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DEPARTMENT OF STATISTICS AND BIOSTATISTICS
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Seminar

Speaker: **Professor Joseph Romano**
Department of Statistics
Stanford University

Title: **Permutation Tests 101**

Time: **3:20 – 4:20pm, Wednesday, September 2, 2015**

Place: **552 Hill Center**

Abstract

Given independent samples from P and Q , two-sample permutation tests allow one to construct exact level tests when the null hypothesis is $P = Q$. On the other hand, when comparing or testing particular parameters θ of P and Q , such as their means or medians, permutation tests need not be level α , or even approximately level α in large samples. Under very weak assumptions for comparing estimators, we provide a general test procedure whereby the asymptotic validity of the permutation test holds while retaining the (exact) rejection probability α in finite samples when the underlying distributions are identical. The ideas are broadly applicable and generalized to the Wilcoxon test, and to the k -sample problem of comparing general parameters, whereby a permutation test is constructed which is exact level α under the hypothesis of identical distributions, but has asymptotic rejection probability α under the more general null hypothesis of equality of parameters. A quite general theory is possible based on a coupling construction, as well as a key contiguity argument for the multinomial and multivariate hypergeometric distributions. Time permitting, the results will be extended to multivariate settings and multiple testing.

**** Refreshments will be served @2:50pm in Room 502 Hill Center ****