

QIANYING MAO

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EDUCATION

University of Waterloo

Waterloo, ON

PhD., Microfluidics, Mechanical & Mechatronics Engineering

Apr. 2028

Advisor: Professor Carolyn Ren

Average: 96.75%

University of Guelph

Guelph, ON

B.Sc., Biomedical Engineering

Apr. 2023

Graduated Honors with Distinction

Average: 84%

RESEARCH EXPERIENCE

University of Waterloo

Waterloo, ON

PhD Student, Mechanical & Mechatronics Engineering

Sept. 2025 – Present

University of Waterloo

Waterloo, ON

Masters Student, Mechanical & Mechatronics Engineering

Mar. 2024 – Sept. 2025

- Published paper on Microwave Detection of Anastomotic Leakage under the guidance of Professor Carolyn Ren, resulting in offer for accelerated PhD study.

Harbin Institute of Technology

Harbin, HL

Undergraduate Research Assistant, Materials Science & Engineering

Apr. 2019 – Jun. 2019

- Under the guidance of Professor Yang Jianqun, built and analyzed results of TCAD Silvaco simulation of a 4H-SiC JBS transistor for graduate paper.
- Presented on the Modulation of Radiation Resistance by Hydrogen Soaking and Annealing on Bipolar Transistors in the 3rd International Conference on Radiation Effects of Electronic Devices (ICREED-2019).

AWARDS AND HONOURS

Canada Graduate Research Scholarship – Doctoral Program

Awarded May 2026

Natural Sciences and Engineering Research Council of Canada

- Valued at \$40,000 per year, for 3 years, up to a maximum of \$120k.
- Represents top graduate student status at the National level.

Ontario Graduate Research Scholarship – Doctoral Program

Awarded May 2026

- Valued at \$5,000 per term, for 3 terms, up to a maximum of \$15,000.
- Represents top graduate student status at the Provincial level.

Nanofellowship

Awarded September 2025

- Valued at \$5,000 per term, for two terms, up to a maximum of \$10k.
- Awarded to top graduate students, recognizing exceptional academic performance and potential research in the field of nanotechnology.

PUBLICATIONS

1. M. Shafiei-Darabi, **Q. Mao**, W. Cui et al., “Development of a Microwave-Based Biosensor for the Monitoring of Anastomotic Leakage Through the Detection of Amylase in Drainage Fluid” *Biosensors and Bioelectronics*, Jan. 2025
<https://doi.org/10.1016/j.bios.2025.117990>
2. *In Submission* - Esanullah et al., incl. **Q. Mao** “Physical Drivers of Bacterial Taxis in Planetary Surface Conditions” *Nature Applied Physics Letters*, June 2026
3. *In Editing* - **Q. Mao**, M. Shafiei-Darabi et al., “Leak Monitoring After Gastrointestinal Surgery” *Nature Reviews Gastroenterology & Hepatology*, Feb. 2025
4. *Conference Paper* - M. Shafiei-Darabi, Q. Mao, W. Cui et al., “1. In-line Microwave Biosensor for Monitoring Anastomotic Leakage Through Amylase Content in Post-operative Peritoneal Drainage Fluid After Colorectal Anastomosis Surgery”, 28th International Conference on Miniaturized Systems for Chemistry and Life Sciences - Micro-Total Analysis Systems (μ TAS 2024)

PRESENTATIONS

1. Modulation of Radiation Resistance by Hydrogen Soaking, 3rd International Conference on Radiation Effects of Electronic Devices (ICREED-2019).
2. Microwave Biosensor for Amylase Detection in Drainage Fluid to Monitor Anastomotic Leakage, (BioTEC-2025)

POSTERS

1. In-line Microwave Biosensor for Monitoring Anastomotic Leakage Through Amylase Content in Post-operative Peritoneal Drainage Fluid After Colorectal Anastomosis Surgery, 28th International Conference on Miniaturized Systems for Chemistry and Life Sciences - Micro-Total Analysis Systems (μ TAS 2024)
2. Microwave Aptamer Sensors (μ WAS) for Multi-Biomarker Detection, Waterloo Institute for Nanotechnology (WIN Day 2026).

PATENTS

1. A SENSOR FOR SELECTIVE AMYLASE DETECTION - Weijia: 25%, Alice: 25%, Maziar: 25%, Matt: 7%, Robert: 4%, Carolyn: 14%

TEACHING EXPERIENCE

University of Waterloo

TA, MTE 123 – *Electrical Engineering for Mechanical Engineers*

TA, MTE 121 - *Digital Computation*

TA, MTE 120 – *Circuits*

Waterloo, ON

Winter 2024, Spring 2024

Fall 2024, Fall 2025

PROFESSIONAL EXPERIENCE

FluidAI*Research Assistant, R&D*Kitchener, ON
Mar. 2024 – Present

- Optimized surface coating preparation and conditions and performed experiments, detecting amylase concentrations comparable to established laboratory methods.
- Designed improved coating jig for sensor fabrication using additive manufacturing processes.
- Designed, Fabricated and tested starch-microwave biosensor for Detection of Anastomotic Leakage. This device is currently under application for a patent. Developed surface coating procedure and performed optimization experiments, detecting amylase concentrations in solution comparable to laboratory methods.

Rapid Novor*Project Coordinator, Proteomics*Kitchener, ON
Jul. 2023 – May. 2024

- Oversaw end-to-end project workflow and acted as subject matter expert for antibody sequencing.
- Coordinated 7-8 antibody sequencing projects weekly, acting as the primary link between Clients, Account Managers, and Operations.

Royal Canin*Maintenance and Reliability Engineering, Reliability*Puslinch, ON
May. 2022 – May 2023

Administrator for the implementation of novel QFS Change Control software

- Collaborated with Subject Matter Experts within the software development team to gain insights into the essential functionalities of the software within a short period of weeks.
- Developed all SOPs, technical manuals, and training materials associated with the update according to GDPs. Produced 8 documents, 2 powerpoints, and 2 training videos.
- Rolled out new software factory-wide through multiple sessions of 2-week presentations. Trained and coached ~75 associates to ensure smooth implementation of software.
- Creation of missing overdue SOPs and maintenance of secure document repository.
- Updated factory-wide CMMS data architecture for equipment hierarchy (20000+ items).

Royal Canin*Industrial Engineering, Operations*Puslinch, ON
Jan. 2021 – Sept. 2021

- (Daily) Created and maintained Excel databases for key operational performance parameters including: Efficiency trending and loss data, waste tracking and trending, asset bottleneck and capacity analysis.
- Employed Power BI to link SQL datasets and create an impactful data visualization simulation explaining the most prevalent reason codes for machine breakdowns, expediting continual improvement efforts.
- Delivered key update to factory core internal system for data trending and collection.
- Scheduled meetings with international and local stakeholders to discuss appropriate additions and modifications.
- Acted as key leader to validate and provide feedback on internal tests during following months

DARE Foods*Process Engineering, Operations*Milton, ON
May. 2020 – Aug. 2020

- Prepared detailed research study tracking plant wastewater streams for Dare Foods. Efficiently processed large data sets using Excel with high degree of efficiency, and prepared and delivered presentation for visualization to stakeholders.
- Discovered opportunity to improve an engineering drawing log made in Excel, developed a Python script to automate process leading to better efficiency.

EXTRACURRICULARS

Camino Wellbeing + Mental Health

Waterloo, ON

Volunteer Tutor, Junior Design Competition

Sept. 2025 - Present

- 1:1 Supporting Children & youth with academics in community center environment.
- Approximate commitment: 2 hours per week.

Ontario Engineering Competition (OEC) 2024

Waterloo, ON

Judge, Junior Design Competition

Nov. 2024

- Consultant for decision of finalists for Junior Design Competition, OEC 2024.
- Assessed presentations with other panel judges to rank contestants on best optimization of design solutions.

Guelph Engineering Society

Guelph, ON

Secretary & Resource Manager

Sep. 2021 – Apr. 2023

- Took detailed minutes during weekly meetings and presented highlights, important dates, and assisted with event planning for Guelph Engineering Society.
- Maintained Engsoc office and assisted students with questions regarding upcoming engineering events, administrative concerns, and general queries.
- In charge of merchandise sales and merchandise stocking for Engsoc store.

Professional Development Conference (PDC) 2020

Guelph, ON

VP Marketing & Volunteer Coordinator

Feb. 2020

- In charge of promotion of conference on social media pages, as well as school website updates.
- Coordinated signup, hiring, and direction of volunteers during conference.

Ontario Engineering Competition (OEC) 2020

Guelph, ON

Communications Volunteer

Jan. 2020

- Welcomed competitors to OEC, assisted in answering questions at an information desk and assisted in coordination of events.

Guelph Engineering Competition (GEC) 2019

Guelph, ON

Competitor, Junior Design

Jan. 2019

- Competed in Junior Design Engineering Competition to build a glider out of limited materials capable of traversing the longest distance in a straight path.
- Our team's glider took second place in the competition, traversing a path of 10m.

Guelph Engineering Competition (OEC) 2018

Guelph, ON

Competitor, Junior Design

Jan. 2018

- Competed in Junior Design Engineering Competition to build a catapult in a limited timeframe to launch a ping pong ball over a barrier.