

SHIYU WANG

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EDUCATION

University of Illinois at Urbana Champaign AUGUST 2011 – MAY 2016
Ph.D. *Statistics*

Beijing Normal University, China SEPTEMBER 2007 – JUNE 2011
B.S. *Statistics, School of Mathematical Science*

ACADEMIC POSITION

The University of Georgia MAY 2017 – Present
Adjunct Assistant Professor, Department of Statistics

The University of Georgia AUGUST 2016 – Present
Assistant Professor, Department of Educational Psychology

RESEARCH INTERESTS

- Latent Variable Modeling, including Item Response Theory and Cognitive Diagnostic Modeling
- Adaptive design, including Computerized Adaptive Testing and Multistage Testing
- Educational and Psychological Measurement
- Automated Test Assembly
- Educational Statistics

PUBLICATIONS

Peer-reviewed Journal Articles

* indicates supervisory role of a graduate student as co-authors

1. **Wang, S.**, Xiao, H., & Cohen, A.(in press), Adaptive Weight Estimation of Latent Ability: Application to Computerized Adaptive Testing with Response Revision. *Journal of Educational and Behavioral Statistics*
2. Bao, Y.* Shen, Y.*, **Wang, S.** & Bradshaw, L. (2020). Flexible Computerized Adaptive Tests to Detect Misconceptions and Estimate Ability Simultaneously. *Applied Psychological Measurement*.
3. **Wang, S.**, Chen, Y. (2020). Using Response Times and Response Accuracy to Measure Fluency Within Cognitive Diagnosis Models. *Psychometrika*, 85(3), 600-629.
4. **Wang, S.**, Hu, Y., Wang, Q *., Wu, B., Shen, Y. *, & Carr, M. (2020) The Development of a Multidimensional Diagnostic Assessment with Learning Tools to improve 3-D Mental Rotation Skills.*Fronteier in Psychology*,11.
5. **Wang, S.**, Zhang, S., Shen, Y*. (2019). A joint modeling framework of responses and response times to assess learning outcomes. *Multivariate behavioral research*, 1-20.
6. **Wang, S.**, Fellouris, G. & Chang, H. (2019) Statistical Foundations for Computerized Adaptive Testing that Allows for Response Revision. *Psychometrika*, 84(2), 375-394
7. Tu, D., **Wang, S.**, Cai, Y., Douglas, J. & Chang, H. (2019). Cognitive Diagnostic Models with Attribute Hierarchies: Model Estimation with a Restricted Q matrix Design. *Applied psychological measurement*, 43(4), 255-271.

8. Zhang, S*.& **Wang, S.** (2018) Modeling Learner Heterogeneity: A Mixture Learning Model with Responses and Response Times. *Frontiers in Psychology*, 9,2339.
9. **Wang, S.**, Zhang, S., Douglas, J.,& Culpepper, S.(2018). Using Response Times to Assess Learning Progress: A joint model for responses and response times. *Measurement: Interdisciplinary Research and Perspectives*, 16(1), 45-58.
10. **Wang, S.**(2018). The Two-Stage Maximum Likelihood Estimation in Misspecified Restricted Latent Class Model. *British Journal of Mathematical and Statistical Psychology*,71(2), 300-333.
11. **Wang, S.**, Yang, Y., Culpepper, S., & Douglas, J.. (2018). Tracking skill acquisition with cognitive diagnosis models: A higher-order hidden Markov model with covariates. *Journal of Educational and Behavioral Statistics*,43(1), 57-87.
12. Chen, Y., Culpepper, S.A., **Wang, S.** and Douglas, J. A. (2018). A hidden Markov model for learning trajectories in cognitive diagnosis with application to spatial rotation skills. *Applied Psychological Measurement*,42(1), 5-23.
13. **Wang, S.**, Fellouris, G. & Chang, H. (2017). Computerized Adaptive Testing that Allows for Response Revision: Design and Asymptotic Theory. *Statistica Sinica*, 27, 1987-2010.
14. **Wang, S.**, Zheng, Y., Zheng, C., Su, Y. H., & Li, P. (2016). An Automated Test Assembly Design for a Large-Scale Chinese Proficiency Test. *Applied Psychological Measurement*, 40(3), 233-237.
15. **Wang, S.**, Lin, H., Chang, H. , & Douglas, J. (2016). Hybrid Computerized Adaptive Testing: From Group Sequential Design to Fully Sequential Design. *Journal of Educational Measurement*, 53(1), 45-62.
16. **Wang, S.** & Douglas, J.A. (2015). Consistency of Nonparametric Classification in Cognitive Diagnosis. *Psychometrika*,80(1), 85-100.

Book Chapter

17. Zhang, S., Douglas, J., **Wang, S.**, & Culpepper, S. (2019). Reduced Reparameterized Unified Model Applied to Learning Spatial Reasoning Skills. *The Handbook of Diagnostic Classification Models*. (pp. 503-524). Springer, Cham.

Conference publication (peer review)

18. Xiao, H., Gao, J., Wang, Z., **Wang, S.**, Su, L., & Liu, H. (2016). *A Truth Discovery Approach with Theoretical Guarantee*. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD): Research Track*

Submitted Manuscripts

19. Xiao, H., **Wang, S.**, Lu,S, & Gao, J. Toward Quality of Information Aware Distributed Machine Learning

Manuscripts in Preparation

20. Shen, Y * & **Wang, S.** Clustering analysis to explore learning behaviors from a computer-based learning program.
21. **Wang, S.** & Xiao, H. The Application of Matrix Completion to Item Response Theory Model Calibration from Targeted Testing designs.
22. Chen, Y. & **Wang, S.** Data-drive Attribute Hierarchy Detection Using Bayesian Graphical Model designs.

GRANTS

Grants Received

Co-Principal Investigator A Multi-phase development of the Electric Circuit Concepts Diagnostic tool: Phase I (2020-2023), (\$299,951.), National Science Foundation. PI, Nathaniel Hunsu.

Principal Investigator Dynamic Diagnostic Classification Model based Adaptive Learning: Design and Application (2018-2019)(\$15,000), Junior Faculty Seed Grant in STEM, the University of Georgia.

Principal Investigator The Development of A Computerized Adaptive Test with Response Revision to Improve Classroom Instruction and Assessment (2018-2019)(\$5,000) , Early Career Faculty Grant, College of Education,The University of Georgia.

Principal Investigator The development of a cognitive diagnostic assessment to enhance the learning of 3-D spatial visualization skills (2016-2017)(\$10,000), The Owens Institute for Behavioral Research, The University of Georgia.

Statistical Consultant Diagnostic Inventories of Cognition in Education (2017-2021), (\$1,400,000.), Institute of Educational Sciences, Cognition and Student Learning: Goal 5 Measurement. PI, Laine Bradshaw

Grants Submitted

Principal Investigator Career: Adaptive Design in Education: Advancing the Educational Measurement and Psychometrics Methodologies to Enhance Personalized Assessment and Learning in Education. (2020-2025),(\$670,280), National Science Foundation.

Grants Rejected

Principal Investigator Computerized Adaptive Testing with Response Revision: Theory and Application (2019-2022),(\$432,510), National Science Foundation.

Principal Investigator Collaborative Research: Response Time Models in Latent Class Analysis of Mastery and Fluency(2018-2020),(\$159,237), National Science Foundation.

Co-PI 21st Century Formative Assessments for STEM (2017-2021), (\$842,811), NSF, PI, Chandra Orill.

Senior Personnel Serious Games as Authentic Inquiry Tools within a Real Time Formative Assessment Framework (2017-2022) ,(\$3,300,000), Institute of Educational Sciences. PI, Georgia Hodges.

HONORS AND AWARDS

Jason Millman Promising Measurement Scholar Award, NCME	2020
Early Career Researcher Award, IACAT	2019
Early Career Faculty Research Award, UGA	2018
Norton Prize for Outstanding Doctoral Thesis in Statistics, UIUC	2015
International Association for Computerized Adaptive Testing (IACAT) Young Researcher /Students Grants, Cambridge, England	2015
Pearson Travel Award for International Meeting of the Psychometric Society (IMPS) Beijing,China	2015
Graduate College Spring Conference Travel Award, UIUC	2013–2014
Mathematical First-class Scholarship for Undergraduates, Beijing Normal University, Beijing, China	2008–2011
National Scholarship Endeavors, Ministry of Education, China	2009–2010

PRESENTATIONS

Invited International Conference and Workshop

1. **Wang, S.** (2017, November). Using response time to assess learning progress: A hidden Markov Model for Response and Response Time, *Fifth Conference on the Statistical Methods in Psychometrics*, department of statistics, Columbia University, New York.
2. **Wang, S.** (2017, June). Model learning in Latent Class analysis: A higher-order hidden Markov model with covariates. *Statistical Colloquium*, department of statistics, Beijing Normal University, Beijing, China.
3. **Wang, S.** (2017, June). Track students' growth: Application of the higher order Markov model to spatial reasoning diagnostic tests with learning modules. *The Workshop on Deep Learning in Education*, department of educational technology, East Normal University, Shanghai, China.
4. **Wang, S.** (2016, September). Model Learning in Cognitive Diagnosis: A Case Study in Spatial Reasoning . *Fourth Conference on the Statistical Methods in Psychometrics*, New York, NY.
5. **Wang, S.** (2015, June). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *Fifth International Workshop in Sequential Methodologies*, New York, NY.
6. **Wang, S.** (2014, December). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *The International Computerized Adaptive Testing and Cognitive Diagnosis Workshop*, JiangXi Normal University, JiangXi, China.

Invited Research Talk

7. **Wang, S.** (2019, September). Measuring Learning Outcome Using Responses and Response Times. *Educational and Psychological Measurement Colloquium Series*, Faculty of Education, The University of Hong Kong.
8. **Wang, S.** (2017, October). Model Learning in Latent Class Analysis: a higher-order hidden Markov model with covariates. *The Big Data Analytics Lab*, University of Georgia, GA.
9. **Wang, S.** (2017, March). Computerized Adaptive Testing with Response Revision. *Statistical Colloquium*, department of statistics, University of Georgia, GA.
10. **Wang, S.** (2016, January). Adaptive Testing and Cognitive Diagnosis with Application to Personalized Assessment. *University of Georgia*, Athens, GA.
11. **Wang, S.** (2016, January). Computerized Adaptive Testing that Allows for Response Revision. *University of California*, Los Angeles, CA.
12. **Wang, S.** (2015, March). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *Department of Educational Measurement and Statistics* , *University of Iowa*, Iowa City, IA.
13. **Wang, S.** (2014, September). Developing Cutting-Edge Technologies for Chinese Language Proficiency Test (HSK). *Confucius Institute Day and Open House*, *School of Education*, *University of Illinois*, Urbana-Champaign, IL.
14. **Wang, S.** (2013, February). A Modified Maximum Likelihood Procedure for CAT Consisting of Both Dichotomous and Polytomous Items. *Department of Psychology*, *University of Illinois*, Urbana-Champaign, IL.

Conference Presentation

15. **Wang, S.** (2020, Apr 17 - 21) Using Exploratory and Confirmatory Approaches to Explore Students' Learning From a Multidimensional Diagnostic Assessment With Learning Tools to Improve

- 3-D Mental Rotation Skills [Invited Poster Session]. AERA Annual Meeting San Francisco, CA <http://tinyurl.com/trgmzdh> (Conference Canceled)
16. **Wang, S.** and Chen, Yinghan (2019, June). Automated Attribute Hierarchy Detection within Cognitive Diagnosis Modelling framework *Paper presented at the 2019 International Association of Computerized Adaptive Testing*, Minneapolis, MN.
 17. **Wang, S.** (2019, June). Computerized Adaptive Testing with Response Revision: Challenges, Solutions and Applications. *Early Career Researcher Award invited speak at the 2019 International Association of Computerized Adaptive Testing*, Minneapolis, MN.
 18. **Wang, S.** and Zhang, S. (2019, April). Measuring Learning Outcome using Responses and Response times: Mastery and Fluency. *Paper presented at the 2019 Annual Meeting of the National Council on Measurement in Education*, Toronto, Ontario, Canada.
 19. **Wang, S.**, Zhang, S., Douglas, J. and Culpepper, S. (2018, July). A joint Modeling Framework using responses and response times to track skill acquisition. *Paper presented at the 2018 Joint Statistical Meeting*, Vancouver, Canada.
 20. Zhang, S.& **Wang, S.** (2018, July). Modelling Heterogeneity in Online Learners: A Mixture Learning Model with Responses and Response Times. *Paper presented at the 2018 International Meeting of Psychometric Society*, New York, NY.
 21. **Wang, S.** (2018, June). A joint Modeling Framework using responses and response times to track skill acquisition: Model Estimation and Application. *Paper presented at the 2018 ICASA Applied Statistics Symposium*, New Brunswick, NJ.
 22. **Wang, S.** (2018, April). Diagnostic Assessment with Learning Tools to improve 3D Spatial Rotation Skills. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, New York, NY.
 23. **Wang, S.** (2017, August). Computerized Adaptive Testing with Response Revision: Statistical Foundations, New Challenges and Possible Solutions. *Paper presented at the International Association for Computerized Adaptive Testing Conference*, Niigata, Japan.
 24. Chen, Y., Culpepper, S., **Wang, S.** and Douglas, J. (2017, July). Bayesian Modeling for Learning Trajectories in Cognitive Diagnosis Models. *Paper presented at the 2017 International Meeting for Psychometric Society*, Zurich, Switzerland.
 25. **Wang, S.** (2017, April). Computerized Adaptive Testing with Response Revision. *Paper presented at the Annual Meeting of the American Educational Research Association*, San Antonio, Texas.
 26. **Wang, S.** (2017, April). Tracking change with predictors: A model for learning in cognitive diagnosis. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, San Antonio, Texas.
 27. **Wang, S.** (2017, March). Tracking Skill Acquisition: A family of Higher-Order Hidden Markov Learning Models *Poster at COE Research Conference*, Athens, GA.
 28. **Wang, S.** (2015, September). A Partial Likelihood method for Computerized Adaptive Testing to Allow for Response Revision. *Paper presented at the 2015 International Association of Computerized Adaptive Testing*, Cambridge, England.
 29. **Wang, S.**, Fellouris, G. & Chang, H. (2015, August). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *Paper presented at the 2015 Joint Statistical Meetings*, Seattle, WA.

30. **Wang, S.**, Fellouris, G. & Chang, H. (2015, July). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *Paper presented at the 80th International Meeting of Psychometric Society*, Beijing, China.
31. **Wang, S.**, Fellouris, G. & Chang, H. (2014, November). Sequential Design for Computerized Adaptive Testing Allowing for Response Revision. *Paper presented at the Rober Bohrer Student Workshop in Statistics, Department of Statistics, University of Illinois*, Urbana-Champaign, IL.
32. **Wang, S.** & Douglas, J.A. (2014, July). Model Misspecification in Cognitive Diagnosis: Asymptotic Behavior of Maximum Likelihood Classification and A Robust Alternative. *Paper presented at the 79th Annual Meeting of the Psychometric Society*, Madison, MA.
33. **Wang, S.**, Lin, H., Chang, H. & Douglas, J.A. (2014, April). Hybrid Computerized Adaptive Testing: From Group Sequential Design to Fully Sequential Design. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, Philadelphia, PA.
34. **Wang, S.**, Chang, H. & Douglas, J.A. (2013, April). A Modified Maximum Likelihood Procedure for CAT Consisting of Both Dichotomous and Polytomous Items. *Paper presented at the Annual Meeting of the American Educational Research Association*, San Francisco, CA.
35. **Wang, S.** & Douglas, J.A. (2012, November). Consistency of Nonparametric Classification in Cognitive Diagnosis. *Paper presented at the Rober Bohrer Student Workshop in Statistics, Department of Statistics, University of Illinois*, Urbana-Champaign, IL.
36. **Wang, S.** & Douglas, J.A. (2012, July). Consistency of Nonparametric Classification in Cognitive Diagnosis. *Paper presented at the 77th Annual Meeting of the Psychometric Society*, Lincon, NE.

Mentored Student Presentations/Posters

37. Shen, Y*.& **Wang, S.** (2019, July). Investigating Students' Testing Behaviors Using Mixed Types of Process Data. *Paper presented at the International Meeting of Psychometric Society*, Santiago, Chile.
38. Shen, Y*.& **Wang, S.** (2019, April). Exploratory Analysis of Process Data to Investigate Students Learning Behaviors. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, Toronto, Ontario, Canada.
39. Yan, Y*.& **Wang, S.** (2019, April). An Item-level Dynamic Learning Model. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, Toronto, Ontario, Canada
40. Shen, Y*.& **Wang, S.** (2019, January). Investigating Students Learning and Testing Behaviors Using Multivariate Data Analysis. COE research conference, Athens, GA.
41. Yan, T*.& **Wang, S.** (2019, January). Measuring Learning Effectiveness: An Item-level Dynamic Learning Model. COE research conference, Athens, GA
42. Shen, Y*., Bao, Y*.,**Wang, S.** & Bradshaw, L. (2018, April). Detecting Misconceptions and Estimating Ability Simultaneously: A Hybrid Computerized Adaptive Testing Framework. *Paper presented at the Annual Meeting of the National Council on Measurement in Education*, New York, NY.
43. Shen, Y*., Bao, Y*.,**Wang, S.** & Bradshaw, L. (2018, March). Detecting Misconceptions and Estimating Ability Simultaneously: A Hybrid Computerized Adaptive Testing Framework. *Poster Presented at the College of Education Research Conference*, Athens, GA.
44. Shen, Y*., Bao, Y*., **Wang, S.** & Bradshaw, L. (2017, August). Using Computerized Adaptive Testing to Detect Students' Misconceptions: Exploration of Item Selection. *Paper presented at the International Association for Computerized Adaptive Testing Conference*, Niigata, Japan.

Minho Kwak, Quantitative Methodology Program, Educational Psychology, 2019.
Jiajun Xu, Quantitative Methodology Program, Educational Psychology, In progress.
Guoguo Zheng, Quantitative Methodology Program, Educational Psychology, In progress.

Master Committee Member

Selay Zor, Quantitative Methodology Program, Educational Psychology, 2018 May.

SERVICE TO INSTITUTION

University of Georgia, College of Education

COE Research Conference Committee, 2017

University of Georgia, Department of Educational Psychology

The Owen Scott Research Competition Award Committee, 2017, 2018

University of Georgia, Department of Educational Psychology

The Search Committee for Lecturer, Educational Psychology, 2018

PROFESSIONAL SERVICE & AFFILIATIONS

Manuscript Reviewer

Applied Psychological Measurement,	2012 – PRESENT
British Journal of Mathematical and Statistical Psychology,	2017 – PRESENT
Journal of Educational Behavioral and Statistics.	2017 – PRESENT
Journal of Educational Measurement.	2017 – PRESENT
The American Statistician.	2018 – PRESENT
Frontiers in Psychology.	2017 – PRESENT
Psychometrika.	2019 – PRESENT
Journal of Classification	2019 – PRESENT
Structure Equation Modelling	2019 – PRESENT
Educational and Psychological Measurement	2019 – PRESENT
Journal of Experimental Education	2019 – PRESENT
The Annual Meetings of National Council on Measurement in Education.	2016 – PRESENT

Conference Committee

Member, NCME Dissertation Award Committee	APRIL 2017 – APRIL 2019
Chair, NCME Dissertation Award Committee	APRIL 2019 – APRIL 2020
Program Chair, AERA SIG Cognition and Assessment Conference Program	APRIL 2019 – APRIL 2020

Member of Professional Associations

American Educational Research Association, Division D (Measurement & Research Methodology)	JANUARY 2012 – PRESENT
National Council on Measurement in Education	JANUARY 2014 – PRESENT
Psychometric Society	AUGUST 2013 – PRESENT
American Statistical Association	JANUARY 2014 – PRESENT
International Association for Computerized Adaptive Testing	JANUARY 2015 – PRESENT

SKILLS

Highly proficient programming skills: R, Matlab

Experience with statistical and specialized software: SAS, SPSS, WINSTEP, flexMIRT

Word Process: Latex