



The University of Chicago  
Department of Statistics

Seminars for First Year Ph.D. Students

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**Multiple Hypothesis Testing in High-dimensional  
Data with Strong Dependence**

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110 Eckhart Hall, 5734 S. University Avenue**

**ABSTRACT**

The dependence structure of large-scale, high-dimensional datasets might not be entirely characterized by measured variables of interests. Residual dependence complicates significance analysis since multiple testing procedures assume that true null p-values are independent.

This presentation describes a general framework for performing large-scale significance testing in the presence of arbitrarily strong dependence. The idea is to derive a low-dimensional set of random vectors, called a dependence kernel, to capture observed dependencies that are not explained by the model. Conditioning on this kernel makes statistical tests independent.

As an example, the concept is applied in a gene expression study to reduce the effect of genetic heterogeneity.

This is work done by Jeffrey T. Leek and John D. Storey, “A general framework for multiple testing dependence,” PNAS, 2008.