$$\dot{V} = -J - g_{\mathrm{Na}} m^3 h (V - V_{\mathrm{Na}}) - g_{\mathrm{K}} n^4 (V - V_{\mathrm{K}}) - g_{\mathrm{L}} (V - V_{\mathrm{L}}) + \ldots$$

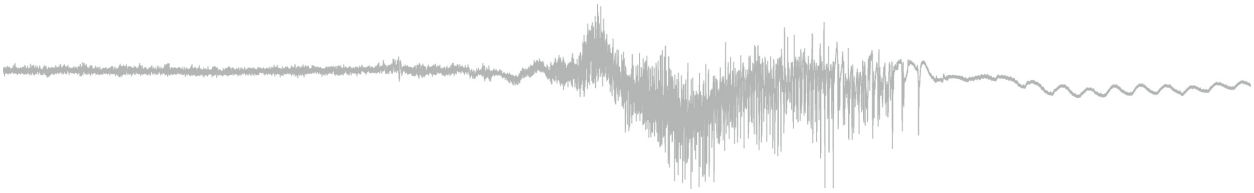
MA665: Introduction to Modeling and Data Analysis in Neuroscience
MA666: Advanced Modeling and Data Analysis in Neuroscience

In this course, we'll use mathematics to address questions like:

How do I quantify the randomness or regularity of neural spiking activity?

How do I analyze rhythmic activity in local field potential recordings or EEG?

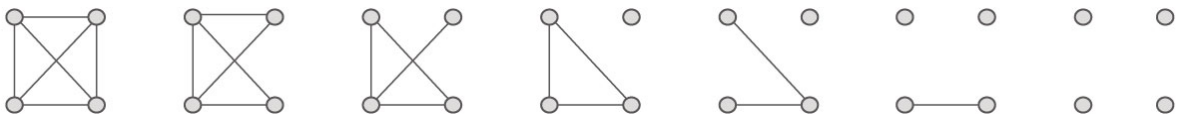
What biophysical mechanisms govern neural rhythms and spiking?



MA665/MA666 are new courses offered by the Department of Mathematics and Statistics. In both courses we will introduce mathematical ideas useful to neuroscience, with a focus on neural voltage activity. Specifically, we will explore action potentials (or spikes) generated by individual neurons and the local field potential or EEG generated by neural populations. To characterize these data sets, we will explore basic data analysis techniques and learn to build mathematical models of the observed activity.

Both MA665 and MA666 are 2-credit courses. MA665 (Introduction) will meet for the first 7 weeks of the semester. The only pre-requisites for this course are graduate standing and calculus. MA666 (Advanced) will meet for the last 7 weeks of the semester, and require the additional pre-requisite of differential equations. The two courses may be taken separately, or sequentially as a 4-credit sequence.

Each week will consist of one classroom lecture and one computer lab. In the computer lab, we will learn to use **MATLAB** and other software to implement the data analysis and modeling techniques described in lecture. Upon finishing the course, you will have developed the basic skills necessary to begin thinking about neuroscience in a mathematical way.



Meeting times: T/Th, 12:30-2 PM
GRS MA665: Sept 4 - Oct 18, 2012 (first 7 weeks)
GRS MA666: Oct 23 - Dec 11, 2012 (last 7 weeks)

Questions: Email Mark Kramer - mak@bu.edu