

**UNIVERSITY OF MARYLAND**

**College of Education**

**Graduate Studies**

**ORAL DEFENSE ANNOUNCEMENT**

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**TITLE OF DISSERTATION:**A MIXTURE RASCH MODEL  
WITH A COVARIATE:A SIMULATION STUDY VIA  
BAYESIAN MCMC ESTIMATION

**DATE OF DEFENSE:** Thursday, November 12, 2009

**TIME:** 9:45am ~ 12:00 pm

**LOCATION OF DEFENSE:** Cole conference room

## **ABSTRACT**

Mixtures of item response theory models have been proposed as a technique to explore response patterns in test data related to cognitive strategies, instructional sensitivity, and differential item functioning (DIF). Estimation proves challenging due to difficulties in identification and questions of effect size needed to recover underlying structures. In particular, the impact of auxiliary variables, or covariates, for examinees in estimation has not been systematically explored. The goal of this dissertation is to carry out a systematically designed simulation study to investigate the performance of mixture Rasch model (MRM) under Bayesian estimation using Markov Chain Monte Carlo (MCMC) method. The dependent variables in this study are (1) the proportion of cases in which the generating mixture structure is recovered, and (2) among those cases in which the structure is recovered, the bias and root mean squared error of parameter estimates. The foci of the study are to use a flexible logistic regression model to parameterize the relation between latent class membership and the examinee covariate, to study MCMC estimation behavior in light of effect size, and to provide insights and suggestions on model application and model estimation.