PIBBS
PROGRAM IN INTERDISCIPLINARY BIOLOGICAL & BIOMEDICAL SCIENCES

Topics in Interdisciplinary Biology and Biological Sciences (TIBBS)

Wed 3-5:30, Ceria Rm 125

Enroll for credit in the following depts:
CS/591C 004, Stat/579D 004, Math/579D 004, Anthro 560, Bio 503 004

This course presents and discusses recent work in biological science that bridges scientific disciplines, integrates different approaches, and demonstrates the effectiveness of collaborative research. The multiple units in this course will be from Biology, Math and Statistics, Computer Sciences and Electrical and Computer Engineering.

Biology

Felisa Smith

With Marcy Litvak & Will Pockman

Unit 1: Anthropogenic climate shifts from both modern and paleoperspectives

Over the past few decades perceptible changes in a number of temperature and climatic measures have occurred on every continent. A recent meta analysis has elegantly demonstrated that over 50% of species already demonstrate a response. Yet the changes that have already occurred (~1°C over the past 50 years) will be dwarfed by what is expected over the next century (up to 5.8°C). Better predictions of how organisms will respond to climatic fluctuations are urgently needed. Studies have documented the entire gamut of changes possible, including tolerance, local extirpation and range shifts, as well as adaptive changes in genetics and/or morphology. In this unit we will explore the current thought about the evolutionary capability of organisms, using both modern and paleoperspectives. This unit will explore studies conducted at a variety of temporal, spatial and heirarchical levels, which provide an integrated perspective into how organisms may respond to ongoing anthropogenic climate shifts.

Math/Stats & Biology

Helen Wearing

Unit 2: Numb3rs in the real world: Integrating mathematics and biology to understand and predict infectious disease dynamics

Taking influenza as a case study we will consider how mathematical models are being used to help explain patterns of disease spread and evolution, as well as investigate control measures for future outbreaks. The unit will be a mixture of lectures, discussion and a small student group project.

Electrical and Computer Engineering

Vince Calhoun

Unit 3: Functional Imaging of the Brain

In these lectures we will cover basic functional magnetic resonance imaging acquisition, preprocessing, basic analysis, and advanced analysis. Examples of applications will be provided throughout and hopefully we will be able to arrange a tour of the MRI scanner.

Physics and Astronomy

Nitant Kenkre

Unit 4: Theory of Animal Motion and Spread of Epidemics

Description of the motion of animals such as rodents, and of the transmission of infection of epidemics based on such motion will be taught in this unit. Examples of epidemics are the Hantavirus, the West Nile virus and the Plague. A physicist's perspective on these interdisciplinary problems will be explained and tools taught from the ground up. Spatiotemporal patterns in bacteria in a Petri dish, refugia of epidemics in a landscape, and patterns arising from nonlinear competitive interactions will be among the subjects discussed.

For more info, contact PIBBS Co-Director: Professor Felisa Smith at fasmith@unm.edu
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