

Qianou Christina Ma

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Research Focus

My research is at the intersection of human-AI interaction (HAI), Large Language Models (LLMs), and Computer Science education (CSEd). I **design, build, and evaluate** LLM-based student-facing [R1] and instructor-facing [W1] applications, where I study different interactions to minimize the risks and maximize the effectiveness of LLMs in the CSEd context.

Education

Carnegie Mellon University Human-Computer Interaction Institute (CMU HCII)

Pittsburgh, PA

PH.D. IN HUMAN-COMPUTER INTERACTION

Sept. 2022 - present

Advisors: Dr. **Ken Koedinger** & Dr. **Sherry Tongshuang Wu** *Relevant Coursework:* Deep Learning; Advanced NLP; LLM Systems; Persuasive Design

Carnegie Mellon University (CMU)

Pittsburgh, PA

B.S. IN COGNITIVE SCIENCE, B.S. IN COMPUTER SCIENCE, MINOR IN DESIGN FOR LEARNING (QPA: 3.91/4.0)

Sept. 2018 - May. 2022

Publications

SUBMITTED (IN REVIEW)

- [S1] **Qianou Ma**, Weirui Peng, Hua Shen, Kenneth Koedinger, and Tongshuang Wu. **What You Say = What You Want? Teaching Humans to Articulate Requirements for LLMs**. In *In Submission*, 2024.

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*. Springer, 2024. 🏆 **Best Paper**.
- [R2] 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***, 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 Generative AI for Education (GAIED) - co-located with 37th Conference on Neural Information Processing Systems (NeurIPS 2023)*, 2023. *Equal contribution.
- [W2] **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 Empowering Education with LLMs - the Next-Gen Interface and Content Generation 2023 co-located with 24th International Conference on Artificial Intelligence in Education (AIED 2023)*, pages 64–77, 2023.
- [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 2024 (55th ACM Technical Symposium on Computer Science Education)*, 2024.
- [W4] **Qianou Ma** and Erik Harpstead. Support designer-teacher collaboration in educational game design using learning science principles. In *Extended Abstracts of the 2021 Annual Symposium on Computer-Human Interaction in Play*, pages 117–121, 2021.
- [W5] **Qianou Ma** and Lauren Herckis. Work-in-progress: VR-enabled pedagogy in a first-year seminar. In *Proceedings of the 2021 7th International Conference of the Immersive Learning Research Network (iLRN)*, pages 1–3. IEEE, 2021.

Awards & Fellowships

HONORS & AWARDS

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| 2024 | Best Paper & Best Interactive Event , best paper and the best interactive event [R1] awarded at AIED 2024 | Recife, Brazil |
| 2024 | Best Paper Nominee , best paper nominee [R2] 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 & GRANTS

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	Patterns of linguistic input differentially predict relatedness in children's semantic structure, Ireland Undergraduate Research Fund	\$1750

Teaching & Mentoring Experience

2024 Summer	Mentor , CMU LearnLab Summer School Computing Education Research (CER) Track	5 Ph.D. and 1 Master's students
2024 Summer	Mentor , LLM-assisted requirement engineering (Weirui Peng, Columbia MSEE)	1 Master's student
2024 Spring	Mentor , LLM-assisted pAIR programming (Atharva Naik, now PhD at CMU LTI, worked on [R2])	1 Master's student
2023 Fall	Mentor , LLM-assisted debugging tutor (Vicky Zhou, CMU HCI)	1 Undergraduate student
2023 Summer	Mentor , CMU LearnLab Summer School Computing Education Research (CER) Track (Aysa Fan at UIUC, Rully Hendrawan at UPitt, worked on [W3] with Yang Shi)	2 Ph.D. students
2024 Fall	Teaching Assistant , CMU 05-430/630 Programming Usable Interfaces	70+ Undergrad/grad students
2024 Summer	Guest Speaker , CMU 82-183 AI for Humanities	20 Undergraduate 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	30+ Grades 9-12 students
2021 Spring	Teaching Assistant , CMU 15-150 Functional Programming (Reflection Blog)	300+ Undergraduate students
2019 Spring	Teaching Assistant , CMU LGC Gelfand Outreach	15+ Grades K-2 students
2019 Spring	Project Advisor , CMU Project Ignite Machine Learning Team	5+ Grades 9-12 students
2019 Spring	Tutor , Assemble Girls' Maker Night After School Program	10+ Grades 5-8 students
2018 Fall	Tutor , Taylor Allderdice High School Writing Center	10+ Grades 9-10 students

Service & Leadership Experience

2024 - present	Program Committee , EDM (2024), SIGCSE TS (2025)	
2022 - present	Reviewer , ACM CHI (2023, 2024), ACM UIST (2024), NeurIPS (2023), Computers & Education (2024)	
2024 Fall	Panelist , CMU School of Computer Science Freshman Immigration Course	Pittsburgh, PA
2023 - present	Member , CMU School of Computer Science CS Curriculum Review Committee (CRC) Serve as a committee member to help review the assessment of the CS curriculum at CMU SCS	Pittsburgh, PA
2019 - present	Member , CMU University Disciplinary Committee & Academic Review Board Serve as a board member to review student violations of community standards in hearings	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 Serve to review nominations of faculty members for the CMU teaching innovation award	Pittsburgh, PA
2018 - 2022	President (21-22), VP of Communications (20), Project Advisor (18-19) , CMU Project Ignite Collaborate with other organizations to recruit college students, provide free interdisciplinary project-based learning opportunities to local high-school students, and facilitate about 100 workshop sessions per year	Pittsburgh, PA