

# RUTGERS UNIVERSITY

DEPARTMENT OF STATISTICS AND BIostatISTICS  
501 HILL CENTER/BUSCH CAMPUS

[www.stat.rutgers.edu](http://www.stat.rutgers.edu)

## Statistics Seminar

**Speaker:** Gabor J. Szekely  
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Division of Mathematical Sciences  
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**Title:** Brownian Covariance: Measuring and Testing Dependence by Correlation of Distances

**Date:** Wednesday – November 28, 2007  
**Time:** 3:20 PM  
**Place:** 552 Hill Center

## Abstract

We introduce a simple new measure of dependence between random vectors. Distance covariance (dCov) and distance correlation (dCor) are analogous to product-moment covariance and correlation, but unlike the classical definition of correlation,  $dCor = 0$  characterizes independence for the general case. The empirical dCov and dCor are based on certain Euclidean distances between sample elements rather than sample moments, yet have a compact representation analogous to the classical covariance and correlation. Definitions can be extended to metric-space-valued observations where the random vectors could even be in different metric spaces. Asymptotic properties and applications in testing independence will also be discussed. It turns out that dCov can easily be understood and defined via Brownian motions; in this way we can define the Brownian covariance, a natural and effective counterpart of Pearson's classical covariance.

**Refreshments:** 2:50 PM, 502 Hill Center