



BOSTON UNIVERSITY STATISTICS
AND PROBABILITY SEMINAR SERIES

**Analysis of Neural Spike Train Data:
Current State and Future Challenges**

Robert E. Kass

Department of Statistics and Center for the Neural Basis of Cognition

Carnegie Mellon University

Thursday, March 17, 2008, 4-5pm

Mathematics and Computer Science (MCS) Building, Room 149

111 Cummington Street, Boston

Tea and Cookies at 3:30pm in MCS 153

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.

A key statistical step is to formalize specific scientific questions in terms of point process intensity functions. In my talk I will very briefly outline some of the substantive problems my colleagues and I have examined, the progress that's been made, and the challenge of dealing with high-dimensionality of data sets.