YUANZHE (FELIX) DENG

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EDUCATION

M.A.Sc in Mechanical and Industrial Engineering Sept. 2024 - Present
University of Toronto Toronto, Canada

- Thesis topic: *Understanding and Tackling the Challenges of Version Control in Modern Computer-Aided Design from a User Perspective*
- Co-advisors: Dr. Alison Olechowski (Mechanical and Industrial Engineering) and Dr. Shurui Zhou (Electrical and Computer Engineering)
- Relevant courses: *MIE1626*: Data Science Methods and Statistical Learning, *MIE1520*: Learning with Graphs and Sequences, *MIE1621*: Non-Linear Optimization, *MIE1628*: Cloud-Based Data Analytics

B.A.Sc in Mechanical Engineering, *Honours, CGPA: 3.85/4.0* Sept. 2019 - Jun. 2024
University of Toronto Toronto, Canada

- Upper-year focused streams: mechatronics and bioengineering
- Minors: Artificial Intelligence Engineering; Robotics and Mechatronics
- Certificate in Engineering Business
- Thesis: *Towards Bimanual Operation of Magnetically Actuated Surgical Instruments* (supervised by Dr. Eric Diller)
- Capstone project: *The Development of A Multivariate Design Optimization Framework for Aircraft Tires*

RESEARCH EXPERIENCE

Ready Lab & FORCOLAB, University of Toronto Sept. 2024 - Present
Fields of research: human-computer interaction, computer-aided design, version control, machine learning

- Conducted a systemic review of version control capabilities in modern CAD software
- Developing tools for automatic version comparison of CAD models with unsupervised learning
- Developing tools to reverse engineer the modelling sequence of CAD models given its boundary representation through machine learning

Microrobotics Lab, University of Toronto May 2023 - Apr. 2024
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 demonstration on bimanual operation of magnetically actuated surgical instruments using a single electromagnetic field source

Ready Lab, University of Toronto May 2020 - Apr. 2022
Fields of research: collaborative 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 the use of a 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 subsequent research analysis results using the framework through journal and conference papers

PROFESSIONAL EXPERIENCE

Innovation Engineer Intern May 2022 - May 2023
PTC Education & Onshape R&D, PTC Inc. Boston, USA (Remote)

- Conducted commercial-scale data mining on backend user analytic data on CAD modelling usage in Onshape
- 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 enable the advanced use of Onshape for academic research and digital integration with the REST API
- Developed digital twins connection between virtual CAD models and physical robotic control systems using the VEX V5 Robotic kit

PUBLICATIONS

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)*.

[2] A. Olechowski, T. Marion, and **Y. Deng**, "The Impact of Synchronous Collaboration on Team Performance and Design Tasks," Under review for the *Production and Operations Management*.

AWARDS

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

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

Reviewers' Favourite Award (top 10% of all presented papers) Jul. 2023
The 24th International Conference on Engineering Design (ICED)

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

Third Place Mar. 2020
Biomedical Engineering Design Competition, University of Toronto

GRANTS AND SCHOLARSHIPS

MIE Conference Travel Grant **$600**
Department of Mechanical and Industrial Engineering, University of Toronto Sept. 2024

Undergraduate Student Research Award (USRA) **$7500**
Natural Sciences and Engineering Research Council (NSERC) of Canada Apr. 2023

Chester B. Hamilton Scholarship **$4749.83**
University of Toronto Aug. 2022

J. A. Findlay Scholarships **$213.41**
University of Toronto Aug. 2022

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

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

- **Planning Committee Co-chair**, University of Toronto Undergraduate Engineering Research Day (UnERD), Toronto, Canada, Aug. 2022

Membership

- **Canadian Society of Mechanical Engineeers (CSME)**: student member (2022 - 2025)

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

CERTIFICATION

- **Small Remotely Piloted Aircraft System (RPAS) Pilot Certificate – Basic operations** 2022
- **Certified Onshape Associate** 2022
- **Certified SOLIDWORKS Associate in Mechanical Design (CSWA)** 2020

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: February 22, 2025