YALE QUAN
Email: yalequan@uw.edu • Website: yalequan.github.io

EDUCATION

UNIVERSITY OF WASHINGTON — Seattle, WA
Ph.D. Measurement & Statistics — Expected May 2026
Advisor: Chun Wang, Ph.D.

CALFORNIA STATE UNIVERSITY, LONG BEACH — Long Beach, CA
M.S. Applied Statistics — December 2020
B.S. Criminal Justice — May 2013

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

PROFESSIONAL TRAININGS AND CERTICIATIONS

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

AMERCIAN INSTITUTES FOR RESEARCH — Arlington, VA
The National Assessment of Educational Progress Winter Data Training — January 2023

AMERCIAN INSTITUTES FOR RESEARCH — Arlington, VA
National Assessment of Educational Progress Process Data Training Series — August 2021

RESEARCH INTERNSHIPS

DATA SCIENCE 4 EVERYONE — Chicago, IL
Graduate Research Assistant — June 2024 – August 2024
Supervisors: Zarek Drozda, Sarah Miller, Sean Sukol

Conducted a systematic literature review following PRISMA guidelines to support the development of a nationwide assessment for measuring data science and data literacy competencies in K-12 education.

TEACHING EXPERIENCE

UNIVERSITY OF WASHINGTON — Seattle, WA
Teaching Assistant, College of Education — March 2022 – June 2022
Basic Educational Statistics

Teaching Assistant, Department of Psychology — August 2021 – March 2022
Fundamentals of Psychological Research

CALIFORNIA STATE UNIVERSITY, LONG BEACH — Long Beach, CA
Lecturer, Department of Mathematics and Statistics — December 2020 – January 2021
Statistics for Everyday Life

Teaching Associate, Department of Mathematics and Statistics — August 2018 – December 2020
Statistics for Everyday Life
Essential Algebra A/B
The Power of Mathematics

Supplemental Instructor — August 2017 – August 2018
Business Calculus
Calculus I

RESEARCH EXPERIENCE

CENTER FOR SOCIAL SCIENCE COMPUTATION AND RESEARCH — Seattle, WA
Statistical Research Consultant
University of Washington — June 2021 – August 2021; June 2025 – Present

Provided statistical and programming consulting services to students and faculty across University of Washington Seattle campus.

EQUAL OPPORTUNITY SCHOOLS — Seattle, WA
Community Partner Doctoral Fellow — August 2022 – June 2025
Supervisors: Erin Bogan Ph.D., Alaina Boyle Ph.D., Jessica Paulson Ph.D.

Projects:

1. Balancing Accuracy and Equity: Total Scores versus Latent Scores in Measuring Student Needs
2. Developing an Equitable Machine Learning Algorithm to Identify Students at Risk of Chronic Absenteeism
3. Predicting Advanced Course Enrollment and Success from Measures of Student Belonging
4. Using Categorical Structural Equation Models to Identify Facets of Student Belonging.
5. Reliable Measurement of Student Belonging. A Reliability and Validity Study of a Student Belonging Survey.

PRESENTATIONS AND PUBLICATIONS

1. **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
2. 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
3. **Quan, Y.**, & Wang, C. (In Press) Calibrating Multidimensional Assessments with Structural Missingness, An Application of a Multiple-Group Higher-Order IRT Model. *Applied Psychological Methods*
4. **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.
5. **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
6. **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.
7. **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
8. **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.
9. **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.
10. **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.
11. **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.
12. **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
13. **Quan, Y.,** & Wang, C. (2024, April 11-14) *Collapsing or not? A Practical Guide to Handling Sparse Responses for Polytomous Items,* [Poster Presentation, Paper Presentation], American Educational Research Association Annual Meeting, Philadelphia, PA, United States. https://doi.org/10.3102/2102869
14. **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.

15. **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
16. **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
17. **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

PREPRINT MANUSCRIPTS

1. **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
2. **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

MANUSCRIPTS UNDER REVIEW AND IN PREPERATION

1. **Quan, Y.**, & Wang, C. (Under Review) Using Multi-label Classification Neural Networks to Detect Intersectional DIF with Small Sample Sizes. *British Journal of Mathematical and Statistical Psychology*
2. 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*
3. **Quan, Y.**, & Wang, C. (In Preparation) Transitive DIF Clustering: A Graph-Theoretic Approach to Identifying Many-Group Partial Measurement Invariance
4. Park, A., **Quan, Y.**, Lohr, M., & Oxford, M. (In Preparation). Concurrent and enduring predictors of preschool language among young children of parents involved in child welfare. *Journal of Speech, Language, and Hearing Research*

PROFESSIONAL SERVICE

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
Reviewer 2023 – Present

Reviewed paper and poster submissions in the following areas:
- Educational Measurement, Psychometrics, and Assessment
- Measurement and Research Methodology
- Quantitative Methods and Statistical Theory
- Critical Quantitative Methodologies

JOURNAL OF EDUCATIONAL MEASUREMENT
Reviewer 2023 – Present

Reviewed manuscripts for publication

NATIONAL COUNCIL ON MEASUREMENT IN EDUCATION
Reviewer 2022 – Present

Reviewed paper and poster submissions

MEMBERSHIPS

National Council on Measurement in Education 2022 - Present
American Educational Research Association Division D 2022 – Present