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# Joint Statistics Seminar

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*The Hong Kong University of Science and Technology*

## **Directional Regression for Dimension Reduction**

*by*

**Dr. Shaoli Wang**

Yale School of Medicine

**Date: February 16, 2009 (Monday)**

**Time: 3:00 p.m. - 4:15 p.m.**

**Venue: Room 4379 (Conference Room, Lift 17/18)**

### **Abstract**

Dimensionality is a major concern in many modern statistical problems. In regression analysis, dimension reduction means to reduce the dimension of predictors without loss of information on the regression. Dimension reduction proves to be particularly useful during the model development and criticism phase as it usually does not require any pre-specified parametric models for regression. We propose a Directional Regression (DR) method for dimension reduction. This novel method naturally synthesizes dimension reduction methods based on first two conditional moments, such as Sliced Inverse Regression (SIR) and Sliced Average Variance Estimation (SAVE), and in doing so combines the advantages of these methods. Under mild conditions, it provides an exhaustive estimate of the Central Dimension Reduction Subspace (CDRS). We also develop the asymptotic distribution of the Direction Regression estimator, and therefore establish a sequential test procedure to determine the dimension of the Central Dimension Reduction Subspace. The Directional Regression is compared with existing methods via simulation. An application to a handwritten digit recognition problem is also presented.

\* This is a joint work with Bing Li.

### **Biography**

Dr. Wang graduated from Jilin University with BS and MS in applied mathematics. He obtained his PhD in Statistics from the Pennsylvania State University in 2005. After graduation, he has been doing research at Yale School of Medicine as a postdoctoral associate.

❖ ***All interested are welcome!*** ❖

*For details, please contact ISOM Department.*