Invites you to Attend the Final, Public Dissertation Defense for:

**Jing Jiang**

Titled: **Regularization Methods for Detecting Differential Item Functioning**

The defense will be held on **Friday, March 29th at 9 AM**

in **Campion Hall 306**

Dissertation Committee:

Dr. Zhushan Li (Chair),
Dr. Henry Braun (Reader), Dr. Ehri Ryu (Reader)

Abstract:
Differential item functioning (DIF) occurs when examinees of equal ability from different groups have different probabilities of correctly responding to certain items. DIF analysis aims to identify potentially biased items to ensure the fairness and equity of instruments, and has become a routine procedure in developing and improving assessments. This study proposed a DIF detection method using regularization techniques, which allows for simultaneous investigation of all items on a test for both uniform and nonuniform DIF. In order to evaluate the performance of the proposed DIF detection models and understand the factors that influence the performance, comprehensive simulation studies and empirical data analyses were conducted. Under various conditions including test length, sample size, sample size ratio, percentage of DIF items, DIF type, and DIF magnitude, the operating characteristics of three kinds of regularized logistic regression models: lasso, elastic net, and adaptive lasso, each characterized by their penalty functions, were examined and compared. Selection of optimal tuning parameter was investigated using two well-known information criteria AIC and BIC, and cross-validation. The results revealed that BIC outperformed other model selection criteria, which not only flagged high-impact DIF items precisely, but also prevented over-identification of DIF items with few false alarms. Among the regularization models, the adaptive lasso model achieved superior performance than other two models in most conditions. The performance of the regularized DIF detection model using adaptive lasso was then compared to two commonly used DIF detection approaches including the logistic regression method and the likelihood ratio test. The proposed model was applied to analyzing empirical datasets to demonstrate the applicability of the method in real settings.