

# Network and AI-Driven Approaches in Psychometrics and Behavioral Science: Concepts and Empirical Case Studies

**SPEAKER: PROF. ZHANG, JIHONG**  
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**Date** : 18 December 2025 (Thursday)  
**Time** : 3:00pm-4:00pm  
**Zoom Link** : <https://cityu.zoom.us/j/85747825171?pwd=FVozrlkRkRBU08kfaU01HuWwRDMUBlp.1>  
Meeting ID: 857 4782 5171 Passcode: 965865  
**Moderator** : Prof. Ben Li (Associate Professor)  
**Language** : English

## **Abstract**

This research seminar examines network-based approaches in psychometrics and behavioral science, integrating conceptual foundations with empirical demonstrations. The first part contrasts psychological network models with traditional latent variable frameworks to highlight how network analysis captures the dynamic interplay among symptoms, behaviors, and cognitive processes. Two case studies illustrate these advantages: (1) estimating cognitive networks from EEG data using Gaussian graphical modeling to characterize functional dependence among psychological processes; and (2) modeling longitudinal symptom dynamics in eating disorders with graphical vector autoregression to identify temporal risk pathways and gender-specific mechanisms of symptom maintenance. These applications underscore how network methods enhance theoretical interpretation and inform targeted intervention strategies. The seminar concludes by discussing emerging innovations in AI-augmented psychometrics, including large language models and computational tools that expand the possibilities for measurement, data augmentation, and adaptive decision-making in applied settings.

## **Biography**

Prof. Zhang is a tenure-track Assistant Professor of Educational Statistics and Research Methods in the Department of Counseling, Leadership, and Research Methods, and a faculty affiliate with the Center for Public Health & Technology Research at the University of Arkansas. His research advances modern psychometric methodology while bridging educational measurement, behavioral science, and computational innovation.

His work focuses on two synergistic strands of methodological development. The first centers on psychological network analysis, with applications to EEG data, longitudinal modeling of mental-health symptoms, physical activity, and dynamic processes in eating disorders. The second investigates AI-enabled psychometrics, including interview-informed large language models for survey response generation, AI conversational assessment and emerging multi-agent systems that support human-AI collaboration in educational decision-making.

In addition to these core areas, Prof. Zhang contributes to the advancement of Bayesian latent variable modeling and related approaches, such as factor analysis, diagnostic classification models, generalizability theory, and structural equation modeling. Across his scholarship, he emphasizes the integration of rigorous quantitative techniques with applications that address practical challenges in education and clinical psychology, including inclusive education, learning disabilities, motivation, mathematics anxiety, and behavioral-health outcomes.

Through collaborations across education, psychology, and public health, Prof. Zhang's work aims to shape the future of psychometrics by enhancing the validity, interpretability, and real-world utility whether in classrooms, clinical contexts, or digitally mediated environments.

***ALL ARE WELCOME***