Kathy Cheng

PhD Candidate · Human-Computer Interaction · University of Toronto

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Education

University of Toronto *Toronto, ON*

PhD in Mechanical & Industrial Engineering *2021 – 2026*

- Dissertation: Improving collaborative CAD systems through human–AI interaction and software engineering insights.
- Co-advisors: Dr. Alison Olechowski (Mechanical & Industrial Engineering); Dr. Shurui Zhou (Computer Engineering).

University of Toronto *Toronto, ON*

BASc in Mechanical Engineering *2021*

- Minors: Advanced Manufacturing; Environmental Engineering
- Undergraduate thesis: *An Analysis of Collaborative Computer-Aided Design Assembly.* Supervised by Dr. Alison Olechowski.

Professional Experience

University of Toronto *Toronto, ON*

HCI Researcher *Sept 2021 – Present*

- Designed and implemented an LLM-powered, multimodal agent using GPT-4V, Pyrender, and Blender to automate change summarization for CAD models.
- Built Python-based data collection and analysis pipelines to curate and analyze 16K+ product reviews.
- Designed and led qualitative studies (40+ professionals) to identify core collaboration and coordination challenges.
- Analyzed 33M+ interaction logs from 30+ designers to model user behavior and inform the design of adaptive AI assistance.

Autodesk Research *Toronto, ON*

HCI Research Scientist Intern *May 2025 – Sept 2025*

- Developed and prototyped 6 agentic GenAI assistance concepts for professional CAD workflows, emphasizing reasoning, explanation, and user control (Think Aloud project).
- Designed and conducted 30 user studies to evaluate human–AI interaction patterns among casual and professional users.
- Published a full paper accepted to CHI 2026 and delivered 2 invited talks to industry and research audiences.
- Collaborated with the HCI & Visualization team, working with Dr. Jo Vermeulen, Dr. Justin Matejka, and Dr. George Fitzmaurice.

Scotiabank *Toronto, ON*

Technology Consultant *May 2019 – May 2023*

- Executed a COVID-19 technology roll-out, increasing the department's remote work capacity from 30% to 98% within 20 days.
- Developed Excel-based automation to optimize recruitment, improving turnaround time by 30% and intake volume by 50%.
- Collaborated with designers, developers, and product managers to deliver solutions tailored to diverse user needs.
- Led the migration of 300+ users' primary telecommunications provider from Blackberry to Apple within 2 months.

Publications

Peer-Reviewed Conference Proceedings

[C9] **Cheng, K.**, Vermeulen, J., Fitzmaurice, G., Matejka, J. Lost in Translation: The Value of Verbalizations in Interpreting 3D Computer-Aided Design Workflows. *Accepted to ACM Conference on Human Factors in Computing Systems (CHI). 2026.*

[C8] Deng, Y., Zhang, S., **Cheng, K.**, Olechowski, A., Zhou, S. Untangling the Timeline: Challenges and Opportunities in Supporting Version Control in Modern Computer-Aided Design. *Accepted to ACM Conference on Human Factors in Computing Systems (CHI). 2026.*

[C7] **Cheng, K.**, Olechowski, A., Zhou, S. It's a Complete Haystack: Understanding Dependency Management Needs in Computer-Aided Design. *Proceedings of the ACM on Human-Computer Interaction (CSCW). 2025.* View here.

[C6] **Cheng, K.**, Zhou, S., Olechowski, A. "A Lot of Moving Parts": A Case Study of Open-Source Hardware Design Collaboration in the Thingiverse Community. *Proceedings of the ACM on Human-Computer Interaction (CSCW). 2024.* View here.

[C5] Zhang, K., **Cheng, K.**, Olechowski, A. Quantitative CAD Archetype Framework Evaluation with Professional User Data. *ASME International Design Engineering Technical Conference (IDETC-CIE). 2024.* View here.

[C4] Zhang, K., **Cheng, K.**, Olechowski, A. Developing a CAD Personality Framework Based on User Data. *Computer-Aided Design Conference and Exhibition (CAD). 2024.* View here.

[C3] **Cheng, K.**, Cuvin, P., Olechowski, A., Zhou, S. User Perspectives on Branching in Computer-Aided Design. *Proceedings of the ACM on Human-Computer Interaction (CSCW). 2023.* View here.

[C2] **Cheng, K.**, Davis, M., Zhang, X., Zhou, S., Olechowski, A. In the Age of Collaboration, the Computer-Aided Design Ecosystem is Behind: An Interview Study of Distributed CAD Practice. *Proceedings of the ACM on Human-Computer Interaction (CSCW). 2023.* View here.

[C1] **Cheng, K.**, Olechowski, A. Some (Team) Assembly Required: An Analysis of Collaborative Computer-Aided Design Assembly. *ASME International Design Engineering Technical Conference (IDETC-CIE). 2021.* View here.

Peer-Reviewed Journal Articles

[J4] Asuzu, C., **Cheng, K.**, Olechowski, A. The Personas of Cloud CAD Collaboration: A Case Study of a Professional Design Team. *IEEE Transactions on Engineering Management. 2024.* View here.

[J3] **Cheng, K.**, Olechowski, A. Analysis of Collaborative Assembly in Multi-User Computer-Aided Design. *Journal of Mechanical Design,* 146(3): 031701. 2024. View here.

[J2] Roy, D., Calpin, N., **Cheng, K.**, Olechowski, A., Arguelles, A., Zurita, N., Menold, J. Designing Together: Exploring Collaborative Dynamics of Multi-Objective Design Problems in Virtual Environments. *Journal of Mechanical Design,* 146(3): 031702. 2024. View here.
🏆 JMD Editor's Choice Award 2024

[J1] Ferguson, S., **Cheng, K.**, Adolphe, L., Van de Zande, G., Wallace, D., Olechowski, A. Communication patterns in engineering enterprise social networks: an exploratory analysis using short text topic modelling. *Design Science 8*, e18. 2022. View here.

Peer-Reviewed Short Conference Papers

[S1] **Cheng, K.**, Zhang, Z., Deng, Y., Zhou, S., Olechowski, A. Fetch-A-Sketch: Navigating Dependency Density of 3D CAD Master Sketches. *Accepted to Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI). 2026.*

In Review

Velikonja, V., **Cheng, K.**, Olechowski, A. Exploring the Prevalence and Cause of Manufacturing Fixation in Design in Novice Engineering Designs via Computer-Aided Design. *Under review for Advanced Engineering Informatics. 2026*.

Awards, Fellowships, & Grants

2026	**SGS Conference Travel Grant**, University of Toronto	*$ 1690*
	MIE Conference Travel Grant, University of Toronto	*$ 500*
2025	**SGS Conference Travel Grant**, University of Toronto	*$ 690*
2024	**Canada Graduate Scholarship – Doctoral**, NSERC	*$ 118,333*
	Ontario Graduate Scholarship, Ontario Student Assistance Program, *Declined*	*$ 15,000*
2023	**Ontario Graduate Scholarship**, Ontario Student Assistance Program	*$ 15,000*
	MIE Conference Travel Grant, University of Toronto	*$ 500*
	BPart Travel Award, American Society of Mechanical Engineers (ASME)	*$ 1,250*
	1st Place Poster Presentation – MIE Graduate Research Symposium, University of Toronto	*$ 500*
2022	**Ontario Graduate Scholarship**, Ontario Student Assistance Program	*$ 15,000*
	Best Poster Design – Onshape Research Symposium, PTC Inc.	*$ 350*
2021	**Best Poster Award – Undergraduate Engineering Research Day**, University of Toronto	*$ 100*
	PEY Co-op Student of the Year Award, University of Toronto	–
2016	**Dean's Merit Entrance Scholarship**, University of Toronto	*$ 7,500*
	President's Entrance Scholarship, University of Toronto	*$ 2,000*

Presentations

** presenting author; + mentored undergraduate*

Invited Talks

[T6] Aug 2025. *Lost in Translation: The Value of Verbalizations in Interpreting 3D CAD Workflows*. Invited talk: Autodesk Research, Toronto, ON.

[T5] July 2025. *Talking While Designing: The Value of Verbalizations in Interpreting 3D CAD Workflows*. Invited talk: Autodesk Research, Toronto, ON.

[T4] Nov 2024. *Open-Source Hardware Design Collaboration*. Invited talk: Human-Centered AI Reading Group, McGill University, Online.

[T3] Aug 2024. *The Trove of CAD Informatics: Acquiring and Analyzing CAD Data for Design Process Insights and AI Applications*. Workshop talk: ASME International Design Engineering Technical Conference, Washington D.C., USA.

[T2] July 2024. *Open-Source Hardware Design Collaboration in the Thingiverse Community*. Invited talk: Machine Agency Reading Group, University of Washington, Online.

[T1] May 2021. *Reflections on leadership skills and organizational considerations for the workplace of tomorrow*. Invited talk: 11th Conference on the Leader Engineer, Toronto, ON.

Conference Presentations Without Proceedings

[P13] **Cheng, K.***, Zhou, S., Olechowski, A. A Case Study of Open-Source Hardware Design Collaboration. Poster: University of Toronto MIE Graduate Research Symposium, Toronto, ON. 2024.

[P12] **Cheng, K.***, Zhou, S., Olechowski, A. Analysis of Collaborative Software Development Insights to Physical Product Design via Computer-Aided Design. Poster: ASME (American Society of Mechanical Engineers) IDETC (International Design Engineering Technical Conference), Boston, MA. 2023.

[P11] **Cheng, K.***, Zhou, S., Olechowski, A. Is Cloud the Future of Computer-Aided Design? An Industry Case Study of CAD Collaboration. Poster: Onshape Research Symposium, Virtual, Online. 2023.

[P10] Roy, D.*, **Cheng, K.**, Olechowski, A., Menold, J. Exploring Collaborative Dynamics for Multi-Objective Design Problem Solving. Poster: Onshape Research Symposium, Virtual, Online. 2023.
🏆 Best Poster Award in the Informatics category

[P9] Velikonja, V.*+, **Cheng, K.**, Olechowski, A. Exploring the Prevalence and Cause of Manufacturing Fixation in Design (MFD) in Novice Engineering Designers via Computer-Aided Design (CAD). Poster: Onshape Research Symposium, Virtual, Online. 2023.

[P8] **Cheng, K.***, Olechowski, A., Zhou, S. User Perspectives on Branching in Computer-Aided Design. Poster: University of Toronto MIE Graduate Research Symposium, Toronto, ON. 2023.
🏆 1st place in the Applied Mechanics & Design category

[P7] **Cheng, K.***, Olechowski, A., Zhou, S. Time to branch out: An analysis of online user forum posts to inform Computer-Aided Design (CAD) branching. Poster: Onshape Research Symposium, Virtual, Online. 2022.
🏆 Best Poster Design Award

[P6] Cuvin, P.*+, **Cheng, K.**, Zhou, S., Olechowski, A. Where to Grow from Here? An Empirical Study of Branching Use in Computer-Aided Design. Poster: Onshape Research Symposium, Virtual, Online. 2022.

[P5] Cuvin, P.*+, **Cheng, K.**, Zhou, S., Olechowski, A. Where to Grow from Here? An Empirical Study of Branching Use in Computer-Aided Design. Poster: University of Toronto Undergraduate Engineering Research Day, Toronto, ON. 2022.

[P4] **Cheng, K.***, Olechowski, A. An Analysis of Collaborative Computer-Aided Design Assembly. Poster: PTC Digital Transformation in Education Summit, Virtual, Online. 2021.

[P3] **Cheng, K.***, Olechowski, A. A Study of Collaborative Computer-Aided Design Assembly. Poster: University of Toronto Undergraduate Engineering Research Day, Toronto, ON. 2021.
🏆 Best Poster Award in the Advanced Manufacturing category

[P2] Davis, M.*+, Zhang, X.+, **Cheng, K.**, Zhou, S., Olechowski, A. What's Wrong with CAD?: Identifying and Classifying Challenges in Collaborative Work with Computer-Aided Design. Poster: University of Toronto Undergraduate Engineering Research Day, Toronto, ON. 2021.
🏆 Best Poster Award in the Transdisciplinary Engineering Education & Practices category

[P1] Zhang, X.*+, Davis, M.+, **Cheng, K.**, Zhou, S., Olechowski, A. Challenges of Collaboration with Computer-Aided Design (CAD). Oral presentation: University of Toronto Undergraduate Engineering Research Day, Toronto, ON. 2021.

Teaching Experience

2024-2025 **MIE221: Manufacturing Engineering**, Head Teaching Assistant
2024-2025 **MIE221: Manufacturing Engineering**, Lab Manager
2024-2025 **MIE221: Manufacturing Engineering**, Marking Teaching Assistant
2025 **MIE221: Manufacturing Engineering**, Tutorial Teaching Assistant
2022-2023 **MIE221: Manufacturing Engineering**, Lab Teaching Assistant
2022-2024 **MIE301: Kinematics & Dynamics of Machines**, Lead Project Teaching Assistant
2021 **MIE301: Kinematics & Dynamics of Machines**, Project Teaching Assistant

Mentoring

2025 **Sally Zhang**, Computer Science undergraduate summer student.
2024-2025 **Felix Deng**, Mechanical & Industrial Engineering MASc student.
2023-2024 **Kevin Zhang**, Mechanical Engineering undergraduate thesis student.
2022-2023 **Victoria Velikonja**, Mechanical Engineering undergraduate thesis student.
2022 **Phil Cuvin**, Mechanical Engineering undergraduate summer student.
2021 **Michal Davis**, Engineering Science undergraduate summer student.
2021 **Jasmine Zhang**, Engineering Science undergraduate summer student.

Outreach & Professional Development

Peer Review

2026. Reviewer for ACM Conference on Human Factors in Computing Systems (CHI).
2023-2025. Reviewer for ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW).
2023-2024. Reviewer for ASME International Design Engineering Technical Conference (IDETC-CIE).

Volunteering

2025. Student volunteer for IEEE/ACM International Conference on Software Engineering (ICSE).

Professional Memberships

2022-2025. Association for Computing Machinery (ACM) Student Member.
2021-2025. American Society of Mechanical Engineers (ASME) Student Member.

Skills

Programming: Python; R; VBA; MATLAB
AI & ML: Large Language Models (GPT-4/4V), prompt engineering, multimodal AI, agent-based systems
Data & Evaluation: Experimental design, qualitative coding, log analysis, mixed-methods evaluation
Other Software: Overleaf; Qualtrics; SurveyMonkey; Figma; NVivo; Miro; Jupyter Notebook; Dovetail; Camtasia; Zotero
Languages: English (fluent); Mandarin (advanced); French (intermediate)