The Math/Stats Colloquium
Department of Mathematics and Statistics
San José State University

Tim Lewis

UC Davis

Limb Coordination in Crustacean Locomotion: Neural Mechanisms and Mechanical Implications

May 09, 2018, MH320

Abstract: Despite the general belief that neural circuits have evolved to optimize behavior, very few studies clearly identify the neural mechanisms underlying optimal behavior. In this talk, I will describe work in which: (1) a computational fluid dynamics model is used to show that the limb coordination during swimming of long-tailed crustaceans (crayfish, shrimp, etc.) is biomechanically optimal, and (2) coupled oscillator theory is used to explain how the structure of the underlying neural circuit robustly gives rise to this optimal limb coordination. This work provides one of the first concrete examples of how an optimal behavior arises from the anatomical structure of a neural circuit.

Background: One course in differential equations.

About the speaker: Tim Lewis is a Professor of Mathematics at UC Davis. His Ph.D. is from the Univ. of Utah, and he previously did a postdoc at the Courant Institute and Center for Neural Science at NYU. His research uses methods from applied mathematics to study Neurobiology and Cardiac Electrophysiology/Pharmacology.

Snacks in MH331B at 2:30 pm
Talk starts at 3:00 pm

For more information, see our full schedule at:

`http://www.math.sjsu.edu/~hsu/colloq/`