



The University of Chicago
Department of Statistics

Seminars for First Year Ph.D. Students

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Modeling Neuronal Spiking Activity in a Point Process Framework

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ABSTRACT

One experimental approach to studying brain activity is by recording neural spiking, a method that allows us to record from many neurons simultaneously at a very high temporal resolution. Truccolo *et al.* [2005]¹ propose a poisson point process framework which incorporates the information of (i) past activity of the neuron (ii) concurrent activity of other neurons and (iii) external stimuli [controlled by the experimenter] to model the spiking activity of the neuron. Goodness-of-fit measures, residual analyses and model comparison methods are also discussed. The authors demonstrate the application of the point process framework to a simulation study with 6 neurons as well as an experimental study of multiple single units recording from 20 neurons in the primary motor cortex of a monkey.

Truccolo, W., Eden, U.T., Fellows, M.R., Donoghue, J.P. & Brown, E.N. 2005. A Point Process Framework for Relating Neural Spiking Activity to Spiking History, Neural Ensemble, and Extrinsic Covariate Effects. *Journal of Neural Physiology* 93, 1074–1089.

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