

Qianou Christina Ma

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Research Focus

Research intersects Human-AI Interaction, Generative AI, and Learning Sciences. **Design, build, and evaluate LLM applications** to 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 - May 2027 (expected)

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

Relevant Coursework: Deep Learning; Advanced NLP; LLM Systems; AI Tools for SDE; 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

PhD Research

Training for the Future: Preparing Humans for Effective Human-AI Programming

Pittsburgh, PA

CARNEGIE MELLON UNIVERSITY. ADVISORS: DR. KEN KOEDINGER & DR. SHERRY TONGSHUANG WU 2022 - present

- Designed and built LLM-based learning tools with iterative prototyping, aiming to *scaffold human-AI task delegation* in programming and develop AI literacy. E.g., a teachable agent for CS1 debugging (HypoCompass [R1]), a tutor to help end-users specify requirements in prompts (ROPE [R2]), and a social game for general public understanding on GenAI behaviors and prompts (ImaginAltion [S1]).
- Led *mixed-methods research* (literature reviews [W1, R3], controlled experiments [R2], classroom study [S2], and pre-post user studies [R1, S1], and conducted statistical modeling, log data analysis, and qualitative coding to evaluate human-AI collaboration effectiveness and analyze behavioral patterns that inform AI pedagogy design.
- Collaborated with *interdisciplinary teams* to co-author 5+ peer-reviewed papers (e.g., NLP [R3, W2], CSEd [R4, W3], SWE [S3], HCI [W4]), including a first-authored Best Paper [R1] and Honorable Mention [R5] and multiple invited presentations (IJCAI, CSCL).

Selected Publications

SUBMITTED (IN REVIEW)

- [S1] **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.
- [S2] **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.
- [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**, 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](#).
- [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***, 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.

- [R4] 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.
- [R5] 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**.

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 @NeurIPS*, 2023. *Equal contribution.
- [W3] 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 (55th ACM Technical Symposium on Computer Science Education)*, 2024.
- [W4] **Qianou Ma**, Anika Jain*, Jini Kim*, Megan Chai*, and Geoff Kauffman. [ImaginAltion: 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.

Awards & Fellowships

HONORS & AWARDS

- 2024 **Best Paper & Best Interactive Event**, [R1] awarded at AIED 2024
- 2024 **Best Paper Nominee**, best paper nominee [R5] at AIED 2024
- 2023 **Generative AI Innovation Incubator (GAI3) Hackathon**, 1st place team awarded with \$20,000
- 2021 **Phi Beta Kappa**, 1 of 16 seniors selected in Fall 2021

FELLOWSHIPS & FUNDINGS

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

Presentations & Talks

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

Teaching & Mentoring Experience

2023-present	Mentor , Independent Studies or Projects on LLM-assisted Learning Advised students from HCI, CS, and NLP on various projects [R2, R5, R1, W4], now UMich PhD, CMU PhD, etc.	8 Undergrad/grad
2024 Fall	Mentor , CMU Paths to AI Research Program <i>for traditionally underrepresented</i>	2 Undergraduates
2022, 2024	Mentor , CMU SCS Graduate Application Support Program <i>for underrepresented</i>	3 Master's students
2023, 2024	Mentor , CMU LearnLab Summer School Computing Education Research (e.g., [W3])	7 Ph.D. and 1 Master's
2025 Fall	Guest Lecturer , University of Michigan EECS-498 AI in Education	15+ Undergrad/grad
2025 Summer	Guest Lecturer , Northeastern INFO-7375 Prompt Engineering for Generative AI	40+ Undergrad/grad
2025 Spring	Guest Lecturer , CMU 05-898 HCI & Data Science for Product Managers	40+ Undergrad/grad
2024 Summer	Guest Lecturer , CMU 82-183 AI for Humanities: The Multi-dimensions of World	20+ Undergraduate
2024 Fall	Teaching Assistant , CMU 05-430/630 Programming Usable Interfaces	70+ Undergrad/grad
2023 Fall	Teaching Assistant , CMU 05-391/891 Design Human-Centered Software	60+ Undergrad/grad
2021 Fall	Teaching Assistant , CMU 15-110 Principles of Computing	300+ Undergraduates
2021 Summer	Teaching Assistant , CMU CS Scholar Pre-College Program <i>for underrepresented</i>	30+ Grades 9-12
2021 Spring	Teaching Assistant , CMU 15-150 Functional Programming (Reflection Blog)	300+ Undergraduates

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 (2023-25), UIST'24, NeurIPS'23, Computers & Education'24	
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 , HCII NSF Research Experiences for Undergrad (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 Organize and direct a musical revue with 30+ performers and 200+ audience	Pittsburgh, PA
2022 Fall	Co-leader , CMU Women@SCS TechNights (data bias session) Help organize a session on training data and data bias card game for 20+ female middle-school students	Pittsburgh, PA
2021 Fall	Member , CMU Teaching Innovation Award Selection Committee	Pittsburgh, PA
2018 - 2022	President (21-22), VP of Communications (20), Project Advisor (18-19), Project Ignite Recruit college students to 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	Pittsburgh, PA

Skills

Programming Languages	Python, JavaScript/TypeScript, C/C++, Go, R, SML, Nools
Frameworks and Tools	PyTorch, React, Node.js, Flask, CUDA, Git, Figma, Arduino, Audacity, Adobe (AE/PS), SPSS
Research Methods	Mixed-Methods, LLM Finetuning and Evaluation, Statistical Modeling, Controlled User Experiment, Log Data Analysis, Cognitive Task Analysis, Learning Design, Thematic Analysis, Interview, Survey Design, Think-Aloud