

Department of Applied and Computational Mathematics and Statistics Colloquium

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will give a lecture entitled:

*Regulatory genetic oscillators: simple models of synthetic circuits
and circadian clocks*

Abstract

A regulatory network is a set of interacting molecules in a cell. Oscillatory regulatory networks have been discovered in many pathways and are central to phenomena as fundamental as circadian rhythm and cell division. Mathematical modeling helps to reveal the design principles of the oscillatory regulatory networks. Furthermore, it connects the research on regulatory networks with synthetic biology since simple circuits can be implemented experimentally. In this talk, I present a few models and emphasize their distinctions and similarities, both in the design and dynamical characteristics. Thus, I define the principles of designing oscillations with desired characteristics. In one example, I show a new bifurcation scenario for an oscillatory solution that calls for an expansion of bifurcation theory. In another example, I address the question whether relaxation oscillations can be produced by a delay differential equation.



**Monday, November 25, 2013
4:00 p.m. to 5:00 p.m.
127 Hayes-Healy Center**

Colloquium Tea

3:30 p.m. to 4:00 p.m. 154 Hurley Hall