

# JERRY (QILONG) CHENG

☎ 6474483661    📄 Google Scholar    ✉ qilong.cheng@mail.utoronto.ca    🔗 LinkedIn    🐙 GitHub

## Education

University of Toronto, M.Eng. in Computer Engineering

Sep. 2023 – Aug. 2025

Major in Robotics

GPA: 3.89/4.00

University of Toronto, B.A.Sc in Mechanical Engineering

Aug. 2017 – Jun. 2023

Major in Mechanical Engineering, Minor in Robotics & Business

Graduated with Honour, Major GPA: 3.92/4.00

## Research Interest

My research interests lie in developing unified policies that integrate **visual perception**, **loco-manipulation**, and **dexterous manipulation** for robotic systems. I am also a strong believer that "those who are truly serious about software should design their own hardware".

## Publications

- [1] E. Wise, P. Kaveti, **Q. Cheng**, W. Wang, H. Singh, J. Kelly, D. M. Rosen, and M. Giamou, "A Certifiably Correct Algorithm for Generalized Robot-World and Hand-Eye Calibration," *The International Journal of Robotics Research* arXiv:2507.23045, 2025.
- [2] B. Huang, S. Ren, Y. Luo, **Q. Cheng**, H. Cai, Y. Sang, M. Sousa, P. H. Dietz, and D. Wigdor, "VibraForge: A Scalable Prototyping Toolkit For Creating Spatialized Vibrotactile Feedback Systems" *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI)*, 2024.
- [3] B. Huang, Z. Wang, **Q. Cheng**, S. Ren, H. Cai, A. Alvarez Valdivia, K. Mahadevan, and D. Wigdor, "AeroHaptix: A Wearable Vibrotactile Feedback System for Enhancing Collision Avoidance in UAV Teleoperation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 4, pp. 1234–1245, 2024.
- [4] **Q. Cheng**, E. Wise, and J. Kelly, "Extrinsic Calibration of 2D Millimetre-Wavelength Radar Pairs Using Ego-Velocity Estimates," in *Proc. IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, pp. 123–129, 2023.
- [5] E. Wise, **Q. Cheng**, and J. Kelly, "Spatiotemporal Calibration of 3D Millimetre-Wavelength Radar-Camera Pairs," *IEEE Transactions on Robotics (TRO)*, vol. 38, no. 12, pp. 5678–5685, 2022.
- [6] M. He, **Q. Cheng**, and G. Qi, "Weakly Supervised Semantic and Attentive Data Mixing Augmentation for Fine-Grained Visual Categorization," *IEEE Access*, vol. 10, pp. 35814–35823, 2022.
- [7] J. Chen, **Q. Cheng**, and M. Han, "Generative Design for Self-Balancing Unicycle Robot in Additive Manufacturing," in *Proc. International Conference on Automation Control, Algorithm, and Intelligent Bionics (ACAIB)*, Qingdao, China, 2022, vol. 12253, pp. 122530A.

## Research Experience

### Biomechatronics and Intelligent Robotics Lab

Sep. 2025 – Now

Research Fellowship - **Prof. Hao Su**

New York University

- Leveraged reinforcement learning with a musculoskeletal simulation and mixture-of-experts framework for hip exoskeleton control, enabling device-agnostic and user-adaptive assistance policies transferable across multiple walking gaits.
- Proposed and developed a benchmark framework to systematically compare human musculoskeletal locomotion with humanoid robot controllers, analyzing gait kinematics, torque profiles, and energy efficiency across walking, running, and stair climbing.

### Space and Terrestrial Autonomous Robotic Systems Lab

Sep. 2021 - Aug. 2025

Robotics Researcher - **Prof. Jonathan Kelly**

University of Toronto Institute for Aerospace Studies

- Developed a state estimation method for 2D mm-wave radar calibration using ego-velocity and Levenberg-Marquardt for accurate yaw and translation without overlapping views.
- Proposed a targetless spatiotemporal calibration for 3D radar-camera systems using continuous-time B-splines and nonlinear least squares via Ceres.
- Validated methods via simulation and real-world driving tests, outperforming state-of-the-art. **View Video**

### Dynamic Graphic Project Lab

Sep. 2022 – Aug. 2025

HCI Researcher - **Prof. Daniel Wigdor**

University of Toronto Computer Science Faculty

- Developed VibraForge, an open-source toolkit for rapid prototyping of spatialized vibrotactile systems with high-bandwidth, low-latency control over 128 actuators.
- Developed AeroHaptix, a wearable haptic system for drone teleoperation using MultiCBF control algorithm for collision avoidance to reduce UAV collisions and operator workload. **View Videos**

### M.Eng Research Project: Desktop-Level Cinema Robot Arm

Sep. 2024 – Aug. 2025

M.Eng Researcher – Supervisors: **Prof. Matthew Mackay** and **Prof. Ali Bereyhi**

University of Toronto Robotics Institute

- Designed and fabricated **IRIS**, a low-cost 6-DOF 3D-printed cinema robot arm with modular Quasi-Direct Drives, timing-belt/differential transmission, and carbon-fiber linkages; integrated full ROS-based kinematic and control stack for hardware-simulation compatibility.
- Developed a vision-based **imitation learning pipeline** for reactive path planning and dynamic obstacle avoidance, incorporating real-time depth sensing and policy deployment on both xArm Lite 6 and IRIS. **View Videos**

### Neural Robotics Lab

Sep. 2023 – Aug. 2024

Robotics Researcher - **Prof. Brokoslaw Laschowski**

KITE Research Institute

- Integrated monocular vision for adaptive exoskeleton locomotion with a Virtual Holonomic Constraint nonlinear control for stair walking gait adaptation.
- Developed a monocular depth estimation pipeline using a fine-tuned Metric3D model with enhanced normal maps for staircase segmentation and staircase parameter extractions.

## Industry Experience

---

### GouPals Inc.

Aug. 2024 – April 2025

*Cofounder/CEO*

*Toronto*

- Built a peer-to-peer social logistics platform with SwiftUI, React, and Firebase for real-time tracking, secure authentication, and personalized recommendations.
- Launched an iOS MVP with GPS tracking, push notifications, and an optimized backend for efficient traveler pairing and item tracking.
- Led a team of 3 co-founders in product design, marketing, and finance for China-America-Europe trade logistics.

### ONE800 Inc.

Apr. 2023 – Dec. 2023

*Software Engineer/Machine Learning Engineer*

*Toronto*

- Collaborated with a 10-member engineering team to develop an Apple-certified iMessage integration tool, enhancing accessibility for LLMs (e.g., ChatGPT) for older demographics.
- Built an LLM-powered multilingual system for audio transcription, translation, generation, and **OCR** integrated with LLMs.
- Developed a pipeline using Langchains and Redis for text-based chatbot services with short- and long-term memory capabilities.

### China State Shipbuilding Corporation

Sep. 2020 – Apr. 2021

*Mechanical Engineer Intern*

*Shanghai*

- Contributed to HVAC design for China's first in-house 12-deck cruise ship using CADMATIC and Bentley.
- Patented a high-efficiency spray nozzle and fire pipeline system; CFD tests showed 80% water savings and 67% faster fire response. [View Patent](#)

### Autodesk Inc.

Sep. 2019 - Jun. 2020

*Student Ambassador*

*Toronto*

- Founded and presided over the Fusion Design Association Club, cultivating expertise in generative design and advanced automated manufacturing tools among members.
- Mentored and trained 30+ students in leveraging state-of-the-art design and manufacturing tools like Generative Design, CAM, and CAD tools.
- Initiated and organized an annual 3D-printed glider competition, taking the lead in the design and implementation of a sophisticated glider launching system.

## Technical Skills

---

**Software & Tools:** C, C++, Python, SQL, PyTorch, NumPy, SciPy, MATLAB, ROS, Linux, MuJoCo, Isaac Sim, IsaacLab, DART, Docker

**Hardware & Robots:** Raspberry Pi, Nvidia Jetson Nano, Arduino, ESP32, STM32, Microsoft Kinect, Intel RealSense, xArm, Ufactory, Turtlebot, PND Adam Robot, Booster Robot