Yihuai Zhang

Doctor of Philosophy
in Intelligent Transportation
The Hong Kong University of Science and
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RESEARCH INTERESTS

Theory: Boundary control of distribute parameter systems, stochastic **partial differential equations(PDEs)**, theoretical-guaranteed machine learning methods(**neural operators**), learning-based control for dynamical systems.

Applications: Intelligent transportation systems, traffic flow control on macroscopic levels.

EDUCATION

The Hong Kong University of Science and Technology(Guangzhou)   **Sep 2022 – Now**
Ph.D. in Intelligent Transportation   *GPA 4.1/4.3*

South China University of Technology   **Sep 2019 – June 2022**
M.S. in Vehicle Engineering   *Average score 88/100*

Southwest University   **Sep 2015 – June 2019**
B.Eng in Vehicle Engineering   *Average score 86/100*

PUBLICATIONS

Journal Papers

Yihuai Zhang, Huan Yu, Jean Auriol, Mike Pereira. "Mean-Square Exponential Stabilization of Mixed-Autonomy Traffic PDE System." **Automatica**, 2024, 170: 111859.

Yihuai Zhang, Ruiguo Zhong, and Huan Yu. "Mitigating Stop-and-Go Traffic Congestion with Operator Learning." **Transportation Research Part C: Emerging Technologies**, 2025, 170: 104928.

Yihuai Zhang, Jean, Auriol, Huan Yu. "Operator Learning for Robust Stabilization of Linear Markov-Jumping Hyperbolic PDEs", **IEEE Transactions on Automatic Control (TAC)**, Under Review, 2025.

Yihuai Zhang, Huan Yu. "Event-Triggered Control of Congested Mixed-Autonomy Traffic", **IEEE Transactions on Intelligent Transportation Systems (T-ITS)**, Submitted, 2025.

Yihuai Zhang, et al. "Low-speed Vehicle Path-Tracking Algorithm Based on Model Predictive Control Using QPKWIK Solver." **Journal of Dynamic Systems, Measurement, and Control** 143.12 (2021): 121003.

Conference Papers

Yihuai Zhang, Ruiguo Zhong, and Huan Yu. "Neural Operators for Boundary Stabilization of Stop-and-Go Traffic." 6th Annual Learning for Dynamics & Control Conference (L4DC). PMLR, 2024.

Yihuai Zhang, Jean Auriol, and Huan Yu. "Robust Boundary Stabilization of Stochastic Hyperbolic PDEs." 2024 American Control Conference (ACC). IEEE, 2024.

Yihuai Zhang, and Huan Yu. "Event-triggered Boundary Control of Mixed-autonomy Traffic." 2024 IEEE 63rd Conference on Decision and Control (CDC), IEEE, 2024.

INVITED TALKS

Event-triggered Boundary Control of Mixed-autonomy Traffic, *Oral*   **2024**
2024 Conference on Decision and Control (CDC 2024), Milan, Italy

Neural Operators for Boundary Stabilization of Stop-and-Go Traffic, *Poster*   **2024**
6th Annual Learning for Dynamics & Control Conference, Oxford, United Kingdom

Robust Boundary Stabilization of Stochastic Hyperbolic PDEs, *Oral*   **2024**
2024 American Control Conference (ACC), Toronto, Canada

Mean-Square Exponential Stabilization of Mixed-Autonomy Traffic PDE System, *Oral*   **2024**
Joint International Conference on "Automation-Intelligence-Safety" & "International Symposium on Autonomous Systems" (ICAIS&ISAS), Chongqing, China

Impact of Connected Automated Vehicle Platooning On Mixed Lane-Free Traffic, *Poster*   **2023**
The 27th International Conference of Hong Kong Society for Transportation Studies (HKSTS), Hong Kong, China

TEACHING EXPERIENCE

INTR 6000G: Traffic Flow Theory | *Teaching assistant*   **Fall 2023**
Intelligent Transportation Thrust, HKUST(GZ)
Led office hours and gave feedback and comments for weekly readings and in-class discussions. Contributed to the design and grading of assignments.

INTR 5300: Nonlinear Control System | *Teaching assistant*   **Spring 2024**
Intelligent Transportation Thrust, HKUST(GZ)
Led weekly sections and office hours. Contributed to the design and grading of weekly assignments as well as the final exam.

MENTORSHIP

Ziming Wang (Mphil student, HKUST(GZ))   **Aug 2024 - Now**
Project: Event-Triggered Control of Multi-Agent Systems (Preparing submission to T-ITS)

Kaijing Lv (Visiting PhD student, Beijing Institute of Technology)   **Mar 2024 - Sep 2024**
Project: Neural Operators for Adaptive Control of Freeway Traffic (Paper submitted to Automatica)

Ruiguo Zhong (PhD Student, HKUST(GZ))   **Sep 2023 - Jan 2024**
Project: Mitigating Stop-and-Go Traffic Congestion with Operator Learning (Paper published on TRC)

ACADEMIC SERVICES

Served as the reviewers of

Peer-reviewed journals: Automatica, System & Control Letters, IEEE Transactions on Intelligent Transportation Systems (T-ITS), IEEE Transactions on Cybernetics, International Journal Of Adaptive Control And Signal Processing, Engineering Applications of Artificial Intelligence, IEEE Transactions on Vehicular Technology

Peer-reviewed conferences: American Control Conference (ACC), Conference on Decision and Control (CDC), Learning for Dynamics and Control Conference (L4DC), IFAC Workshop on Control of Systems Governed by Partial Differential Equations (CPDE)

TECHNICAL SKILLS

English Proficiency: IELTS (7.0), CET-6 (508)

Programming Languages: Python, MATLAB

Tools and Frameworks: PyTorch, Tensorflow, Linux

AWARDS & SCHOLARSHIPS

- Special Prize in Chongqing Division of the 15th "Challenge Cup" National College Students Extracurricular Academic Science and Technology Competition.
- Second Prize of the 4th Gaoming District Creative Innovation and Entrepreneurship Competition.
- Outstanding student leaders, Outstanding Student Union Cadre.
- First class award of SWU(3x), Tanglixin award, first class award of SCUT(3x).
- Men's Basketball League Champion of South China University of Technology, men's basketball league champion of Southwest University