

Title: Dynamical Models of Neuronal Computation

Instructor: Kevin Lin

Description: This course will survey mathematical models of neurons and networks of neurons, with a focus on how their dynamical behavior enables (or limits) the types of "computations" which may occur in the nervous system. Topics include biophysical and phenomenological models of single neurons, approaches to network modeling, and models of synaptic plasticity and learning. Along the way, we will develop some relevant mathematical and computational tools for analyzing these models.

Prerequisites: Nonlinear dynamics / differential equations, linear algebra, and probability theory at the advanced undergraduate level. No prior knowledge of neurobiology is assumed.

Texts:

Dayan and Abbott, "Theoretical Neuroscience"
Gerstner and Kistler, "Spiking Neuron Models"