

STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, March 8, 2005
Sequoia Hall Room 200
(Cookies at 3:45 in 1st Floor Lounge)

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Some Statistical Issues in the Analysis of Neuronal Data

Abstract:

One of the most important techniques in learning about the functioning of the brain has involved examining neuronal activity in laboratory animals under varying experimental conditions. Neural information is represented and communicated through series of action potentials, or spike trains, and the central scientific issue in many studies concerns the physiological significance that should be attached to a particular neuron firing pattern in a particular part of the brain. In addition, a major relatively new effort in neurophysiology involves the use of multielectrode recording, in which responses from dozens of neurons are recorded simultaneously. Among other things, this has made possible the construction of brain-controlled robotic devices, which could benefit people whose movement has been severely impaired.

My colleagues and I have formalized specific scientific questions in terms of point process intensity functions, and have used Bayesian methods to fit the point process models to neuronal data (though we sometimes prefer simple smoothers and the Bootstrap). In my talk I will outline the substantive problems we are examining and the progress we've made.