyclic behavior is biologically significant. However, while I was able to identify cis-regulatory elements that were associated with different phases of light-dark expression, these cis-elements proved to be poor predictors of cyclic expression phase on their own, raising question about the complexity of gene network regulating the timing of expression. It was these questions that ultimately led to my current work studying the timing of events in cell differentiation and regulation of ribosomes by cyclic signals.