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 Riegle-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 Single Subject Teaching Credential – Secondary Mathematics**, *University of California, Los Angeles*.

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

Publications

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).

2025 Nye, B. D., Ambite, J., Matthew, J., Core, M. G., Auerbach, D. D., Ramirez, D. R., and **Walsh, J.** *Training Developer Feedback on AI for Revision of Content (ARC)*. Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC).

2025 Khan, S., **Walsh, J.**, and Nye, B. D. *TopoGen: Training Generative AI to Produce Maps for Experiential Scenarios*. Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC).

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., Wolesensky, 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., Riegle-Crumb, C., and La Cour, B. *Piloting a Full-year, Optics-based High School Course on Quantum Computing*. Physics Education. arXiv

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

2025	Co-PI - Supporting Accommodations for Multilingual Learners. Spencer Foundation Rapid Response Grant.($50,000)
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

Aug 2025–Present **Assistant Professor of Computer Science**, *Occidental College*.
Courses: Introduction to Computer Science, Deep Learning, AI Learning Technologies.

Apr 2024–August 2025 **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 multimodal 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–May 2022 **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.

2019–2021 **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.

2017–2022 **Teaching Assistant**, *UTeach Program, University of Texas at Austin.*
Assisting student teachers with lesson planning, data management, and classroom teaching.

2017–2019 **Teaching Assistant**, *Department of Mathematics, University of Texas at Austin.*
Single variable, Integral, and and multivariable Calculus

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 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.