

# UCCS Mathematics

## Colloquium

Thursday February 10<sup>th</sup>, 2011

UC 307

12:30 pm – 1:30 pm

(Refreshments at 12:15 pm)

**Dr Deena Schmidt, Ohio State University**

**Stochasticity and structure in biological systems:**

**from the evolution of gene regulation to sleep-wake dynamics**

Abstract: Stochasticity is fundamental to gene expression and also plays an under-appreciated role in physiological regulation at larger scales, such as the regulation of sleep and wake behavior. In the first part of the talk, I will discuss a probabilistic model for the evolution of gene regulation, looking at how population genetic factors such as mutation and selection influence the rate of this evolutionary process. In the second part, I will talk about modeling the neuronal network structure and stochastic dynamics involved in sleep-wake regulation. I explore these issues using random graph theory, specifically looking at stochastic processes occurring on random graphs, and also by investigating the accuracy of predictions made by deterministic approximations of stochastic processes on networks.

