



The University of Chicago  
Department of Statistics  
Seminar Series

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**Regularization for Cox's Proportional Hazards  
Model With NP-Dimensionality**

**MONDAY, February 14, 2011, at 4:00 PM**

133 Eckhart Hall, 5734 S. University Avenue

*Refreshments following the seminar in Eckhart 110.*

**ABSTRACT**

High throughput genetic sequencing arrays with thousands of measurements per sample and a great amount of related censored clinical data have increased demanding need for better measurement specific model selection. In this paper we establish strong oracle properties of non-concave penalized methods for *non-polynomial* (NP) dimensional data with censoring in the framework of Cox's proportional hazards model. A class of folded-concave penalties are employed and both LASSO and SCAD are discussed specifically. We unveil the question under which dimensionality and correlation restrictions can an oracle estimator be constructed and grasped. It is demonstrated that non-concave penalties lead to significant reduction of the "irrepresentable condition" needed for LASSO model selection consistency. The large deviation result for martingales, bearing interests of its own, is developed for characterizing the strong oracle property. Moreover, the non-concave regularized estimator, is shown to achieve asymptotically the information bound of the oracle estimator. A coordinate-wise algorithm is developed for finding the grid of solution paths for penalized hazard regression problems, and its performance is evaluated on simulated and gene association study examples.

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