

TEMPLE UNIVERSITY  
Department of Mathematics

# Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 6 April 2016, 4:00 p.m.

## Insects on Rubber, Dogs on Springs, and Newfangled Neurogenetics in Mice: How do Many-Legged Animals Control Their Locomotion?

by Andrew Spence

Temple University, Department of Bioengineering

### **Abstract.**

One of the grand challenges for modern science is to understand how animals move. Movement results from the dynamic interaction of many complex, nonlinear constituents: the nervous system, muscles, the the body, and an often-unpredictable external environment. Yet many animals move quickly through the environment with stability and economy surpassing our technology. This talk will present three threads of research that seek to understand different aspects of legged lomocotion control: 1) comparative work in insects, dogs, and the XRL robot aimed at understanding both how and why control strategy varies with body morphology, 2) a dynamical systems approach to understanding gait, that aims to understand how the “fine structure” of experimentally observed quadrupedal gait control reflects constraints such as stability, and finally, 3) recent work towards bringing optogenetics to bear on problems in legged locomotion control.