

# The University of Chicago

Department of Statistics

## Seminar

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**John David Storey**

Department of Statistics, Stanford University

**“A Direct Approach to False Discovery Rates, with Applications to  
DNA Microarrays”**

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**Thursday, January 31, 2002 at 11:00 am  
110 Eckhart Hall, 5734 S. University Avenue**

## ABSTRACT

When testing multiple hypotheses it is important to assess the number of false positives in some fashion. In order to accomplish this task we investigate the False Discovery Rate (FDR), and we introduce a new quantity called the positive False Discovery Rate (pFDR). We show that the pFDR can be written in a very simple form and has a Bayesian interpretation. We also suggest a more direct approach to multiple hypothesis testing than what has traditionally been taken. Instead of fixing the error rate and estimating the corresponding rejection region, we take the opposite approach: we fix the rejection region and estimate its corresponding error rate. We show how this approach can be applied to the pFDR and the FDR, resulting in substantial improvements to power, interpretability, and applicability. This methodology works particularly well for large numbers of hypothesis tests and is also immune to certain forms of dependence -- both of which make it well applicable to DNA microarrays, where it is often the case that thousands of dependent hypotheses are simultaneously tested.