

## YALE QUAN

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### EDUCATION

UNIVERSITY OF WASHINGTON  
Ph.D. Measurement & Statistics  
*Advisor: Chun Wang, Ph.D.*

Seattle, WA  
Expected May 2026

CALIFORNIA STATE UNIVERSITY, LONG BEACH  
M.S. Applied Statistics  
B.S. Criminal Justice

Long Beach, CA  
December 2020  
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  
Three Year Community Partner Fellowship Award

Seattle, WA  
2022 - 2025

### PROFESSIONAL TRAININGS AND CERTIFICATIONS

UNIVERSITY OF PENNSYLVANIA  
Data Science Methods for Digital Learning Platforms Certification  
Certificate ID: 149359454

Philadelphia, PA  
June 2025

AMERICAN INSTITUTES FOR RESEARCH  
The National Assessment of Educational Progress Winter Data Training

Arlington, VA  
January 2023

AMERICAN INSTITUTES FOR RESEARCH  
National Assessment of Educational Progress Process Data Training Series

Arlington, VA  
August 2021

### RESEARCH INTERNSHIPS

DATA SCIENCE 4 EVERYONE  
Graduate Research Assistant

Chicago, IL  
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  
Teaching Assistant, College of Education  
Basic Educational Statistics

Seattle, WA  
March 2022 – June 2022

Teaching Assistant, Department of Psychology  
Fundamentals of Psychological Research

August 2021 – March 2022

CALIFORNIA STATE UNIVERSITY, LONG BEACH  
Lecturer, Department of Mathematics and Statistics  
Statistics for Everyday Life

Long Beach, CA  
December 2020 – January 2021

Teaching Associate, Department of Mathematics and Statistics  
Statistics for Everyday Life  
Essential Algebra A/B  
The Power of Mathematics

August 2018 – December 2020

Supplemental Instructor  
Business Calculus  
Calculus I

August 2017 – August 2018

## RESEARCH EXPERIENCE

CENTER FOR SOCIAL SCIENCE COMPUTATION AND RESEARCH  
Statistical Research Consultant  
University of Washington

Seattle, WA

June 2021 – August 2021; June 2025 – Present

Provided statistical and programming consulting services to students and faculty across the UW campus. Design and host workshops on quantitative research methods.

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.

## 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. (In Press). Investigating Answer Choice Bias within a College-Level Introductory Computing Assessment. *SIGCSE 2026*
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*

## 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](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](https://doi.org/10.31234/osf.io/zr3je_v1)

## PRESENTATIONS

1. **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.
2. **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
3. **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.
4. **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
5. **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.
6. **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.
7. **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.
8. **Quan, Y.** (2024, October 18). *Item Response Theory (IRT) Model Selection and Applications* [Invited Talk]. UW Behavioral Research Center for HIV, Seattle, WA, United States.

9. **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
10. **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>
11. **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
12. **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
13. **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
14. **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 AND IN PREPARATION

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. *Psychological Methods*
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