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Education

- 2021 – 2026 **Ph.D., Stanford University** Learning Sciences and Technology Design /
Developmental and Psychological Sciences
Advisors: *Jason Yeatman, Nick Haber, Ben Domingue*
Thesis: *Bridging Psychometrics and Psychophysics to Advance Digital Dyslexia Screening at Scale*
- Ph.D. Minor, Stanford University** Computer Science
- 2018 – 2019 **M.S.Ed., University of Pennsylvania** Learning Sciences and Technologies
Advisor: *Ryan Baker*
Thesis: *A Literature Review to Compare Natural Language Processing with Critical Discourse Analysis in Understanding Students' Science Practices*
- 2016 – 2018 **B.S., New York University** Computer Science
B.S., New York University Teaching Chemistry 7-12
Advisor: *Susan Kirch*
Honors Thesis: *Understanding students' dialogic learning experience in an emergent transformative science classroom*
- 2014 – 2015 **Boston University** Computer Science, Science Education

Credential

- 2018 – 2023 Chemistry Initial Certificate 7–12 with 5–6 Extension, New York State Education Department

Research Interests

- Psychometrics, natural language processing, multimodal learning analytics
- Evaluation of AI in education, dyslexia, special education, STEM education

Competitive Fellowships and Grants

- 2025-2026 **Stanford Human-Centered AI Graduate Fellow**, Stanford University (\$3,000) - 19 students across the university per year
- 2023-2026 **Stanford Interdisciplinary Graduate Fellowship**, Stanford University (\$174,600) - 34 students across the university per year

Awards

- 2025 **Best Poster Award**, National Council on Measurement in Education, Graduate Student Issues Committee (\$1,000)
- 2023 **Distinguished Poster Award**, International Meeting of Psychometrics Society (\$500)
- 2019 **Best Paper Nominee**, International Conference on Computer Supported Collaborative Learning
- 2018 **Merit-Based Scholarship**, University of Pennsylvania (\$5,000)
Luke Hallenbeck Scholarship, New York University (\$10,000)
Letha Hurd Morgan Award, New York University, a graduation award in recognition of outstanding scholastic attainment and service to their department and school (1 scholar per graduating class)

Awards (continued)

- Honors in Science Education**, New York University
- 2017 **John Park Graduate Student Convention Travel Award**, School Science and Mathematics (\$450)
- Undergraduate Student Spotlight**, New York University Courant Computer Science

Research Experiences

- 2025 – ... **Enhancing Math Tutoring Through Whiteboard Interaction Data**
Researcher at EduNLP lab, Stanford University
Mentors: *Dora Demszky, Judy Fan, Susanna Loeb*
Explore how digital whiteboard interactions can illuminate and improve the quality of math tutoring, particularly when delivered by novice instructors.

- 2021 – ... **Rapid Online Assessment of Reading**
Researcher at Brain Development and Education Lab, Stanford University
Mentors: *Jason Yeatman, Ben Domingue, Mike Frank*

Data Analytics

- Develop an adaptive testing solution using Item Response Theory and Maximum Fisher Information that increased the testing efficiency to 40%.
- Conduct an online randomized controlled trial to evaluate the effect of trial-by-trial feedback on students' test performance and make actionable suggestions to school partners in selecting testing modes.
- Lead psychometric research: apply statistical analysis and data science techniques to solve operational questions: optimize test assembly, inform standard-setting in the score reports, and analyze longitudinal evidence on the validity (predictive and concurrent) and reliability of assessments.
- Work closely with engineers and research partners to improve the quality and user experience of assessments, score reports, and data access.
- Contribute to the authorship of the [technical manual](#) and the application for California Reading Difficulties Risk Screener ([Approved!](#)).

Design and Implementation

- Design, implement, and deploy large-scale online applications to assess foundational reading skills, serving over 50,000 K-12 students across the U.S., Colombia, Brazil, Italy, and Canada.
- Develop an open-source library, [jsCAT](#), enabling real-time, browser-based computerized adaptive testing for broad application in behavioral research.

Human-AI Alignment and Evaluation Projects

- Fine-tuned Llamaz to align AI agents' responses with previous students' responses; designed strategic human-in-the-loop systems to automate item generation and model item difficulty for creating [parallel testing forms](#).
- Created a large dataset to explore how multimodal embeddings (such as CLIP) predict children's vocabulary development.
- Lead a research collaboration with Microsoft Education to evaluate the efficiency of an AI-powered reading tool in promoting students' sentence reading development.

Research Experiences (continued)

- 2024 Summer **Automatic Item Generation of Reading Comprehension Items**
Ida Lawrence Research Intern at ETS Research Institute
Mentors: *Michael Flor, Zuowei Wang*
- Conducted literature review on the construct of inference making and computational techniques related to bridging anaphora recognition and resolution.
 - Annotated and analyzed the existing item bank to explore the relationship between item types and the item difficulties.
 - Designed and implemented an automated workflow utilizing state-of-the-art LLMs for generating test items aligned with targeted inference types, and established rigorous evaluation criteria to ensure quality and consistency.
- 2018 – 2019 **Linguistic Analysis and a Hybrid Human-Automatic Coach for Improving Math Identity**
Research Assistant at Penn Center for Learning Analytics, University of Pennsylvania
- Mentor: *Ryan Baker*
- Built latent semantic spaces to model 5th-graders' math discourse in Reasoning Mind.
 - Conducted the stepwise regression to investigate relationships among students' math discourse, learning outcomes, and their math identity.
- Mitosis Idea Manager in Web-Based Inquiry Environment (WISE)**
Research Assistant at RIDDLE Lab, New York University
Mentor: *Camillia Matuk*
- Led qualitative and quantitative data analysis to investigate students' scientific inquiry.
 - Applied topic modeling to build features to evaluate students' science explanation.
 - Created visualizations of students' learning trajectory across the learning unit.
- 2017 – 2018 **Children Being and Becoming Learner-Scientists: Inquiry Tools for Learning Cultures**
Honors Thesis, New York University
Mentor: *Susan Kirch*
- Conducted literature review in learning theories, transformative practices and discourse analysis.
 - Co-designed instructional tools that help pre-service teachers better reflect the learning processes in the classroom.
 - Longitudinal video analysis on children's dialogic learning experience when engaging in transformative scientific practices.

Professional Experiences

- 2019 – 2021 **Chemistry Subject Expert Teacher**
BASIS Independent Brooklyn, NY
- Taught 6th-grade and 7th-grade chemistry classes
 - Created engaging and rigorous curriculum infused with laboratory experiences and creative projects that meet both BASIS curriculum and the NGSS standards
 - Coordinated and facilitated Creative Computing Club that engaged middle school students with Scratch
- 2018 – 2019 **FirstHand Lab Teaching Intern**
The University City Science Center, Philadelphia, PA
- Co-taught one Maker Education class for students from Philadelphia Public Schools
 - Wrote science mentor curriculum on "how to invite scientists to your classroom"
 - Co-designed Scratch curriculum for patients in Children's Hospital of Philadelphia.

Professional Experiences (continued)

2017 – 2018

Secondary Science Student Teacher

East Side Middle School/Brooklyn Preparatory High School, New York, NY

- Co-taught one 8th-grade physical science class and three 7th-grade life science classes
- Co-taught one 11th-grade chemistry class and one AP chemistry class
- Provided IEP and ELL students with accommodations and modifications specific to their science learning

Publications

* indicates equal first-author contributions

Journal Articles

1. **Ma, W. A.**, Jimenez, M., Siebert, J. M., Saavedra, A., Townley-Flores, C., Richie-Halford, A., Domingue, B. W., & Yeatman, J. D. (in press). Improving validity and efficiency of digital dyslexia screening through trial by trial feedback. *Psychological Assessment*.
https://doi.org/10.31234/osf.io/4uag6_v2
2. **Ma, W. A.**, Richie-Halford, A., Burkhardt, A. K., Kanopka, K., Chou, C., Domingue, B. W., & Yeatman, J. D. (2025). Roar-cat: Rapid online assessment of reading ability with computerized adaptive testing. *Behavior Research Methods*, 57(1), 1–17. <https://doi.org/10.3758/s13428-024-02578-y>
3. Gijbels, L., Burkhardt, A., **Ma, W. A.**, & Yeatman, J. D. (2024). Rapid online assessment of reading and phonological awareness (roar-pa). *Scientific Reports*, 14(1), 10249.
<https://www.nature.com/articles/s41598-024-60834-9>
4. Yeatman, J. D., Tran, J. E., Burkhardt, A. K., **Ma, W. A.**, Mitchell, J., Yablonski, M., Gijbels, L., Townley-Flores, C., & Richie-Halford, A. (2024). Development and validation of a rapid and precise online sentence reading efficiency assessment. *Frontiers in Education*, 9, 1494431.
<https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2024.1494431/full>

Conference Proceedings

1. **Ma, W. A.**, Flor, M., & Wang, Z. (2025). Automatic generation of inference making questions for reading comprehension assessments. *20th Workshop on Innovative Use of NLP for Building Educational Applications*. <https://arxiv.org/abs/2506.08260>
2. Tan, A. W. M., Yu, S., Long, B., **Ma, W. A.**, Murray, T., Silverman, R. D., Yeatman, J. D., & Frank, M. C. (2024). Devbench: A multimodal developmental benchmark for language learning. *Advances in Neural Information Processing Systems*. <https://doi.org/https://arxiv.org/abs/2406.10215>
3. Zelikman, E., * **Ma, W. A.**, * Tran, J., Yang, D., Yeatman, J., & Haber, N. (2023). Generating and evaluating tests for k-12 students with language model simulations: A case study on sentence reading efficiency. *Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing*, 2190–2205. <https://doi.org/10.18653/v1/2023.emnlp-main.135>
4. Matuk, C., **Ma, W.**, Sharma, G., & Linn, M. (2019). The lifespan and impact of students' ideas shared during classroom science inquiry. *Proceedings of the 13th Annual International Conference for Computer Supported Collaborative Learning. Lyon: International Society for the Learning Sciences.*, 49–56.
<https://par.nsf.gov/servlets/purl/10180393>
5. **Ma, W.** (2017). A computer tool that will allow secondary science teachers to differentiate reading materials for students with varied reading abilities. *Proceedings of the 116th annual convention of the School Science and Mathematics Association*, 14–21.
<https://www.ssmas.org/assets/Proceedings/Proceedings2017FINALWeb.pdf#page=15>

Preprints/Under Review

1. Long, B., **Ma, W. A.**, Tan, A. W. M., Silverman, R., Frank, M. C., & Yeatman, J. D. (2025). Developmental changes in the precision of visual concept knowledge. https://doi.org/10.31234/osf.io/nbj62_v1
2. **Ma, W. A.**, Liu, Y., Kanopka, K., Ma, W., & Domingue, B. W. (2025). A comparison of the predictive performance of continuous and class-based latent trait models. https://osf.io/preprints/psyarxiv/acwdz_v1
3. Roncete, K., Klotz, L., **Ma, W. A.**, Arteaga, E., Alves, L., Chrispim, R., Diniz, D., Yeatman, J., & Lichand, G. (2025). The opportunities and challenges of digital assessments in low-resource settings: Evidence from measuring reading fluency in brazil. <https://doi.org/10.21203/rs.3.rs-5516837/v1>
4. Bhat, K. G., Mogan, A. D., Saavedra, A., Fuentes-Jimenez, M., Siebert, J. M., **Ma, W. A.**, Townley-Flores, C., Richie-Halford, A., Wilkey, E. D., & Yeatman, J. (2024). Shared and unique influences of phonological processing on reading and math. <https://doi.org/10.31219/osf.io/em3bg>
5. He-Yueya, J., **Ma, W. A.**, Gandhi, K., Domingue, B. W., Brunskill, E., & Goodman, N. D. (2024). Psychometric alignment: Capturing human knowledge distributions via language models. <https://arxiv.org/abs/2407.15645>
6. Siebert, J. M., Fuentes-Jimenez, M., **Ma, W. A.**, Saavedra, A., Townley-Flores, C., & Yeatman, J. (2024). A fair lexical decision task for monolingual and multilingual spanish-speakers. <https://osf.io/preprints/psyarxiv/qfdpb>

Open Software

1. **Ma, W. A.**, Yeatman, J. D., & Richie-Halford, A. (2023). Jscat: Computer adaptive testing in javascript [Open-source software]. <https://github.com/yeatmanLab/jsCAT>

Selected Presentations

Invited Talks

1. **Ma, W. A.** Bridging psychometrics and ai to accelerate dyslexia screening and progress monitoring for all children. In: Measurement Lab, Harvard Graduate School of Education. 2026.
2. **Ma, W. A.**, Yue, A., Mukherjee, K., Loeb, S., Demszky, D., & Fan, J. When talk is not enough: Understanding variation in digital whiteboard use in online math tutoring. In: Stanford HAI: AI+Education Summit: The AI Inflection Point: What, How, and Why We Learn. 2026.
3. **Ma, W. A.** A comparison of the predictive performance of continuous and class-based latent trait models. In: BEAR Seminar, UC Berkeley. 2025. <https://events.berkeley.edu/educ/event/304591-bear-seminar-a-comparison-of-the-predictive>
4. Zelikman, E., * **Ma, W. A.**, * Tran, J., Yang, D., Yeatman, J., & Haber, N. Generating and evaluating tests for k-12 students with language model simulations: A case study on sentence reading efficiency. In: Stanford HAI: AI+Education Summit: AI in the Service of Teaching Learning. 2024. https://drive.google.com/file/d/1AB7i40LmrW0Ub_QrFaqvcAyPKB8DwoNs/view

Conference Presentations

1. Fuentes-Jimenez, M., **Ma, W. A.**, Maximilian, J., Saavedra, A., Townley-Flores, C., Richie-Halford, A., & Yeatman, J. D. Developing a spanish sentence reading efficiency measure fair for multilingual learners: Roar-frase. In: Annual Meeting of the National Council on Measurement in Education. 2025.
2. **Ma, W. A.**, & Domingue, B. W. A comparison of the predictive performance of continuous and dichotomous latent trait models. In: Annual Meeting of the National Council on Measurement in Education. 2025.

3. **Ma, W. A.**, Fuentes, M., Siebert, J. M., Saavedra, A., Townley-Flores, C., Richie-Halford, A., Domingue, B. W., & Yeatman, J. D. Exploring effects of trial by trial feedback on validity of dyslexia screening. In: Annual Meeting of the National Council on Measurement in Education. 2025.
4. **Ma, W. A.**, Zelikman, E., Tran, J. E., Domingue, B. W., Haber, N., & Yeatman, J. D. Developing parallel forms for sentence reading efficiency using llm-based item response simulator. In: Annual Meeting of the National Council on Measurement in Education. 2025.
5. Long, B., **Ma, W. A.**, Silverman, R., Yeatman, J., & Frank, M. C. Developmental changes in the precision of visual concept knowledge. In: Vision Science Society. 2024.
6. Tran, J. E., **Ma, W. A.**, Burkhardt, A., T., M., Wentzlof, K., Ungashe, A., Fuentes-Jimenez, M., Stone, H., Mitchell, J., Yablonski, M., Gijbels, L., Richie-Halford, A., Townley-Flores, C., & Yeatman, J. D. Improving the efficiency of silent reading measure through timing analyses and automatic ai test generation. In: NCME Special Conference on Classroom Assessment. 2024.
7. **Ma, W. A.**, Burkhardt, A. K., & Yeatman, J. D. Exploring parameter invariance for adaptively assessing reading among students with learning differences. In: Annual Meeting of the National Council on Measurement in Education. 2023.
8. **Ma, W. A.**, Richie-Halford, A., Burkhardt, A., Kanopka, K., Chou, C., Domingue, B., & Yeatman, J. D. Roar-cat: Rapid online assessment of reading ability with computerized adaptive testing. In: International Meeting of the Psychometric Society. 2023.
9. Tran, J. E., **Ma, W. A.**, Gijbels, L., Townley-Flores, C., Siebert, J., Tran, J. E., Murray, T., Fuentes-Jimenez, M., Ramamurthy, M., Richie-Halford, A., & Yeatman, J. D. Rapid online assessment of reading (roar): A platform for developmental cognitive neuroscience research at an unprecedented scale. In: Flux Congress. 2023.
10. **Ma, W.**, Kirch, S. A., Sabouri, P., & Zhang, M. Understanding students' dialogic learning experience in an emergent transformative science classroom. In: National Association for Researching Science Teaching Annual International Conference. 2019.

Graduate Teaching Experiences

Stanford University

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| 2026 | EDUC 423B/SOC 302B: Introduction to Education Data Science: Data Analysis
Teaching Assistant |
| 2025 | EDUC 423A/SOC 302A: Introduction to Education Data Science: Data Processing
Teaching Assistant |
| | EDUC 452: Simulation in Education Research
Teaching Assistant |
| 2024 | EDUC 252: Introduction to Psychometrics
Teaching Assistant |

Professional Activities

Departmental Service to Stanford

- Student representative at the Faculty Search Committee
- Guest lecturer and panel speaker in the department graduate seminar

Service to Field

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| Graduate Student Committee | Psychometric Society 2025 |
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Professional Activities (continued)

Reviewer ACM Learning at Scale conference 2026
International Conference on Educational Data Mining 2026
ACL 2025 20th Workshop on Innovative Use of NLP for Building Educational Applications
NeurIPS 2024 Workshop Large Foundation Models for Educational Assessment
National Council on Measurement in Education 2024, 2025, 2026

Professional Memberships

2023 – Associations for Computational Linguistics (ACL)
2022 – National Council on Measurement in Education (NCME)
2023 – Psychometric Society (IMPS)

STEM Outreach

2017 **Discovery Camp Curriculum Intern**, The Franklin Institute, Philadelphia, PA
2016-2017 **Volunteer Program Assistance**, Go Project (a Saturday program supporting ELL students),
New York, NY
 Girls Who Code Facilitator, Leadership and Public Service High School, New York, NY
2016 **STEM Education Volunteer**, Pacific Science Center, Seattle, WA