Jerry (Qilong) Cheng

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Education

New York University, Ph.D. in Mechanical Engineering — **Sep. 2025 – Aug. 2026**
Major in Robotics - Reinforcement Learning, Humanoid Locomotion, Manipulation — *GPA: 4.00/4.00*

University of Toronto, M.Eng. in Computer Engineering — **Sep. 2023 – Aug. 2025**
Major in Robotics — *GPA: 3.92/4.00*

University of Toronto, B.A.Sc in Mechanical Engineering — **Aug. 2017 – Jun. 2023**
Major in Mechanical Engineering, Minor in Robotics & Business — *Senior GPA: 3.94/4.00*

Research Interest

I aim to integrate **Universal Manipulation Interface–scale perception** with **torque-level reinforcement learning** to handle contact, embodiment, and whole-body loco-manipulation in real-world settings.
I am also a strong believer that *"those who are truly serious about software should design their own hardware"*.

Publications

[1] Evolution of Humanoid Locomotion Control
Y. Gu, G. Shi, F. Shi, I. Chang, Y. Wang, **Q. Cheng**, Z. Olkin, I. Lopez-Sanchez, Y. Feng, J. Zhang, A. D. Ames, H. Su, and K. Sreenath
Science Robotics (Under Review), 2025

[2] A Certifiably Correct Algorithm for Generalized Robot–World and Hand–Eye Calibration
E. Wise, P. Kaveti, **Q. Cheng**, W. Wang, H. Singh, J. Kelly, D. M. Rosen, and M. Giamou
International Journal of Robotics Research (Under Review), 2025

[3] VibraForge: A Scalable Prototyping Toolkit for Creating Spatialized Vibrotactile Feedback Systems
B. Huang, S. Ren, Y. Luo, **Q. Cheng**, H. Cai, Y. Sang, M. Sousa, P. H. Dietz, and D. Wigdor
ACM CHI Conference on Human Factors in Computing Systems (CHI), 2024

[4] AeroHaptix: A Wearable Vibrotactile Feedback System for Enhancing Collision Avoidance in UAV Teleoperation
B. Huang, Z. Wang, **Q. Cheng**, S. Ren, H. Cai, A. A. Valdivia, K. Mahadevan, and D. Wigdor
IEEE Robotics and Automation Letters (RA-L), 2024

[5] Extrinsic Calibration of 2D Millimetre-Wavelength Radar Pairs Using Ego-Velocity Estimates
Q. Cheng, E. Wise, and J. Kelly
IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), 2023

[6] Spatiotemporal Calibration of 3D Millimetre-Wavelength Radar–Camera Pairs
E. Wise, **Q. Cheng**, and J. Kelly
IEEE Transactions on Robotics (TRO), 2022

[7] Weakly Supervised Semantic and Attentive Data Mixing Augmentation for Fine-Grained Visual Categorization
M. He, **Q. Cheng**, and G. Qi
IEEE Access, 2022

[8] Generative Design for Self-Balancing Unicycle Robot in Additive Manufacturing
J. Chen, **Q. Cheng**, and M. Han
International Conference on Automation Control, Algorithm, and Intelligent Bionics (ACAIB), 2022

Research Experience

New York University, Tandon School of Engineering — **Sep. 2025 – Aug. 2026**
Research Fellowship — Prof. Ludovic Righetti and Prof. Katsuo Kurabayashi — *New York University*

- **Topics:** musculoskeletal simulation, RL-based exoskeleton control, adaptive locomotion assistance, humanoid–robot gait benchmarking.
- **Key Contributions:** developing MoE-based RL controllers for user-adaptive hip exoskeletons; constructing benchmarking framework comparing human biomechanics with humanoid locomotion policies across gaits.

Space and Terrestrial Autonomous Robotic Systems Lab — **Sep. 2021 – Aug. 2025**
Robotics Researcher — Prof. Jonathan Kelly — *University of Toronto Institute for Aerospace Studies*

- **Topics:** sensor calibration, extrinsic estimation, certifiable optimization, continuous-time trajectory estimation.
- **Key Contributions:** developed a globally optimal robot–world & hand–eye calibration method [1]; created a 2D radar ego-velocity–based calibration pipeline [4] (video); proposed targetless 3D radar–camera spatiotemporal calibration using B-splines [5].

Dynamic Graphics Project Lab **Sep. 2022 – Aug. 2025**
HCI Researcher — Prof. Daniel Wigdor *University of Toronto, Department of Computer Science*

- **Topics:** haptics, teleoperation, multisensory interfaces, wearable feedback systems, CBF-based safety control.
- **Key Contributions:** built VibraForge, a 128-actuator high-bandwidth spatialized vibrotactile system [2] (video); developed AeroHaptix, a wearable haptic teleoperation system with multi-CBF UAV collision avoidance [3] (video).

Desktop-Level Cinema Robot Arm (IRIS) **Sep. 2024 – Aug. 2025**
M.Eng Researcher — Prof. Matthew Mackay and Prof. Ali Bereyhi *University of Toronto Robotics Institute*

- **Topics:** robot-arm design, quasi-direct-drive actuation, differential transmissions, ROS-based kinematics/control, imitation learning for motion planning.
- **Key Contributions:** designed and built IRIS, a modular low-cost 6-DOF cinema robot; implemented ROS motion stack with hardware–sim integration; developed IL pipeline enabling reactive obstacle-aware path planning deployed on IRIS and xArm Lite 6 (video).

Neural Robotics Lab **Sep. 2023 – Aug. 2024**
Robotics Researcher — Prof. Brokoslaw Laschowski *KITE Research Institute*

- **Topics:** adaptive exoskeleton control, VHC locomotion, monocular depth estimation, stair perception.
- **Key Contributions:** integrated monocular perception with VHC-based control for adaptive stair-walking; implemented Metric3D-based depth pipeline with enhanced normal-map reasoning for stair geometry extraction.

Industry Experience

GouPals Inc. **Aug. 2024 – Apr. 2025**
Cofounder / CEO *Toronto*

- Founded GouPals, a peer-to-peer logistics platform that connects international travelers with buyers needing overseas goods.
- Managed all business operations (legal setup, accounting, finances, investor outreach) while leading product and strategy.
- Built and launched the iOS MVP in under one month using SwiftUI, React, and Firebase with real-time tracking and scalable backend systems.

ONE800 Inc. **Apr. 2023 – Dec. 2023**
Software Engineer / ML Engineer *Toronto*

- Built an Apple-approved iMessage integration that enabled seamless LLM access for older demographics, including text, image, and memo support.
- Developed multilingual LLM pipelines (transcription, translation, OCR, generation) and a LangChain + Redis memory system for persistent conversational agents.

China State Shipbuilding Corporation **Sep. 2020 – Apr. 2021**
Mechanical Engineer Intern *Shanghai*

- Designed HVAC subsystems for China's first domestically built 12-deck cruise ship using CADMATIC and Bentley.
- Patented a high-efficiency spray-nozzle fire pipeline system achieving 80% water savings (patent).

Autodesk Inc. **Sep. 2019 – Jun. 2020**
Student Ambassador *Toronto*

- Founded and led the Fusion Design Association, training students in Fusion 360 (CAD/CAM/Generative Design) and modern manufacturing workflows.
- Mentored 30+ students and organized an annual 3D-printed glider competition with a custom engineered launch system.

Academic Service

Reviewer: IEEE ICRA, IEEE/RSJ IROS, IEEE AIM, IEEE BioRob, Nature Publishing Group journals. (Since 2023)
Teaching Assistant: MIE443 – Mechatronics Systems (University of Toronto), 2023 & 2024.

Technical Skills

Software: Python, C++, MATLAB, ROS (1/2), PyTorch, NumPy, OpenCV, Ceres Solver, MuJoCo, Isaac Sim, IsaacLab, Linux, Docker
Hardware: Intel RealSense, Microsoft Kinect, mmWave Radar, Raspberry Pi, NVIDIA Jetson Nano, STM32/ESP32, Arduino, BLDC/FOC Actuators, xArm Lite6, TurtleBot2, PND Adam Robot, Booster Robot