

STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, October 2, 2001
Sequoia Hall Rm. 200
(Cookies at 3:45 in 1st Floor Lounge)

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The Positive False Discovery Rate

When testing multiple hypotheses it is important to assess the number of false positives in some fashion. In order to accomplish this task, we introduce the positive False Discovery Rate (pFDR), which is a modified version of Benjamini and Hochberg's False Discovery Rate (FDR). 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, 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 particularly applicable to DNA microarrays.