



The University of Chicago  
Department of Statistics

Master's Seminar

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**HUI DU**

Department of Statistics  
The University of Chicago

**“Bayesian Nonlinear Regression with Spatial Structure”**

**MONDAY OCTOBER 17, 2005, at 9:00 AM**  
**110 Eckhart Hall, 5734 S. University Avenue**

**ABSTRACT**

Using nonlinear models to characterize complex input-output relations is of significant scientific value but also poses difficult problems. For example, the stimulus-response relation for high-level neurons has been a challenging issue in neuroscience. Motivated by the applications in neuroscience, in this work we propose and explore a Bayesian approach to nonlinear regression and develop a simulated annealing procedure to conduct maximum likelihood estimation for the parameters involved. The parameters not only include coefficients in nonlinear transformation functions of the model, but also include “groupings” of features by their spatial relations as well as regularities of the groupings. The simulation procedure is implemented through C++ programming. Results from the simulation will be presented, analyzed and discussed.