Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR
4:15pm, Tuesday, December 3, 2013
Sequoia Hall Room 200

Cookies served at 3:45pm, 1st Floor Lounge.

Speaker: Yuval Benjamini, Stanford University

Title: Brain decoding of visual stimuli: A statistical perspective

Abstract:

Brain decoding refers to extracting the experimental stimulus - in our case a natural image (photo) or video - from brain activity. For a subject that watches images or video while being scanned in an function MRI, the goal is to recover what they saw from their brain scans. In other words, can we see what they were seeing?

In the talk, I will discuss the statistical framework we developed for brain decoding of natural visual stimuli. Our decoder combines three sources of information: (a) regression models relating the image or video to the evoked brain activity, (b) the multivariate distribution of the prediction errors from the regressions, and (c) a prior of natural stimuli sampled from public image or video repositories. By combining these sources, the decoder provided remarkable reconstructions of the displayed videos, demonstrating that dynamic brain activity can be decoded using current technology. Still, there is much room for improvement in estimation and in providing inference for decoding.

The work is in collaboration with Bin Yu and the Gallant lab in UC Berkeley.