Qianou Christina Ma

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Research Focus

My research intersects Human-AI Interaction, Generative AI, and Learning Sciences. I **design, build, and evaluate LLM-based applications** to help optimize human-AI task delegation for the future and train people to better work with AI, especially for **programming** and **computing education**.

Education

Carnegie Mellon University (CMU)   *Pittsburgh, PA*

PH.D. IN HUMAN-COMPUTER INTERACTION   *Advisors:* DR. **KEN KOEDINGER** & DR. **SHERRY TONGSHUANG WU**   *Sept. 2022 - present*

Skills (Programming & Framework): Python, Pytorch, Transformer, JavaScript/TypeScript, React/Flask, C++/C, CUDA, R, SML, Go

M.S. IN HUMAN-COMPUTER INTERACTION   *Sept. 2022 - Dec. 2024*

Relevant Coursework: Deep Learning; Advanced NLP; LLM Systems; AI Tools for Software Development; Learning Media Design; Persuasive Design

Carnegie Mellon University (CMU)   *Pittsburgh, PA*

B.S. IN COMPUTER SCIENCE, B.S. IN COGNITIVE SCIENCE, MINOR IN DESIGN FOR LEARNING (QPA: 3.91/4.0)   *Sept. 2018 - May. 2022*

Selected Publications

SUBMITTED (IN REVIEW)

[S1] **Qianou Ma**, Ken Koedinger, and Tongshuang Wu. Not Everyone Wins with LLMs: Behavioral Patterns and Pedagogical Implications in AI-assisted Data Analysis. In *Submission*, 2025.

[S2] **Qianou Ma**, Megan Chai, Yike Tan, Jihun Choi, Jini Kim, Erik Harpstead, Geoff Kauffman, and Tongshuang Wu. From Prompts to Reflection: Designing Reflective Play for GenAI Literacy. In *Submission*, 2025.

[S3] Chenyang Yang, Yike Shi, **Qianou Ma**, Michael Xieyang Liu, Christian Kästner, and Tongshuang Wu. What Prompts Don't Say: Understanding and Managing Underspecification in LLM Prompts. In *Submission*, 2025.

PEER-REVIEWED CONFERENCE AND JOURNAL PUBLICATIONS

[R1] **Qianou Ma***, Dora Zhao*, Xinran Zhao, Chenglei Si, Chenyang Yang, Ryan Louie, Ehud Reiter, Diyi Yang, and Tongshuang Wu. SPHERE: An Evaluation Card for Human-AI System Evaluation. In *ACL Findings*, 2025. **Equal contribution*.

[R2] **Qianou Ma**, Weirui Peng, Chenyang Yang, Hua Shen, Kenneth Koedinger, and Tongshuang Wu. What Should We Engineer in Prompts? Training Humans in Requirement-Driven LLM Use. In *Transactions on Computer-Human Interaction (TOCHI)*, 2025. To be presented at CHI'26. Media coverage: SCS News.

[R3] **Qianou Ma**, Hua Shen, Kenneth Koedinger, and Tongshuang Wu. How to Teach Programming in the AI Era? Using LLMs as a Teachable Agent for Debugging. In *International Conference on Artificial Intelligence in Education (AIED)*, 2024. 🏆 **Best Paper**. Invited presentations at IJCAI'25 and CSCL'25. Media coverage: The Link.

[R4] Atharva Naik, Jessica Ruhan Yin, Anusha Kamath, **Qianou Ma**, Sherry Tongshuang Wu, Charles Murray, Christopher Bogart, Majd Sakr, and Carolyn P. Rose. Generating Situated Reflection Triggers About Alternative Solution Paths: A Case Study in Generative AI for Computer-Supported Collaborative Learning. In *International Conference on Artificial Intelligence in Education*. Springer, 2024. 🏆 **Best Paper Nominee**.

[R5] Atharva Naik, Jessica Ruhan Yin, Anusha Kamath, **Qianou Ma**, Sherry Tongshuang Wu, R. Charles Murray, Christopher Bogart, Majd Sakr, and Carolyn P. Rose. Providing tailored reflection instructions in collaborative learning using large language models. *British Journal of Educational Technology*:20, 2024.

PEER-REVIEWED WORKSHOP, POSTERS & WORK-IN-PROGRESS

[W1] **Qianou Ma**, Tongshuang Wu, and Kenneth Koedinger. Is AI the better programming partner? Human-Human Pair Programming vs. Human-AI pAIr Programming. In *Proceedings of the Workshop on LLMs@AIED 2023*, 2023.

[W2] **Qianou Ma***, Yann Hicke*, Anmol Agarwal*, and Paul Denny. AI-TA: Towards an Intelligent Question-Answer Teaching Assistant using Open-Source LLMs. In *Proceedings of the Workshop on GenAI for Education (GAIED) @NeurIPS*, 2023. **Equal contribution*.

[W3] **Qianou Ma**, Anika Jain*, Jini Kim*, Megan Chai*, and Geoff Kauffman. ImaginAItion: Promoting Generative AI Literacy Through Game-Based Learning. In *CHI EA'25: Extended Abstracts of the CHI Conference on Human Factors in Computing Systems*, 2025. **Equal contribution*.

[W4] Aysa Xuemo Fan, Rully Agus Hendrawan, Yang Shi, and **Qianou Ma**. Enhancing Code Tracing Question Generation with Refined Prompts in Large Language Models. *SIGCSE TS 2024 (55th ACM Technical Symposium on Computer Science Education)*, 2024.

Awards & Fellowships

Honors & Awards

2024	**Best Paper & Best Interactive Event**, best paper and the best interactive event [R3] awarded at AIED 2024	*Recife, Brazil*
2024	**Best Paper Nominee**, best paper nominee [R4] at AIED 2024	*Recife, Brazil*
2023	**Generative AI Innovation Incubator (GAI3) Hackathon**, 1st place winning team awarded with $20,000	*Pittsburgh, PA*
2021	**Phi Beta Kappa**, 1 of 16 seniors selected in Fall 2021	*Pittsburgh, PA*

Fellowships & Fundings

2025	*ImaginAItion: Promoting Generative AI Literacy Through Game-Based Learning*, CMU GSA/Provost Conference Fund	*$1500*
2024	*Explicitly Train Humans towards Human-AI Collaboration* **(Lead Researcher)**, Google Academic Research Award (PI: Sherry Wu & Ken Koedinger; assisted in proposal writing)	*$100,000*
2021	*Support Designer-Teacher Collaboration in Educational Game Design Using Learning Science Principles*, CMU Dietrich College Senior Honors Fellowship	*$6500*
2020	*The contribution of local and global language statistics to the development of structured semantic networks*, CMU Summer Undergraduate Research Fellowship	*$3500*
2020	*Improving Museums' Websites to Support Teachers & Parents: a Case Study of the Carnegie Museum of Art*, CMU Small Undergraduate Research Grant	*$500*
2019	*Linguistic patterns differentially predict children's semantic structure relatedness*, Ireland Undergraduate Research Fund	*$1750*

Presentations & Talks

2025 Fall	**Invited Talk**, Training Humans in Requirement-Driven LLM Use for Prompt Programming	*Mila HCAI reading seminar*
2025	**Invited Talk**, Training the Use of LLMs on Programmatic Data Science for Non-Experts	*Bloomberg; Pitt*
2025 Summer	**Invited Talk**, IJCAI 2025 Sister Conferences' Best Paper Presentation [R3]	*Montreal, Canada*
2025 Summer	**Invited Talk**, CSCL/ISLS 2025 IAALDE-Network Best Paper Presentation [R3]	*Helsinki, Finland*
2024 Fall	**Invited Talk**, Scaling Student Support: Online Question-Answering with LLM Tutors	*Google DeepMind LearnLM*
2024 Fall	**Invited Talk**, Training for the Future: Preparing Students for Effective Human-LLM Partnerships Computational Social Science (CSS) Group; Learning Science and Engineering (LSE) Seminar; PAWS Lab	*UMich; CMU; Pitt*

Teaching & Mentoring Experience

2023-present	**Mentor**, Independent Studies or Projects on LLM-assisted Learning Weirui Peng (now PhD at UMich) [R2]; Atharva Naik (now PhD at CMU LTI) [R4]; Vicky Zhou [R3]; Megan Chai, Anika Jain [W3]; Yike Tan [S2]; Keyu He, Akeil Smith	*8 Undergrad/grad students*
2024 Fall	**Mentor**, CMU Paths to AI Research Program *for traditionally underrepresented*	*2 undergraduate student*
2022, 2024	**Mentor**, CMU SCS Graduate Application Support Program *for traditionally underrepresented*	*3 Master's students*
2023, 2024	**Mentor**, CMU LearnLab Summer School Computing Education Research Track (e.g., [W4])	*7 Ph.D. and 1 Master's students*
2025 Fall	**Guest Lecturer**, University of Michigan EECS-498 AI in Education	*15+ Undergrad/grad students*
2025 Summer	**Guest Lecturer**, Northeastern INFO-7375 Prompt Engineering for Generative AI	*40+ Undergrad/grad students*
2025 Spring	**Guest Lecturer**, CMU 05-898 HCI for Product Managers; Data Science for Product Managers	*40+ Undergrad/grad students*
2024 Summer	**Guest Lecturer**, CMU 82-183 AI for Humanities: The Multi-dimensions of World	*20+ Undergraduate students*
2024 Fall	**Teaching Assistant**, CMU 05-430/630 Programming Usable Interfaces	*70+ Undergrad/grad students*
2023 Fall	**Teaching Assistant**, CMU 05-391/891 Design Human-Centered Software	*60+ Undergrad/grad students*
2021 Fall	**Teaching Assistant**, CMU 15-110 Principles of Computing	*300+ Undergraduate students*
2021 Summer	**Teaching Assistant**, CMU CS Scholar Pre-College Program *for traditionally underrepresented*	*30+ Grades 9-12 students*
2021 Spring	**Teaching Assistant**, CMU 15-150 Functional Programming (Reflection Blog)	*300+ Undergraduate students*

Service & Leadership Experience

2025 - present	**Member**, CMU School of Computer Science CS Curriculum Review Committee (CRC)	*Pittsburgh, PA*
2024 - present	**Program Committee**, EDM (2024-2025), SIGCSE (2025), ICLR workshop (2025)	
2022 - present	**Reviewer**, ACM CHI (2023-2025), ACM UIST (2024), NeurIPS (2023), Computers & Education (2024)	
2019 - present	**Member**, CMU University Disciplinary Committee & Academic Review Board	*Pittsburgh, PA*
2025 Fall	**Invited Expert**, MIT Media Lab Benchmarks for Human Flourishing with AI Workshop	*Boston, MA*
2025 Spring	**Co-leader**, NSF I-Corps Team for LLM-powered Teaching Assistant Project	*Pittsburgh, PA*
2025 Spring	**Member**, CMU HCII NSF Research Experiences for Undergraduates (REU) Admissions Committee	*Pittsburgh, PA*
2025 Spring	**Member**, CMU HCII Ph.D. Admissions Committee	*Pittsburgh, PA*
2025 Spring	**Panelist**, K-12 AI Teacher Professional Development at Eberly Center	*Pittsburgh, PA*
2024 Fall	**Panelist**, CMU School of Computer Science Freshman Immigration Course	*Pittsburgh, PA*
2023 Spring	**Director**, CMU School of Computer Science Graduate Student Musical	*Pittsburgh, PA*
	Organize and direct a musical revue with 30+ performers and 200+ audience	
2022 Fall	**Co-leader**, CMU Women@SCS TechNights (data bias session)	*Pittsburgh, PA*
	Help organize a session on training data and data bias card game for 20+ female middle-school students	
2021 Fall	**Member**, CMU Teaching Innovation Award Selection Committee	*Pittsburgh, PA*
2018 - 2022	**President (21-22), VP of Communications (20), Project Advisor (18-19)**, CMU Project Ignite	*Pittsburgh, PA*
	Collaborate with other organizations to recruit college students, provide free interdisciplinary project-based learning opportunities to local high-school students, increase diversity in high-school student application, and facilitate about 100 workshop sessions per year	