THE UNIVERSITY OF GEORGIA
DEPARTMENT OF STATISTICS

Colloquium Series

Thursday, February 9, 2023
4:00 PM, Room 204, Caldwell Building

Dr. Shiyu Wang

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EXPLORATORY COGNITIVE DIAGNOSIS MODELS: ATTRIBUTE HIERARCHY ESTIMATION AND EXPLORATION OF UTILIZING EYE-TRACKING DATA.

Attribute hierarchy, the underlying prerequisite relationship among attributes, plays an important role in applying Cognitive Diagnosis Models (CDM) for designing efficient cognitive diagnostic assessments. However, there are limited statistical tools to directly estimate attribute hierarchy from response data. In this talk, we present a Bayesian formulation for a class of general CDMs with attribute hierarchy and introduce an efficient Metropolis within Gibbs algorithm to estimate the underlying hierarchy along with CDM parameters. Our simulation study demonstrated our method can fully recover or estimate at least a subgraph of the underlying structure across various conditions. The real data application indicates the potential of learning attribute structure from data using our algorithm and validating the existing attribute hierarchy specified by content experts. In the end of the talk, we will also briefly present some preliminary results of one on-going project that aim to use eye-tracking data to improve the estimation of CDMs

About the Speaker

Dr. Shiyu Wang is an Associate Professor from Quantitative Methodology Program, Department of Educational Psychology at University of Georgia. Before moving to this position, she got her PhD in statistics from University of Illinois at Urbana-Champaign. Dr. Wang's research interests lie broadly to personalized assessment and learning through three perspectives:1) developing innovative adaptive testing designs that can provide efficient individualized assessments and an examinee-friendly testing environment; 2) establishing statistical foundations for a family of restricted latent class models to provide guidelines for model estimation and selection; and 3) developing novel dynamic psychometric models that can measure and predict students' learning outcomes based on a variety of assessment data, including produce data (i.e., students' responses) and process data (i.e., response time and learning time) to facilitate the development of adaptive learning.