

**STANFORD UNIVERSITY**  
**DEPARTMENT OF STATISTICS**  
**DEPARTMENTAL SEMINAR**

4:15 p.m., Tuesday, August 15, 2006  
Sequoia Hall Room 200  
(Cookies at 3:45 in 1st Floor Lounge)

*Daniele De Martini*  
Dipartimento di Scienze Economiche e Metodi Quantitativi (SEMEQ)  
Università del Piemonte Orientale

**On the Stability of Statistical Tests**

The application of statistical tests in various research fields often generates problems, because the results obtained through statistical hypothesis testing have been, and are, often confuted in further studies, for example in the biomedical field. Here, stemming from the variability of statistical tests, we first introduce the estimator of the reproducibility probability of the statistical significance, i.e. the estimator of the power of the test. Then we define rejection regions on the basis of the estimator of the power. In many standard examples, the threshold for the power estimator to define statistical tests turns out to be  $1/2$ , at least approximately, in parametric as well as in nonparametric frameworks. Moreover, we introduce the notion of stability, which is based on the lower bound of the power. Some numerical examples are shown, and a brief discussion is given.