

**YALE QUAN**  
Email: [yalequan@uw.edu](mailto:yalequan@uw.edu) • Website: [yalequan.github.io](https://yalequan.github.io)

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## EDUCATION

UNIVERSITY OF WASHINGTON	Seattle, WA
Ph.D. Measurement & Statistics	Expected May 2026
Advisor: Chun Wang, Ph.D.	
<i>Dissertation Title:</i> Culturally Responsive Measurement: Machine Learning and Artificial Intelligence Approaches to DIF Detection, Parameter Estimation, and Scoring	
CSU, LONG BEACH	Long Beach, CA
M.S. Applied Statistics	2020
B.S. Criminal Justice	2013

## FACULTY APPOINTMENTS

UNIVERSITY OF SOUTHERN MISSISSIPPI	Hattiesburg, MS
Assistant Professor of Education; Tenure Track. Research, Evaluation, Statistics, and Assessment	2026 – Present

## RESEARCH INTERESTS

My research is motivated by the need for fair and rigorous measurement in complex educational and psychological settings. Methodologically, I develop psychometric models that integrate modern machine learning approaches with item response theory and diagnostic classification models to support culturally responsive measurement. Much of my work focuses on intersectional differential item functioning, small-sample and high-dimensional inference, and many-group measurement invariance. I am particularly interested in using neural networks and graph-based methods to improve DIF detection, parameter estimation, and scoring, with the goal of producing more equitable, interpretable, and practically useful assessment tools.

In my applied work, I collaborate with K–12 schools and community partners to study barriers to student success, with a focus on student belonging and chronic absenteeism. I also apply psychometric and statistical methods to healthcare and psychological research settings, using real-world data to inform both substantive findings and ongoing methodological development.

## AWARDS AND HONORS

UNIVERSITY OF WASHINGTON	Seattle, WA
Three Year Community Partner Fellowship Award	2022 - 2025

## RESEARCH EXPERIENCE

CENTER FOR SOCIAL SCIENCE COMPUTATION AND RESEARCH	Seattle, WA
Statistical Research Consultant	2021; 2025 - Present

DATA SCIENCE 4 EVERYONE	Chicago, IL
Graduate Research Assistant	Summer 2024
<i>Supervisors:</i> Zarek Drozda, Sarah Miller, Sean Sukol	

EQUAL OPPORTUNITY SCHOOLS  
Community Partner Doctoral Fellow  
*Supervisor:* Jessica Paulson Ph.D.

Seattle, WA  
2022 - 2025

## PEER-REVIEWED JOURNAL ARTICLES

1. **Quan, Y., & Wang, C.** (In Press) Using Multi-label Classification Neural Networks to Detect Intersectional DIF with Small Sample Sizes. *British Journal of Mathematical and Statistical Psychology*
2. Parker, M., Ciou, S.Y., **Quan, Y.**, Ren, H., Wang, C., & Li, M. (2026). Investigating Answer Choice Bias within a College-Level Introductory Computing Assessment. *SIGCSE 2026*. <https://doi.org/10.1145/3770762.3772622>
3. **Quan, Y., & Wang, C.** (2026). Calibrating Multidimensional Assessments with Structural Missingness, An Application of a Multiple-Group Higher-Order IRT Model. *Applied Psychological Methods*. <https://doi.org/10.1177/01466216251415011>
4. **Quan, Y., & Wang, C.** (2025). Collapsing or Not? A Practical Guide to Handling Sparse Responses for Polytomous Items. *Methodology*, 21(1), 46-73. <https://doi.org/10.5964/meth.14303>

## WORKING PAPERS & PREPRINTS

1. **Quan, Y., & Ren, H.** (2025). Sample Size and Assessment Length Recommendations for the Diagnostic Status Facet Model. *PsyArXiv*. [https://doi.org/10.31234/osf.io/zr3je\\_v1](https://doi.org/10.31234/osf.io/zr3je_v1)

## CONFERENCE PRESENTATIONS

1. **Quan, Y., & Wang, C.** (2026, April 8-11). *Beyond DIF Detection: A Downstream Clustering Framework for Small Sample Parameter Estimation* [Paper Presentation]. National Council on Measurement in Education 2026 Annual Meeting, Los Angeles, CA, United States
2. **Quan, Y., & Wang, C.** (2026, April 8-11). *Advancing Diagnostic Models for Fair and Insightful Educational Action* [Paper Presentation]. National Council on Measurement in Education 2026 Annual Meeting, Los Angeles, CA, United States
3. **Quan, Y., & Wang, C.** (2025, July 15-18) *A Neural Network Approach to Small Sample Intersectional DIF Detection* [Paper Presentation]. Annual International Meeting of the Psychometric Society (IMPS), Minneapolis, MN, USA.
4. **Quan, Y.** (2025, May 9). *Using Categorical Structural Equation Models to Identify Facets of Student Belonging* [Paper Presentation]. Community Partner Doctoral Fellowship Research Presentation, Seattle, WA, United States

5. **Quan, Y.**, Ren, H., & Wang, C. (2025, March 29). *Constructing A Machine Learning Model For Binary Predictions with Incomplete, Imbalanced Data and Non-Linear Effects* [Paper Presentation]. A Meeting of Methodologists.
6. **Quan, Y.**, Sager, M. (2025, February 17-20) *Identifying Core Formal Assessment Competencies and Informal Learning Outcomes of Data Science and Data Literacy* [Paper Presentation]. Data Science Education K-12: Research to Practice Annual Conference
7. **Quan, Y.**, & Ren, H. (2024, December 4) *Sample Size and Test Length Recommendations for the Diagnostic Facet Status Model* [Paper Presentation]. Center for Statistics and The Social Sciences Student Research Presentation, Seattle, WA, United States.
8. **Quan, Y.**, & Wang, C. (2024, November 17-18) *A New Item Fit Test for the Diagnostic Facet Test Model (DFSM)* [Paper Presentation]. Annual Pacific Northwest Research on Psychometrics and Applied Statistics Conference, Pullman, WA, United States.
9. **Quan, Y.** (2024, June 4) *Introduction to Bayesian Item Response Theory*, [Paper Presentation]. Center for Statistics and The Social Sciences Student Research Presentation, Seattle, WA, United States.
10. **Quan, Y.** (2024, October 18) *Item Response Theory (IRT) Model Selection and Applications* [Invited Talk]. University of Washington Behavioral Research Center for HIV. Seattle, WA, United States.
11. **Quan, Y.**, & Wang, C. (2024, April 11-14) *Parameter Recovery from Higher Order Item Response Theory Models with Structural Missingness* [Paper Presentation]. National Council on Measurement in Education 2024 Annual Meeting, Philadelphia, PA, United States
12. **Quan, Y.**, & Wang, C. (2024, April 11-14) *Collapsing or not? A Practical Guide to Handling Sparse Responses for Polytomous Items*, [Paper Presentation], American Educational Research Association Annual Meeting, Philadelphia, PA, United States.  
<https://doi.org/10.3102/2102869>
13. **Quan, Y.**, & Xiao, T. (2024, March 11) *The Effects of Measurement Error on Multilevel Linear Growth Model Parameter Estimates*, [Paper Presentation]. Center for Statistics and The Social Sciences Student Research Presentation, Seattle, WA, United States.
14. **Quan, Y.**, & Wang, C. (2022, April 12-15) *The Effects of Sample Size and Collapse Direction on Parameter Recovery* [Poster Presentation]. National Council on Measurement in Education 2023 Annual Meeting, Chicago, IL, United States
15. **Quan, Y.** (2021, December 3). *Clustering Education Data Using K-Medoids with Partitioning Around the Medoids Algorithm* [Seminar Presentation]. Measurement & Statistics Seminar, University of Washington. Seattle, WA, United States

## **MANUSCRIPTS UNDER REVIEW**

1. Wang, C., **Quan, Y.**, Arthur, D. (Under Review) Review of Cognitive Diagnostic Models (CDMs): Recent Methodological Advancements for Addressing Challenges in Applications. *British Journal of Mathematical and Statistical Psychology*
2. **Quan, Y.**, & Wang, C. (Under Review) Transitive Differential Item Functioning Clustering: A Graph-Theoretic Approach to Identifying Many-Group Partial Measurement Invariance. *Psychological Methods*

## **TEACHING EXPERIENCE**

TEACHING ASSISTANT; UNIVERSITY OF WASHINGTON 2021-2022  
College of Education  
Basic Educational Statistics  
Department of Psychology  
Fundamentals of Psychological Research

LECTURER; CSU, LONG BEACH 2020-2021  
Department of Mathematics and Statistics  
Statistics for Everyday Life

TEACHING ASSOCIATE; CSU, LONG BEACH 2018-2021  
Department of Mathematics and Statistics  
Statistics for Everyday Life  
Essential Algebra A/B  
The Power of Mathematics

SUPPLEMENTAL INSTRUCTOR; CSU, LONG BEACH 2017-2018  
Department of Mathematics and Statistics  
Business Calculus  
Calculus I

## **PROFESSIONAL TRAININGS AND CERTIFICATIONS**

UNIVERSITY OF PENNSYLVANIA Philadelphia, PA  
Data Science Methods for Digital Learning Platforms Certification 2025  
Certificate ID: 149359454

AMERICAN INSTITUTES FOR RESEARCH Arlington, VA  
The National Assessment of Educational Progress Winter Data Training 2023  
National Assessment of Educational Progress Process Data Training Series 2021

## **PROFESSIONAL SERVICE**

METHODOLOGY; EUROPEAN JOURNAL OF RESEARCH METHODS FOR THE BEHAVIORAL AND SOCIAL SCIENCES

Reviewer 2025 – Present

JOURNAL OF BEHAVIORAL DATA SCIENCE

**Reviewer** 2025 – Present

# JOURNAL OF EDUCATIONAL MEASUREMENT

## Reviewer

2023 – Present

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

## NATIONAL COUNCIL ON MEASUREMENT IN EDUCATION

#### **MEMBERSHIPS**

National Council on Measurement in Education 2022–Present

American Educational Research Association Division D 2022 Present