

Joel Walsh

Curriculum Vitae

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Research Interests

Educational Technology, Natural Language Processing, Knowledge Representation, Teacher Education, Probabilistic Programming, Multimodal Models, Computer Science Education.

Education

2016–2022 **Ph.D. in Curriculum and Instruction – STEM Education**, *University of Texas at Austin*.

Advisor: Dr. Catherine Rieggle-Crumb

Dissertation Title: “Natural Language Processing in Educational Contexts: Opportunities and Potential Pitfalls”

2019–2022 **M.S. in Computational Science, Engineering, and Mathematics**, *University of Texas at Austin*.

Advisor: Dr. Moriba Jah

Report Title: “Using Relation Extraction to Identify Launch States of Anthropogenic Space Objects”

2012 **M.Ed. and Preliminary Credential – Secondary Mathematics**, *University of California, Los Angeles*.

2008 **B.A. in Political Science**, *University of California, Davis*.

Publications

2023 Foster, C., Hamer, J., **Walsh, J.**, Converse, G., and Souza, C. *Injecting Knowledge Graph Triples into Large Language Models for Passage and Question Generation*. [Whitepaper]. Finetune Learning. [Link](#)

2022 Starbird, M., Wolessensky, W., **Walsh, J.**, Miller, B., and Chahin, T. *The Effective Thinking Calculus Project*. MAA Notes Volume on Diverse, Equitable, and Inclusive Issues in Calculus Programs. [arXiv](#)

2022 **Walsh, J.**, Fenech, M., Tucker, D., Rieggle-Crumb, C., and La Cour, B. *Piloting a Full-year, Optics-based High School Course on Quantum Computing*. Physics Education. [arXiv](#)

2025 **Walsh, J.**, Mamidanna, S., Nye, B., Core, M. G., and Auerbach, D. *Fine-tuning for Better Few Shot Prompting: An Empirical Comparison for Short Answer Grading*. Second Workshop on Automated Evaluation of Learning and Assessment Content (EvalLAC) at the International Conference on Artificial Intelligence in Education (AIED).

[Submitted for review](#)

Kim, G. M., **Walsh, J. A.** *Automated Speech Recognition and Multilingualism in Qualitative Research.*

Presentations

- Oct 2023 Invited Talk and Workshop, Responding to the “Arrival”: Essential Background Information and Strategies for Language Instructors in the Age of Human-Like Language Technologies (Machine Translation and Large Language Models)”
- Sep 2023 Panelist, AI Los Angeles and Loyola Marymount University. Pathways to Progress: AI Literacy and Education
- Mar 2023 Panelist, AI Los Angeles and Loyola Marymount University. Disruptive Technologies and Education
- April 2022 Presentation, Visibilizing Raciolinguistics Conference. The Coded Listening Subject: An Examination of Natural Language Processing Use Cases in Educational Technology
- April 2022 Presentation, AERA Annual Meeting. Lesson Plan Generation using Natural Language Processing: Prompting Best Practices with OpenAI’s GPT-3 Model
- Nov 2021 Presentation, NBME NLP in Assessment Conference. Automated Extraction of Knowledge Graphs from Science Content Standards
- July 2021 Presentation, MIT Connected Ed Conference (Virtual). The Quantum Computing Project
- June 2021 Member, National Council of Teachers of Mathematics - 2021 Dallas Regional Planning Committee. Duties: Planning and review of submitted proposals.
- Jan 2020 Presentation, Creating Balance in an Unjust World Conference on Math Education and Social Justice, Honolulu, HI. Machine Learning Bias: Examining Pretrial Risk Assessment Algorithms
- April 2019 Presentation, UT Austin TEDx Conference - Let’s Grow a Generation of Data Natives
- Jan 2016 Presentation, Creating Balance in an Unjust World Conference on Math Education and Social Justice, San Francisco, CA - Payday Loans and Predatory Lending: Investigating Using Technology in an Algebra 2 Classroom
- July 2014 Presentation, Free Minds, Free People Conference, Chicago, IL - Math and Science as a Critical Lens

Selected Coursework

Statistical Methods I and II, Machine Learning, Statistical Learning, Probability, Mathematical Statistics, Regression Analysis, Social Network Analysis, Bayesian Statistical Methods, Scientific Computing I and II, Computational Linguistics, Natural Language Processing, Design and Analysis of Experiments.

Grants and Fellowships

- 2023–2026 Grant Consultant – Translating Machine Translation for Language Education to Promote Language Learning, Critical Digital Literacies, and Global Citizenship. USDOE International Research and Studies (\$150,000).
- 2021–2022 Graduate Student Continuing Fellowship. University of Texas at Austin.
- 2016–2018 Graduate Student Recruitment Fellowship. University of Texas at Austin.

Relevant Work Experience

- Apr 2024–Present **Postdoctoral Fellow – AI Learning Technologies**, *University of Southern California – Institute for Creative Technologies*.
Supervising and collaborating on generative vision and text projects with undergraduate students. Building software for numerous learning technologies projects for the military, K-16, and adult education contexts. Conducting research on applications of probabilistic programming to learning technologies.
- Sep 2022–Present **Senior Machine Learning Engineer**, *Privateer Space*.
Building and tracking edge-based computer vision models for satellites, developing multi-modal systems for semantic search of images, constructing production cloud (AWS) machine learning pipelines, and guiding research and implementation directions.
- August 2024–Present **Computer Vision instructor**, *Caltech CTME program*.
Developing and delivering a course on modern approaches to computer vision for scientific workforces, professional mentoring.
- May 2022–Aug 2022 **AI Research Intern**, *Finetune Learning*.
Worked on NLP-based assessment tools that utilize structured knowledge and Large Language Models (LLMs).
- May 2021–Present **Consultant – Data Science Curriculum Developer**, *MathAction*.
Responsible for proposal generation and design as part of a Lucas Foundation Project-Based Learning Design Sprint.
- Jan 2020–Jun 2020 **Instructor – Mathematics 175T Computer Science Pathways**, *University of Texas at Austin*.
Part of a Computer Science “micro-credential” for undergraduate math and science majors. Focused on pedagogical content knowledge, multiple representations, computational thinking, and project-based learning.
- 2019–Present **Graduate Research Assistant**, *Texas Advanced Computing Center – Applied Research Laboratories*.
Creating Quantum Computing curriculum for high school students in the Canvas Learning Management System, including Python and mathematics tutorials via Jupyter notebooks.
- 2017–Present **Teaching Assistant**, *UTeach Program, University of Texas at Austin*.
Assisting student teachers with lesson planning, data management, and classroom teaching.
- 2014–2016 **Blended Learning Mathematics Instructor**, *USC Hybrid High School, Los Angeles, CA*.
Digital curriculum creation and implementation.
- 2011–2014 **Mathematics Instructor**, *Locke High School, Los Angeles, CA*.
Taught Algebra 2, Precalculus, Trigonometry, and Integrated Mathematics.

Service and Campus Organizations

- 2024–present Mentor, *AI LA Inclusivity, Diversity, Equity, and Allyship community college program mentor*
- 2024 Reviewer, *Artificial Intelligence in Education*
- 2024 Panelist, National Science Foundation.
- 2021 Reviewer, *Computer Science Education*.
- 2018–Present Founder, LAMDA@edu: Student group focused on Learning Analytics, Machine Learning/Data Mining, and Artificial Intelligence.
- 2020 Expert Declaration (Volunteer), Rio Grande Legal Aid. Provided expert declaration predicting the spread of COVID-19 in federal detention centers for asylum seekers using time series data.
- 2019–2020 Vaccine Cold Chain Analysis (Volunteer), S and S Project Management (Myanmar). Conducted hierarchical modeling and data analysis on vaccine cold chains from Yangon to the Putao region.