YALE QUAN
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EDUCATION

UNIVERSITY OF WASHINGTON — Seattle, WA
Ph.D. Measurement & Statistics — Expected May 2026
Advisor: Chun Wang, Ph.D.
Dissertation Title: 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. — 2026 – Present
Research, Evaluation, Statistics, and Assessment

RESEARCH INTERESTS

My research is motivated by the need for fair and rigorous measurement tools. To meet this need, my primary area of research focuses on developing measurement techniques that integrate explainable machine learning and artificial intelligence methods with cutting edge psychometric models to achieve accurate measurement of key educational constructs, especially tackling the challenges of high-dimensional variables and small sample sizes. My broader research explores barriers in K-12 education, with a focus on critical issues such as student belonging and chronic absenteeism. I also explore applications of psychometric tools to measures constructs in healthcare and psychological research settings.

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
Supervisors: Zarek Drozda, Sarah Miller, Sean Sukol

EQUAL OPPORTUNITY SCHOOLS — Seattle, WA
Community Partner Doctoral Fellow — 2022 - 2025
Supervisor: Jessica Paulson Ph.D.

PRESENTATIONS AND PUBLICATIONS

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*
1. **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
2. **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
3. Parker, M., Ciou, S.Y., **Quan, Y.,** Ren, H., Wang, C., & Li, M. (2025). Investigating Answer Choice Bias within a College-Level Introductory Computing Assessment. *SIGCSE 2026.* https://doi.org/10.1145/3770762.3772622
4. **Quan, Y**., & Wang, C. (2025). Using Multi-label Classification Neural Network to Detect Intersectional DIF with Small Sample Sizes. *PsyArXiv*. https://doi.org/10.31234/osf.io/rftyg_v2
5. **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
6. **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
7. **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
8. **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.
9. **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
10. **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.
11. **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
12. **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.
13. **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.

14. **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 Sates.

15. **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.
16. **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
17. **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
18. **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.
19. **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
20. **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
21. **Quan, Y.** (2020). *A Multivariate Statistical Analysis of Major Change Patterns and Significant Factors That Influence Graduation Rates: A Case Study at California State University, Long Beach* (Publication No. 28155286) [Master's Thesis, California State University Long Beach]. ProQuest Dissertations and Theses Global. https://www.proquest.com/dissertations-theses/multivariate-statistical-analysis-major-change/docview/2519029245/se-2

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 CERTICIATIONS

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

AMERCIAN 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
Reviewer 2023 – Present

NATIONAL COUNCIL ON MEASUREMENT IN EDUCATION
Reviewer and Session Chair 2022 – Present

MEMBERSHIPS

National Council on Measurement in Education 2022 - Present

American Educational Research Association Division D 2022 – Present