TANG JIAWEI

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Educations

Hong Kong University of Science and Technology **Sept. 2022 – Jul. 2025**
PhD in Electronic & Computer Engineering

Hong Kong University of Science and Technology **Sept. 2019 – Aug. 2021**
MPhil in Electronic & Computer Engineering

Hong Kong Polytechnic University **Sept. 2014 – Jun. 2019**
BEng(Hons) in Electronic & Information Engineering

Working Experiences

Noah's Ark Lab, Huawei **Jun. 2023 - Nov. 2023**
Research Intern *Hong Kong, CN*

- Designed geometric tracking control and learning-based balancing control algorithms for wheeled-legged robot.
- Developed a Python simulation platform and implemented the cascade control framework in simulation and real robots.
- Published one first-author paper on geometric control in IEEE Robotics & Automation Letters (RAL).
- Recorded weekly paper sharing on AI, control, optimization and robotics.

Autonomous Driving Solution, Huawei **Oct. 2021 - Aug. 2022**
Software Engineer *Shanghai, CN*

- Served as a C++ software engineer and contributed to Huawei's self-developed navigation engine.
- Maintained and developed new features for HD-map navigation; Implemented data structure for cloud-based map.
- Recorded daily on-road test results from test engineers; coordinated software engineers from different teams to debug.

Robotics Institute, Carnegie Mellon University **Jun. 2018 - Aug. 2018**
Research Intern *Pittsburgh, US*

- Developed an efficient extrinsic calibration toolbox for camera and 3D LiDAR with a user-friendly GUI.
- Presented the work in the CMU RISS poster section; Report available in pp.140-144 of [RISS Journal].

Publication

Submitted Papers

[4] Yuqiang Jin, Wen-An Zhang, **Jiawei Tang**, Hu Sun, Ling Shi, "A Nonlinear Filter for Pose Estimation Based on Fast Unscented Transform on Lie Groups." Submitted to *IEEE Robotics & Automation Letters (RAL).*

[3] **Jiawei Tang**, Nachuan Yang, Shuang Wu, Shilei Li, Dawei Shi, and Ling Shi, "Geometric Tracking Control for Differential Wheeled Robots with Unknown Kinematic Parameters: a Data-driven LQR Approach ." Submitted to *IEEE Control Systems Letters (L-CSS).*

[2] **Jiawei Tang**, Shuang Wu, Bo Lan, Yahui Dong, Yuqiang Jin, Guangjian Tian, Wen-An Zhang, Ling Shi, "GMPC: Geometric Model Predictive Control for Wheeled Mobile Robot Trajectory Tracking." Submitted to *IEEE Robotics & Automation Letters (RAL).*

[1] Pengyu Wang, **Jiawei Tang**, Hi Wang Lin, Fan Zhang, Chaoqun Wang, Jiankun Wang, Max Q.-H Meng, and Ling Shi, "MINER-RRT: A Hierarchical and Fast Trajectory Planning Framework in 3D Cluttered Environments." Submitted to *IEEE Transactions on Automation Science and Engineering (TASE).*

Journal Papers

[2] Yuxing Zhong, **Jiawei Tang**, Nachuan Yang, Dawei Shi, Ling Shi, "Event-triggered Sensor Scheduling for Remote State Estimation with Error-Detecting Code." *IEEE Control Systems Letters (L-CSS)*, 2023.

[1] Nachuan Yang, **Jiawei Tang**, Yik Ben Wong, Yuzhe Li, and Ling Shi, "Linear Quadratic Control of Positive Systems: A ProjectionBased Approach." *IEEE Transactions on Automatic Control(TAC)*, 2022.

Conference Papers

[4] **Jiawei Tang**, Yuxing Zhong, Pengyu Wang, Xingzhou Chen, Shuang Wu, Ling Shi, "Direct Shooting Method for Second-order Systems: An Improved Transcription Method." *European Control Conference (ECC)*, 2024.

[3] **Jiawei Tang**, Yik Ben Wong, Zhengyu Fu, Nachuan Yang, Sil Kwong Tse, Winnie Leung, Ling Shi, "Motion Planning for Mobile Robots with Noise: A Probabilistic MPC Approach." *Asian Control Conference*, 2022.

[2] Nachuan Yang, **Jiawei Tang**, Yuzhe Li, Ling Shi, "LQR Design for Discrete-Time Positive Systems: A First-Order Method", *IEEE Conference on Decision and Control*, 2022.

[1] Sil Kwong Tse, Yik Ben Wong, **Jiawei Tang**, Peihu Duan, Suk Wai Winnie Leung, Ling Shi, "Relative State Formation-based Warehouse Multi-robot Collaborative Parcel Moving", *ICPS*, 2021.

Research Works

Data-driven Geometric Optimal Tracking Control | *RL, Optimal Control, Python* **Sept. 2023 - Mar. 2024**

- Investigated Lie theory and formulated model-based optimal Lie-algebra tracking control for wheeled mobile robots.
- Developed Q-learning algorithm using Bellman's optimal principle for tracking control with unknown system model.
- Completed two first-author papers and submitted them to the top-tier control and robotics journals (*L-CSS* and *RAL*).

Trajectory Optimization for high-order Systems | *Optimization, Numerical Analysis* **Dec. 2022 - Sept. 2023**

- Indicated the contradictory dynamics issues of existing numerical optimization methods for high-order systems.
- Developed modified direct transcription schemes and proved the superior theoretical performance of proposed methods.
- Completed two first-author papers and submitted them to the top-tier control journal (*L-CSS*) and conference (*ECC*).

Advanced Motion Control for Mobile Robots | *Robotics, Planning, C++* **Sept. 2022 - Mar. 2023**

- Led a five-person team to build a mobile robotic platform with perception, planning, and control systems from scratch.
- Designed the overall system and developed various control, planning, and state estimation algorithms.
- Conducted various simulations and physical experiments; Successfully demonstrated automatic navigation at HKUST.

Multi-robot Testbed | *Optimization, State Estimation, C++* **Jan. 2020 - Mar. 2021**

- Cooperated with two MPhils to build a physical multi-robot testbed and a ROS-based simulation platform from scratch.
- Implemented various algorithms, including formation control, path planning with MPC, and extended Kalman filter.
- Completed and published one paper as the first author at *ASCC* and one as the third author at *ICPS*.

Teaching

- ELEC1100 Introduction to Electro-Robot Design, HKUST Spring 2024
- ELEC5650: Introduction to Networked Sensing, Estimation and Control, HKUST Spring 2023
- ELEC1100 Introduction to Electro-Robot Design (Online Mode), HKUST Spring 2020

Awards

- Postgraduate Studentship, HKUST 2022.9-present
- Postgraduate Studentship, HKUST 2019.9-2021.8
- UG Summer Research Abroad Sponsorship, PolyU 2018.6
- Mingxi Outstanding Youth Award 2017.11
- Hall Residences with Outstanding Contribution (2 of 250) 2017.7
- Second Runner-up Award of Robotic Challenge 2016, PolyU 2016.8
- HKSAR Government Scholarship Fund - Reaching Out Award 2016.6
- Best Sem GPA Award; Dean's List Honor; International Student Ambassador Scheme Outreaching Award

Others

Programming: C++, Python, MATLAB **Language**: Fluent in English, Mandarin and Cantonese