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Seminar

Speaker: **Professor Jun Liu**
Department of Statistics
Harvard University

Title**:** **On the detection of non-linear relationships**

Time: **3:20 – 4:20pm, *Wednesday*, September 30, 2015**

Place: **552 Hill Center**

Abstract

I will discuss a few recent results from my group aiming at the detection of non-linear dependence between two and more random variables. Our approach is based on the idea of sliced inverse regression of Ker-Chau Li, with a Bayesian twist. In one approach, we dynamically slice (discretization) one variable (or the response) to optimize a score function based on the likelihood-ratio statistic. Our test statistic, called generalized R-square or G2, gives rise to a relationship measure, which takes value in [0,1] and can be viewed as a direct extension of the standard R-square. When the linear relationship holds, this measure is almost surely equal to the R-square. We can also fully "Bayesianize" the procedure to arrive at a Bayesian counterpart of G2. The G2 statistic is compared with some well-known methods such as Distance Correlation, Pearson Correlation, Maximal Information Criterion, etc., on many simulated examples, and found superior for highly nonlinear and non-smooth relationships between the two variables. In another approach, we build a stepwise procedure to select relevant variables, which may contribute nonlinear and interactive effects, in a high-dimensional nonparametric regression setting.

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