Fall 2009
Signal Processing in Neural Networks (V80.0302.002)

Faculty: Alex Reyes, Rm 1057 Meyer
Phone: 212 998-3994
reyes@cns.nyu.edu
Office hours: by appointment

Prerequisites:
Students must have taken or are currently taking Cellular and Molecular Neurobiology (V80.0210.001).

Schedule:
All lectures will be held in room 815, Monday 3:30-5:30

Required Materials:
laptop and MatLab (available from NYU Computer store)

Grading:
25% will be based on weekly homework assignments; 75% on oral presentation of a project. Students will develop a computer program that simulates a neural network of their choosing. Students are expected to formulate a hypothesis, perform the appropriate simulations, and analyze/interpret the results.

Course Syllabus

September 14: Introduction
Matlab exercises: basic programming techniques

September 21: Passive Properties of neurons
Matlab exercises: response of parallel resistor and capacitor

September 28: Active Properties of neurons
Matlab exercises: leaky integrate and fire neuron

October 5: Analyses of spike trains
Matlab exercises: development of analyses tools

October 12: Synaptic potentials
Matlab exercises: modeling synaptic inputs with alpha functions

October 19: Society for Neuroscience meeting – no class

October 26: Input barrages I
Matlab exercises: generating presynaptic spike trains

November 2: Input barrages II
Matlab exercises: generating large presynaptic spike trains

November 9: patterned network activity
Matlab exercises: analysis tools for measuring correlation

November 16: Inhibitory neurons
Matlab exercises: modeling inhibitory inputs

November 23: Network architecture I
Matlab exercises: multilayered feedforward networks

November 30: Network architecture II
Matlab exercises: Gaussian distributed connection patterns

December 7: Network architecture III
Matlab exercises: lateral inhibition

December 14: Student presentations I

December 21: Student presentations II