

UCCS Math Department Math Colloquium Series

Dr. Matthew Johnston
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February 26, 2015
12:30pm-1:30pm
OSB A327

Refreshments at 12:15pm
Students are encouraged to attend



| Recent Results in the Modeling of Chemical Reaction Systems

Abstract: Systems biology attempts to understand the dynamical behavior of complicated biochemical reaction systems by modularizing them into primary functional pathways, such as enzymatic cycles, signaling cascades, and positive/negative feedback loops. The understanding of these recurring motifs---which can be complicated in themselves---has been significantly aided in recent years by the development of Chemical Reaction Network Theory. This area of research aims to relate a system's qualitative behavior to the topology of its reaction network and is often able to give results which are independent of the reaction rate parameters, rate form, and even the underlying modeling choice (e.g. deterministic vs. stochastic). In this talk, I will summarize the state of knowledge at the interface of these areas and present two recent contributions: (1) a new method, called network translation, capable of characterizing the steady states of deterministically-modeled systems; and (2) a new result which gives sufficient conditions for extinction in stochastically-modeled systems.