

# Kathy Cheng

PHD CANDIDATE · MECHANICAL & INDUSTRIAL ENGINEERING · UNIVERSITY OF TORONTO

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## Education

### University of Toronto

Toronto, ON

#### PHD IN MECHANICAL & INDUSTRIAL ENGINEERING

2021 – 2025 (Expected)

- Thesis topic: Improving CAD collaboration through HCI principles and software development insights.
- Co-advisors: Dr. Alison Olechowski (Mechanical & Industrial Engineering); Dr. Shurui Zhou (Computer Engineering).
- Relevant courses: CSC2604: Design Theory and HCI; ECE1785: Empirical Software Engineering; MIE1402: Statistical Methods in Human Factors Research; APS1023: New Product Innovation.

### 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

#### DOCTORAL RESEARCHER

May 2021 – Present

- Built a Python-based web-scraper to collect and analyze 16K+ product reviews of 3D CAD (computer-aided design) software.
- Designed and conducted interviews with 30+ professional designers to identify 14 pain points of CAD collaboration.
- Developed a computer vision tool using Pyrender, Blender, and GPT-4V to automate change summarization for CAD models.
- Designed user studies with 30+ participants, generating actionable insights to improve usability for different skill levels.
- Analyzed 33M+ user actions, representing 350+ designers, from CAD trace data to identify 5 user personas.

### Autodesk

Toronto, ON

#### HCI RESEARCH SCIENTIST INTERN

May 2025 – Sept 2025

- Investigated 6 opportunities for think-aloud computing-enabled GenAI assistance for 3D CAD software.
- Conducted 30 user studies with recreational and professional Autodesk Fusion software users.
- Collaborated with HCI and Visualization team, working with Dr. Jo Vermeulen and Dr. Justin Matejka.

### 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 macro to optimize intern recruitment, reducing turnaround time by 30% and increasing applicants 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

### JOURNAL ARTICLE MANUSCRIPTS

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

**Cheng, K.**, Zhou, S., Olechowski, A. 2024. "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)*. View here.

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

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

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

🏆JMD Editor's Choice Award 2024

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

**Cheng, K.**, Davis, M., Zhang, X., Zhou, S., Olechowski, A. 2023. 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)*. View here.

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

## PEER-REVIEWED CONFERENCE PROCEEDINGS

Zhang, K., **Cheng, K.**, Olechowski, A. 2024. Quantitative CAD Archetype Framework Evaluation with Professional User Data. *ASME International Design Engineering Technical Conference*. View here.

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

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

## IN REVIEW

**Cheng, K.**, Vermeulen, J., Fitzmaurice, G., Matejka, J. Lost in Translation: The Value of Verbalizations in Interpreting 3D Computer-Aided Design Workflows *Under review for ACM CHI Conference on Human Factors in Computing Systems*. 2026.

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. *Under review for ACM CHI Conference on Human Factors in Computing Systems*. 2026.

Velikonja, V., **Cheng, K.**, Olechowski, A. Exploring the Prevalence and Cause of Manufacturing Fixation in Design in Novice Engineering Designs via Computer-Aided Design. *In preparation for Advanced Engineering Informatics*. 2025.

## Awards, Fellowships, & Grants

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

## Presentations

\* presenting author; + mentored undergraduate

## INVITED TALKS

- July 2025. *Talking While Designing: The Value of Verbalizations in Interpreting 3D CAD Workflows*. Invited talk: Autodesk Research, Toronto, ON.
- Nov 2024. *Open-Source Hardware Design Collaboration*. Invited talk: Human-Centered AI Reading Group, McGill University, Online.
- 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.
- July 2024. *Open-Source Hardware Design Collaboration in the Thingiverse Community*. Invited talk: Machine Agency Reading Group, University of Washington, Online.
- 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

- Cheng, K.\***, Zhou, S., Olechowski, A. 2024. A Case Study of Open-Source Hardware Design Collaboration. Poster: University of Toronto MIE Graduate Research Symposium, Toronto, ON.
- Cheng, K.\***, Zhou, S., Olechowski, A. 2023. 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.
- Cheng, K.\***, Zhou, S., Olechowski, A. 2023. Is Cloud the Future of Computer-Aided Design? An Industry Case Study of CAD Collaboration. Poster: Onshape Research Symposium, Virtual, Online.
- Roy, D.\*, **Cheng, K.**, Olechowski, A., Menold, J. 2023. Exploring Collaborative Dynamics for Multi-Objective Design Problem Solving. Poster: Onshape Research Symposium, Virtual, Online.  
*Received Best Poster Award in the Informatics category.*
- Velikonja, V.\*+, **Cheng, K.**, Olechowski, A. 2023. 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.
- Cheng, K.\***, Olechowski, A., Zhou, S. 2023. User Perspectives on Branching in Computer-Aided Design. Poster: University of Toronto MIE Graduate Research Symposium, Toronto, ON.  
*Received 1st place in the Applied Mechanics & Design category.*
- Cheng, K.\***, Olechowski, A., Zhou, S. 2022. Time to branch out: An analysis of online user forum posts to inform Computer-Aided Design (CAD) branching. Poster: Onshape Research Symposium, Virtual, Online.  
*Received Best Poster Design Award.*
- Cuvín, P.\*+, **Cheng, K.**, Zhou, S., Olechowski, A. 2022. Where to Grow from Here? An Empirical Study of Branching Use in Computer-Aided Design. Poster: Onshape Research Symposium, Virtual, Online.
- Cuvín, P.\*+, **Cheng, K.**, Zhou, S., Olechowski, A. 2022. 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.
- Cheng, K.\***, Olechowski, A. 2021. An Analysis of Collaborative Computer-Aided Design Assembly. Poster: PTC Digital Transformation in Education Summit, Virtual, Online.
- Cheng, K.\***, Olechowski, A. 2021. A Study of Collaborative Computer-Aided Design Assembly. Poster: University of Toronto Undergraduate Engineering Research Day, Toronto, ON.  
*Received Best Poster Award in the Advanced Manufacturing category.*
- Davis, M.\*+, Zhang, X.\*+, **Cheng, K.**, Zhou, S., Olechowski, A. 2021. 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.  
*Received Best Poster Award in the Transdisciplinary Engineering Education & Practices category.*
- Zhang, X.\*+, Davis, M.\*+, **Cheng, K.**, Zhou, S., Olechowski, A. 2021. Challenges of Collaboration with Computer-Aided Design (CAD). Oral presentation: University of Toronto Undergraduate Engineering Research Day, Toronto, ON.

## 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).

### 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

**Python Packages:** Matplotlib; Selenium; Beautiful Soup; SciPy; NumPy; NetworkX

**Other Software:** Overleaf; Qualtrics; SurveyMonkey; Figma; NVivo; Miro; Jupyter Notebook; Dovetail; Camtasia; Zotero

**Languages:** English (fluent); Mandarin (advanced); French (intermediate)