New Course Announcement for Autumn 2015
Biology-Inspired Robot Control

ME 599 (3) *graduate level, Offered jointly with AA546 and EE546*

Instructor: Sawyer B. Fuller

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WF 3:30-4:50 pm, room to be announced

Despite decades of advancements in robotics, the capabilities of biological systems remain an elusive performance target. Watch a honeybee land on a flower buffeted by wind using a brain the size of a sesame seed, or a mountain goat navigate a sheer cliff. The dynamic motions and robustness to uncertainty exhibited by these and other animals far exceeds what has been so far achieved by their robotic counterparts.

In this course, students will learn about the latest findings about feedback control in animal motion. These have lead to an emerging, but by no means complete, understanding about how the transformations from sensory input to motor output can produce these capabilities. We will see how these findings, when applied to robots, have led to new insights. In addition to preparing students to pose questions at the cutting edge of robotics, this course will cover analytical concepts, methods, and tools that can be used to answer them.

Topics of particular emphasis will include

- reflexive control architectures

- using "mechanical intelligence" to reduce the burden of feedback control

- biomechanics of animal motion

- tools for modeling biological and robotic systems

This course assumes an undergraduate training in electrical, mechanical, or aerospace engineering, including system dynamics (ME 373 and 374 or equivalent) and control theory (ME471 or equivalent). Topics will be developed through problem sets, demonstrations, assigned readings and presentations of current literature, and analytical, numerical, or experimental semester projects.