ALEXANDER SCARLATOS

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SUMMARY

My research focuses on the intersection between natural language processing (NLP) and education, where I develop methods to enhance educational AI systems and simulate student behavior. My contributions include novel reinforcement learning pipelines, large language model (LLM) annotation and evaluation techniques, and machine learning architectures. My work has been published in leading conferences in NLP (EMNLP, ACL, NAACL) and educational AI (AIED, LAK, EDM). Additionally, I have extensive experience in industry-scale full-stack software engineering, allowing me to put research into practice to benefit real students.

EDUCATION

University of Massachusetts Amherst Sep 2021 - May 2026

- PhD in Computer Science, advised by Prof. Andrew Lan, GPA: 4.00/4.00

Stony Brook University Aug 2013 - May 2018

- MS in Computer Science, GPA: 3.90/4.00
- BS in Computer Science with minor in Music Technology, GPA: 3.81/4.00 (Magna Cum Laude)

WORK EXPERIENCE

Cambium Assessment Feb 2025 - June 2025
Research Intern

- Developed methods for question difficulty prediction using LLM-based simulated students.

Google DeepMind Dec 2023 - March 2024
Student Researcher

- Worked with the Magenta team to develop an interface for real-time human-AI musical collaboration.

Bloomberg L.P. July 2018 - Aug 2021
Software Engineer

- Full-stack developer for high volume client-facing applications, designed application architecture and development workflows, built CI/CD tools used across teams, mentored incoming teammates.

Applied Visions Inc. Jan 2016 - Jan 2017
Software Engineer Intern

- Worked on software for visualizing large network security datasets and for building branching story comics.

Eduware Inc. Feb 2014 - Nov 2015
Part-Time Web Developer

- Worked on online testing platforms, automated workflows, and Unity games.

TEACHING EXPERIENCE

Teaching Associate Fall 2025
University of Massachusetts Amherst

- Developed and taught two sections of a first year seminar - Age of Generative AI.

Teaching Assistant Fall 2021, Spring 2024
University of Massachusetts Amherst

· Taught discussion sections for Computer Science 240 - Reasoning Under Uncertainty.

Volunteer Teacher Sep 2019 - June 2020
Code Nation

· Taught programming basics to high schoolers in an underserved community in Brooklyn, NY.

HONORS AND AWARDS

- Winner of best student paper award at AIED 2024.
- Nominated by UMass for Google PhD Fellowship in 2024.
- Member of winning team for NCES Math Automated Scoring Challenge 2023.
- One of the URECA researchers of the month at Stony Brook University, May 2017.
- Honors College and Computer Science Honors Program at Stony Brook University, 2013-2017.
- Presidential Scholarship and Dean's Scholarship from Stony Brook University, 2013.
- Link and A.B. Lawrence Scholarships for community service from First Presbyterian Church of Smithtown, 2013.

SERVICE

- **Mentoring**
  - Two undergraduate students, resulting in a publication at LAK 2025 for one and the other in progress.
  - Two junior PhD students in my lab, each resulting in publications at BEA 2025.
  - A PhD applicant from an underserved community for the UMass PhD Applicant Support Program.
  - Three junior software engineers at Bloomberg L.P.
- **Session Chair** at AIED 2024.
- **Guest Editor** for the Journal of Educational Technology Systems, Special Issue on AI, March 2024.
- **Reviewer** for ACL ARR (May 2025, June 2024, April 2024, Dec 2023, Dec 2022), AIED (March 2025), CHI LBW (Jan 2025), IJAIED (Nov 2024), iRaise (Nov 2024), JLA (Sep 2024), BEA (April 2026, May 2023), JEDM (Sep 2023), JETS (March 2024, Aug 2022).
- **Invited Talks** - speaker at EPFL learning sciences workshop (October 2025), guest lecture for Worcester Polytechnic Institute User Modeling course (Sep 2025), presentation for Simon Fraser University music AI reading group (April 2025), speaker for Mount Holyoke College CS seminar (March 2025), research presentation for National Council on Measurement in Education (Jan 2025), speaker for UMass MassAI club (Nov 2024), guest lecture for UMass Introduction to Machine Learning course (May 2023).
- **Volunteer** at UMass Eureka! Program workshop teaching programming to middle school girls, July 2022.

RESEARCH PUBLICATIONS

Selected Papers:

Simulated Students in Tutoring Dialogues: Substance or Illusion?
ACL 2026

· *Alexander Scarlatos*, Jaewook Lee, Simon Woodhead, Andrew Lan

SMART: Simulated Students Aligned with Item Response Theory for Question Difficulty Prediction
EMNLP 2025

· *Alexander Scarlatos*, Nigel Fernandez, Christopher Ormerod, Susan Lottridge, Andrew Lan

Training LLM-based Tutors to Improve Student Learning Outcomes in Dialogues
AIED 2025

· *Alexander Scarlatos*, Naiming Liu, Jaewook Lee, Richard Baraniuk, Andrew Lan

Exploring Knowledge Tracing in Tutor-Student Dialogues using LLMs
LAK 2025

· *Alexander Scarlatos*, Ryan S. Baker, Andrew Lan

DiVERT: Distractor Generation with Variational Errors Represented as Text for Math Multiple-choice Questions
EMNLP 2024

· Nigel Fernandez*, *Alexander Scarlatos**, Wanyong Feng, Simon Woodhead, Andrew Lan

Improving the Validity of Automatically Generated Feedback via Reinforcement Learning
*AIED 2024 (**Best student paper award**)*

· *Alexander Scarlatos*, Digory Smith, Simon Woodhead, Andrew Lan

Tree-Based Representation and Generation of Natural and Mathematical Language
ACL 2023

· *Alexander Scarlatos*, Andrew Lan

Other Papers:

Interpretable Difficulty-Aware Knowledge Tracing in Tutor-Student Dialogues
BEA (ACL Workshop) 2026

· Shuyan Huang, *Alexander Scarlatos*, Jaewook Lee, Andrew Lan

Letting Tutor Personas "Speak Up" for LLMs: Learning Steering Vectors from Dialogue via Preference Optimization
BEA (ACL Workshop) 2026

· Jaewook Lee, *Alexander Scarlatos*, Simon Woodhead, Andrew Lan

Interpretable Mnemonic Generation for Kanji Learning via Expectation-Maximization
EMNLP 2025

· Jaewook Lee, *Alexander Scarlatos*, Andrew Lan

LookAlike: Consistent Distractor Generation in Math MCQs
BEA (ACL Workshop) 2025

· Nisarg Parikh, *Alexander Scarlatos**, Nigel Fernandez*, Simon Woodhead, Andrew Lan

Exploring LLMs for Predicting Tutor Strategy and Student Outcomes in Dialogues
BEA (ACL Workshop) 2025

· Fareya Ikram, *Alexander Scarlatos*, Andrew Lan

ReaLJam: Real-Time Human-AI Music Jamming with Reinforcement Learning-Tuned Transformers
CHI 2025 LBW

· *Alexander Scarlatos*, Yusong Wu, Ian Simon, Adam Roberts, Tim Cooijmans, Natasha Jaques, Cassie Tarakajian, Cheng-Zhi Anna Huang

Evaluating GPT-4 at Grading Handwritten Solutions in Math Exams
LAK 2025

· Adriana Caraeni, *Alexander Scarlatos*, Andrew Lan

SyllabusQA: A Course Logistics Question Answering Dataset
ACL 2024

· Nigel Fernandez, *Alexander Scarlatos*, Andrew Lan

Adaptive Accompaniment with ReaLchords
ICML 2024

· Yusong Wu, Tim Cooijmans, Kyle Kastner, Adam Roberts, Ian Simon, *Alexander Scarlatos*, Chris Donahue, Cassie Tarakajian, Shayegan Omidshafiei, Aaron Courville, Pablo Samuel Castro, Natasha Jaques, Cheng-Zhi Anna Huang

Exploring Automated Distractor Generation for Math Multiple-choice Questions via Large Language Models
NAACL 2024 Findings

· Wanyong Feng*, Jaewook Lee*, Hunter McNichols*, *Alexander Scarlatos**, Digory Smith, Simon Woodhead, Nancy Otero Ornelas, Andrew Lan

Improving Automated Distractor Generation for Math Multiple-choice Questions with Overgenerate-and-rank
BEA (NAACL Workshop) 2024

· *Alexander Scarlatos**, Wanyong Feng*, Digory Smith, Simon Woodhead, Andrew Lan

Automated Distractor and Feedback Generation for Math Multiple-choice Questions via In-context Learning
GAIED (NeurIPS Workshop) 2023

· Hunter McNichols*, Wanyong Feng*, Jaewook Lee*, *Alexander Scarlatos*, Digory Smith, Simon Woodhead, Andrew Lan

RetICL: Sequential Retrieval of In-Context Examples with Reinforcement Learning
Preprint

· *Alexander Scarlatos*, Andrew Lan

Process-BERT: A Framework for Representation Learning on Educational Process Data
EDM 2022

· *Alexander Scarlatos*, Christopher Brinton, Andrew Lan

UMass PCL at SemEval-2022 Task 4: Pre-trained Language Model Ensembles for Detecting Patronizing and Condescending Language
SemEval (NAACL Workshop) 2022

· David Koleczek, *Alexander Scarlatos*, Preshma Linet Pereira, Siddha Makarand Karkare

Sonispace: a simulated-space interface for sound design and experimentation
Master's Project Report

· *Alexander Scarlatos*

* equal contribution