Yuanzhe (Felix) Deng

Department of Mechanical and Industrial Engineering
University of Toronto
Toronto, Canada
yuanzhe.deng@mail.utoronto.ca

Website: felix-deng.github.io
LinkedIn: felix-deng-b845331b3
GitHub: github.com/Felix-Deng
Google Scholar: link to profile

Education

2024– **University of Toronto**, Toronto, Canada

M.A.Sc. in Mechanical and Industrial Engineering

Thesis Topic: Understanding and Tackling the Challenges of Version Control in Modern Computer-Aided Design from a User Perspective

Co-advisors: Prof. Alison Olechowski (Dept. Mechanical and Industrial Engineering) and Prof. Shurui Zhou (Dept. Electrical and Computer Engineering)

2019–24 **University of Toronto**, Toronto, Canada

B.A.Sc. in Mechanical Engineering, *Honours*, CGPA: 3.85/4.0

Minors in Artificial Intelligence Engineering; Robotics and Mechatronics

Certificate in Engineering Business

Undergraduate Thesis: *Towards Bimanual Operation of Magnetically Actuated Surgical Instruments* (supervised by Prof. Eric Diller)

Capstone Project: *The Development of A Multivariate Design Optimization Framework for Aircraft Tires*

Research Experience

2024– **Graduate Research Assistant**, Ready Lab & FORCOLAB, University of Toronto

Fields of research: human-computer interaction, computer-aided design, machine learning

- Conducted a systemic review of version control capabilities in modern CAD
- Developing tools to enable automatic version comparison of CAD models with feature clustering
- Developing machine learning models to automatically recommend next modelling features based on existing CAD models

2023–24 **Undergraduate Research Assistant**, Microrobotics Lab, University of Toronto

Fields of research: surgical robotics, miniaturized robots, magnetically actuated robots

- Designed a magnetically actuated tetherless impact needle for minimally invasive surgery with force magnification using twisting strings
- Designed and completed a first-of-its-kind bimanual operation of magnetically actuated surgical instruments using a single electromagnetic field source

2020–22 **Undergraduate Research Assistant**, Ready Lab, University of Toronto

Fields of research: engineering design, computer-aided design, engineering education

- Conducted small-scaled user experiments to explore the potential of improving collaboration in the engineering design process with multi-user CAD software
- Analyzed large-scale backend CAD analytics of user actions from over 100 teams of designers with statistical models in Python
- Published a self-developed analytical framework for data mining of CAD user behavioural data and performed subsequent research analysis using the framework

Professional Experience

2022–23 **Innovation Engineer Intern**, PTC Inc., Boston, USA (Remote)

- Conducted commercial-scale data mining on backend user analytic data on CAD modelling usage in Onshape, a PTC-owned cloud-based CAD software
- Developed a theoretical framework and deployed full-stack web applications with OAuth integrations and REST API connections to enable a novel model of engineering design education in CAD
- Developed educational resources and technical documentation to support academic research and digital integration with Onshape using the REST API
- Developed digital twins connection between virtual CAD models and physical robotic control systems using the VEX V5 Robotic kit

Awards and Honours

2024 **Best Student Paper Award** (1 out of 400 presented papers), the 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)

2023 **Best Poster Presentation** (top 1 out of 13 presentations), Onshape Research Symposium, PTC Inc.

2023 **Reviewers' Favourite Award** (top 10% of all presented papers), the 24th International Conference on Engineering Design (ICED)

2022 **Third Place**, Consulting, University of Toronto Engineering K[C]ompetition

2020 **Third Place**, Biomedical Engineering Design Competition, University of Toronto

Publications

An up-to-date publication list is available on Google Scholar: https://scholar.google.com/citations?user=NCexN38AAAAJ

Journal Articles

[J3] **Y. Deng**, J. Chen, and A. Olechowski, "What Sets Proficient and Expert Users Apart? Results of a Computer-Aided Design Experiment," *ASME Journal of Mechanical Design*, vol. 146, no. 1, pp. 011401, Jan. 2024, doi: 10.1115/1.4063360.

[J2] A. Olechowski, **Y. Deng**, E. DaMaren, I. Verner, U. Rosen, and M. Mueller, "All's not Fair in CAD: An Investigation of Equity of Contributions to Collaborative Cloud-based Design Projects," *Computer-Aided Design and Applications*, vol. 20, no. 3, pp. 574 - 583, Sep. 2022, doi: 10.14733/cadaps.2023.574-583.

[J1] **Y. Deng**, M. Mueller, C. Rogers, and A. Olechowski, "The multi-user computer-aided design collaborative learning framework," *Advanced Engineering Informatics*, vol. 51, pp. 101446, Jan. 2022, doi: 10.1016/j.aei.2021.101446.

Refereed Conference Proceedings

[C5] **Y. Deng**, M. Roshanfar, H. Mayer, C. He, J. Drake, T. Looi, and E. Diller, "Towards Bimanual Operation of Magnetically Actuated Surgical Instruments," *Proceedings of the 2024 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*, pp. 1295 - 1300, Heidelberg, Germany, Sep. 2024, doi: 10.1109/BioRob60516.2024.10719793. 🏆 **awarded Best Student Paper Award**

[C4] **Y. Deng**, M. Mueller, and M. Shields, "CAD Challenges App: An Informatics Framework for Parametric Modeling Practice and Research Data Collection in Computer-Aided Design," *Proceedings of the ASME 2023 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*, pp. V002T02A046, Boston, Massachusetts, USA, Aug. 2023, doi: 10.1115/DETC2023-114927.

[C3] A.P. Vrolijk, **Y. Deng**, and A. Olechowski, "Connecting design iterations to performance in engineering design," *Proceedings of the Design Society*, vol. 3: ICED23, pp. 1067–1076, Bordeaux, France, Jul. 2023, doi: 10.1017/pds.2023.107. 🏆 **awarded Reviewers' Favourite Award**

[C2] **Y. Deng**, T. Marion, and A. Olechowski, "Does Synchronous Collaboration Improve Collaborative Computer-Aided Design Output: Results From a Large-Scale Competition," *Proceedings of the ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*, pp. V006T06A026, St. Louis, Missouri, USA, Aug. 2022, doi: 10.1115/DETC2022-89731.

[C1] A. Olechowski, **Y. Deng**, E. DaMaren, I. Verner, U. Rosen, and M. Mueller, "All's not Fair in CAD: An Investigation of Equity of Contributions to Collaborative Cloud-based Design Projects," *CAD'22 Proceedings*, pp. 179 - 183, Beijing, China, Jun. 2022, doi: 10.14733/cadconfP.2022.179-183.

Under Review

[1] **Y. Deng**, S. Zhang, K. Cheng, A. Olechowski, and S. Zhou, "Untangling the Timeline: Challenges and Opportunities in Supporting Version Control in Modern Computer-Aided Design," under review for the *ACM on Human-Computer Interaction (CSCW 2025)*.

Grants and Scholarships

2024	**MIE Conference Travel Grant** ($600) Department of Mechanical and Industrial Engineering, University of Toronto
2023	**Undergraduate Student Research Award (USRA)** ($7500) Natural Sciences and Engineering Research Council (NSERC) of Canada
2022	**Chester B. Hamilton Scholarship** ($4749.83) University of Toronto
2022	**J. A. Findlay Scholarships** ($213.41)

University of Toronto

2020 **Undergraduate Summer Research Award** ($5625)
Department of Mechanical and Industrial Engineering, University of Toronto

Teaching

Teaching Assistant, University of Toronto

- **MIE301: Kinematics and Dynamics of Machines**: tutorial TA (2024 Fall)
- **MIE100: Dynamics**: tutorial TA (2025 Winter)

Academic Outreach

Peer-Reviewing

Journals: *Artificial Intelligence Review* (2024)

Volunteering

2025 **Mentor**, *University of Toronto Discovery Program*, Toronto, Canada

2025 **Student volunteer**, *IEEE/ACM International Conference on Software Engineering (ICSE)*, Ottawa, Canada

2025 **Judge**, *Ontario Provincial VEX V5 Robotics Competition Championships*, Markham, Canada

2022 **Planning committee co-chair**, *University of Toronto Undergraduate Engineering Research Day (UnERD)*, Toronto, Canada

Membership

- **Canadian Society of Mechanical Engineeers (CSME)**: student member (2022 - 2025)
- **American Society of Mechanical Engineers (ASME)**: student member (2023, 2025)
- **Institute of Electrical and Electronics Engineers (IEEE)**: graduate student member (2024)
- **IEEE Robotics and Automation Society (RAS)**: graduate student member (2024)

Certifications

2022 Small Remotely Piloted Aircraft System (RPAS) Pilot Certificate – Basic operations

2022 Certified Onshape Associate

2020 Certified SOLIDWORKS Associate in Mechanical Design (CSWA)

Skills

Applications Microsoft Office (Word, PowerPoint, Excel), Photoshop

Design Tools SolidWorks, Onshape, Autodesk Fusion, EAGLE, ANSYS, SketchUp, AutoCAD

Programming Python (Pandas, NumPy, SciPy, NetworkX, PyTorch, Django, BeautifulSoup),

	C/C++, ROS, MATLAB
Computing Tools	Git, SQL, PyQt, LaTeX
Statistics Tools	Looker, Tableau, Minitab
Fabrication	Basic Machine Shop Tools, 3D Printing, PCB Soldering
Languages	English, Mandarin, Cantonese

Last updated: May 6, 2025