

# Jerry (Qilong) Cheng

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## Education

### New York University, Ph.D. in Mechanical Engineering

Major in Robotics - Reinforcement Learning, Dexterous Manipulation, Robot Learning

Sep. 2025 – Aug. 2026

GPA: 4.00/4.00

### University of Toronto, M.Eng. in Computer Engineering

Major in Robotics

Sep. 2023 – Aug. 2025

GPA: 3.92/4.00

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

Major in Mechanical Engineering, Minor in Robotics & Business

Aug. 2017 – Jun. 2023

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*, 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

### Machine in Motion Lab [🔗](#)

Ph.D. Research Fellowship — [Prof. Ludovic Righetti](#) and [Prof. Katsuo Kurabayashi](#)

Sep. 2025 – Now

New York University, Tandon School of Engineering

- **Research Topics:** RL-based control, robot learning, sim-to-real, dexterous manipulation, diffusion model, musculoskeletal simulation.
- **Key Contributions:** 1) Developing unified diffusion–RL policies for fine-grained dexterous hand manipulation in precision assembly and contact-rich tasks. 2) Developing Mixture-of-Experts (MoE) RL controllers for user-adaptive hip exoskeletons.

### Space and Terrestrial Autonomous Robotic Systems Lab [🔗](#)

Robotics Researcher — [Prof. Jonathan Kelly](#)

Sep. 2021 – Aug. 2025

University of Toronto Institute for Aerospace Studies

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

### Dynamic Graphics Project Lab [🔗](#)

HCI Researcher — [Prof. Daniel Wigdor](#)

Sep. 2022 – Aug. 2025

University of Toronto, Department of Computer Science

- **Topics:** haptics, teleoperation, multisensory interfaces, wearable haptic feedback systems, CBF-based safety control.

- **Key Contributions:** 1) Built VibraForge, a 128-actuator high-bandwidth spatialized vibrotactile system [2] (video). 2) Developed AeroHaptix, a wearable haptic teleoperation system with multi-CBF UAV collision avoidance [3] (video).

### Desktop-Level Cinema Robot Arm (IRIS)

M.Eng Researcher — Prof. Matthew Mackay and Prof. Ali Beryhi

Sep. 2024 – Aug. 2025

University of Toronto Robotics Institute

- **Topics:** robot-arm mechanical design, impedance control, ROS framework, vision-based path planning via imitation learning.
- **Key Contributions:** 1) Designed and built IRIS, a modular low-cost 6-DOF cinema robot arm. 2) Implemented ROS stack with hardware-sim integration. 3) Developed IL pipeline enabling reactive obstacle-aware path planning deployed on IRIS and xArm Lite 6 (video).

### Neural Robotics Lab

Robotics Researcher — Prof. Brokoslaw Laschowski

Sep. 2023 – Aug. 2024

KITE Research Institute

- **Topics:** adaptive exoskeleton control, VHC locomotion, monocular depth estimation, stair perception.
- **Key Contributions:** 1) Integrated monocular perception with VHC-based control for adaptive stair-walking. 2) Implemented Metric3D-based depth pipeline with enhanced normal-map reasoning for stair geometry extraction.

## Industry Experience

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### GouPals Inc.

Cofounder / CEO

Aug. 2024 – Apr. 2025

Toronto

- Founded GouPals, a peer-to-peer international logistics platform connecting travelers with buyers seeking overseas goods; led design, engineering, marketing and investor outreach.
- Built and launched an iOS MVP in under two month using Swift, React, and Firebase, delivering real-time order tracking with a scalable backend architecture.

### ONE800 Inc.

Software Engineer / ML Engineer

Apr. 2023 – Dec. 2023

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

Mechanical Engineer Intern

Sep. 2020 – Apr. 2021

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.

Student Ambassador

Sep. 2019 – Jun. 2020

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

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**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

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**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