

Jaewook (Jake) Lee

140 Governors Drive, Amherst, MA, 01002

 LinkedIn |  Google Scholar |  jaewooklee@cs.umass.edu

summary	Ph.D. candidate in Computer Science at UMass Amherst applying generative AI and LLMs to diverse domains, from education technology to security. Skilled in statistical modeling, evaluation design, and human-AI collaboration, with a strong foundation in computer systems and deep learning frameworks from earlier work on compiler optimization and Processing-in-Memory platforms. Published in leading venues (EMNLP, NAACL, AIED, ACM TODAES) with experience in both academic research and industry-scale AI projects.	
education	University of Massachusetts, Amherst, MA, United States	
	- Ph.D. in <i>Computer Science</i> (Advisor: <u>Prof. Andrew Lan</u>) - Research Area: NLP Application, Personalization, Human-in-the-loop AI - Passed Qualification Exam with distinction (2025.05)	2022.9 - present GPA: 3.89/4.0
	Korea University, Seoul, Republic of Korea	
	- M.E. in <i>Electrical and Computer Engineering</i> (Advisor: <u>Prof. Seon Wook Kim</u>) - Research Area: Compiler, Processing-in-Memory, AI framework - B.E. in <i>Electrical Engineering</i>, Graduated with honors	2019.1 - 2022.2 GPA: 4.28/4.5 2013.3 - 2019.8 GPA: 3.98/4.5
	Amazon Web Service, Seattle, WA, United States	2025.5 - 2025.8
work experience	Applied Scientist Intern	
	Developed a methodology for evaluating a security review multi-agent framework (details under NDA).	
	Eedi, London, United Kingdom (Remote)	2023.6 - 2023.8
	Machine Learning Research Intern	
	Built the prototype for <u>AnSearch</u>, an AI-driven math diagnostic question generator that won the Tools Competition, combining LLM speed with educator expertise to create assessments targeting common misconceptions.	
research experience	Ph.D. Research in Generative AI and NLP	2022.9 - present
	University of Massachusetts, Amherst	
	AI for Human Creativity and Learning — Keyword Mnemonics - Statistical modeling: Developed expectation-maximization models to learn latent user variables and generation rules for interpretable mnemonics (ARR 2025) - Phonological similarity: Mentored and advised research on algorithms that identify phonologically similar keywords in a learner's L1 for L2 vocabulary acquisition (ARR 2025) - Evaluation: Designed and deployed evaluation pipelines combining psycholinguistic measures with human assessments to measure mnemonic memorability and creativity (EMNLP 2024) - Multi-modal creativity: Initiated early exploration of integrating LLM-generated verbal cues with visual elements, opening a new direction for mnemonic design (AIED 2023)	

- **AI for Educational Assessment and Feedback — Math Education**

- Training LLM-based tutors: Developed a training approach for dialogue-based tutors that optimizes tutor responses for both student correctness and pedagogical quality, using candidate generation, scoring, and preference optimization (AIED 2025)
- Automated distractor creation: Created pipelines using prompting, fine-tuning, and variational error modeling to produce plausible, targeted distractors (NAACL 2024)
- Human–AI collaboration: Designed interactive authoring workflows enabling educators to refine AI-generated stems and distractors (EDM 2024)

M.E Research in Computer Systems

2019.1 - 2022.2

Korea University, Seoul

- **AI Systems and Platform Optimization (Industry–Academia collaboration)**

- PIM platforms: Developed ONNX Runtime integration for PIM on both x86 and ARM environments; designed profiling and scheduling algorithms to optimize DNN inference on heterogeneous PIM architectures (SK Hynix, TODAES 2023).
- Compiler-based frameworks for NPUs: Built tools to extract memory traces from DNN accelerators and modified LLVM to generate code that maximizes scratchpad memory efficiency (Samsung).

publications
(* denotes equal
contribution)

Jaewook Lee, Alexander Scarlatos, Andrew Lan, “Interpretable Mnemonic Generation for Kanji Learning via Expectation-Maximization,” Proceedings of the Association for Computational Linguistics: EMNLP, Suzhou, China, 2025 

Sana Kang*, Myeongseok Gwon*, Su Young Kwon*, **Jaewook Lee**, Andrew Lan, Bhiksha Raj, Rita Singh, “PhoniTale: Phonologically Grounded Mnemonic Generation for Typologically Distant Language Pairs,” Proceedings of the Association for Computational Linguistics: EMNLP, Suzhou, China, 2025 

Jaewook Lee, Jeongah Lee, Wanyong Feng, Andrew Lan, “From Text to Visuals: Using LLMs to Generate Math Diagrams with Vector Graphics,” International Conference on Artificial Intelligence in Education (AIED), Palermo, Italy, 2025 

Alexander Scarlatos, Naiming Liu, **Jaewook Lee**, Richard Baraniuk, Andrew Lan, “Training LLM-based Tutors to Improve Student Learning Outcomes in Dialogues,” International Conference on Artificial Intelligence in Education (AIED), Palermo, Italy, 2025 

Jaewook Lee, Hunter McNichols, Andrew Lan, “Exploring Automated Keyword Mnemonics Generation with Large Language Models via Overgenerate-and-Rank,” Findings of the Association for Computational Linguistics: EMNLP, Florida, USA, 2024 

Wanyong Feng*, **Jaewook Lee***, Hunter McNichols*, Alexander Scarlatos*, Digory Smith, Simon Woodhead, Nancy Otero Ornelas, Andrew Lan, “Exploring Automated Distractor Generation for Math Multiple-choice Questions via Large Language Models,” Findings of the Association for Computational Linguistics: NAACL, Mexico City, Mexico, 2024 

Seok Young Kim*, **Jaewook Lee***, Yoonah Paik, Chang Hyun Kim, Won Jun Lee, Seon Wook Kim, “Optimal Model Partitioning with Low-Overhead Profiling on the PIM-based Platform for Deep Learning Inference,” ACM Transactions on Design Automation of Electronic Systems, 29(2), 1-22 

	Jaewook Lee , Andrew Lan, “SmartPhone: Exploring Keyword Mnemonic with Auto-generated Verbal and Visual Cues,” International Conference on Artificial Intelligence in Education (AIED), Tokyo, Japan, 2023 	
posters	Jaewook Lee , Digory Smith, Simon Woodhead, Andrew Lan, “Math Multiple Choice Question Generation via Human-Large Language Model Collaboration,” International Conference on Educational Data Mining (EDM), Atlanta, USA, 2024  Hunter McNichols, Jaewook Lee , Stephen Fancsali, Steve Ritter, Andrew Lan, “Can Large Language Models Replicate ITS Feedback on Open-Ended Math Questions?,” International Conference on Educational Data Mining (EDM), Atlanta, USA, 2024  Nischal Ashok Kumar, Wanyong Feng, Jaewook Lee , William Hunter McNichols, and Andrew Lan, “A Conceptual Model for End-to-End Causal Discovery in Knowledge Tracing,” International Conference on Educational Data Mining (EDM), Bengalaru, India, 2023 	
awards	NAEP Math Automated Scoring Challenge Grand Prize 	2023
	<i>Organized by National Center for Education Statistics (NCES)</i> • Challenge to develop an accurate, LLM-based scoring system for open-ended math responses	
	NeurIPS 2022 Causal Edu Competition (Task 3) - 3rd	2022
	<i>Organized by EEDI</i> • Challenge to identify causal relationship in real-world educational time-series data	
	iOS Application Hackathon Grand Prize 	2018
	<i>Organized by Software Technology and Enterprise, Korea University</i> • Developed a vocabulary builder app designed to help users efficiently memorize new words	
skill set	Deep Learning	Skilled in PyTorch and ONNX Runtime for model deployment
	Debugging & Analysis	Strong skills in debugging and performance optimization
	Programming	Expertise in C, C++, and Python
	Web Development	Expertise in building interfaces with React for human evaluations
	UX/UI	Knowledge in UX research and interface design
	Mobile Development	Hands-on experience with iOS and Android app development