HE REN

Email: heren@uw.edu | Phone: 206-255-3108 | Website: www.heren.life

PROFESSIONAL SUMMARY

I have over five years of experience in psychometrics and data science, with proficiency in R and Python.
My research interests focus on Item Response Theory (IRT), Cognitive Diagnostic Modeling (CDM), Differential Item Functioning (DIF), Response Time (RT), Large-Scale Assessment (LSA), and the application of machine learning/AI in psychometrics. I am dedicated to promoting fairness and addressing ethical challenges through interpretable and valid measurements. I am also passionate about integrating AI with psychometric principles to develop transparent, fair, and socially responsible models that bridge the gap between computer science and social science.

EDUCATION

06/2027 (Exp.) University of Washington (UW). Seattle, WA, United States
PhD Measurement & Statistics (Advisor: Chun Wang, PhD)

Beijing Normal University (BNU). Beijing, China
06/2022 **MEd Psychology (Advisor: Ping Chen, PhD)**
Thesis Title: New termination rule for multicategory multidimensional computerized classification testing: From the perspectives of psychometrics and machine learning

06/2019 **BS Statistics**

SELECTED AWARDS/HONORS

2024 Psychometric Society Travel Award
2024 UW Center for Statistics and Social Sciences (CSSS) Travel Award
2024 UW Graduate and Professional Student Senate (GPSS) Travel Grant
2024 UW College of Education Travel Grant
2022 Outstanding Graduate of Beijing
2021 China National Scholarship
2020 The First Prize Scholarship of Beijing Normal University
2020 Meritorious Winner in the Interdisciplinary Contest in Modeling (ICM; As Student Advisor)

RESEARCH EXPERIENCE

06/2024–09/2024 **Research Assistant,** University of Washington, Seattle, WA, United States
NSF Project 2300382 HARLI: Harvesting actionable results for learning and instruction: A novel mixed methods approach to extracting and validating information from diagnostic assessment
PI: Chun Wang, PhD

- Pioneered the application of causal discovery methods to recover the facet map
- Developed and evaluated an innovative longitudinal cognitive diagnostic model
- Collaborated weekly with content experts to interpret and refine modeling results, as well as integrate feedback to improve the analytical process

09/2022–09/2024 **Research Assistant,** University of Washington, Seattle, WA, United States
NIH Project 5R01AG077706-02 HOPE: Achieving home discharge for institutionally bound patients with PROMs, AI, and the HER
PIs: Andrea Cheville, MD & Chun Wang, PhD

- Cleaned a massive electronic health record (EHR) dataset with over 10 million records and conducted descriptive statistics
- Conducted a comprehensive comparison of multiple fairness metrics, bridging their statistical definitions with social context and commonly used predictive performance metrics
- Developed a prediction model that can handle a large proportion of missingness and variable selection using advanced regularization methods

06/2019–08/2019 **Research Assistant,** National Assessment Center for Education Quality, Beijing, China
Chinese Testing International Co. Project: Vertical linking based on large-scale assessment projects in China
PI: Ping Chen, PhD

- Participated in the research on test equating design and methods
- Helped with programming for Monte Carlo simulation programs to compare different equating methods
- Prepared for presentation slides and posters

TEACHING EXPERIENCE

06/2023–Present **Statistical Consultant,** UW Center for Social Science Computation and Research, Seattle, WA, United States
Supervisor: Jerald Herting, PhD

- Conducted workshops on R Programming for faculty and students
- Provided statistical, methodological, and computation consultation to improve the research of faculty and students

09/2020–01/ 2021 **Teaching Assistant,** Beijing Normal University, Beijing, China
Awarded as Excellent Teaching Assistant
Course: Adaptive testing and diagnostic adaptive assessment

- Taught R programming and tutored 18 graduate students in foundational statistics
- Reviewed and provided feedback on weekly assignments

INTERNSHIPS

05/2022–07/2023 **Psychometrician,** ByteDance Ltd., Beijing, China

- Conducted descriptive statistics, data visualization, and results interpretation
- Identified the items in which the difficulty parameters were abnormally labeled through quantitative analysis
- Simulated item recommendation rules and adjusted the recommendation rules based on the simulation results

PUBLICATIONS

PEER-REVIEWED ARTICLES

1. Parker, M.C., **Ren, H.**, Li, M., & Wang, C. (2024). Intersectional biases within an introductory computing assessment. *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1,* 1021–1027. https://doi.org/10.1145/3626252.3630882
2. Huang, Y., **Ren, H.**, & Chen, P. (2023). Item selection methods with exposure and time control for computerized classification test. *British Journal of Mathematical and Statistical Psychology, 76*(1), 52–68. https://doi.org/10.1111/bmsp.12281
3. Chen, P., Li, X., **Ren, H.**, & Xin, T. (2023). Influence factors of cross-test-cycles linking: A modified single group design (in Chinese). *Journal of Psychological Science, 46*(4), 960–970. https://doi.org/10.16719/j.cnki.1671-6981.202304025
4. **Ren, H.**, Huang, Y., & Chen, P. (2022). Types, characteristics, and application of termination rules in computerized classification testing (in Chinese). *Advances in Psychological Science, 30*(5), 1168–1182. https://doi.org/10.3724/SP.J.1042.2022.01168
5. **Ren, H.**, Xu, N., Lin, Y., Zhang, S., & Yang, T. (2021). Remedial teaching and learning from a cognitive diagnostic model perspective: Taking the data distribution characteristics as an example. *Frontiers in Psychology, 12*, Article 628607. http://doi.org/10.3389/fpsyg.2021.628607
6. **Ren, H.**, & Chen, P. (2021). Two new termination rules for multidimensional computerized classification testing (in Chinese). *Acta Psychologica Sinica, 53*(9), 1044–1058. https://doi.org/10.3724/SP.J.1041.2021.01044
7. **Ren, H.,** Lyu, W., Wang, C., & Xu, G. (under review). A novel method for detecting intersectional DIF: Multilevel random item effects model with regularized Gaussian variational estimation. *Psychometrika*.

8. **Ren, H.,** Wang, C., Xu, G., & Weiss, D. (under second-round review). Constructing a binary prediction model with incomplete data: Variable selection to balance fairness and precision. *Psychological Methods*.
9. **Ren, H.,** Wang, C., & Li, M. (under review). Using causal discovery to uncover attribute maps from cognitive diagnostic models: Beyond attribute hierarchy. *Journal of Educational and Behavioral Statistics*.
10. **Ren, H.,** Wang, C., Weiss, D., Bowles, K., Xu, G., Keeney, T., & Cheville, A. (under review). Using machine learning to identify social determinants of health that impact discharge disposition for hospitalized patients. *Journal of the American Medical Directors Association*.

PRESENTATIONS

11. **Ren, H.,** & Wang, C. (2025, April). *A longitudinal diagnostic facet status model: Tracking the learning trajectory.* To be presented at the Annual Meeting of the National Council on Measurement in Education (NCME), Denver, CO.
12. **Ren, H.,** Pan, Q., Zhang, Y., & Lyu, W. (2025, April). *Item reduction for digital literacy assessment: Perspectives from content-expert, psychometrics, and machine learning.* To be presented at the Annual Meeting of the National Council on Measurement in Education (NCME), Denver, CO.
13. **Ren, H.,** Lyu, W., Wang, C., & Xu, G. (2024, July). *Regularized Gaussian variational estimation for detecting intersectional differential item functioning.* Presented at the 2024 International Meeting of the Psychometric Society (IMPS), Prague, Czech Republic.
14. **Ren, H.**, & Wang, C. (2024, April). *Variable selection and binary prediction with incomplete data: Balance between fairness and precision.* Presented at the Annual Meeting of the American Educational Research Association (AERA), Philadelphia, PA.
15. **Ren, H.**, Wang, C., Li, M., & Parker, M. (2024, April). *Detecting intersectional differential item functioning: A comparison of two methods.* Presented at the Annual Meeting of the American Educational Research Association (AERA), Philadelphia, PA.
16. **Ren, H.**, Wang, C., & Sanders, E.A. (2024, April). *Modeling between- and within-person response time-response dependency: A comparison between two approaches.* Presented at the Annual Meeting of the National Council on Measurement in Education (NCME), Philadelphia, PA.
17. Huang, Y., **Ren, H.**, & Chen, P. (2022, April). *New item selection designs for computerized classification test.* Poster presented at the Annual Meeting of the National Council on Measurement in Education (NCME), San Diego, CA (Online).
18. **Ren, H.**, & Chen, P. (2020, April). *Research on termination rules of multidimensional computerized classification testing.* Poster presented at the Annual Meeting of the National Council on Measurement in Education (NCME), Online.
19. **Ren, H.** (2025, February). Using AI to Help Program/Code in R. Workshop at Center for Social Science Computation and Research, University of Washington, Seattle, WA.
20. **Ren, H.** (2024, March). Introduction to Pytorch. Workshop at Measurement & Statistics Seminar, University of Washington, Seattle, WA.
21. **Ren, H.** (2024, January). Introduction to R. Workshop at Center for Social Science Computation and Research, University of Washington, Seattle, WA.
22. **Ren, H.** (2023, October). Introduction to R. Workshop at Center for Social Science Computation and Research, University of Washington, Seattle, WA.

SERVICE

REVIEWER

2025–Now	Journal of Educational and Behavioral Statistics
2022–Now	Journal of Educational Measurement
2023, 2024	National Council on Measurement in Education (NCME) Annual Meeting
2023, 2024	American Educational Research Association (AERA) Annual Meeting
2023, 2024	ACM Technical Symposium on Computer Science Education (SIGCSE)

COMMITTEE MEMBER

2023–2024	Committee of NCME Brenda Loyd Outstanding Dissertation Award (Student Member)