G80.3400001 SPECIAL TOPICS: NEURONAL NETWORKS. (Cross-listed from Courant course: G63.2851.001) 3 points. Fall term, 2009 Tuesday, 1:25-3:15, WWH Rm 512. J. Rinzel.

Prerequisite: familiarity with applied differential equations; most neurobiological background will be provided.

This course will involve the formulation and analysis of models for neuronal ensembles and neuronal computations. Spiking and firing rate mechanistic treatments of network dynamics as well as probabilistic behavioral descriptions will be covered. We will consider mechanisms of coupling, synaptic dynamics, rhythmogenesis, synchronization, bistability, adaptation,... Applications will likely include: central pattern generators and frequency control, binocular rivalry, working memory, decision-making and neuroeconomics, feature detection in sensory systems, cortical oscillations (gamma, up-down states,...). Students will undertake computing projects related to the course material: some in homework format and a term project with report and oral presentation.